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AERONAUTICS DIVISION:
STRATEGIC AND BUDGET PLAN
KENT STATE UNIVERSITY
KENT, OHIO

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I. Introduction

Established in 1910 as Kent Normal School by a statutory act of the State of Ohio, the Kent State University System has evolved into the second largest state university system in Ohio, the "birthplace of aviation" and the largest state university in Northeast Ohio. A year after the university was founded, Kent was firmly placed in the annals of aviation history when it was designated as one of the stopover cities in America's first cross country flight by Calbraith P. Rodgers, a historic venture that was comparable to NASA's successful Apollo 11 moon shot in 1969. Conclusion of the National Air Races for the Bendix Trophy in Cleveland, during the third decade of airplane flight, also underscored Northeast Ohio's rather large place in aviation. Today, the airspace over Northeast Ohio boasts the busiest air traffic corridor in the entire world. Aviation at Kent State University is therefore natural, appropriate, and in a place of its own.

Aviation started at Kent State University as a flight training program in 1947, not as an academic degree program. From this early foundation as a pilot training program, a baccalaureate degree program in Aerospace Technology was introduced in 1967. The Aerospace Technology degree program has evolved into an Aeronautics degree program with four sub major areas of specialization, namely: Aeronautical Studies, Aeronautical Systems Engineering Technology, Aviation Management, and Flight Technology.

This report is a strategic and budget plan designed to improve the Aeronautics Program and ensure the continued viability of its sub major in Flight Technology. As such, it comprehensively addresses the entire Aeronautics Program through analytical foci on enrollment, curriculum, facilities and equipment, faculty, budget, and program enhancement or strategic goals.

VISION

Consonant with its "place in aviation," the Aeronautics Program at Kent State University has a vision born of a fundamental mandate to serve as the leading academic program in aviation at the tertiary level in Ohio. As such, the Aeronautics Program strives to advance aviation by providing an outstanding education in aviation that produces a cadre of highly competent professionals to operate the National Airspace System in the 21st Century and beyond.

This vision encompasses a broad-based education in aviation, the empirical sciences and liberal arts, which would render Aeronautics graduates highly functional and effective in professional aviation within the United States and on the world stage. Through partnership with professional aviation, Aeronautics graduates from Kent State University would thus remain on the leading edge of innovative advancements in aviation throughout this century and the next.

MISSION

As an academic unit in the School of Technology, the Aeronautics Division has a mission to work in concert with business, government and industry to enhance technological literacy, education and training in aviation that is essential to the socioeconomic well-being and workforce development needs of Ohio and the nation. Specifically, the Aeronautics Program's mission is fourfold: (1) to prepare students to function effectively as leaders and professionals in the highly dynamic field of aviation; (2) to prepare students for professional positions in flight operations; (3) to prepare students for administrative, managerial, operational, and technical positions in aviation; (4) to provide students with the academic background and preparation necessary for successful graduate and advanced studies in aviation and allied academic disciplines.

II. Enrollment

At present, student enrollment (as academic majors) in the Aeronautics Division falls into one of four sub major areas of concentration under *Aeronautics* and one of four sub major areas of concentration under *Aerospace Technology*. The Aeronautics Division is therefore responsible for two academic majors and eight sub majors. Of the eight sub majors offered by the Aeronautics Division, Flight Technology has the largest number of academic majors and may erroneously be used interchangeably with the entire Aeronautics Division. **With appropriate emphasis on the other academic sub major areas of concentration offered by the Aeronautics Division, the interchangeable and erroneous use of Flight Technology to represent the entire Aeronautics Division shall cease.**

As indicated in Table E-1 below, student admission into sub majors under Aerospace Technology effectively ceased in fall 1998. The number of students majoring in *Aerospace Technology* has since declined to 27 in fall 2001, and should exit the system within the next three years. The discussion in this document shall therefore refer to Aeronautics, not *Aerospace Technology*. Aeronautics is therefore the collective term for sub majors in Aeronautical Studies, Aeronautical Systems Engineering Technology, Aviation Management, and Flight Technology. In the preceding five years, the number of students with academic majors in the Division of Aeronautics has steadily increased from 174 to 293, an average increase of 24 annually. Aeronautics therefore represents the largest academic major in the School of Technology at Kent Campus

Table E-1. Five-Year Enrollment by Major/Sub Major in Aeronautics 1997 – 2001

CODE	AERONAUTICS MAJOR AND SUB MAJOR	Fall 1997	Fall 1998	Fall 1999	Fall 2000	Fall 2001
AERN						
	(Undeclared)	0	2	25	23	24
AAA	Aeronautical Systems Engineering Technology	0	1	15	19	23
BAA	Flight Technology	0	8	89	136	160
CAA	Aviation Management	0	6	14	23	25
DAA	Aeronautical Studies	0	11	18	19	34
AERO						
	(Undeclared)	22	24	13	8	1
AAA	Aerospace Engineering Technology	28	23	11	8	3
BAA	Aerospace Flight Technology	114	108	64	33	23
CAA	Aerospace Manufacturing Management Technology	4	7	3	0	0
DBA	Airway Computer Science	6	3	1	1	0
	TOTAL ENROLLMENT	**174**	**193**	**253**	**270**	**293**

annual rate of growth 10-17 %

Though respectably modest, the number of academic majors in the Aeronautics Division is an incomplete and perhaps inaccurate metric to properly represent enrollment in academic programs offered by the Aeronautics Division. Since Aeronautics courses are required by no other academic program and therefore taken chiefly by Aeronautics majors, the number of students enrolled in Aeronautics courses provides additional detail to create a more comprehensive picture of enrollment in the Aeronautics Division. It is therefore to enrollment in Aeronautics courses that this document turns for a more comprehensive picture of enrollment in the Aeronautics Division.

HISTORICAL ENROLLMENT DATA

The number of students enrolled in Aeronautics courses offered in the Spring, Summer, and Fall semesters of each year from 1980 to 2001 are presented in Table E-2. A more detailed breakdown of enrollment statistics in the individual courses that make up each semester's and the annual totals presented in Table E-2 are presented as appendix I of this document. Course enrollment in Aeronautics shows a fairly steady climb from 44 students in 1980 to an apex of 1,568 student enrollments in 1989. Enrollment in Aeronautics courses then suffered a gradual but equally steady decline from 1,568 in 1989 to 722 in 1996. This decline has been followed by a slow upswing in course enrollment from 722 in 1996 to 974 in 2001.

Table E-2. Enrollment in Aeronautics Courses 1980 – 2001

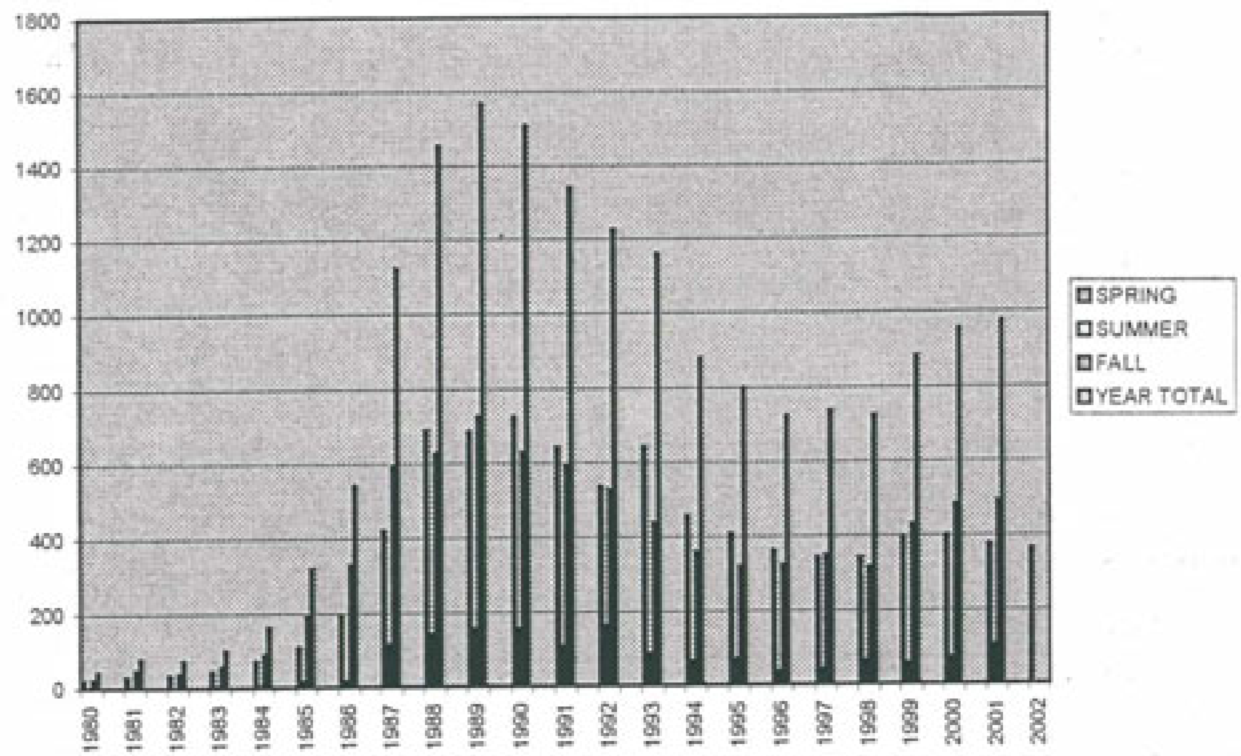
67- 80 40 Enrollment

YEAR	SPRING	SUMMER	FALL	YEAR TOTAL	ANNUAL CHANGE	Percent change
1980	21		23	44		+10
1981	30		48	78	34	+56
1982	34		39	73	-5	-07
1983	46		57	103	30	+41
1984	71	3	90	164	61	+59
1985	109	16	194	319	155	+95
1986	193	18	329	540	221	+69
1987	421	114	590	1125	585	+208
1988	688	140	626	1454	329	+29
1989	687	156	725	1568	114	+08
1990	725	155	628	1508	-60	-04
1991	641	107	593	1341	-167	-11
1992	535	165	526	1226	-115	-09
1993	641	83	437	1161	-65	-05
1994	456	65	358	879	-282	-24
1995	409	70	320	799	-80	-09
1996	361	37	324	722	-77	-10
1997	343	44	349	736	14	+02
1998	341	64	317	722	-14	-02
1999	397	57	429	883	161	+22
2000	400	71	482	953	70	+08
2001	376	106	492	974	21	+02

The course enrollment data in Table E-2 indicates that total enrollment has varied from a low of 44 in 1980 to a high of 1568 nine years later in 1989. The range for the number of students enrolled in Aeronautics courses over the period presented is therefore 1524. The annual change in the number of students enrolled in Aeronautics courses have varied from a decline of –282 between 1993 and 1994 to an increase of 585 between 1987 and 1988. The range of annual change in the number of students enrolled in Aeronautics courses therefore stands at 867 between 1980 and 2001. In the analytically more important period of the last five years, annual change in the number of students enrolled in Aeronautics courses has swung from a decline of –14 between 1997 and 1998 to an increase of 161 between 1998 and 1999. The range of annual change in the number of students enrolled in Aeronautics within the last five years therefore stands at 175.

Graphical representation of the same data in Figure 1 shows the cyclical nature of course enrollment in Aeronautics more clearly. From the data in Table E-2 and its graphical representation in Figure E-1, enrollment in Aeronautics courses appears to be in another upswing that may easily see total course enrollment exceed a thousand students in 2002.

Figure E-1. Graphical Representation of Enrollment in Aeronautics Courses 1980 – 2001



Over the course of the period presented, it appears quite obvious that the degree of variance in the total number of students enrolled in Aeronautics courses is considerably excessive and abnormal for an academic program that has existed for several decades before 1980. Anecdotal information on student enrollment in Aeronautics courses before 1980 appears to be congruent with the pattern of variation that is evident in the preceding enrollment data for 1980 – 2001. The highly significant differences and wide swings in the number of students enrolled in Aeronautics courses indicate a considerable degree of program instability in Aeronautics that is not ideal for an academic program. Such instability is inimical to effective planning and efficient deployment of program resources to accomplish programmatic objectives effectively and fulfill the mission of the Aeronautics Division. **The Aeronautics Division must receive effective and consistent institutional support from the university to ensure its successful evolution into a stable academic program that systematically fulfills its mission in a strategic fashion for the wider benefit of the university and the nation in the field of professional aviation.**

Commercial airlines[1] constitute the chief engine that drives employment into professional positions in commercial aviation in the United States. Airlines employed 621,000 people in 1998 at an average annual compensation of nearly $64,000 while spending $38 billion on supplies and services. Average expenditure on each of the 4,800 odd jet aircraft fleet of the US members of the Air Transport Association (ATA) for maintenance is $2 million per year. Most large airports[2] are supported entirely by airlines and their customers who generate taxes and fees of $18.8 billion annually. With firm orders of $61.7 billion worth of new aircraft by the US members of ATA alone, airlines clearly play a major role in driving employment within the manufacturing and production sector of aviation as well (ATA, 2001). Airline spending in 1998 is portrayed in Table E-3 below. It is therefore to the airlines that this document turns to for an analysis of the possible impact of the unprecedented attack on civil aviation that occurred on 11th September 2001.

Table E-3. Airline Spending in the 12 months ended 31st December 1998

Expenditure Category	**Expense (in billions)**
Labour Compensation	**$ 33.1**
Materials Purchased	16.5
Services Purchased	21.5
Capital Expenses	**17.2**
Other Expenses	20.8
Total Direct Spending	109.1
Total Indirect Spending	109.1
Total Induced Spending	54.6
Total GDP Contribution	$ 272.8
Airline Spending as a % of GDP	3.2%

Source: Air Transport Association 2001

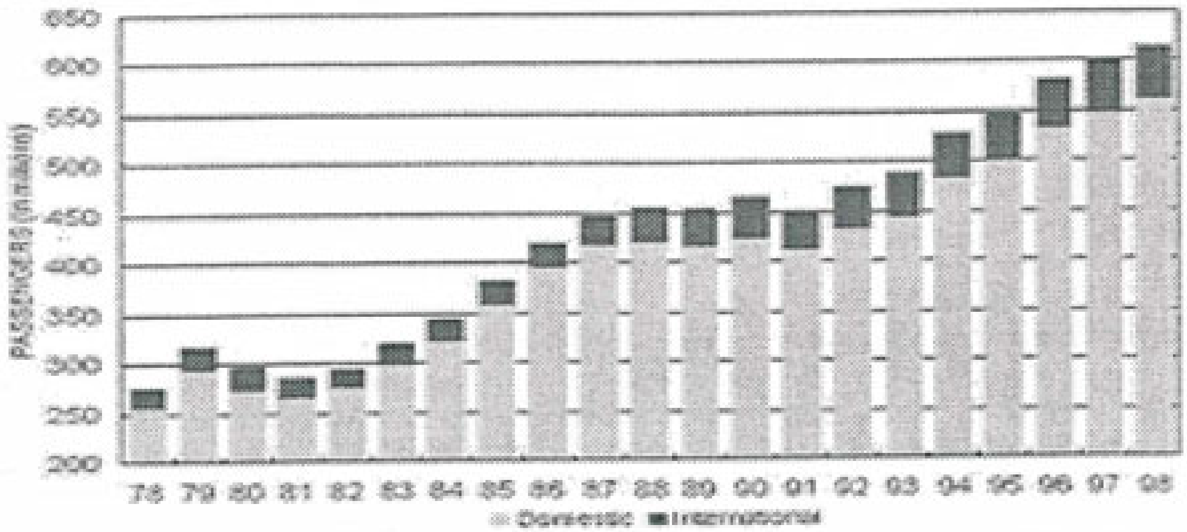
Airline employment is in turn driven by passenger demand and growth in GDP. With an average annual growth rate of 4 percent in passenger demand since deregulation in 1978, airlines have enjoyed a 100% increase in the number of passengers since 1980. Figure E-2 is a graphical presentation of domestic and international revenue passenger enplanements by the commercial

[1] Commercial airlines comprise common air carriers classified as major, national, and regional airlines. By definition, major airlines are air carriers with annual revenues exceeding $1 billion. National airlines have annual revenues of between $1billion and $100 million, and Regional airlines have annual revenues of less than $100 million. The list of major airlines typically comprises Alaska, American, America West, American Trans Air, Continental, Delta, Fedex, Hawaiian, Northwest, Southwest, United, UPS and US Airways (Vose and Kane, 1996; Wells, 2000).

[2] Large airports are defined under statute (49 U.S.C. sections 47109a and 47114f) as having more than 0.25 percent of total scheduled passenger enplanements in a given year in the United States (Nettey, 2000:5).

airlines in the first twenty years after deregulation. It shows a fairly steady and quite impressive rate of growth throughout the twenty-year period after deregulation.

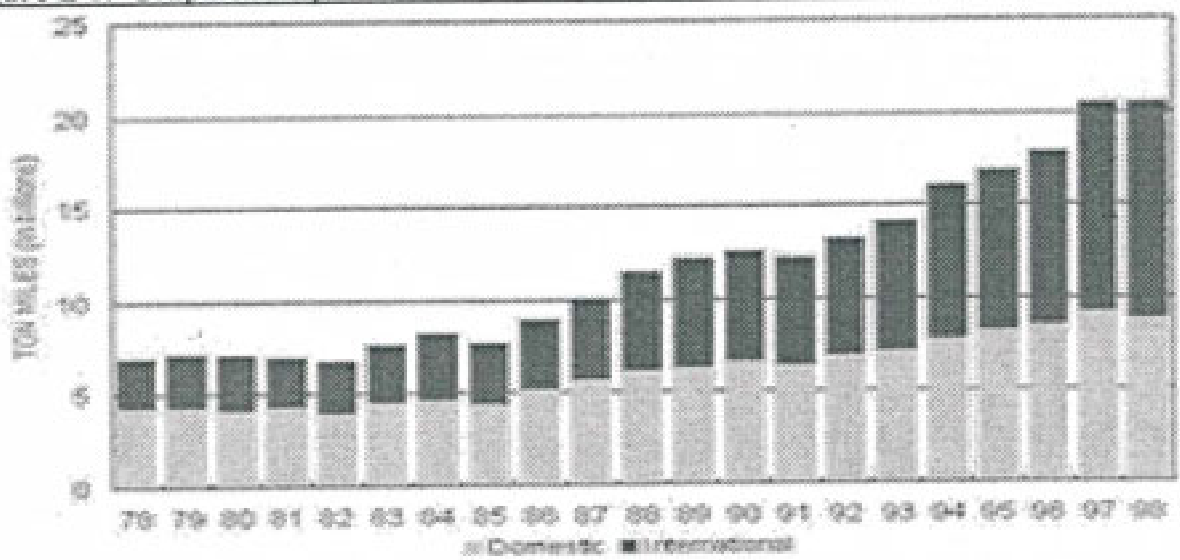
Figure E-2. Graphical Representation of Revenue Passenger Enplanements 1978 – 1998



Source: Air Transport Association 2001

Declines in revenue passenger enplanements caused by the severe economic recession of 1980–1982 and the Gulf War in 1991 were overcome by growth in subsequent years to sustain the impressive annual growth rate of four percent. Air Cargo services have grown at an even faster average annual rate of six percent due to an increase in mail and freight shipments that have been fueled by growth in demand for both domestic and international express package services.

Figure E-3. Graphical Representation of Air Cargo Ton Miles (in billions) 1978 – 1998



Source: Air Transport Association 2001

The effect of the tragic events of 11th September on civil aviation was very severe in several respects. In addition to the unprecedented scale of loss and destruction, it also resulted in an equally unprecedented ground stop that altered the balance between commerce and security in civil aviation, especially in airline service. In the interest of security, airline service in the entire nation was halted for days, and flights out of such airports as Reagan National Airport in Washington DC and nearby College Park Airport remained halted indefinitely till security concerns were effectively addressed. Worse yet, the attack on 11th September occurred on the heels of weakening demand for airline service in a soft economy that was skirting recession.

Traffic statistics for September 2001 are not particularly illustrative for the analytical purposes here because of the ground stop ordered by the FAA on 11th September so this document would look to traffic statistics in the subsequent months that enjoyed uninterrupted airline service. It is worth indicating, however, that the airlines made valiant attempts to generate and sustain demand through significantly discounted air fares that resulted in an 18.7 percent decline in domestic airfares, average airfares of $118.54, and a decline of 34.2 percent in passenger enplanements in September 2001 (ATA, 2001). The decline in enplanements subsequently improved from 34.2 percent to 23 percent in October and 19.8 percent in November 2001. The average declines in airfares also improved from 19.2 percent in October to 16 percent in November 2001.

Table E-4. Comparison of Airline Traffic Statistics: November 2001 and November 2000

	November		
Scheduled Services*	**2001**	**2000**	**Change**
SYSTEM (Domestic and international service)			
Passenger Enplanements (000)	38,741	48,311	(19.8%)
Revenue Passenger Miles (000)	41,584,381	52,179,189	(20.3%)
Available Seat Miles (000)	62,003,142	73,571,230	(15.7%)
Load Factor (%)	67.1	70.9	(3.9)

*Alaska, Aloha, American, American Trans Air, America West, Continental, Continental Micronesia, Delta, Hawaiian, Midwest Express, Northwest, Southwest, TWA, United, US Airways.

Note: Data allocated geographically as defined by DOT Form 41 reporting requirements.

Source: Air Transport Association 2001

Table E-4 shows the compound effect of soft economic demand caused by the weakening economy and the 11th September attack on demand for airline services in November 2001. Revenue passenger enplanements declined by 19.8 percent from 48.311 million passengers in November 2000 to 38.741 million passengers a year later. A corollary decline of 20.3 percent occurred in revenue passenger miles between November 2000 and November 2001. Primarily as a result of the announced layoffs presented in Table E-5 and reduction in the number of flights by airlines, available seat miles declined by 15.7 percent from 73.571 billion in November 2000 to 62 billion in November 2001. More disturbing was the 3.9 percent decline in load factor[3] from 70.9 percent in November 2000 to 67.1 percent in 2001. The 3.9 percent decline in load factor between November 2000 and November 2001 constitutes proof that in addition to a diminution in the number of flights offered by the air carriers, there was also a system wide decrease in the number of fare paying passengers on the reduced number of flights. Anecdotal evidence and preliminary news reports had suggested that the reduced number of flights available in the aftermath of the attack on 11th September were full during the traditional Thanksgiving holiday traveling season.

In addition to airfare reductions to generate demand, airlines also announced layoffs to stem operating losses and shore up investor confidence in airline securities on the security markets after 11th September 2001. Airline layoffs announced during that period varied from two percent by Delta to 24 percent by US Airways for a system wide average layoff of 14 percent or 80,300 employees. As indicated in Table E-5, Alaska and Southwest Airlines announced no layoffs.

Table E-5. Announced Layoffs by Airlines in the Aftermath of 11th September 2001

Airline	Total Workforce	Layoffs	Percent
Alaska	11,000	-	-
American	138,000	20,000	14
America West	13,900	2,000	14
American Trans Air	7,700	1,500	19
Atlas	1,400	200	15
Continental	56,000	8,500	15
Delta	83,500	2,000	2
Hawaiian	3,500	400	12
Midwest Express	3,000	450	15
Northwest	53,800	9,000	17
Southwest	31,100	-	-
United	101,500	20,000	20
US Airways	46,700	11,000	24
Others	16,400	5,200	32
TOTAL	567,800	80,300	14

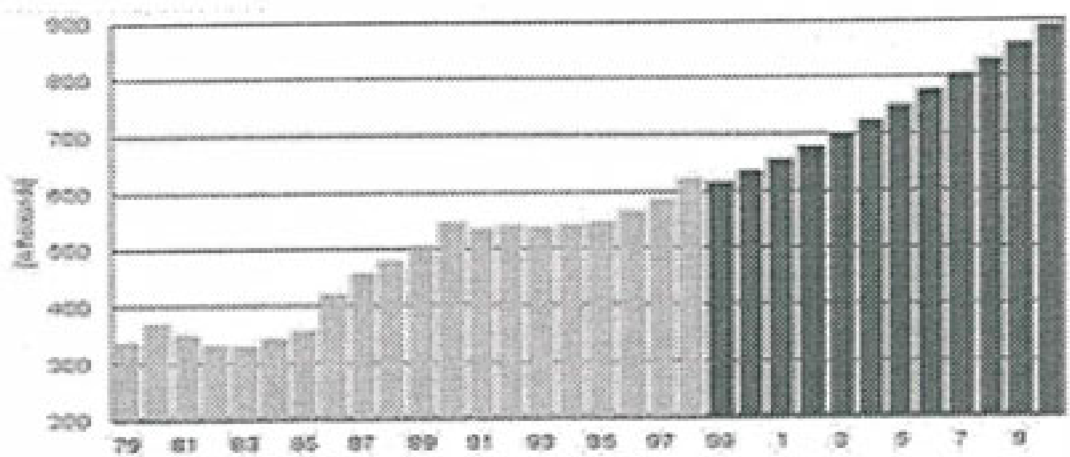
Source: Air Transport Association 2001

In addition to the announced airline layoffs presented in the above table, layoffs and furloughs occurred in several sectors of the transportation and tourism industries that enjoy a symbiotic relationship with airline service. Considering the compound effect of the devastating 11th September attack and the economic recession on public demand for airline service, announced system wide layoffs of 14 percent is considered to be rather encouraging by industry analysts and experts. In addition, significant difficulties and inconvenience imposed by new security measures in commercial airline service did not cause system wide demand to collapse, as had been feared and predicted. In a perverse sense, the tragic events of 11th September have actually demonstrated how indispensable commercial airline service has become to the American and global economies.

[3] Load Factor is the primary economic statistic for determining the profitability of each airline flight. It is obtained by dividing revenue passenger miles (RPM) by available seat miles (ASM). In effect, it measures the number of airplane seats occupied by fare paying passengers on a given flight. Break-even load factor generally varies between 55– 65%.

Several airlines recalled some of the laid off and furloughed employees to handle the 40 million passengers who were expected to travel over the three week winter holidays at the end of 2001. The traditional post holiday slump in late January–February 2002 and job actions by unionized workers at several airlines, especially United Airlines, may continue to obfuscate the true extent of economic recovery by the major airlines and affect system wide employment growth in aviation through spring 2002. In spite of the obfuscating effect of the post holiday slump and job actions by unionized airline workers, a positive growth trend in airline service and airline employment is expected to occur through 2010 as shown below in Figure E-4. In the near term, the positive growth trend in airline service and employment is also expected to eventually overcome the effect of the slump in airline employment that occurred in the aftermath of 11th September 2001.

Figure E-4. Graph of Actual and Forecasted Number of Airline Employees 1979–2009

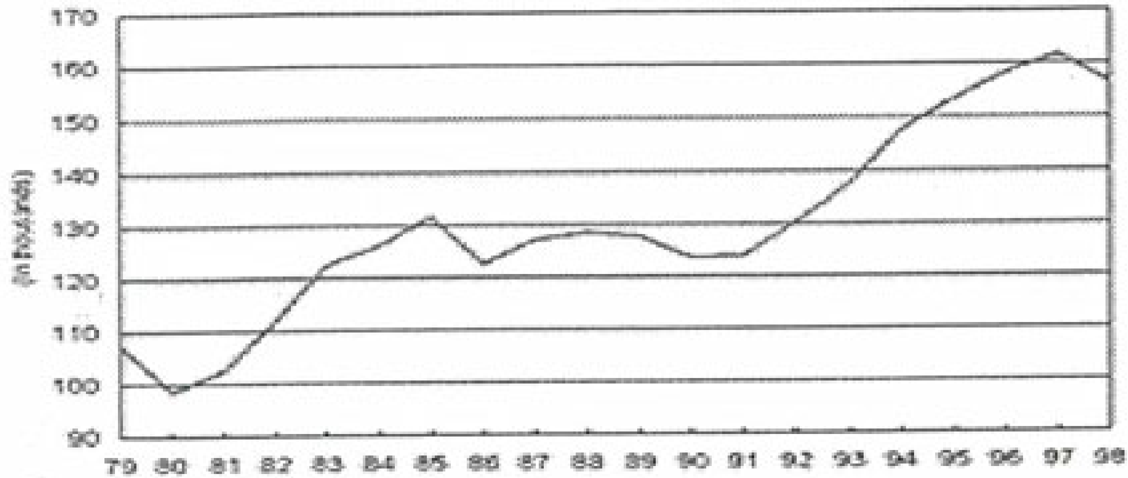


Source: Air Transport Association 2001

With a workforce that grew nearly four percent in 2000, airlines have one of the fastest rates of employment growth as contrasted with the 2.9 percent growth rate of all private industries in the same period. This fast rate of employment growth translates into a need for an average of about 45,000 people to fill airline-created jobs every year. Of that number, some 30,000 people are hired to replace resigning and retiring employees each year. Growth in passenger services and shipper volume accounts for the remainder of 15,000 employees each year (ATA, 2001).

It is rather important to note that automation and increased use of computers by the airlines have also contributed towards significant increases in employee productivity over the post deregulation period from 1979 to 1998. After an initial decline in employee productivity in the chaotic aftermath of deregulation, employee productivity started a fairly steady average climb after 1980 as indicated in Figure E-5 on the following page. In addition to automation and computerization, airplane size, aircraft engine improvements and innovative management, have combined with employee initiative to increase productivity by an average of 3 percent each year since 1978. From figures E-4 and E-5, total employment by the airlines is expected to exceed 860,000 people by 2010 and improvements in employee productivity are also expected to continue as well.

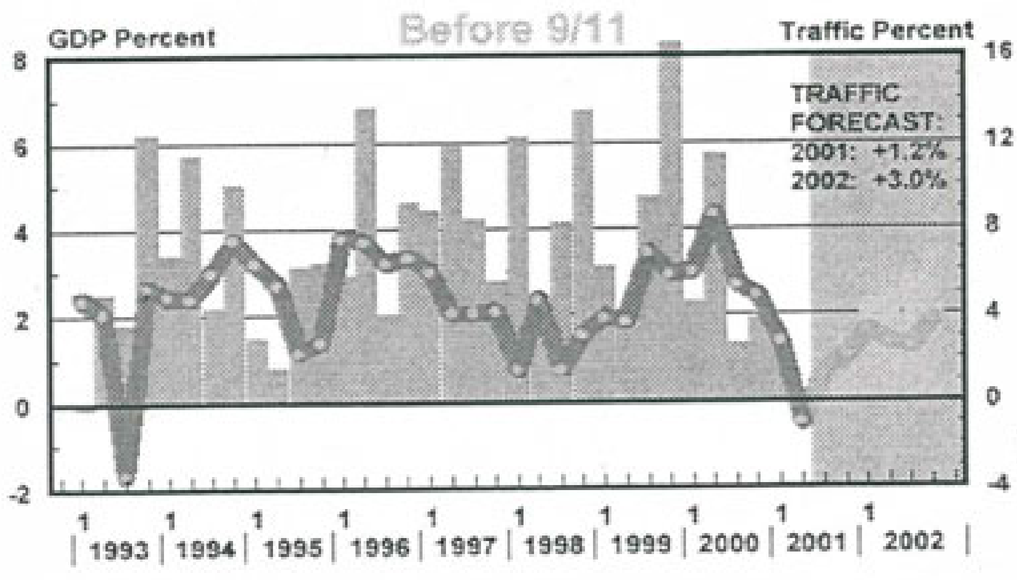
Figure E-5. Graph of Airline Employee Productivity 1979–1998



Source: Air Transport Association 2001

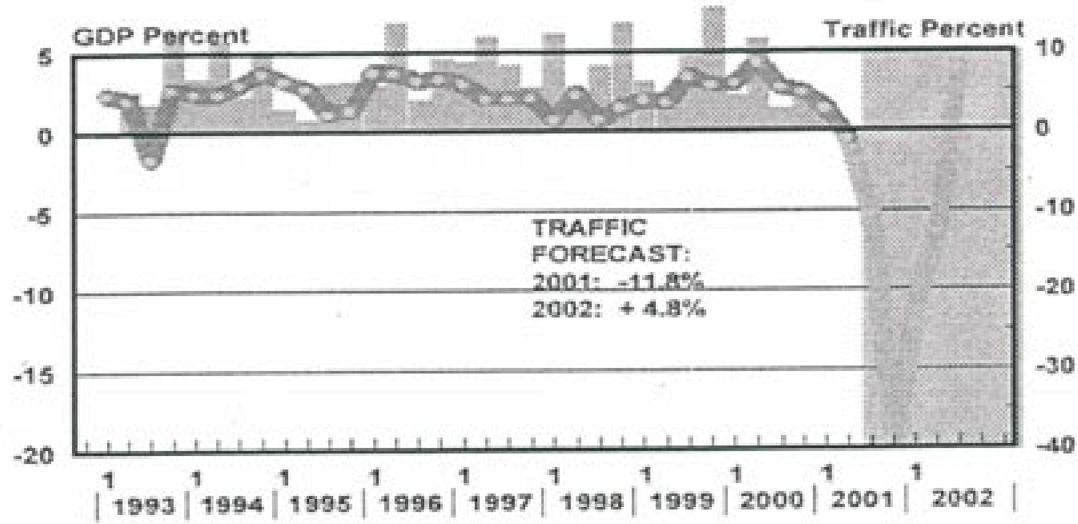
The need for an average of 45,000 new employees by the airlines each year has occurred against a broader background of significant increases in employee productivity over the twenty year period after enactment of the Airline Deregulation Act of 1978. In classical economic terms, significant increase in employee productivity results in a diminution in the number of employees needed by a given industry. In airline service, however, significant gains in employee productivity have occurred simultaneously with increases in the number of airline employees, largely because of increased demand and a growing market for airline services. This speaks well of the consistency of employment growth in commercial airline service. The relationship between traffic growth and GDP are presented in Figures E-6 and E-7 for scenarios before and after 11th September 2001.

Figure E-6. Traffic Growth Compared to GDP: 2001 and 2002 (Before 11th September)



Source: Air Transport Association 2001

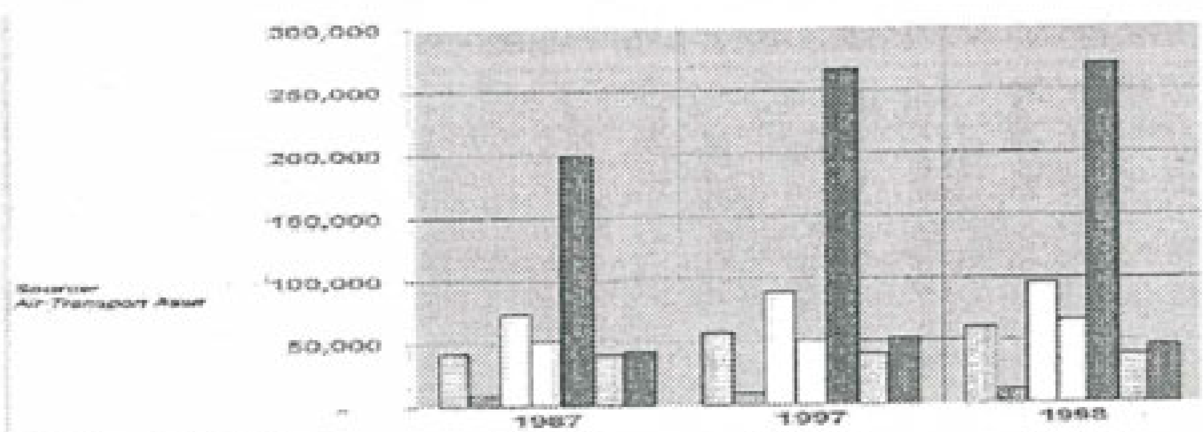
Figure E-6. Traffic Growth Compared to GDP: 2001 and 2002 (After 11th September)



Source: Air Transport Association 2001

As indicated in Figures E-5 and E-6, the traffic forecast for 2001 underwent significant revision from 1.2 percent to –11.8 percent in the aftermath of September 11th 2001. The fairly modest GDP growth of about 1.5 percent in 2001 also suffered a reversal of about 2 percent which resulted in negative GDP growth for the final quarter of 2001. Forecasted GDP for 2002 remained positive in the aftermath of the attack on 11th September. Expectation of positive GDP in 2002 is accompanied by a modest adjustment in the traffic forecast from 3 percent to 4.8 percent in 2002. It is rational to expect the forecasted growth in traffic to be accompanied by growth in airline employment in 2002. Figure E-7 provides additional graphical illustration of employment trends and the distribution of airline employees among the seven professional groups in airline service.

Figure E–7. Employment Distribution at the Airlines in 1987, 1997, and 1998



	1987	1997	1998
Pilots & Copilots	41,963	57,564	66,434
Other Flight Personnel	8,541	8,866	10,703
Flight Attendants	72,697	89,079	96,198
Mechanics	51,233	50,807	65,500
Aircraft/Traffic Service	198,892	266,491	269,581
Office	40,690	40,151	38,354
All Other	43,333	51,467	45,729

Of the seven professional groups, pilots and copilots are of the greatest significance to the Aeronautics Division at Kent State University because of the overwhelming concentration of the program's educational assets and resources in Flight Technology. As indicated in Table E-1, most students majoring in Aeronautics are in the sub major area of Flight Technology. In consideration of that fact, the preceding discussion on employment distribution and trends for all airline employees would be supplemented by additional information on projections of pilot hiring through 2015. Table E-6 presents an employment outlook for pilot hiring through 2015 (Blue Ribbon Panel Report) that translates into an average of about 14,433 new pilot hires each year.

Table E-6. Projected Pilot Hiring and Demand 2003 – 2015

YEAR	MAJOR AIR CARRIER PILOTS			COMMUTER AIR CARRIER PILOTS			OTHER PROFESSIONAL PILOTS				TOTAL
	Aircraft (1)	Pilots (2)	New-Hire Pilots (3)	Aircraft (1)	Pilots (4)	New-Hire Pilots (5)	Aircraft	Pilots (6)	New-Hire Pilots (7)	TOTAL PILOTS	NEW HIRES
2003	5,566	64,287	3,895	2,359	18,872	3,119	67,948	73,070	8,406	156,229	15,420
2004	5,747	66,377	3,641	2,381	19,048	3,033	68,099	73,969	8,296	159,394	14,970
2005	6,200	71,610	3,214	2,500	20,000	3,201	68,250	76,440	8,063	168,050	14,478
2006	6,280	72,534	2,787	2,540	20,320	3,368	68,401	76,609	7,830	169,463	13,985
2007	6,360	73,458	2,791	2,580	20,640	3,416	68,552	76,778	7,847	170,876	14,054
2008	6,440	74,382	2,796	2,620	20,960	3,464	68,703	76,947	7,864	172,289	14,124
2009	6,520	75,306	2,801	2,660	21,280	3,512	68,854	77,116	7,881	173,702	14,194
2010	6,600	76,230	2,805	2,700	21,600	3,560	69,510	77,851	8,520	175,681	14,885
2011	6,660	76,923	2,578	2,740	21,920	3,608	69,611	77,964	7,910	176,807	14,096
2012	6,720	77,616	2,581	2,780	22,240	3,656	69,712	78,077	7,921	177,933	14,158
2013	6,780	78,309	2,585	2,820	22,560	3,704	69,813	78,191	7,932	179,060	14,221
2014	6,840	79,002	2,588	2,860	22,880	3,752	69,914	78,304	7,943	180,186	14,283
2015	6,900	79,695	2,591	2,900	23,200	3,800	70,350	78,792	8,368	181,687	14,759
TOTALS			37,653			45,193			104,781		187,627

(1) Obtained from FAA Aviation Forecast Data.
(2) The number of pilots for the major air carriers is equal to the number of aircraft multiplied by the size of the crews (steadily decreasing from 2.5 in 1990 to 2.1 in 2000) and the number of crews per aircraft (5.5).
(3) The number of new-hire pilots is equal to the growth over the previous year plus attrition (.5 percent) and retirements (obtained from ALPA date) for the year.
(4) The number of pilots for the commuter air carriers is equal to the crew size (2) multiplied by the number of crews per aircraft (4).
(5) The number of new-hire pilots is equal to the growth over the previous year plus attrition (15 percent) for the year.
(6) Assumes that there are 1.12 pilots per professionally flown general aviation aircraft. (This does not include part time pilots.)
(7) The number of new-hire pilots is equal to the growth over the previous year plus attrition (10 percent) for the year.

Of the 14,433 new pilot hires each year, about 6,373 new pilots are expected to be hired by the major air carriers (2,896) and the regional or commuter air carriers (3,477). Total new pilot hires through 2015 are projected to be 187,627. Supporting this level of new pilot hiring is a projected average annual growth rate of 2.6 percent in the major air carrier fleet size and a smaller average annual growth rate of 1.7 percent in the commuter or regional air carrier fleet. The much larger general aviation[4] fleet is expected to enjoy an annual growth rate of .6 percent through 2015. In addition to the overriding impact of trends in the nation's GDP, important changes that will affecting airline demand for new pilot hires include the replacement of old generation three-man cockpit aircraft with new generation two-person cockpit transport category jet aircraft pioneered by Airbus Industrie, the European Consortium.

The continued implementation of a mandatory retirement age of sixty years for all first officers and captains at the airlines will ensure a fairly consistent demand for new pilots each year by the major air carriers (Blue Ribbon Panel Report 1993, Nettey, *et al.* [National Research Council], 1997). Diminution in the number of new military pilot trainees and an increase in minimum service requirements for military pilots will exercise a compound effect that jointly drives and sustains airline demand for new pilots each year (Nettey, *et al.* [National Research Council], 1997). With the increase in minimum service requirements to ten years for most military pilots, fewer military pilots separate from the military to fly for the airlines than had been the case in the past. That is an important trend that bodes well for pilot training programs at colleges and universities as such as Kent State University.

The newly enacted Aviation and Transportation Security Act of 2001 is expected to create significant job growth in aviation as it comprehensively seeks to improve security in aviation by providing for an expansion of the federal air marshal system, expanded background checks of all employees with access to secure areas at airports, and passenger screening by professional federal security officers under a new undersecretary of transportation security. Increased security needs in civil aviation are expected to drive significant increases in the employment of non-flight aviation professionals at large airports, commercial airlines, the FAA and large general aviation operations. Effective allocation and appropriation of resources to support the development of the Aviation Management and Aeronautical Studies sub majors would produce growth in the enrollment of those two comparably low cost academic sub majors that would properly complement the high cost Flight Technology sub major.

Increasing reliance on university based aviation programs to produce pilots and airmen for the air carriers underscores a continuing need for the Flight Technology program at Kent State University. Deployment of airline aircraft and pilots that comprise the Civil Reserve Air Fleet (CRAF) during national emergencies underscores a national security need for the continuation of effective flight training programs at such universities as Kent State. Increased need and hiring of non flight personnel in civil aviation requires increased emphasis on the development of the Aviation Management and Aeronautical Studies sub majors in Aeronautics through effective allocation and appropriation of resources to support the requisite development of those two sub majors. Collectively, enrollment in the three sub major areas of Aeronautical Studies, Aeronautical Systems Engineering Technology, and Aviation Management should reach parity with enrollment in Flight Technology within five years. In ten years, enrollment in Aviation Management should be comparable to enrollment in Flight Technology (as well as the combined enrollment in Aeronautical Studies and Aeronautical Systems Engineering Technology) to offset the cost of offering flight training for students with a sub major in Flight Technology.

[4] General aviation comprises all aviation activity excluding the airlines and military. In 1999, the FAA and AOPA estimated the total number of general aviation aircraft registered in the United States at 206,530 (AOPA, 2001).

From the preceding discussion and information, it is obvious that there is and will continue to be firm demand for new employees in aviation in the near and long term. Enrollment in academic programs offered by the Aeronautics Division must, however, be dictated by the mission and resources of the Aeronautics Division. To that effect steps would have to be taken to properly manage enrollment in Aeronautics, especially into the Flight Technology sub major. The governing principle in this effort would be a "selective admission" policy to provide for "controlled enrollment" into Aeronautics, especially Flight technology.

To address the holdover problem, effective summer 2002, flight training shall be provided on a five-days-a-week schedule instead of the current three-days-a-week schedule. To permanently eliminate the holdover problem in flight training, effective fall 2002, all students shall have no more than one academic year to complete any flight class they enroll in. Failure to complete any flight class in an academic year will result in a withdrawal from that class and a refund of any unused flight fees less the usual administrative fee of $300. Using the five-days-a-week flight training schedule, the policy of "selective admission" and "controlled enrollment" shall ensure the enrollment of no more than an average of 10 students per available aircraft in the university's fleet of training aircraft.

Effective fall 2002, all incoming students in Aeronautics shall be required to complete a minimum of one semester of full-time academic work with a grade point average of 2.5 before declaring Flight Technology as a major and commencing flight training. Till students meet this requirement, they shall remain classified in the Aeronautical Studies sub major of Aeronautics. The same requirement of sub major declaration shall apply to Aeronautical Systems Engineering Technology and Aviation Management.

Implementation of the preceding enrollment policies will ensure effective and well managed growth in student enrollment in Aeronautics courses, including flight training courses. Enrollment in flight training courses shall remain firmly pegged to the preceding policies of "controlled enrollment" in order to ensure an effective balance between growth in numbers and the quality of flight training, as well as between flight training expenses and overall income generation by the Aeronautics Division. Five-year projected enrollment in Aeronautics is presented below.

Table E-7. Five-Year Target Enrollment Levels by Sub Major in Aeronautics 2002–2006

CODE	AERONAUTICS MAJOR AND SUB MAJOR	Fall	Fall	Fall	Fall	Fall
		2002	2003	2004	2005	2006
AERN						
	(Undeclared)	26	30	30	20	10
AAA	Aeronautical Systems Engineering Technology	30	35	37	45	50
BAA	Flight Technology	165	170	170	170	170
CAA	Aviation Management	35	50	75	105	130
DAA	Aeronautical Studies	42	45	48	50	55
AERO						
	(Undeclared)	0	0	0	0	0
AAA	Aerospace Engineering Technology	2	0	0	0	0
BAA	Aerospace Flight Technology	20	15	5	0	0
CAA	Aerospace Manufacturing Management Technology	0	0	0	0	0
DBA	Airway Computer Science	0	0	0	0	0
	TOTAL ENROLLMENT	**320**	**345**	**365**	**390**	**415**

7.8 5.8 6.8 6.4

30% increase 2002 - 2006

III. Curriculum

The four areas of academic specialization or sub-majors in Aeronautics; Aeronautical Studies, Aeronautical Systems Engineering Technology, Aviation Management and Flight Technology, require minima of 121, 127, 121 and 128 credit hours, respectively, for graduation. At the heart of a viable academic program is a sound curriculum. Analyses of the curricular for the four sub-majors in Aeronautics indicate they are good but not sound. They deviate from the normal regimen of coursework found in traditional non-engineering aviation degree programs and they may fall short of the accreditation standards stipulated in the Accreditation Standards Manual of the Council on Aviation Accreditation (CAA). Significant modification and restructuring of the curricula in all four sub majors in Aeronautics is required to ensure conformity with CAA accreditation standards and the general norm of the regimen of courses traditionally offered in non-engineering aviation programs.

All the four academic areas of specialization that are offered under the rubric of "aeronautics" are non-engineering aviation degree programs. The academic and instructional emphasis in all four sub major areas in Aeronautics must therefore dwell on coursework in aviation, not engineering. Non-engineering aviation is traditionally and purposefully different from engineering degree programs. Fashioning a non-engineering aviation program as a quasi engineering degree program produces aviation majors whose knowledge and experiential base falls short of both engineering and non-engineering aviation. An engineering emphasis in non-engineering aviation rests on a hybrid curriculum that provides neither the knowledge nor experiential base for students to readily secure viable professional positions in either engineering or in non-engineering aviation upon graduation with the baccalaureate degree.

To conform with the guidelines and standards stipulated in the Accreditation Standards Manual of CAA, the Aeronautics Core, which is generic to all four sub majors in Aeronautics, must reflect coursework in: rudimentary information on aviation careers and professional certification; aviation safety, accident investigation and human factors; airports, the national airspace system and air traffic management; flight meteorology; aviation management and operations; aviation law, regulatory policy and record keeping; aerodynamics, aircraft design, flight mechanics and performance. The Aeronautics Core of the existing curricula in all four sub major areas of Aeronautics appears to deviate substantially from CAA guidelines and standards.

Effective fall 2002, the Aeronautics Core must be restructured and modified to conform with CAA accreditation standards and the normal regimen of courses traditionally offered in non-engineering aviation programs. To accomplish that objective, an Aeronautics Core comprising the following aviation courses must be established: TECH 15000-Aerospace Technology (3), TECH 25250-Elements of Aviation Weather (2), TECH 35340-Airport Management (3), TECH 35341-Air Transportation Systems (3), TECH 35342-Air Traffic Control (3), TECH 45150-Applied Flight Dynamics (3), TECH 45250-Aviation Law and Safety (3), TECH 45291-Aerospace Senior Seminar (1) and *TECH 45791 – Aviation Security and Policy Seminar* (3). Effective fall 2002, the TECH 35342–Air Traffic Control class shall be reintroduced as a three credit hour course and the TECH 25250–Elements of Aviation Weather class, shall be modified to become a three credit hour course. Both courses provide important knowledge and understanding of both natural and technological constraints on airspace that affect flight operations and aviation. Modification of the Elements of Aviation weather class into a three credit hour course ensures its conformity with the norm in university aviation programs and more effective representation of the body of material addressed in the said course. **Effective fall 2002, a new course, TECH 45791 – Aviation Security and Policy Seminar, shall be introduced to better prepare students for the new operational emphasis on security in civil aviation.**

Successful offering of the preceding courses will create an Aeronautics Core of 25 credit hours that conforms to CAA standards and ensures that each student majoring in Aeronautics will complete coursework consisting of a sound body of knowledge in non-engineering aviation similar to what is completed in other university aviation programs. The suggested Aeronautics Core will also create a common body of coursework in non-engineering aviation for all Aeronautics majors and an academic platform for exit exams to be completed by candidates for graduation with the B.S. degree in Aeronautics.

In the continued drive towards academic excellence, **efforts must be completed to institute comprehensive exit examinations for all Aeronautics students admitted after fall 2002. Exit exams shall be completed by each candidate for graduation before mid terms of the semester of intended graduation.**

A cursory review indicates that the course outlines and syllabi used in the Aeronautics Division vary significantly in content and quality. **Effective fall 2002, all course outlines and syllabi used for Aeronautics courses shall at a minimum, provide information under the following sections: Course Title, Description and Number; Course Professor's Name, Contact information (phone number, e-mail address, etc.,), Office Location and Office Hours; Required and Supplementary Course Textbook(s), and Other Required Material as applicable; Course Requirements, Course Objectives, and Course Content Outline; Evaluation Criteria, Grading System and Grading Scale; Required Student Activities/Projects; University Policy Statement on Students with Disabilities; and Course References. Each course syllabus shall establish common course policies that are in agreement with university guidelines and policies. Course outlines and syllabi shall be reviewed and updated bi-annually to ensure that references remain current with changes in the discipline and that course policies continue to conform to university policies.**

Efforts to properly and effectively integrate high-end flight courses into the Flight Technology curriculum would continue through consistent offering of coursework in Crew Resource Management (TECH 45720/45721-Lab), Applied Transport Category Aircraft Systems (TECH 45730), and Flight Management and Electronic Display Systems (TECH 45740). Since effective instruction in high-end flight courses requires considerably recent flight experience in high performance aircraft, special efforts would be consistently made to secure instruction by adjunct faculty who are full time pilots with major air carriers.

In preparation for program accreditation, additional curriculum changes may be made in the other three sub major areas of Aeronautics to ensure adequate topical coverage is provided in all courses. Efforts would also be made to ensure the Aeronautical Studies curriculum supports the transfer of aviation students into Aeronautics, especially AMT students from KSU-Ashtabula.

IV. Facilities and Equipment

The Aeronautics Division operates out of assigned space in Van Deusen Hall on Kent Campus and rented operations facilities along with a number of temporary buildings at Kent State University's Paton Field. Van Deusen Hall, an old Industrial Arts building on Kent campus, also houses faculty offices and laboratories used by Aeronautics students taking courses in aviation and technology. Among the laboratories in Van Deusen Hall that support coursework towards the baccalaureate degree in Aeronautics are: the computer, industrial technology, manufacturing and robotics laboratories, and the flight simulator laboratory.

Offices for administrative support personnel for the Aeronautics Division are also housed in Van Deusen Hall. Such offices include enrollment management, marketing and public relations. Through the intervention and assistance of the Provost's office, the office of the senior academic program director of Aeronautics has become adequate and comparable to other faculty offices at the university. In December 2000 a program review team described "the facilities provided on the main campus for the rest of the Program" as "undersized, dingy, improperly ventilated, poorly maintained (broken shades on windows, layers of dust in areas where computers are present, trash on the floor) and are in many cases technologically out of date" (NewMyer and Bauserman, 2000).

Facilities rented by the Aeronautics Division at the 295-acre airport are not adequate and may not meet the minimum standards for CAA accreditation of academic programs that offer flight training. Originally opened to the public as Stow Aviation Field in 1920, Kent State University's Paton Field is connected by a student operated campus bus transit service to Kent campus. As university property, the airport's main purpose is to support flight education and training. The airport has a single active North-South runway (RWY 1-19) that is 4,000' by 60' with a maximum load bearing capacity of 18,000 Ibs. The said runway, which was paved in 1965, and resurfaced in summer 2000, handles about 62,000 operations a year for 48 domiciled aircraft, including Kent State University's fleet of 24 aircraft (appendix XX). The present level of aircraft operations represents a significant decline from a peak of 121,000 annual aircraft operations a few years ago.

Facilities at the airport include an aircraft fueling system with underground storage tanks, a terminal built in 1945 which houses airport and flight training personnel, as well as students, a large aircraft community hangar, about 70 odd aircraft tie-down sites, 14 aircraft T hangars, three fixed base operators (Baker Aircraft Technology, Commercial Aviation Corporation, and Novak Aircraft Maintenance Company), which are housed in the maintenance hangar. Facilitating flight operations at the airport are aviation weather information services (DUAT-Direct User Access Terminal, dedicated telephone line to Cleveland Flight Service Station [FSS]), a visual approach slope indicator (VASI) lighting system and pilot controlled runway lighting system.

The university's flight training facilities are housed in several rooms at the airport that serve as offices for instructional and administrative support functions, as well as two trailers used for meetings, classrooms, instructor cubicles, and aircraft simulators. Though obviously limited and functionally inadequate, the flight training facilities simultaneously provide small areas for aircraft dispatching functions, aviation weather equipment, a lobby, offices and restrooms. As part of the FAA's National Airport Plan, the airport receives federal funding and state matching funds for capital improvements. The airport however receives no federal or state grant funds for operational purposes. Kent State University airport is therefore an operationally self-supporting entity.

Discussions and interviews with program faculty and students highlight several problems and concerns with the facilities. The main terminal building and hangars at the airport are obviously old and in a poor state of repair. Consequently, noise, ventilation, lighting, furnishings, as well as the general atmosphere, were all identified as problem areas and inadequate. There is a genuinely serious concern with the amount of privacy these facilities afford faculty and staff. Adequate pre and post-flight briefing areas are nonexistent. The ability to meet with visiting families of both current and prospective students, and conduct student counseling at the airport is severely constrained and distressed. The poor state of the program's facilities at Paton Field promotes an atmosphere of general dissatisfaction and incessant complaining that is quite unprofessional and difficult to combat. The need to address the described shortcomings of the Aeronautics Program's facilities at the university airport is profound, serious, and immediate.

To address the previously described shortcomings of Kent State University's flight training facilities, it would be prudent for the university to expeditiously embark on efforts to either significantly improve the existing facilities, or provide new instructional and operational facilities to support the vision, mission, and educational efforts of the Aeronautics Program.

At the very least, the requested facility improvements must support consolidation of the entire Aeronautics Division under one roof in one location at the airport. Such consolidation would promote unit discipline, cohesive group dynamics, and collective determination to work in concert towards moving Kent State University's Aeronautics Division up to the next plateau of excellence. To accomplish that overall goal, the requested facility improvements must effectively accommodate the following functional and operational spaces at the airport:

(i) Audio visual room for individual and group instruction
(ii) Classrooms (2) to support at least two simultaneous aviation classes
(iii) Conference room to support staff meetings and flight instructor training sessions
(iv) Director's Office and Staff offices for Accounts Clerk and Administrative Assistant
(v) Faculty Offices to support at least eight full time faculty members
(vi) Flight Dispatch Area
(vii) Flight Meteorology Lab
(viii) Flight Planning Room
(ix) Flight Simulator Lab
(x) Flight Instructor Cubicles and Flight Brief/Debrief Rooms
(xi) Pilot Lounge
(xii) Resource Center
(xiii) Student Test Center
(xiv) Storage Area for;
- **(a). Aircraft Maintenance Records**
- **(b). Aircraft Usage Reports**
- **(c). Portable Instructional Aides and Devices**
- **(d). Program Records**
- **(e). Student Records (fee payment records, stage checks, flight records, etc.)**
- **(f). Visual Aides**

Operational enhancements needed to properly support the educational efforts of the Aeronautics Program comprise the following:

(i) Runway 1-19 upgrades

- Installation of a precision approach navigational aid to serve either RWY 1 or RWY 19. Such precision approach may be provided through the installation of an Instrument Landing System (ILS) at the approach end with the requisite orographic clearances to support the installation and operation of a localizer and glide slope antennae. A GPS system that allows ILS category I operations may be installed in lieu of an ILS system to support instrument flight training by flight students and their instructors. The absence of a precision approach navigation system precludes any practice work on instrument approach procedures at the university's airport by students and instructors.
- Pavement reinforcement to boost the load bearing capacity of Runway 1-19 from 18,000 Ibs to 60,000Ibs to support the operation of corporate jet aircraft.
- Widen Runway 1-19 from 60' to 75' to better support high-end small jet aircraft.
- Replace antiquated runway alignment lights with modern fixtures whose parts are easier to obtain and install.

(ii) Navigational upgrades

- Install Automated Weather Observing System (AWOS-3) to support flight operations by providing reports on altimeter setting, wind data and usually temperature, dew point, density altitude, visibility and cloud/ceiling data or
- Automated Surface Observing System (ASOS) capability to support flight operations in IMC by providing the preceding reports for AWOS-3 plus precipitation identification and intensity, and eventually freezing rain occurrence.

The senior academic program director of Aeronautics could work in concert with appropriate university officials to secure financial and technical assistance from the FAA to make the preceding operational upgrades.

To enhance the professional image of the airport and help defray the cost of airport operations and maintenance, especially, after extensive capital investments are made by the university to construct a new building and other facilities, efforts should be made to attract corporate tenants to domicile their aircraft at Paton field. Corporate tenants who operate business jets tend to support their domicile airports more substantively than do owners of small single engine aircraft whose flight activity is primarily recreational. In addition, ramp and flight operations by corporate jet aircraft at the university airport would significantly impact the aspirations and perspectives of both flight students and flight instructors. The operation of corporate jet aircraft domiciled at Paton Field may also lead to opportunities for flight instructors and students to obtain valuable flight experience in high performance aircraft through part time crewing opportunities on ferry flights or on other missions that may support part time flight crew. The effort to attract corporate tenants should be part of a larger strategic effort to establish a limited high technology research park at a redeveloped Paton Field. Anecdotal evidence from the keen interest displayed by Mr. Brian Davis of Mizar Technologies to lease space at the airport for GPS research augurs well for the successful establishment of a research park.

The program's flight operations currently include a fleet of twenty-four small aircraft. The aircraft fleet comprises nine single engine Cessna 152s that were placed into service in 1984, four single engine Cessna 172Ps in 1984, four single engine Cessna 172Rs that were procured in 2000, four single engine Cessna 172RGs that were placed into service in 1984, and two twin engine Piper Seminoles that were placed into service in 1978 and 1979. From the preceding service entry dates, the age of the aircraft fleet ranges from about 2 to 23/24 years. The airplane mix in the existing fleet does not possess the performance and navigational sophistication needed to support the high level flight training experiences associated with a flight training program that "is particularly designed for students who aspire to become airline pilots."

In addition to the aircraft fleet, there are six simulators in the flight training equipment inventory. Three of the six simulators are inactive and remain unused in the middle trailer at the airport. The three inactive simulators comprise one twin-engine ATC 810 simulator waiting for parts and two single engine ATC 710 simulators that have been inactive for about three years. **It would be prudent for the university to authorize expeditious disposal of the two inactive single engine simulators presently housed in the middle trailer at the airport and invest any possible proceeds in the maintenance and restoration of the other twin-engine simulators.** The operational simulators currently used for flight training are the Frasca 142 twin-engine simulator and the Elite TS 1000 multiengine simulator with turbine engine simulation properties. The newly acquired FlyIt flight simulation device was approved by the FAA, *in situ*, on October 30 and 31, 2001 for both high performance single- and multi-engine flight training operations. The Flight Operations Manager is in the process of including the new simulator in the university's Training Course Outline (TCO) under the direction of the local Flight Standards District Office.

Airport operations personnel commenced preparation of systematic reports on aircraft usage in August 2001. That report covered aircraft usage between 1st October 2000 and 30th September 2001. There is therefore no useful trend data on aircraft usage that could properly inform policy decisions of major consequences on the training fleet. The preliminary picture of aircraft usage presented by the initial report prepared by airport operation personnel is one of considerable underutilization of aircraft in the fleet. The average use of each aircraft over the said period was 356.1 hours (appendix XXX). All aeronautics faculty members with direct supervisory responsibility over the university's flight training operations have expressed dismay at the low utilization number and pledged to remedy it. **Effective immediately, Airport Operations personnel should prepare periodic aircraft utilization reports on a biweekly basis for the Senior Academic Program Director of the Aeronautics Division to be used in effective management and monitoring of the university's flight training operations at Paton Field.**

At present 19 of the 24 (almost eighty percent) aircraft in the university's fleet are more than eighteen years old. Maintenance therefore consumes a considerable amount of time and adversely impacts aircraft availability for flight training purposes. Preventive and scheduled maintenance chiefly takes the form of federally mandated 100 hour inspections and program elected 50 hour inspections to be completed after 100 and 50 hours of engine operation[5], respectively. In addition, there is unscheduled maintenance that results from problems documented by students and instructors on a Squawk sheet, hence squawk repairs. Novak Aircraft Maintenance Company performs maintenance work on university aircraft under an agreement with the university. At

[5] Aircraft engine operation is traditionally measured by a Hobbs meter, hence the more popular name Hobbs time.

present, Novak Aircraft Maintenance Company operates from nine to five, Monday through Friday. Unfortunately, those same times are periods of peak demand for flight training aircraft. Restriction of aircraft maintenance to those times means that all aircraft that need routine 100 or 50 hour inspections, or any other routine preventive maintenance, will be unavailable for flight training purposes between nine and five on Monday through Friday. Novak Aircraft Maintenance Company's hours of operation are incompatible with the university's flight training schedule.

Aircraft maintenance work is traditionally scheduled and completed at times that support the primary use of the aircraft. Air carriers generally schedule and complete most of the routine maintenance work on transport aircraft at times that free up aircraft to be used in fulfilling the business mission of transporting passengers, especially during periods of peak demand. Given the advanced age of the university's aircraft fleet, unscheduled maintenance or sqawk repairs can easily eliminate one or two aircraft each day from service for maintenance purposes. The flight training program can therefore not afford to compound the problem of aircraft downtime due to unscheduled maintenance with the loss of additional aircraft time each day for purposes of routine inspections and routine or scheduled maintenance. Completion of routine aircraft inspections and preventive maintenance work in the early evening hours when there are few or no flight training operations would ensure the availability of more aircraft for training purposes during the daytime periods of peak demand. **In its next maintenance contract negotiation, the university must go beyond setting fees for routine maintenance services and include stipulations on reasonable times for the completion of those services as well as stipulations on completing routine inspections, preventive maintenance, and scheduled maintenance work on aircraft in the evening hours after the last flight period of the day starts at 4:00 p.m.**

In 2000, the university procured and placed five new Cessna 172R aircraft into service. While placing these new aircraft into service, the university simultaneously retired and sold other older aircraft out of the fleet. This reduced the average age of the fleet from twenty odd years to fifteen years. The yearly note on the newly acquired aircraft is $124,000. Upon complete retirement of the paper on the five new aircraft, it would be prudent for the university to proceed with the simultaneous acquisition of new aircraft and disposal of old aircraft from the fleet. **The university should embark on a systematic process of periodically replacing old aircraft with new aircraft to ensure flight training is offered with a relatively young fleet of aircraft that is less prone to breakdowns and prolonged periods of stay in the maintenance shop.**

At present the overwhelming number of students receiving flight training are concentrated at the Private Pilot and Commercial Pilot I levels. With the concentration of flight training at those two levels, the need for new aircraft is also greatest at those two entry levels. Flight training towards the Private Pilot Certificate and Commercial Pilot I is respectively offered with Cessna 152's and 172P's that were procured in 1984. **The greatest need for new aircraft therefore exists at the Private Pilot and Commercial I instructional levels.** The oldest aircraft in the fleet, a twin engine Piper Seminole (Kent 37, N8307E, procured in 1978) could be sold to support the acquisition of a high performance aircraft. **In securing a high performance aircraft, the university should also concentrate on securing one aircraft that will adequately support high level flight training experiences in an airline and crew oriented environment. Specifically, the newly acquired aircraft must include high performance and turboprop systems, advanced navigational and flight management systems, and "glass cockpit" instrumentation.**

V. Faculty and Staff

The Senior Academic Program Director of Aeronautics serves as the chief administrative officer of the Aeronautics Division. In that capacity he reports to the Dean of the School of Technology and exercises overall and direct responsibility for the academic, administrative, and operational functions of the Aeronautics Division. The Senior Academic Program Director of the Aeronautics Division works in concert with the School's staff, Assistant Dean, and the Coordinators of the Applied Business Technology, Applied Science and Technology, and Graduate Studies divisions to fulfill the mission of the School of Technology.

Assisting the Senior Academic Program Director of the Aeronautics Division is an administrative assistant with responsibilities for office management and providing administrative support towards fulfillment of the following responsibilities; program coordination, academic and flight operations resource management, faculty and staff supervision and evaluation, academic course scheduling, curricula oversight for all four academic sub majors in Aeronautics, and fiscal management of the Division's Flight Technology budget.

In Fall 2001, there were 293 students with academic majors in the Aeronautics Division (see table E-1) who were divided among four sub majors in the areas of Aeronautical Studies (34), Aeronautical Systems Engineering Technology (23), Aviation Management (25), and Flight Technology (160) under Aeronautics, and four inactive sub majors (27) under Aerospace Technology. Serving these students are the Senior Academic Program Director of Aeronautics, six full time faculty members, six adjunct faculty members, 13 check flight instructors (five hold no other positions in the Aeronautics Division), 27 flight instructors, and 21 flight dispatchers (10 hold no other positions in the Aeronautics Division).

The faculty in the Aeronautics Division comprises a non-tenure track associate professor, a tenure track assistant professor, two non-tenure track lecturers, two non-tenure track instructors, and six adjunct faculty members. Though a full time administrator, the Senior Academic Program Director of the Aeronautics Division supplements the Division's faculty strength by teaching an average of three courses each semester. In addition to the Senior Academic Program Director of the Aeronautics Division, one faculty member holds the doctor of philosophy degree, another holds the masters degree, two hold the bachelors degree in Aeronautics and one holds the bachelors degree in Political Science. Four of the six adjunct faculty members hold masters degree. The other two are captains with Continental Airlines at the Cleveland operational hub who have completed university coursework in aviation and hold bachelors degrees.

Two of the six full time faculty members and four of the six adjunct faculty members, as well as the Senior Academic Program Director of the Aeronautics Division are new Kent State employees who commenced work in the Division after 1st July 2001. In that respect, the Division is in transition and has managed that transition quite successfully given its history of turmoil and instability. The transition also presents the Aeronautics Division with unique opportunities at greatness with appropriate university support. In fall 2001 all flight instructors were organized into three operational groups with respective leaders and the dispatchers were organized into a three-tier system of Journeyman Dispatchers, Dispatchers, and Senior Dispatchers in Operational Group IV. The leaders of the four operational groups report to the Manager of Flight Operations.

The aims of establishing a three-tier dispatcher system were threefold; create a system that relies on experienced dispatchers to uphold high standards of professional conduct among less experienced dispatchers through a process of indoctrination, provide a career ladder for dispatchers to promote retention and *esprit de corps*, and to promote a high level of professionalism among dispatchers in recognition of the central role they play in our flight training operations. Organization of dispatchers into a three-tier system last fall was accompanied by restructuring dispatcher job tasks into the two roles of receiving dispatcher who checks-in and releases aircraft on the ramp and an inside dispatcher who operates the UNICOM frequency and assists students and instructors with the necessary documentation on aircraft rental. Establishment of a receiving dispatcher position with ramp based airplane check-in and check-out responsibilities proved prescient because it has provided the proper platform to augment security on the ramp at peak periods of flight training activity. It has also allowed efficacious compliance with new FBO and Flight School Safety Recommendations (N8700.12)[6] published by the FAA in the aftermath of the unfortunate accident by the 15-year old student on 5th January 2002 in Tampa.

All flight instructors who provide instruction towards the Private Pilot Certificate and Commercial Pilot Certificate I (C-I) are members of Operational Group I. Those providing instruction towards the Multi-engine rating, C-II and C-III operate out of Operational Group II. Operational Group III comprises instructors who provide instruction towards the Certified Flight Instructor certificate and Instrument rating. Each operational group is expected to meet together with its leader at least once each week to discuss issues pertaining to the delivery of flight instructional services and uniformity of standards in providing flight-training services to students. Issues discussed collectively at the weekly operational group meetings shall focus on the accomplishments of each operational group member and address any difficulties encountered by each person in the operational group during the week.

To allow newly hired student flight instructors to develop effective flight instructional skills, **each new student flight instructor shall be assigned a maximum of two flight students during their first semester of providing flight instruction**. To ensure effective orientation, other **newly hired flight instructors who have already completed the baccalaureate degree shall be assigned a maximum of six flight students during their first semester at Kent State.** To support the effective delivery of flight training services, **all flight instructors who are undergraduate students working towards the baccalaureate degree shall be assigned no more than four flight students, and 'graduate' instructors who are not enrolled in school shall be assigned a maximum of eight students each semester. Assignments comprise new starts and holdovers.**

To help solve the holdover problem, **new students are to be assigned to instructors on a replacement basis as previously assigned students complete the flight course or procure the certificate/rating they are working towards, or exit the flight-training program. The leader of each operational group shall make every reasonable effort to eliminate the existing backlog of holdover students as expeditiously as possible and work closely with the flight instructors or dispatchers in their respective operational group to eliminate the development of another backlog of holdover students in the future.**

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[6] N8700.12- "Suggestions for Enhanced Security for Flight Schools and Fixed Base Operators" issued on 9th January 2002, was preceded by N8700.11- "Flight School and Training Center Requirements Under the Aviation and Transportation Security Act" which was issued on 17th December 2001.

As the opportunity arises to employ new faculty members to serve in the Aeronautics Division, search committees shall be formed in 2002 to solicit and evaluate applications and candidates for faculty positions in the Aeronautics Division. Throughout the faculty search process, special emphasis shall be placed on attracting and hiring candidates who hold the terminal degree and possess extensive experience in aviation education at the tertiary level. Evidence of aviation education experience at the tertiary level shall chiefly comprise record of teaching and research work in aviation, administrative or managerial work in a university based flight training program, grants solicitation and management, record of published work in scholarly journals, and committee work in professional groups or trade associations in aviation. In the absence of experience in aviation education at the tertiary level, experience in the private or public sectors of aviation that would properly support instruction and scholarship in the divisional sub major areas of Aeronautical Systems Engineering Technology, Aviation Management, and Flight Technology shall be cardinal determinants of which candidate is selected to join the Aeronautics faculty.

Successful candidates who hold a graduate degree but not the terminal degree shall be expected to earn the terminal degree within four years of employment by Kent State University. Selected candidates shall be expected to promote academic excellence and scholarship while fostering a climate of academic stability and collegiality that are critical to the Division's efforts to move up to the next plateau of academic and scholastic excellence in aviation. In addition, newly hired faculty members shall be expected to support the Aeronautics Division in its efforts to secure initial accreditation and subsequent re-accreditation by the Council on Aviation Accreditation. **All future efforts to hire new Aeronautics faculty shall remain governed by particular attention to the need for academic excellence in the four academic sub majors of Aeronautics through outstanding scholastic effort, aviation research, and collegiality in the Aeronautics Division.**

At present, three non-tenure track faculty members in the Aeronautics Division hold only bachelors degrees. In addition to primary duties in flight training, they have served the Aeronautics Division well by teaching academic courses required in the Flight Technology sub major of Aeronautics. The time and effort required to prepare for and teach these academic courses have obviously taken away NTT faculty time from the fulltime responsibility of supervising a fulltime flight training operation that involve dozens of flight instructors and 190 flight students at the university's airport (Table F-1). Providing effective and close supervision of flight instructors and monitoring the completion rate and systematic progress of flight students throughout the flight training program are very critical tasks that cannot receive the fulltime attention of NTT faculty who are also teaching regular academic courses in flight.

Table F-1. Number of Flight Students – Spring 2002

Flight Course	Spring 2002 New Students	Holdover Students	Total Number of Flight Students
Private	19	49 (P2) +20 (other)	88
C-1	5	33	38
Instrument	13	7	20
C-2	5	6	11
C-3	6	3	9
CFI	9	4	13
Multi	9	2	11
Grand Total	66	124	190

By exercising dual responsibilities of directly supervising the flight training of 190 students[7] and teaching academic courses in flight, NTT faculty members who hold only the bachelors degree have less time to devote to their own studies towards acquiring the graduate degree. Since the primary responsibility of NTT faculty is in the area of flight training, the responsibility for teaching academic courses in the Aeronautics Division must therefore be reduced for NTT faculty members who are working towards the master's degree. In addition, the Senior Academic Program Director of the Aeronautics Division shall make all reasonable efforts to assist NTT faculty members who are working towards the master's degree by offering favorable class scheduling and academic support as requested.

In preparation for CAA accreditation and for purposes of promoting academic excellence and program integrity in a leading aviation program, all full time faculty members in the Aeronautics Division must obtain formal education beyond the undergraduate level in order to teach academic courses at the undergraduate level. The Aeronautics Division therefore expects each NTT faculty member who holds only a bachelors degree to take full advantage of the unique privilege of free tuition for all Kent State University employees to secure the masters degree by 2004. **In effect, by fall 2004, there shall be no full time faculty member in the Aeronautics Division who teaches any academic course towards the baccalaureate degree without academic credentials beyond the bachelor degree.**

In addition to working towards graduate degrees, it is important for faculty members in the Aeronautics Division to receive material support towards participation in professional development activities in aviation. Such professional development activities shall include institutional membership and faculty participation in professional groups and trade associations related to aviation education at the tertiary level. At the very least, the university needs to provide support for institutional membership and faculty participation in the Council on Aviation Accreditation (CAA), University Aviation Association (UAA), National Intercollegiate Flight Association (NIFA), American Association of Airport Executives (AAAE), Regional Airline Association (RAA), Air Transport Association (ATA), Aircraft Owners and Pilots Association (AOPA), Ohio Aerospace Institute (OAI), and Ohio Council of Aerospace Education.

Institutional support for Aeronautics faculty to participate in trade associations and professional groups shall chiefly consist of institutional funding to participate in conferences, meetings, and scholarly events organized by trade associations and professional groups in aviation. Faculty members in the Aeronautics Division would in turn augment the academic profile of Kent State's aeronautics program by exercising peer leadership at the national level in postsecondary aviation education, committee work with professional groups and trade associations in aviation, scholarly activities including paper and panel presentations at academic meetings, service on editorial boards of scholarly journals in post secondary aviation education, and collaborative efforts with other faculty members to write proposals for grants and conduct research in aviation.

[7] In the main, the 190 students receiving flight training in spring 2002 comprise a combination of Aeronautics students in the Flight Technology sub major (160 sub majors) and students from the other sub majors of Aeronautics such as Aeronautical Studies (34 sub majors), Aviation Management (25 sub majors) and Aeronautical Systems Engineering Technology (24 sub majors). Some of the 160 sub majors in Flight Technology are not receiving flight training this semester while several Aeronautics students in sub majors that do not require flight training are enrolled in flight courses that may be used as TECH electives in their curricula. It is therefore possible to have 160 students with Flight Technology as their sub major but 190 students receiving flight training in the Spring 2002 semester.

In the next five years, the Senior Academic Program Director of the Aeronautics Division and Aeronautics faculty would be expected to work assiduously to augment the profile of Kent aviation by organizing and hosting multiple academic events in aviation for the benefit of Aeronautics students, local aviation public, and the media for wider benefit. Such academic events in aviation shall include seminars, lectures, symposia, Technical Flying Seminars, flight clinics, etc., offered in conjunction with the Federal Aviation Administration and trade associations in aviation such as AOPA. Such events would be scheduled and organized with assistance from the School of Technology's public relations coordinator in conjunction with the university's public relations office to ensure maximum publicity and wider benefit.

To ensure the optimization of Divisional faculty resources and effective delivery of educational services in aviation by the Aeronautics Division, an organizational chart was developed in fall 2001 that places appropriate emphasis on the four academic sub majors offered by the Aeronautics Division. A copy of the organizational chart for the Aeronautics Division is attached as appendix XX. Analysis of the Aeronautics Division's organizational chart shows the degree to which the Division is understaffed, especially in its sub major areas of Aeronautical Studies, Aviation Management, and Aeronautical Systems Engineering Technology. At present there is a single full time tenure track faculty position in the Aeronautics Division with 293 majors enrolled in the spring 2002 semester.

As previously stated, the Senior Academic Program Director of the Aeronautics Division is a full time administrator who supplements the Divisions faculty strength by teaching an average of three courses each semester and providing student advisement in the sub major areas of Aeronautical Studies and Aviation Management. NTT faculty members employed to provide flight-training services for students currently serve in similar capacities for the other two sub major areas of Aeronautical Systems Engineering Technology and Flight Technology. At present only a single staff position exists in the entire Aeronautics Division in the form of an accounts clerk II who exercises responsibility for managing the flight accounts of 190 students currently engaged in flight training this semester (spring 2002) and the generation of payroll for 13 check instructors, 27 flight instructors, and 21 flight dispatchers on a bi-weekly and monthly basis at different rates of pay for different levels of instructional services provided. The problem of understaffing in the Aeronautics Division is a serious one and it begs immediate attention and systematic resolution.

To remedy the problem of severe understaffing in the Aeronautics Division, **immediate appropriation must be made for a permanent administrative assistant to help the Senior Academic Program Director of the Aeronautics Division in fulfilling the mission of the Aeronautics Division and realizing its vast potential. The number of funded tenure track positions in the Aeronautics Division must be systematically augmented over the next five to ten years according to the traditional ratio of 30 enrolled program majors to one tenure track faculty member. From that ratio, a minimum of nine tenure track faculty members would be required to effectively support the academic mission of the four sub majors in the Aeronautics Division. The extraordinary safety and security requirements of the program, as well as its technical nature also necessitate the employment of one full time staff person for flight safety and security and at least one full time staff person to serve as a technical assistant in the structures and propulsions laboratories of the Aeronautics Division.**

VI. Budget and Fiscal Management Plan

HOLDOVER FLIGHT STUDENTS AND FISCAL MANAGEMENT.

An analysis of the statistical information on the number of students receiving flight training services in the Spring 2002 semester simultaneously illustrates and underscores the high cost of understaffing in the Aeronautics Division. As indicated in Table B-1 below, 124 of the 190 students currently receiving flight training services in spring 2002 are holdover students from previous semesters. As such they paid their flight fees and commenced flight training in a previous semester. Only 66 of the 190 students receiving flight training this semester are new students who started flight courses and paid flight fees of about $297,450[8] this semester. Of the 88 students receiving flight training services at the private pilot level this semester, only 19 are new starts since 69 are holdovers from previous semesters and only 5 of the 38 students in the C-1 class are new starts who paid flight fees this semester.

Table B-1. Number of Flight Students – Spring 2002

Flight Course	Spring 2002 New Students	Holdover Students	Total Number of Flight Students
Private	19 @ $4449 = $84,531	49 (P2) +20 (other)	88
C-1	05 @ $5543 = $27,715	33	38
Instrument	13 @ $5562 = $72,306	7	20
C-2	05 @ $4393 = $21,965	6	11
C-3	06 @ $4624 = $27,744	3	9
CFI	09 @ $3761 = $33,849	4	13
Multi	09 @ $3260 = $29,340	2	11
Grand Total	66 students = $297,450	124	190

In an understaffed flight training program, flight students generally do not complete flight lessons on time because of inadequate instructional and supervisory resources. They therefore proceed to subsequent semesters as holdover students. Understaffing results in continued accumulation of holdover students who receive flight training services that cost more than the fees they had originally paid. In a flight training program characterized by high fixed costs[9], delayed delivery of flight training services results in significantly higher actual costs of delivering paid services.

Holdover students from previous semesters have also constrained the intake of new students to the point where the number of holdover students is nearly double the number of new starts. In addition to the constraining effect of holdovers on new student intake and new operating revenue, the backlog of holdovers also exercises a bottleneck effect that constrains the number of students who are able to move beyond the private pilot course to complete higher end flight training that generate higher flight fees and make more substantive contributions towards covering fixed costs. With constrained intake of new starts in spring 2002 and the commencement of a five day flight training schedule in summer 2002, **the Aeronautics Program intends to eliminate all holdovers.**

[8] In addition to the $297,450 in fees paid by the 66 new students in flight training, another eight students enrolled in TECH 45711–Turbine Engine Theory Lab paid $7,592 (8 @ $949 ea) for total expected flight fees of about $305,042 in spring 2002.

[9] Fixed costs for flight training stand at $534,837.81 out of projected total expenses of $1,150,597.81 for AY 2001-2002. Fixed costs comprise NTT salaries and benefits of $221,677.81, annual payments of $96,760 to Auxiliary Services for rent, utilities, and administrative services, insurance costs of $171,400 and miscellaneous expenses of $45,000. Though considered a variable cost, about a third to one half of maintenance costs can be regarded as fixed costs as well, which translates into additional fixed costs of between $116,667 to $175,000.

FLIGHT TRAINING EXPENSES AND BREAKEVEN ENROLLMENT

As indicated in Table B-2 below, the budget for flight training remained constant at $792,253 in Academic Year 1997-1998 through Academic Year 1999-2000 when it was revised upward in Academic Year 2000-2001 to $816,634.08, and further upward to $856,831.20 in Academic Year 2001-2002. Total expenditures by the flight training program at the end of FY'01 stood at $1,153,223 against total revenues of $929,881 at the end of FY '01.

Table B-2. Flight Technology Budget – Five Year Chronology

Academic Year	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002
Flight Training Budget	$792,253	$792,253	$792,253	$816,634.08	$856,831.20

Projected expenses for Academic Year 2001-2002 are expected to be $1,150,597.81 with a breakdown as follows:

FLIGHT TRAINING PROJECTED EXPENSES FOR 2001-2002

Budgetary Line Item		Cost ($)
Administrative Costs (Auxiliary Services)		25,000
Aircraft Maintenance (Novak Aircraft Mtc. Co.)		350,000
Engine Replacement/Overhauls	$200,000	
Squawk Repairs	55,000	
Preventive Maintenance	95,000	
Airport Rental and Utilities (Auxiliary Services)		71,760
Airport Rental	$53,760	
Utilities	18,000	
Chief Flight Instructors' Salaries and Benefits		221,677.81
Salaries for 5 NTT Faculty	$198,938.16	
Benefits for 5 NTT Faculty	22,739.65	
Contract/Student Flight Instructor Costs		115,760
Fuel and Lubricant Costs		150,000
Aircraft Insurance Costs		171,400
Hull Insurance (KSU)	$100,000	
Liability Insurance (External)	71,400	
Supplies/Miscellaneous Expenses		45,000
TOTAL PROJECTED EXPENSES		1,150,597.81

Using total expected flight fees of $297,450 for 66 students in spring 2002 yields an average flight fee per student of $4,506.80 per semester (See Table B-2). Average annual expenses of $1,151,910 in the flight training program is obtained from the expenses for FY 2000-2001 ($1,153,223) and the projected expenses of $1,150,597.81 for 2001-2002. Holding the effect of holdovers constant, each flight student would be expected to pay about $9,013.60 per year (2x$4,506) in flight fees. At annual flight fees of $9,013.60[10] per student, the breakeven enrollment in the flight training program is $1,151,910/$9,013.60 which produces a round number of 128.

When holdovers are factored into the computation, the flight fee receipts per student per year drops from $9,013.60 to $4,506.80 which promptly raises the breakeven number of students from 128 to 256. Since the program does not have flight training assets to support flight training for 256 students, the program would always remain doomed to lose money and deficit spending. Elimination of the holdover problem leads to a very manageable and easily surpassable breakeven enrollment of 128 students in the flight training program. In the absence of holdover students, the Flight Training Program can provide quality flight training for fewer students at constant financial gain without factoring in state subsidies and regular tuition income for flight courses.

Payment of NTT faculty salaries from the E&G budget instead of flight fee receipts will eliminate a substantial fiscal burden of $221,677.81 from the Flight Technology account. This will further improve the breakeven enrollment to more manageable levels of 103 students and ensure consistently respectable income margins for the flight training program every time it provides flight training services for over 103 students in a semester.

Transfer of NTT salaries to the E&G budget and the subsequent decrease in breakeven enrollment also creates important fiscal opportunities to effectively address the understaffing problem in the Aeronautics Division through the creation of at least one funded tenure track position at a total cost of $60,000 (in salary and benefits), an administrative assistant's position at a total cost of $30,000 (in salary and benefits), a part time airport safety and security coordinator's position at a total annual salary of $15,000 and a part time technical assistant to assist with practical instruction in the aircraft structures and propulsions labs at a total annual cost of $15,000. It is anticipated that both part time positions would be occupied by retired persons with a strong track record of previous work in the Aeronautics Division and uncommon commitment to work in the program that transcends their part time salary.

The remainder of the fiscal savings realized from the transfer of the Aeronautics Division's NTT faculty salary to the E&G budget could also be invested in; **facility improvements** at the university's airport, establishment of a **sinking fund** to retire the outstanding debt on the most recent aircraft purchases, establishment of a **reserve account** to be used for **fleet modernization**, **adjustments in flight instructor wages**, and creation of a senior and stable corps of part time flight instructors who would be responsible for promoting consistency in flight training and adherence to standard operating procedures throughout our flight training operations.

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[10] Obviously as a result of holdovers, most students may pay one flight fee for a lesson that stretches beyond a semester into a year and beyond. During the prolonged period of flight training for the holdover student, that student rightly pays no new fee till the flight lesson is completed but the flight training program is spending considerable sums in fixed costs on NTT faculty salaries, payments to Auxiliary Services, aircraft insurance, etc.

AERONAUTICS DIVISION: FLIGHT FEES AND INCOME GENERATION

A comparison of the fees charged for different flight courses at Kent State University with those charged at Ohio State and Ohio University, as presented in Table B-3 below, indicates that the flight fees charged at Kent State University do not enjoy a competitive edge over those charged at sister universities in Ohio. Flight fees at Kent State do, however, compare quite favorably with those charged at some of the leading flight training programs in the nation. Kent State University's flight training program, however, appears to draw most of its students from Ohio so its competition comprises the two other state universities with flight training programs. In light of that fact, **Kent State University may have to avoid significant flight fee increases in the next five years while the flight program distinguishes itself as the leading aviation program in Ohio through academic and scholastic excellence, and outstanding program management.**[11]

Table B-3. Comparison of Flight Fees at Kent State with Other University's Flight Fees

FLIGHT COURSE	KENT STATE	OHIO UNIV.	OHIO STATE	ARIZONA STATE	EMBRY RIDDLE	SIU
Private Pilot Flight	$4,449	$4,350 – $4,775	$4,383	$5,488	$7,000	$7,149
Commercial Pilot Flight I	$5,543	$4,750	$3,830	$8,484	$7,500	$5,083
Instrument Pilot Flight	$5,408	$3,900	$4,278	$6,175	$7,500	$3,728
Commercial Pilot Flight II	$4,278	$4,700	$3,608	$5,810	$7,500	$5,865
Commercial Pilot Flight III	$4,364	$4,050	$4,365	--	--	$5,728
Flight Instructor -Airplane	$3,761	$2,900	$3,954	$3,768	$7,000	$3,376
Flight Instructor – Instruments	$2,189	$2,050	$1,706	$3,395	$7,000	$1,994
Multi-Engine Pilot Flight	$3,260	$3,600	$4,887	$3,900	$7,500	$3,864
Advanced Multi-Engine Pilot Flight	$2,093	--	--	--	--	--
Multi-Engine Instructor	$2,283	$2,200	$3,838	--	--	$2,175
Turbine EngineTheory & Op Lab	$1,095	--	--	--	--	--
Crew Resource Mgmt Lab	$ 949	--	--	$3,250	--	--
TOTALS	$ 39,672	$32,500- $32,925	$34,849	$ 40,270	$ 51,000	$ 38,962

[11] The leading metric of excellent program management is accreditation, completion rate and the extent of holdovers.

A review of the income generation report for the Aeronautics Division in Fall 2000, as presented in Table B-4 below, shows **a fiscally buoyant academic program with tremendous potential to generate even more income for the university through revision of course credits throughout the curriculum and the inclusion of Aeronautics courses in the technology core curriculum for all students with academic majors in the School of Technology.** Total income generated in fall 2000 stood at $1,084,729, with nearly half of that sum ($515,016) coming from special fees for flight with the remainder of $569,713 coming from tuition and state subsidies.

INCOME GENERATION REPORT
FALL 2000

TECH Course Number/ Title	Fees-Inst	Fees-N/R	Fees-Spec	Subsidy	TOTAL INCOME
15000 – Introduction to Aeronautics	26,204	5,156		41,783	73,143
15740 – Elements of Flight Theory	43,014	11,687		68,172	122,873
15741 – Private Pilot Flight	19,884	6,068	196,695	30,226	252,873
25250 – Elements of Aviation Weather	10,508	2,392		16,604	29,504
25743 – Commercial Pilot Flight I	6,392	1,570	118,128	10,674	136,764
35020 – Aircraft Propulsion Systems	6,408			13,335	19,743
35040 – Aircraft Systems I	4,368			8,890	13,258
35150 – Aircraft Structures	9,422		550	19,558	29,530
35340 – Airport Management	4,601	1,304		7,112	13,017
35644 – Instrument Flight Theory	9,527	2,881	105	14,224	26,737
35645 – Instrument Pilot Flight	5,452	1,921	89,748	7,709	104,830
35647 – Commercial Pilot Flight II	1,578	1,363	24,012	1,186	28,139
35746 – Commercial Pilot Theory	1,561	993		1,779	4,333
35747 – Commercial Flight III	1,276	324	19,940	2,372	23,912
45030 – Aircraft Systems II	8,702	518		16,002	25,222
45092 – Aeronautical Internship/ Cooperative Education	2,027	639		2,667	5,333
45150 – Applied Flight Dynamics I	10,914	3,170	500	16,891	31,475
45250 – Aviation Law and Safety	5,948	2,214		8,001	16,163
45291 – Aerospace Senior Seminar	2,700	807		3,848	7,355
45350 – Avionics	8,378	1,003		15,113	24,494
45648 – Theory of Flight Instruction	3,073	669		4,744	8,486
45649 – Flight Instructor/Airplanes	3,462	669	39,424	5,337	48,892
45653 – Multi-Engine Pilot Flight	1,076	335	21,364	1,480	24,255
45720 – Crew Resource Management	2,695	1,193		2,965	6,853
45721 – Crew Resource Mgmt. Lab	1,154	361	4,550	1,480	7,545
TOTALS	200,324	47,237	515,016	322,152	1,084,729

In addition to the above income, the Aeronautics Division could, with university approval, work to generate **additional sources of revenue by securing a contract to provide basic flight training for the Air Force.** In addition, additional income could be secured through **contracts with the FAA to hold seminars, flight clinics, and other aviation educational services for the FAA.**