

EVIDENCE OF NEED STUDY FOR EACH  
NEW OCCUPATIONAL PROGRAM

Program Evidence of Need Format:

*File Copy*

1. Oakland Community College  
college code number 2804
2. Aviation Maintenance Technology  
E.E.G.I.S. code  
U.S.O.E. code 17-0401
3. Refer to pages 6 thru 11, and pages 16, 18, 21, 22, 23, and 24  
of the needs study.
4. Macomb and Wayne Community College have joined with the Detroit  
area vocation offering partial programs (courses) on campus and  
laboratory courses at the Detroit City Airport where the area  
vocation school is located.
5. Refer to page 6 of the needs study.
6. Refer to page 21 of the needs study.
7. Refer to pages 4, 26, and 27 of the needs study.

AVIATION MAINTENANCE  
TECHNOLOGY NEEDS  
ASSESSMENTS

AVIATION MAINTENANCE TECHNOLOGY

Powerplant Mechanic  
Airframe Mechanic

Table of Contents

		<u>Page</u>
PART I	PROGRAM DESCRIPTION . . . . .	1
	Mission Statement, Design Criteria, . . . . .	2
	Performance Goals . . . . .	2
PART II	CURRICULUM - ASSOCIATE DEGREE AND CERTIFICATE . .	3
	Powerplant Mechanic . . . . .	4
	Airframe Mechanic . . . . .	4
PART III	SURVEY RESULTS OF NEEDS - STUDY . . . . .	5
	Methods of Surveys . . . . .	6
	Results of Surveys . . . . .	7
	Summary . . . . .	8-11
PART IV	LOCAL ENDORSEMENT . . . . .	12-14
PART V	SUPPORT INFORMATION . . . . .	15-25
PART VI	ADVISORY COMMITTEE . . . . .	26-27

PART I

PROGRAM DESCRIPTION

Mission Statement  
Design Criteria  
Performance Goals

## AVIATION MAINTENANCE TECHNOLOGY

### Mission Statement:

The Aviation Maintenance Technology Program at the Auburn Hills Campus is designed to prepare persons for entrance into the cluster of occupations of aviation which requires competencies in the two basic areas of Airframe and Powerplant Mechanic Technology.

The Aviation Maintenance Technology Program is offered by the Oakland Community College, Auburn Hills Campus. Additional information about participating in this program is available from the Office of the Dean of Occupational Education.

This program offers two aviation certificates leading to an associate degree in Aviation Maintenance Technology. The aviation certificate options are the Airframe Mechanic (Aircraft Frame Repair and Maintenance) and Powerplant Mechanic (Engine Repair and Maintenance). Both certificates may be earned, but only one associate degree may be awarded to any one student. The program is approved for the Auburn Hills Campus by the Federal Aviation Administration in compliance with Federal Aviation Regulation Part 147, Aviation Maintenance Technician Schools.

### Design Criteria and Performance Goals:

The Aviation Maintenance Technology Program at the Auburn Hills Campus will provide the student with technical experiences to maintain and repair the airframes and powerplants of aviation vehicles.

- P. G. I        The student will develop the basic understanding and mechanical skills to service airframes of aviation vehicles.
- P. G. II        The student will develop the basic understanding and mechanical skills to service powerplants of aviation vehicles.
- P. G. III       Upon the completion of the Airframe Mechanics Program, the student will have acquired the knowledge to qualify for F.A.A. certification.
- P. G. IV        Upon the completion of the Powerplant Mechanics Program, the student will have acquired the knowledge to qualify for F.A.A. certification.

PART II

CURRICULUM - ASSOCIATE DEGREE AND CERTIFICATE

Powerplant Mechanic  
Airframe Mechanic

CERTIFICATE AND ASSOCIATE DEGREE IN APPLIED SCIENCES AND ARTS

AVIATION MAINTENANCE TECHNOLOGY

NO OPTIONS: POWERPLANT MECHANIC & AIRFRAME MECHANIC

GENERAL EDUCATION REQUIREMENTS

The student will complete 12-16 hours of credit to include at least 3 of the following 4 categories:

1. Communications and English
2. Social Science
3. Humanities
4. Math/Natural Sciences

12-16 cr.

In addition the student will fulfill the State requirement by completing POL 151. 3 cr.

MAJOR REQUIREMENTS

IND 140.3	Cooperative Internship	3 cr.	Min./20 hrs./w
IND 240.3	Cooperative Internship (Advanced)	3 cr.	Min./20 hrs./w
* & **AVT 111	Introduction to Aviation	3 cr.	45 cont./hrs.
* & **AVT 114	Aircraft Electrical Systems	6 cr.	150 cont./hrs.
		<u>15 cr.</u>	

1. POWER MECHANIC OPTION

*APM 116	Basic Aircraft Powerplant Maintenance	6 cr.	150 cont./hrs.
*APM 210	Advanced Aircraft Powerplant Maintenance	6 cr.	150 cont./hrs.
*APM 216	Powerplant Induction Systems	6 cr.	150 cont./hrs.
*APM 218	Aircraft Propellers	6 cr.	150 cont./hrs.
*APM 220	Powerplant Repair Station	6 cr.	150 cont./hrs.
		<u>30 cr.</u>	

2. AIRFRAME MECHANIC OPTION

**AFM 116	Aircraft Hydraulics & Pneumatics Systems Lab	6 cr.	150 cont./hrs.
**AFM 210	Aircraft Sheetmetal Structure	6 cr.	150 cont./hrs.
**AFM 214	Aircraft Welding	6 cr.	150 cont./hrs.
**AFM 216	Aircraft Wood, Dope, Fabric and Laminates	6 cr.	150 cont./hrs.
**AFM 218	Airframe Repair Facilities	6 cr.	150 cont./hrs.
		<u>30 cr.</u>	

REQUIRED SUPPORTIVE COURSES

TED 103	Basic Blueprint Reading	3 cr.	45 cont./hrs.
APE 821	Electricity D. C. I	3 cr.	45 cont./hrs.
TES 110	Basic Machine Shop	3 cr.	45 cont./hrs.
	***Math	3 cr.	
		<u>12 cr.</u>	

72-76 cr.

\*When all courses marked with one asterisk are completed the student may apply for a Certificate of Achievement in Aviation Technology - Airframe Mechanic.

\*\*When all courses marked with two asterisks are completed the student may apply for a Certificate of Achievement in Aviation Technology - Powerplant Mechanic.

\*\*\*Students selecting a math course as a part of the General Education Component may waive this math requirement.

STUDENTS WISHING TO QUALIFY FOR BOTH AIRFRAME AND POWERPLANT MECHANIC MUST QUALIFY FOR AN ASSOCIATE DEGREE AND COMPLETE THE MAJOR REQUIREMENTS FOR BOTH OPTIONS.

PART V

SURVEY RESULTS OF NEEDS - STUDY

Methods of Surveys  
Results of Surveys  
Summary



## AVIATION MAINTENANCE TECHNOLOGY PROGRAM

### I. INTRODUCTION

In October, 1978, the Department of Instructional Technology and the Office of the Dean of Career Education conducted a survey to ascertain the interest for two proposed Associate Degree Programs; one in Aircraft Power Plant, and the other in Airframe Technology.

### II. METHODOLOGY

Preliminary Questionnaires were developed in conjunction with the Instructional Technology Department and members of the Aviation Technology Advisory Committee, consisting of ten persons from the aviation and education fields.

The questionnaires were entitled and described as follows:

#### Survey No. 1 - Student Survey (see Attachment A)

A survey of current high school and community college students as to their feelings relative to their interest to the proposed Aviation Technology Program.

#### Survey No. 2 - Michigan Flight School Survey (see Attachment B)

Survey of Michigan Flight Schools relative to their opinions on the worth of O.C.C. developing and implementing an Aviation Program as well as their employment of Certified Airplane and Airpower Mechanics.

#### Survey No. 3 - Small Plane Owners (see Attachment C)

Oakland County has the largest number of small plane owners compared to other counties in Michigan and illustrates a continuous growth pattern of small plane owners, which has influenced the advisory committee to survey this group. The small plane owners were surveyed as to their experiences with the maintenance and repair of their planes, as well as the need for aviation mechanics.

#### Survey No. 4 - Aviation Repair Stations (see Attachment C)

Aviation Repair Stations are usually located at airports and employ a number of aviation mechanics who are responsible for the general maintenance and repair of most private and commercial aircraft. The advisory committee surveyed a sample of this group to determine the present and future need of aviation mechanics as well as their opinion of Oakland Community College offering an aviation program.

### III. FINDINGS

#### Student Survey: HIGH SCHOOL

Of the 253 students surveyed, 113 (44.7%) indicated that they, or someone they knew would be interested in a career as an aviation mechanic working on power plants or aircraft, and would enroll if available at O.C.C.

88 (34.8%) indicated that they were not interested in the program, and would not enroll if offered.

52 (20.6%) indicated that they, or someone they knew, would be interested in a career as an aviation mechanic working on power plants or aircraft, but would not enroll if offered.

#### COMMUNITY COLLEGE

Of the 867 students surveyed, 251 (29%) indicated that they, or someone they knew, were interested in a career as an aviation mechanic working on power plants or aircraft, and would enroll if available at O.C.C.

456 (52.6%) indicated that they had already chosen their career and were not interested in the program.

137 (15.8%) indicated that they, or someone they knew, were interested in a career as an aviation mechanic working on power plants or aircraft, but would not enroll if offered.

23 (2.7%) could not be categorized.

#### FLIGHT SCHOOLS

Of the 125 Flight Schools surveyed, 70 (49%) indicated that there is a need for an Aviation Technology Program, that there would be employment opportunities for graduates, and that they presently employ a Certified Power Plant and Airframe Mechanic.

16 (11%) of the 125 Flight Schools surveyed indicated that they felt there was no need for an Aviation Technology Program at O.C.C.

29 (25%) did not respond to the survey.

#### SMALL PLANE OWNERS

Of the 954 small plane owners surveyed, 317 (33.23%) indicated that they felt there was a need for an Aviation Technology Program at Oakland Community College, while 22 (2.31%) did not see the need for a program. 282 (29.56%) suggested that there would be employment opportunities, while 12 (1.26%) did not have opinions. 46 (4.82%) indicated there would be little or no employment opportunities. 275 (28.82%) did not respond.

#### MICHIGAN FAA CERTIFIED REPAIR STATIONS

The Michigan FAA Certified Repair Stations survey results reveals that of 57 stations surveyed by the college, 30 (52.63%) indicated an affirmative for the worth and need for an Aviation Program as well as the opportunity for employment. 5 (8.77%) indicated that there would be little need for an Aviation Program as well as the opportunity for employment. 2 (3.51%) felt that there would be a need for the program, but would have difficulty finding employment. 4 (7.02%) repair stations specializing in the x-raying of airplane structures could not give an opinion on the proposed program or employment opportunities. 16 (28.07%) did not return the surveys.

IV. SUMMARY

The survey has revealed an outstanding affirmative response from the high school level as to student interest in choosing Aviation Technology as a career. Also, the community college student survey displayed that a large number of students already attending the community college would be interested in taking Aviation Technology type courses.

The community response to surveys, other than students, reveals a very high interest. Surveys of small plane owners, Michigan Flight Schools, and FAA repair stations indicated a definite need for an Aviation Technology Program as well as demonstrated that graduates would have good opportunities for employment as aviation mechanics.



Another reason cited for need for A & P mechanics was its traditionally low pay scale that has existed for the past 40 years in comparison to the shops. An A & P mechanic covers 5 skilled trade levels. Many have been leaving the aviation field to become foremen in the various shops. Now, however, the aviation pay scale is rapidly increasing to competitive levels.

A major concern voiced repeatedly was that there was no need for graduates that had only a theoretical background, no matter how strong. There is a need for practical experience as well. This would tend to suggest that it would be necessary to incorporate a strong hands-on program as well as cooperative experiences for the students.

Other general comments that were made were:

1. One company mentioned that it would like to see a baccalaureate degree program instituted somewhere.
2. One company stated that it was not aware of any such program in the Ann Arbor area. It had to generally hire away from other Aviation firms. Requested to be notified of any graduates.
3. There is a crying need for avionics technicians also.
4. One major company was aware only of a 4 year program at WMU and training programs in Arizona and Florida.
5. Cassna will be opening a maintenance facility outside of Toledo requiring a number of A & P mechanics.
6. One company is building a new facility requiring at least 20 new A & P mechanics.
7. There is always an opening for a skilled and trained A & P mechanic.
8. Many companies are consolidating maintenance operations, but there is a need for specialized A & P shops.
9. One company has a graduate of a similar program from Lansing Community College employed full time and a current student employed half time.
10. Coming out of a two year program, one company would require three years on-the-job training under direct supervision and then an examination from the company and an FAA exam. For advancement, there would be three additional years of O.J.T.

AVIATION TECHNOLOGY  
AIRFRAME AND POWERPLANT MECHANICS  
SURVEY LIST

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Aerodynamics Inc.  
Pontiac Municipal Airport  
P.O. Box 508  
Pontiac, Michigan 48056  
666-3500  
Bob LeMay

Airflite and Serv-a-Plane, Inc.  
Tri-City Airport  
Freeland, MI 48623  
(517)695-2554  
Mark Staudacher

Eastern Aircraft Corporation  
Grosse Ile Municipal Airport  
Hangar 2  
Grosse Ile, MI 48138  
527-6110  
Christine

Superior Aviation  
105 Kent Street  
Iron Mountain, MI 49801  
(906)774-0400  
Mark Fontana

General Motors Air Transport Section  
Hangar 2  
Willow Run Airport  
Ypsilanti, MI 48197  
485-5000  
Jean Lemanski

Hillsdale Aero-Inc.  
Box 238  
Municipal Airport  
Hillsdale, MI 49242  
(517)437-4755  
Mr. Moore

Kal-Aero, Inc.  
5605 Portage Rd.  
Kalamazoo, MI 49002  
(616)343-2548  
Carol Lundy

Aerofixica Inc.  
3600 Elizabeth Lake Rd.  
Ann Arbor, MI 48103  
995-0111  
Tucker Comstock  
(Balloons-invalid)

Butler Aviation Willow Run, Inc.  
Willow Run Airport  
Ypsilanti, MI 48197  
482-2621  
Kimberly Martin

Environmental Research Institute of Michigan  
Packard Hangar  
Willow Run Airport  
Ypsilanti, MI 48197  
994-1200  
Mr. VanTuyt

NOTIFY OF ANY  
GRADUATES

G. B. DuPont Co., Inc.  
P.O. Box 38  
1232 Roods Lake Road  
Lapeer, MI 48446  
664-6966  
Mr. Kent DuPont

Highamerica Balloon Repair Station  
2545 Leach Road  
Auburn Heights, MI 48057  
852-0666  
Kathy  
(Balloons-invalid)

CAMAIR Inc.  
16643 Airport Road  
Lansing, MI 48906  
(517)321-1134  
Larry Ingalls

Loars Field, Inc.  
7315 Onsted Highway  
Onsted, MI 49265  
(517)467-2132  
Welson Loars

Lv-Con Aviation, Inc.  
6084 Highland Road  
Pontiac, MI 48054  
666-3990  
Mrs. Blumenschien

Michigan Aviation Company  
6150 Highland Rd.  
Pontiac, MI  
666-3440  
Mike Lukon

Royal Air Inc.  
Oakland Pontiac Airport  
6500 Highland Road  
Pontiac, MI 48054  
666-3070  
Bill Kostich (Has buildings available)

The UpJohn Company  
Aviation Department  
Kalamazoo, Michigan 49001  
(616)323-4000  
Vern Lowe

Mannion Maintenance Center  
Mannion Air Charter  
Hangar 2070  
Willow Run Airport  
Ypsilanti, MI 48197  
484-0300  
Hank Yates

Prentice Aircraft, Inc.  
Adrian City Airport  
Adrian, MI 49221  
(517)265-8101  
(Stated it was not applicable)

Sparta Aviation Service, Inc.  
Sparta Airport  
Sparta, MI 49345  
(616)887-7373  
Loretta

Welch Aviation, Inc.  
Phelps Collins Airport  
Route #2  
Alpena, MI 49707  
(517)356-9051  
Neil Fulkerson

OAKLAND COMMUNITY COLLEGE  
AVIATION TECHNOLOGY PROGRAM  
STUDENT SURVEY

Please complete the survey below and return to Dr. Bill J. Rose, Dean of Career Education, Building B, Room 222, by October 10, 1978.

Each year, millions of lives and billions of dollars worth of equipment are placed in the highly skilled hands of aircraft mechanics. In these days of very sophisticated airplanes and equipment, the importance of the role played by aircraft mechanics cannot be overstated. In the United States, there are well over 100,000 airplanes, which must be kept air-worthy and ready to fly.

Aviation mechanics are employed by the airlines and by companies in general aviation located at or near all major airports. Aircraft power plant mechanics also find employ in the auto industry.

Earning potential of aviation mechanics is equal to or higher than many other skilled trades.

The duties of an airplane mechanic include the repair, maintenance, and testing of all aircraft surfaces and structures, hydraulic and mechanical systems, and the installation of various components such as belongs to the aircraft's electrical systems.

Power plant mechanics do everything that needs to be done to aircraft engines and auxiliary power units, including the repair, service, inspection, testing, maintaining of engines and their accessory fuel and oil systems, pumps, heating and cooling systems.

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Oakland Community College is considering an Aviation Technology Program that would prepare students for a career in Aircraft Power Plant and Airframe Technology.

1. Would you, or someone you know, be interested in a career as an aviation mechanic working on power plants or aircraft?

\_\_\_\_\_ YES                      \_\_\_\_\_ NO

2. Would you enroll in a two-year program to earn the FAA Certification as Power Plant or Airframe Mechanic, if this program would be available at O.C.C.?

\_\_\_\_\_ YES                      \_\_\_\_\_ NO

COMMENTS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_





SMALL PLANE OWNERS

AND

FAA CERTIFIED REPAIR STATION

AVIATION TECHNOLOGY PROGRAM  
SURVEY

Please complete the survey below and return to Dr. Bill J. Rose, Dean of Career Education, Oakland Community College, Auburn Hills Campus, by November 10, 1978.

Oakland Community College is considering offering two, two-year Associate Degrees in Aviation Technology. The two programs would be Aircraft Power Plant and Airframe Technology.

These programs would be set up under FAA guidelines with certified instructors. The two-year programs would earn the student FAA Certification as a Power Plant or Airframe Mechanic.

- 
1. Do you feel that there is a need for an Aviation Technology Program at Oakland Community College?

\_\_\_\_\_ YES \_\_\_\_\_ NO

2. Do you feel that there would be employment opportunities for graduates of an Oakland Community College Aviation Technology Program?

\_\_\_\_\_ YES \_\_\_\_\_ NO

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PART VI

LOCAL ENDORSEMENT



# OAKLAND/PONTIAC AIRPORT

3530 HIGHLAND ROAD

PONTIAC, MICHIGAN 48054

PHONE 666-3900

November 22, 1978

Dr. Marion Rice,  
Provost  
Oakland Community College  
Auburn Hills Campus  
2900 Featherstone Road  
Auburn Hills, Michigan 48057

Dear Dr. Rice,

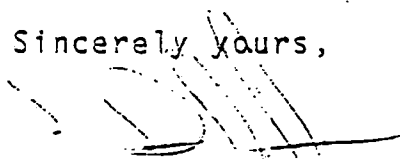
This will confirm the Oakland County Airport Committee's support of your efforts to develop an Aviation Technology Program -- Airframe and Power Plant Mechanics.

There are now in excess of 1,000 airplanes located in Oakland County. Approximately three quarters of these aircraft are located at three County owned airport facilities: Oakland/Pontiac, Oakland/Orion and Oakland/Troy. Each of these facilities is a general aviation airport under the ownership of Oakland County and the jurisdiction of the Airport Committee. In working closely with the aviation community and its various businesses, it is the Committee's observation that there is a shortage and corresponding demand for qualified, trained airframe and power plant mechanics.

By establishing the proposed program, Oakland Community College will be providing a much needed community service and a broadened base from which students may select attractive career opportunities.

You are to be commended for your efforts.

Sincerely yours,

  
J. David VanderVeen,  
Manager of Aviation

JDV:lg

cc

RITTON L. GORDON,

CHAIRMAN

ARIO FONTANA,

VICE CHAIRMAN

ETER H. BURGHER

RS. R. W. (KAY) CHAMBERLAIN

ONALD C. HEINLEIN

ETER B. FLETCHER

OL. GERALD L. HOUGH

. J. SCHERSCHLIGT

AMES D. RAMSEY,

DIRECTOR

STATE OF MICHIGAN



WILLIAM G. MILLIKEN, GOVERNOR

## DEPARTMENT OF STATE HIGHWAYS AND TRANSPORTATION

JOHN P. WOODFORD, DIRECTOR

AERONAUTICS COMMISSION

CAPITAL CITY AIRPORT

LANSING, MICHIGAN 48906

517-373-1834

November 21, 1978

Dr. Marion Rice  
 Provost  
 Auburn Hills Campus  
 Oakland Community College  
 2900 Featherstone Road  
 Auburn Heights, MI 48057

Dear Dr. Rice:

I have been advised that Oakland Community College is considering the establishment of an aviation technology program that would qualify participants in the basic areas of Airframe and Powerplant Mechanic Technology.

I believe that a significant need exists for additional competently trained aviation mechanics and that if a training course of this nature were to be offered by the College, it would serve a most useful purpose.

I would appreciate being advised of your ultimate decision.

Sincerely,

  
 James D. Ramsey, Director  
 MICHIGAN AERONAUTICS COMMISSION

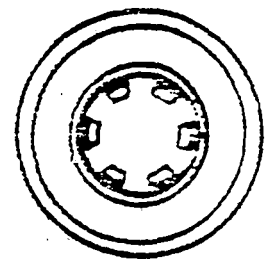


PART VII

SUPPORT INFORMATION



# AIR TRANSPORTATION OCCUPATIONS



OCCUPATIONAL BRIEF

4th ed. D.O.T. 912.

380

## Introduction

The air transport industry consists mainly of scheduled and supplemental certificated airlines. This brief is about occupations with the airlines. Jobs include those dealing with operation, maintenance, and repair of transport aircraft; control and promotional work of the industry; and airlines operation.

In March 1978 the air transport industry comprised thirty-seven certificated route air carriers and a number of air taxi and commuter airlines. They operate under certificates granted by the Civil Aeronautics Board, which specifies the cities and routes they may serve. The Federal Aviation Administration (FAA) administers safety standards.

## Work Performed

About 300,000 people work for certificated airlines in the United States. The departments in which they work are flight operations, maintenance, office, sales, passenger service, cargo, and professional. All departments cooperate to provide a smoothly working airlines system. Job descriptions vary with the airlines.

### Flight Operations

*Airline pilots* are highly skilled individuals who fly planes. *Pilot captains* are responsible for passengers, crew, cargo, and airplanes from the time they enter their planes to prepare for takeoff until they land at their destinations. *Copilots* help or relieve captains during flights.

*Second officers (flight engineers)* check planes before takeoff and help their captains and copilots (first officers) start engines and complete ground run-ups. They observe instruments and engine operation during flights, operate controls, and keep logs of engine and airplane operation. After landing they tell ground crews of any mechanical difficulties and turn in other reports.

*Flight attendants* look after the safety and comfort of passengers during flights. They also serve meals. They sometimes collect tickets.

*Flight dispatchers* authorize aircraft takeoffs.



*Reservations agents use electronic reservations data processing machines that store and transmit information on flight seat availability.*

*Photo courtesy of Delta Air Lines*

They monitor by radio the progress of planes to destinations.

*Meteorologists* prepare weather reports for flight personnel and operations departments. Their help is very important to dispatchers and pilots who plan flights.

### Maintenance

Maintenance jobs with major airlines are varied and require highly skilled personnel. *Airframe and powerplant (A&P) mechanics* work on engines and airframes. They are responsible for seeing that the mechanical parts of planes operate perfectly. *Instrument technicians* install and repair aircraft instruments. *Radio technicians* take care of radio equipment. Other workers are *radio assemblers, aircraft welders,*

File under 4th ed. D.O.T. 910-913. Other Passenger Transportation Workers (Air Transportation Occupations)



*Airframe and powerplant mechanics are responsible for seeing that the mechanical parts of planes operate perfectly. Photo courtesy of Delta Air Lines*

*fabric specialists, and line mechanics. Workers with jobs like those in other industries include machinists, sheet-metal workers, carpenters, painters, and drill press operators.*

#### **Office, Sales, Passenger Service, and Cargo**

*Ticket sales agents or passenger agents sell air transportation at ticket offices (city or airport). They answer questions about fares, routings, and flights and give other travel information. They determine and recommend service that meets the customers' needs. They confirm reservations, figure fares, prepare tickets, and take payments.*

*Reservations agents talk to customers by telephone to give schedule information. They record and post reservations. They also process teletypewriter messages and work electronic reservations data processing machines that store and transmit information on flight seat availability.*

*Operations or station agents record data from other stations on passengers, crew, cargo, and fuel. They prepare weight and balance manifests for flight. They may also load and unload passengers, and work ground radio and teletypewriter equipment. In some airports or terminals they may handle cargo and serve as ticket agents.*

*Sales representatives promote airline business. They call potential clients on the telephone or go see them.*

*Public relations representatives inform the public of developments in the airline industry and of the impact of air transportation on the world. They use newspapers, magazines, radio, and television.*

*Personnel representatives interview and hire qualified applicants. They offer personal and career counseling. They help administer on-the-job training programs. They also help in labor and industrial relations.*

*Cargo and freight agents handle shipments of mail, baggage, express, and freight. They load and unload cargo on flights and keep records of cargo. They also weigh shipments and prepare shipping orders.*

*Programmers apply modern electronic data processing techniques to operations ranging from reservations, accounting, and payroll control to maintenance part inventory. They also use these techniques to schedule workers' hours and the use of aircraft equipment.*

*Research analysts prepare detailed statistical analyses and reports. They work with rate structure and tariffs, traffic tie-ups and trends; and volume of passengers, mail, express, and freight.*

The industry also employs other office personnel. These include *business machine operators, teletypists, switchboard operators, secretaries, stenographers, typists, and accounting clerks.*

#### **Engineering**

*Aeronautical engineers design, build, and modify aircraft prototypes or aircraft accessories. They improve maintenance. They overhaul equipment and procedures.*

*Aircraft engineers develop aircraft suitable for airlines. They help plan the technical operations of air transport systems and their maintenance.*

#### **Working Conditions**

Working conditions vary with jobs. Some personnel work inside all the time. Some work outside all the time. Others work both inside and outside. Many air transportation employees work mainly with the public. Others work almost exclusively with co-workers. Some occupations may cause both physical and emotional stress.

Many air transportation employees travel extensively. They may spend several days a week away from home. Personnel working for airlines that service scheduled routes may fly back and



forth between two fixed destinations. Supplemental airlines and their personnel, however, service several destinations: for example, Tokyo, Paris, Mexico City, and Las Vegas on consecutive flights.

Flight crews, ticket agents, mechanics, cargo agents, and others who work with the public wear uniforms. The employing company pays part of the cost.

Mechanics must have their own hand tools. Companies supply other tools.

In some air transportation occupations workers stand behind counters, lift baggage, use telephones, work with reference materials, and operate electronic equipment. Some jobs may be noisy.

### Hours and Earnings

Some air transportation personnel work an eight-hour day and a forty-hour week. They may have rotating days off, such as Monday and Tuesday one week and Tuesday and Wednesday the next week. They have weekends off the fifth and sixth weeks. Some offices work on a seniority arrangement. Employees bid for the shifts. Those with the most seniority have the best chance to work the hours for which they bid. Professional, secretarial, and management people usually work the day shift and have weekends off.



*Flight attendants take care of the comfort and safety of passengers during flights. They should have poise, an attractive appearance, and an interest in people.*

*Photo courtesy of Delta Air Lines*

Pilots fly a maximum of eighty-five hours a month. Most fly less than seventy hours a month. They do, however, have additional nonflying duty hours. Flight attendants seldom fly more than eighty hours a month. They may spend up to thirty-five hours a month on ground duties necessary to prepare their planes for flights.

Salaries vary. The following salaries were in effect in April 1978.

Copilots' salaries ranged from \$8,000 (base pay, no fringe benefits) to \$53,000. Captains' salaries ranged from \$36,000 to \$80,000. Second officers earned from \$8,000 to \$46,000 a year. Annual salaries for flight attendants ranged from \$9,000 to \$17,000. Flight dispatchers earned \$24,000 to \$31,000 a year. Meteorologists earned from \$18,000 to \$27,000 a year.

Maintenance workers' salaries depend on their jobs and their specialties. Annual salaries ranged from \$19,000 to \$21,000 a year.

Engineering personnel earned between \$17,000 and \$27,000. Seniority and job specialty affect their earnings.

Sales representatives earned between \$16,000 and \$25,000. Public relations representatives had earnings between \$19,000 and \$30,000. Programmers' earnings were between \$15,000 and \$25,000. Earnings for all kinds of agents ranged between \$12,000 and \$18,000 a year.

Employees working evening and midnight shifts may receive shift differential (a higher pay rate). Employees receive meal allowances and other expenses while on flight layovers.

Airlines offer their employees many fringe benefits. These include paid vacations of two to four weeks, sick leave, retirement plans, group life insurance, health and welfare plans, and travel at little or no cost.

### Education and Training

High school students should take courses in English, public speaking, and business arithmetic. Other useful courses may be history, geography, sociology, nursing, and first aid. They should also take courses related to aviation and college preparatory courses.

Some private schools offer training for airline jobs as pilots, mechanics, sales personnel, reservations agents, and others. This training will not guarantee jobs but may help applicants get the jobs they want. Some colleges offer many airline-related courses, such as traffic management, air transportation, business administration, aeronautical engineering, accounting, airport management, sales, and many others.

Most airlines offer on-the-job training. They also offer employees courses to keep them up-to-

date in advanced procedures and to help them advance to higher positions in the company.

### Personal Qualifications

Candidates for pilot positions must have an average of 1,500 hours of flying time, be at least 21 years of age, and have a commercial license. They must be high school graduates and should have some college education. They must pass a flight physical with no waivers.

Flight attendants must be high school graduates, and should have an attractive appearance, a pleasing personality, poise, and friendly interest in people. Weight and height limits vary slightly among the airlines. Height may range from 5'1" to 6'. Weight must be in proportion to height. Usually applicants must be at least 19 years old.

Mechanics must be physically capable. They cannot be color-blind.

Ticket sales agents must be at least 20 years of age. Applicants must be able to express themselves clearly with tact and confidence. Knowledge of a foreign language is helpful. Qualifications for reservations agents are about the same.

Cargo and freight agents should have a driver's license. They should be able to drive cargo tugs, forklifts, trucks, and other equipment.

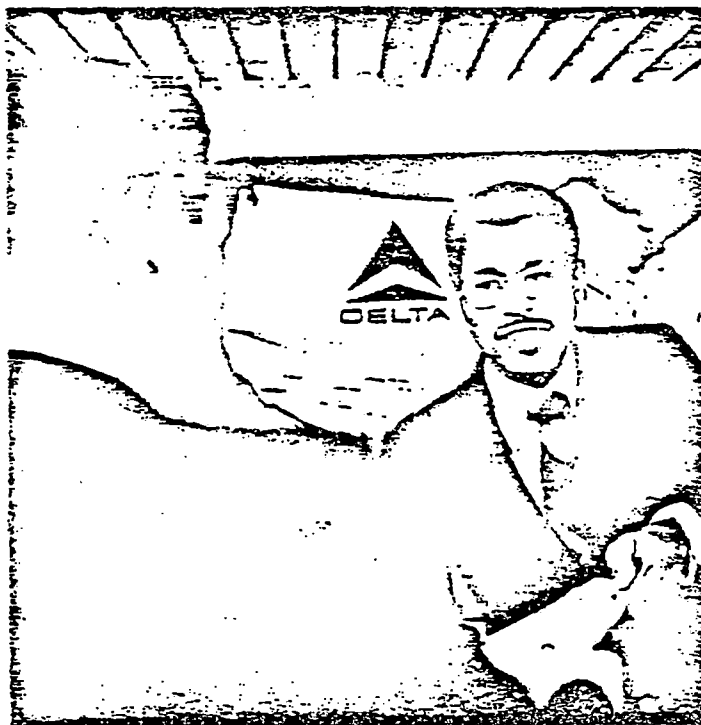
### Licenses and Unions

Many kinds of air transportation employees must be licensed by the FAA. Some of these employees are pilots, flight dispatchers, airframe and powerplant mechanics, instrument technicians, and radio technicians.

Airline employees belong to different unions. Some of the unions are the International Association of Machinists and Aerospace Workers; the Communications Workers of America; the Air Line Pilots Association, International; the Transport Workers' Union of America; the Allied Pilots Association; the Union of Professional Airmen; the Air Line Employees Association, International; and the Association of Flight Attendants.

### Where Employed

Most air transportation employees work near large cities in major airports. The seven cities with the largest airports, and consequently the most employees, are New York, Atlanta, Miami, Chicago, Dallas-Fort Worth, San Francisco, and Los Angeles. Many airline personnel work in other large cities, and some work in small communities served by airlines.



*Ticket sales agents sell air transportation at ticket offices. They answer questions about fares and flights, confirm reservations, and take payments for tickets.*

*Photo courtesy of Delta Air Lines*

### Employment Outlook

The airline transportation industry is a vital force in the economy of the United States. Airlines now account for more than 75 percent of all intercity common-carrier services.

This rapidly expanding industry offers a wide choice of employment for persons throughout the United States. Opportunities are expected to expand through the mid-1980's as more planes are placed in service. Additional opportunities will arise as workers die, retire, or transfer to other kinds of work.

### Entry Methods

Pilot applicants usually begin as flight engineers. Occasionally they may begin as copilots. Pilots must have at least a commercial pilot's license from the FAA. They must also pass preemployment tests for flight assignment.

Before they are assigned flights, flight attendants must successfully complete the company-sponsored training. Attendants are assigned to main airline bases. New attendants usually fill in on extra flights or replace attendants who are sick or on vacation.

Reservation, ticket, and passenger agents receive about a week of classroom instruction and then get on-the-job training from experienced workers. After about three weeks, these employees can do the job without close supervision.

Airframe and powerplant mechanics must

have an FCC license. Those without licenses work under the supervision of licensed mechanics. A few learn the job through on-the-job training, but most learn the skills in the Armed Forces or in FAA-certified trade schools.

Other employees in this industry must meet the same entry requirements as those of employees in similar occupations in other industries. Workers should apply directly to airlines. While they are in high school they should inquire about specific entry requirements.

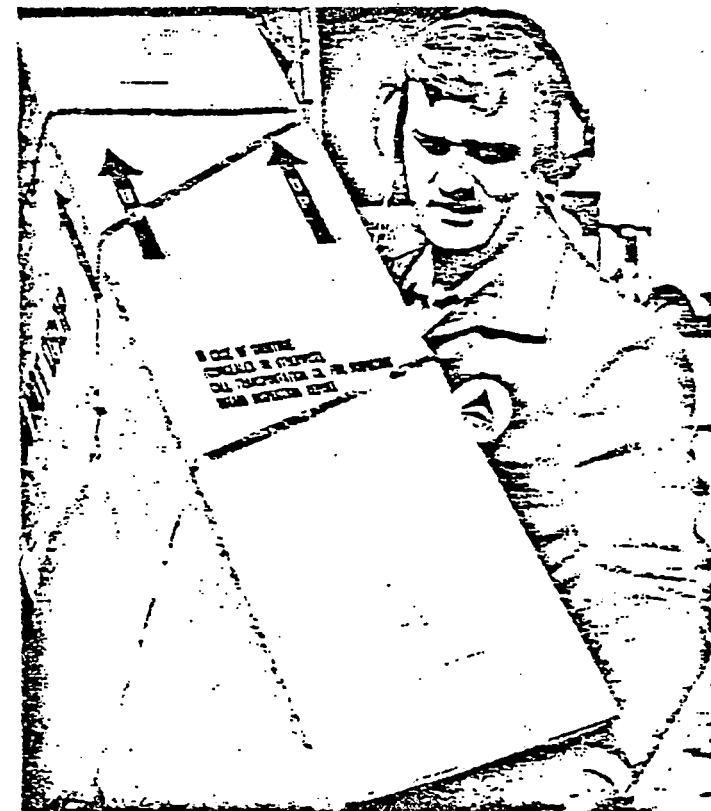
#### Advancement Opportunities

Advancement opportunities vary with different jobs. All airline departments offer advancement to qualified, industrious employees. If airline employees show higher morale and more enthusiasm than workers in some older industries, part of the reason can be traced to a vast system of internal upgrading.

Experienced, skilled flight engineers may become copilots. Copilots become captains or pilots-in-command.

Advancement opportunities for flight attendants are limited. As they acquire seniority, they will have more chances to fly flights they prefer. Some may become flight attendant instructors, customer service directors, or recruiters.

Mechanics may advance to positions of more responsibility. They may supervise other staff



Cargo and freight agents load and unload cargo on flights and keep records of cargo. They also weigh shipments and prepare shipping orders.

Photo courtesy of Delta Air Lines

members. They may also work in training programs for new employees.

#### Related Occupations

Air transportation industry occupations are concerned with operating, maintaining, and repairing aircraft; controlling and commercially operating air transportation systems; and operating privately owned airports. Other transportation-related occupations are included in motor vehicle transportation, railroad transportation, and water transportation.

#### For Further Research

*Air and Water Transportation Occupations.* Occupational Outlook Reprint No. 1955-16. \$.50; minimum Printing Office order \$1.00.

Superintendent of Documents  
U.S. Government Printing Office  
Washington, DC 20402

*Airframe and Powerplant Mechanics.* Occupational Brief No. 182. \$1.00.

*Airline Flight Attendants.* Occupational Brief No. 41. \$1.00.

*Airplane Pilots, Commercial.* Occupational Brief No. 29. \$1.00.

*Air Traffic Controllers.* Occupational Brief No. 322. \$1.00.

*Second Officers (Flight Engineers).* Occupational Brief No. 400. \$1.00.

Chronicle Guidance Publications, Inc.  
P.O. Box 271  
Moravia, NY 13118

*Facts You Should Know About Aviation.* High school syllabus. Free.

Aviation Education Department  
Beech Aircraft Corporation  
Wichita, KS 67201

*Aviation & Space Books in Print.* Free catalog.

Aero Publishers, Inc.  
329 C Aviation Road  
Fallbrook, CT 02023

*Step Into a Fascinating Career as an Eastern Steward/ Stewardess.* Free.

Eastern Air Lines, Inc.  
International Airport  
Miami, FL 33148

*The Official Guide to Airline Careers.* \$5.95.

Airline Careers  
P.O. Box 188  
Hialeah, FL 33011

*Career Information Sheet.* Free.

*Allegheny Airlines Flight Attendant Information.* Free.

Public Relations Department  
Allegheny Airlines  
National Airport  
Washington, DC 20001

*The People of the Airlines.* Free. Enclose No. 10 stamped, self-addressed envelope.

Public Relations Department  
Air Transport Association of America  
1709 New York Avenue, N.W.  
Washington, DC 20006

*The General Aviation Story.* 1-3 copies free.

Att: Ed-1  
General Aviation Manufacturers Association  
1025 Connecticut Avenue, N.W., Suite 1215  
Washington, DC 20036



M E M O R A N D U M

TO: Ms. T. Susskind  
FROM: Aviation Technology Advisory Committee  
SUBJECT: ALTERATIONS PER CURRICULUM COMMITTEE MINUTES OF 2/19/79  
DATE: March 14, 1979

Per the request of the Auburn Hills Campus Curriculum Committee as indicated in Part 4, Line "A" of the February 19, 1979 minutes, the following was concluded:

- 1) Michigan is ranked number 7 in the nation in having the largest number of aircraft owners, pilots, and aircraft maintenance needs.
- 2) Locally, in the past few years, there has been demonstrated a phenomenal growth in the general aviation industry. Locally, in Oakland County, there is an upsurge of business growth as a result of general aviation expansion. The county now has three county-owned airports and has provided all weather capability to Oakland County Pontiac Airport making this airport, in terms of aircraft traffic, the second busiest only to Chicago's O'Hara in the FAA Great Lakes Region. The principle usage is corporate aircraft, providing the many industries of metropolitan Detroit with executive mobility and airfreight.

The servicing of this rapidly expanding general aviation industry requires scores of certified technicians for support. Current statistics from the FAA General Aviation District Office at Willow Run Airport provides significant evidence of the necessity for this support. The General Aviation District Office (GADO) #20 covers Southeast Michigan, with a majority of activity concentrated in Wayne and Oakland Counties. Current available statistics for GADO #20 area coverage with 90% concentration in Oakland and Wayne Counties are:

a) General Aviation Aircraft	4,500
b) FAA Certified Pilots	14,550
c) FAA Certified Aviation Mechanics	575
d) FAA Certified Aviation Repair Stations	53
e) FAA Certified Aviation Mechanic Schools	2 (Both in Wayne)

3) Statistical projections for the period 1979-82 from GADO #20 are:

- a) General Aviation Aircraft      20% growth per year
- b) FAA Certified Pilots            25% growth per year
- c) FAA Certified Mechanics        90% turnover by 1982

(plus 80% growth by 1982 -  
projected from U.S. Labor  
statistics)

4) As this communication is addressed to the necessity for a training of aviation mechanics at Oakland Community College, the requirement is hereto clearly stated:

- a) Oakland County replacement requirements - 233 mechanics (1979-82) or 78 per year.
- b) Oakland County growth requirement - 187 additional mechanics (1979-82) or 62 per year.
- c) Oakland Community College will be required to furnish adequate facilities and staff to provide technical training for 140 airframe and powerplant certification applicants per year to meet the needs of the general aviation industry in Oakland County during 1979-82.

5) There are now two certified schools in the GADO #20 area:

- a) Detroit Public Schools Aero Mechanic Vocation High School graduates 50 students per year as FAA Certified Mechanics. Approximately 30 are absorbed by local aviation industries. The others go to military services or the airlines. Approximately 50% receive Associate Degrees in Aviation Technology through a cooperative program with Macomb and Wayne Community Colleges.
- b) Detroit Institute of Aeronautics is a commercial vocational mechanic school at Willow Run Airport producing about 20 certified mechanics per year. The school is facing bankruptcy and is negotiating with Wayne Community College as the site of a West Campus for the purpose of expanding its Aviation Technology Program to meet the expanding needs of the local aviation industry.

In conclusion, it must become evident that a good market exists for training aviation mechanics to fill the need for support technicians for the general aviation industry in Oakland County. Oakland Community College has adequate facilities and a geographic advantage at Auburn Hills Campus to fulfill the needs of the immediate future for well-trained aviation technicians for the general aviation industry in Oakland County.

In response to Part 4, Line "B" of the minutes, the Aviation Technology Advisory Committee is entirely convinced that the MAT 110 Technical Mathematics will not satisfy the airframe and powerplant guidelines for airframe and powerplant mechanics. Airframe and powerplant mechanics need a mathematics course that is comparable to APM 811 Geo-Algebra. The mathematics course should provide the student with the fundamentals of algebra and geometry as applied to aviation maintenance: for instance, mathematics that relates to different types of tapers, gears, threads, vernier calipers, mathematic layout of practical shop problems, screws, leads, pitches, angles, counter cuts, weight and balances, surface areas, airfoils, cylinder displacement of reciprocating engines, etc. These topics are covered in the APM 811 and not covered in other courses offered at the college. Therefore, the advisory committee strongly recommends this course, APM 811, for the Aviation Technology curriculums. The committee and geo-algebra instructors will be glad to meet with you to discuss the value of the course for the aviation curriculum.

Also, to facilitate the FAA guidelines, the committee agreed that TED 103 Basic Blueprint Reading would be a better course than APD 813 Shop Drawing I. Therefore, Basic Blueprint Reading will be substituted for Shop Drawing I.

Further, the committee felt that the APS 810 Machine Shop Theory should be substituted with TES 110 Basic Machine Shop being that Basic Machine Shop provides the students with the many basic machine shop skills that are required of an airframe and powerplant mechanic.

The committee has reviewed Line "C" of Part 4 and recommends that students entering the Airframe and Powerplant Program receive the English Placement Test and be placed in the appropriate English course. In any case, the committee suggests that ENG 134 Technical Communications be required for the Associate Degree Program.

/djf

SUPPORT INFORMATION  
AVIATION TECHNOLOGY PROGRAM  
AIRFRAME AND POWERPLANT MECHANICS

The following is a collection and correlation of statistics and forecasts from various sources pertaining to the need for Airframe and Powerplant Mechanics. The need for training institutions and a brief job description is also included.

NEED FOR MECHANICS

"This rapidly expanding industry offers a wide choice of employment for persons throughout the United States. Opportunities are expected to expand through the mid-1980's as more planes are placed in service. Additional opportunities will arise as workers die, retire or transfer to other kinds of work."<sup>1</sup>

"It is estimated that 75,000 veteran mechanics who received their training during World War II will retire within the next five years. Such people make up about one third of the aviation maintenance work force, including the airlines and the military."<sup>2</sup>

"There are currently approximately 120,000 active A & P [Airframe and Powerplant] maintenance technicians. In the 1980's it is anticipated that between 145,000 and 180,000 will be needed."<sup>3</sup>

"It has been estimated that for every hour of flight, a jet airliner undergoes five hours of maintenance. For light airplanes, a conservative estimate is three hours of ground work for every hour of flight."<sup>4</sup>

"Currently, it is estimated that there will be an annual average of 7,000 openings for aircraft mechanics."<sup>5</sup>

NEED FOR SCHOOLS

"There are currently 141 FAA certificated A & P schools. It is estimated that at least 144 will be required to produce the

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<sup>1</sup>"Air Transportation Occupations," 4th ed., D.O.T. 912, Chronicle Guidance Publications, Inc., Maravia, N.Y., December 1978, p. 38.

<sup>2</sup>Walter Zaharevitz, Aviation Education, "Aviation Maintenance," Department of Transportation, Federal Aviation Administration, Washington, D.C., [n.d.] p. 5.

<sup>3</sup>Letter from Mervin K. Strickler, Chief, Aviation Education Programs Division, Office of Aviation Policy, Department of Transportation, Federal Aviation Administration, Washington D.C., January 3, 1979.

<sup>4</sup>Aviation Education, "Aviation Maintenance," p.5.

<sup>5</sup>Ibid.

graduates needed. Also, it is assumed that increased productivity will have to flow from all such schools.

The current A & P schools are graduating 5,500 to 6,000 graduates each year. In the 1980's, 10,000 to 12,000 per year will be needed."<sup>6</sup>

#### JOB DESCRIPTION

"Airframe and powerplant mechanics must have an FCC license. Those without licenses work under the supervision of licensed mechanics. A few learn the job through on-the-job training, but most learn the skills in the Armed Forces or in FAA-certified trade schools."<sup>7</sup>

"Mechanics must be physically capable. They cannot be color blind."<sup>8</sup>

"Maintenance jobs with major airlines are varied and require highly skilled personnel. Airframe and powerplant mechanics work on engines and airframes. They are responsible for seeing that the mechanical parts of planes operate properly."<sup>9</sup>

"Mechanics must have their own hand tools. Companies supply other tools."<sup>10</sup>

#### SALARIES AND ADVANCEMENT

"Maintenance workers' salaries depend on their jobs and their specialities. Annual salaries ranged [effective April 1978] from \$19,000 to \$21,000 a year."<sup>11</sup>

"Mechanics may advance to positions of more responsibility. They may supervise other staff members. They may also work in training programs for new employees."<sup>12</sup>

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<sup>6</sup>Letter from Mervin K. Strickler.

<sup>7</sup>"Air Transportation Occupations," p. 38.

<sup>8</sup>Ibid.

<sup>9</sup>Ibid., p. 35.

<sup>10</sup>Ibid., p. 37.

<sup>11</sup>Ibid.

<sup>12</sup>Ibid., p. 39.



PART VIII  
ADVISORY COMMITTEE

AVIATION TECHNOLOGY ADVISORY COMMITTEE

Mr. W. E. McGran (Lefty)  
4801 Giddings Road  
Pontiac, Michigan 48057  
Phone: 373-9363

Mr. J. D. VanderVeen  
Director of Aviation  
Oakland Pontiac Airport  
6500 Highland Road  
Pontiac, Michigan 48054  
Phone: 666-3900

Dr. John Wohler  
3728 Boulder Drive  
Troy, Michigan 48025  
Phone: 977-4109

Mr. Leonard Mapes  
1824 Hopedale  
Troy, Michigan 48098  
Phone: 497-0269

Dr. Bill J. Rose  
Dean, Career Education  
Oakland Community College  
2900 Featherstone Road  
Auburn Heights, Michigan 48057  
Phone: 852-1000

Dr. Marion Rice  
Provost, Auburn Hills Campus  
Oakland Community College  
2900 Featherstone Road  
Auburn Heights, Michigan 48057  
Phone: 852-1000