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**COOPERATIVE EDUCATION SUPPORTED
COLLEGIATE AVIATION PROGRAMS**

Michael A. Schukert, Ph.D.

ABSTRACT

A nationwide study was conducted during the spring of 1992 to determine the nature and scope of contemporary cooperative education supported non-engineering college aviation degree programs. This paper describes the unique and commonly shared characteristics of the cooperative education activities reported by the 30 institutions responding to the information solicitation.

INTRODUCTION

The *Dictionary of Education* defines cooperative education (co-op) as: "A program for persons enrolled in a school that provides for alternating study in school with a job in industry or business, the two experiences being so planned and supervised cooperatively that each contributes definitely to the student's development in his chosen profession . . ." (Good, 1973, p. 138).

First implemented at the University of Cincinnati in 1906 to bolster its engineering curriculum (Collins, 1986), co-op has been contributing to the preparation of workplace experienced American college students for over 85 years. Today, most engineering degree programs, including aeronautical and aerospace engineering, include a co-op program based work/study option. As this investigation has shown, non-engineering college aviation (henceforth referred to as "collegiate aviation") program sponsors are also beneficiaries of co-op's demonstrated government/industry alliance and graduate placement capabilities.

This paper was motivated by an observation and a related assumption. The observation was that there is a dearth of facts and figures concerning extant collegiate aviation co-op programs. The assumption was

that such information could provide a useful reference database for aviation involved colleges and employers wishing to explore the feasibility and salutary possibilities accruing to new, expanded or modified co-op linkages.

In order to address the aforementioned information shortfall, questionnaires were sent to each institution listed in the recently published *Post-Secondary Aviation & Space Education Reference Guide* (Department of Transportation, 1992). Thirty useable instruments were returned.

SUMMARY OF FINDINGS

Collegiate Aviation Co-op Program Sponsors

Collegiate aviation co-op programs can be found at all levels of higher education, and in both publicly and privately supported institutions. Listed in response frequency

Table 1
Collegiate Aviation Co-op Program Sponsors (n = 30)

Institution Type	Frequency n	Percent
University, Public	12	40.0
Four Year College, Private	6	20.0
University, Private	5	16.7
Two Year College, Public	5	16.7
Four Year College, Public	1	3.3
Two Year College, Private	1	3.3

order in Table 1 is the distribution of the various types of co-op program sponsoring schools responding to this study.

Forty percent of the responding institutions were public universities. Four year colleges, public and private, comprised 23.3% of the co-op program sponsors under review. Twenty percent of the schools participating in the survey were two year institutions. All but one of these were publicly supported.

The surveyed schools are located in 24 states. Although slightly more prevalent in southeastern colleges, there do not appear to be any significant geographic concentrations of collegiate aviation co-op programs. The study population included no institutions in California however, reportedly the nation's top rated state with regard to the number of aviation program offering colleges (Schukert, 1991).

Non-Academic Co-op Partnerships

Fifty-seven college/employer co-op alliances were reported. A frequency-ranked participant listing, by employer classification, is provided in Table 2.

Federal government agencies were the most frequently mentioned co-op program sponsors with 59.6% of the reported co-op partners. Of these, the Federal Aviation Administration (FAA) was by far the most prominent federal government co-op participant. Other federal government agencies reporting co-op programs were the Central Intelligence Agency, the Departments of the Army and Navy, the

Drugbo Enforcement Service, the Forest Service, the National Aeronautics and Space Administration, and the National Transportation Safety Board.

The airline industry accounted for 10.5%

Table 2
Co-op Student Employers (n = 57)

Employer	Frequency <u>n</u>	Percent
FAA	26	45.6
Other Federal Agency	8	14.0
Airline	6	10.5
Airport Authority	5	8.8
Fixed Base Operation	4	7.0
Education/Training Facility	2	3.5
State Aviation Agency	2	3.5
Other (Undeterminable)	2	3.5
Aerospace Manufacturer	1	1.8
Aviation Advocacy Group	1	1.8

of the reported co-op partnerships. This employer subgroup was comprised of five major airlines, one all cargo/express delivery carrier and one regional/commuter airline. Two of the four passenger airlines employed co-op students in a flight crew training capacity. The other passenger carriers utilized co-op students in sundry administrative, customer relations, or maintenance roles. Co-op students assigned to the all cargo carrier served in either flight coordinator or load specialist positions.

Five airport authority sponsored co-op programs were reported. The co-op position title at two of the sites was "Airport Intern." The position titles at the other sites were either vague (Airport Operations Management) or unspecified.

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Co-op position titles assigned by the four fixed base operator (FBO) co-op employers included "Pilot/Flight Instructor" at two sites and "Aircraft Service Specialist" at another. The remaining FBO assigned the title of "Assistant."

Of the two education/training facility related co-op employers that reported, co-op students served as youth counselors at one location and simply as trainees at the other.

The remaining co-op employers included a major U.S. aerospace manufacturer and a Washington, D.C. based aviation industry advocacy group. The co-op student position title with the manufacturer was "Distribution Network Engineer." The co-op student was assigned worked by the advocacy group as an assistant to the organization's Director of Safety and Operations.

Co-op Program Supported Collegiate Aviation Degrees

Twelve co-op program supported collegiate aviation areas of study were identified. Six schools failed to indicate the specific degrees in question. Listed in response frequency order in **Table 3** are the program titles and degrees reported by two or more of the responding institutions.

The preponderance of reported co-op activity was at the baccalaureate level. Three

Table 3
Co-op Program Supported Collegiate Aviation Degrees

Area of Study	Degrees			Totals
	Associate	Bachelor	Master	
Aviation Management		17 ^a	1	18
Professional Pilot	2	7 ^b		9
Computer Science		4 ^c		4
Aviation Technology		3		3
Airway Science		3 ^d		3
Aeronautical Science		1	1	2
Air Traffic Control		2		2
Aircraft Maintenance	1	1		2
Aviation/Aviation Studies		2		2
Avionics		2		2
TOTALS:	3	42	2	47

^a Includes Airway Science Management programs.

^b Includes the Airway Science, Aircraft Systems Management Option.

^c Includes Airway Computer Science programs.

^d Specific Airway Science Program options not indicated.

institutions reported co-op program supported associate degree programs. Two master's degree level co-op programs were indicated, one in aviation management and the other in aeronautical science.

Co-op was employed most frequently in support of aviation management degree programs. This application comprised 40.5% of the bachelor's programs and 38.3% of the total reported programmatic involvements.

Nine institutions reported professional pilot co-op programs of which seven were baccalaureate and two were associate level.

Four institutions conducted baccalaureate computer science co-op programs, and at least two institutions reported co-op

programs in each of the following areas of study: aerospace/aviation technology, aeronautical science, air traffic control, aircraft maintenance, airway science (option unspecified), aviation studies, and avionics. With the exception of aeronautical science and aircraft maintenance, these offerings were at the bachelor's level. The aeronautical science related co-op programs were reportedly offered at both the bachelor and master levels. The aircraft maintenance co-op programs were offered at the bachelor and associate levels.

Other collegiate aviation co-op programs mentioned, each by a single institution (therefore not depicted in Table 3), included aviation human factors and aviation systems.

Co-op Plan Options

One of the more obvious ways in which co-op programs differ is with regard to the frequency and duration of off location assignments. Such considerations determine the basic on and off campus structure of a particular institution/employer co-op arrangement. There are currently three options: the alternating plan, the consecutive plan, and the parallel plan. Employer preference is usually the deciding factor for adopting a plan.

The alternating plan entails full time student involvement on alternating academic terms (usually every other semester, quarter, etc.) either on campus or at the job site. Co-op programs based on the parallel plan require that approximately equal portions of a student's daily/weekly time during a given academic term be spent on campus and at the work place. The consecutive plan is one in which students spend two or more consecutive academic terms in a full time employment capacity at the job site with no intervening on-campus study activities.

The alternating plan was the most

frequently indicated co-op arrangement, and the predominant option among the responding universities and four year colleges. Approximately 77% of the respondents conducted alternating co-op programs either exclusively or in combination with the consecutive or parallel co-op plans.

Ten of the institutions reported the availability of parallel co-op programs. Three schools conducted the program exclusively and seven did so in conjunction with one or more of the other co-op plans. Parallel co-op arrangements appeared to be favored by the two year colleges, and at four year institutions and universities located within reasonable commuting distance of the program supporting employers.

The consecutive co-op plan was offered by five of the responding institutions. Two schools conducted the program exclusively and three did so in conjunction with one or more of the other co-op arrangements.

Academic Credit and Grading

Considerations

Co-op was offered for academic credit at all but one of the 30 schools participating in the survey. The reported credit awards varied from one to 15 hours per co-op course enrollment.

The most frequently indicated credit award was three semester hours. Thirteen institutions reported their credit award figures as a range from three to six credit hours. Such variable credit provisions are usually predicated on the amount of time students actually spend on the job during the academic term.

Sixty percent of the responding institutions reported a letter grade based co-op student performance evaluation system. Letter grading systems were mentioned more frequently by institutions operating on the semester calendar. Forty percent of the

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CO-OP COURSE TITLE AND TITLE PHRASEOLOGY	FREQUENCY BY INSTITUTION TYPE AND OFFERING LEVEL				
	2 Year College	4 Year College Divisions ^a			Totals
		Lower	Upper	Upper and Lower	
Cooperative Education ^b / Co-op	2		5		7
Cooperative Education	1	1	3	1	6
Internship ^c			4		4
Internship			2		2
Other ^d	1	2	5		8
Unspecified Title	2		1		3
COLUMN TOTALS:	6	3	20	1	30

^a Catalog number determined (e.g., <300 = lower division, etc.).

^b Avionics Co-op, Flight Co-op, etc..

^c Internship in Aviation Management, etc..

^d Occupational specialty specific titles, Field Study, etc. offerings.

respondents utilized the pass/fail system. The pass/fail grading system also predominated among institutions awarding more than six credit hours for co-op course enrollments.

Co-op Course Titles And Offering Levels

Seven respondents reported course titles which incorporated the terms "cooperative education" or its abbreviated equivalent, "co-op." The offering at 20% of the institutions was titled Cooperative Education without accompanying verbiage. Table 4 shows the reported titling variation frequencies disaggregated by institution type and offering level at co-op program sponsoring

universities and four year colleges.

The term "internship" was the reported course title or a component at 20% of the responding schools. Three institutions employed occupational specialty-specific phraseology in their course titles such as A & P (Airframe and Powerplant) or ATC (Air Traffic Control) Technician.

To the extent that the usual catalog course numbering schema holds (e.g., "upper division" = courses numbered 300 and higher), it would appear that the preponderance of co-op courses reported by the responding four year institutions were classified as upper division.

Off Campus Co-op Program Requirements

Both the alternating and the consecutive co-op plans require students to spend a specified number of academic term based periods away from the campus in a full time work capacity. Such provisions do not pertain to parallel co-op programs. The co-op program sponsoring institutions and employers jointly determine the number of the off campus periods required.

The most frequent number of off campus employment periods was two academic terms. This requirement was reported by 13 institutions, eight of which operated on the semester calendar system and five on the quarter system. All but two of the schools in this subgroup were four year institutions or universities.

Disregarding a "till graduation" response, the greatest number of off campus employment periods indicated was four to seven quarters reported by one institution. The fewest away terms required was one summer session indicated by two schools.

Co-op Student Employment Levels

Approximately 60 co-op students were reportedly placed by the 30 responding institutions during a typical academic term. Twenty employers limited their co-op student sponsorship to one per quarter/

semester. Fourteen employers hosted two co-op students each term. The remaining employers ranged from three to 25 students per term.

Co-op Student Earnings

The co-op student income figures varied widely. As can be seen in Table 5, the reported hourly remuneration rates ranged from \$3.13 to \$12.50 per hour.

Because the earning figures were variously

**Table 5
Collegiate Aviation Co-op Student Earnings**

<u>Employer</u>	<u>n</u>	<u>Reported Hourly Pay Range ^a</u>		<u>Avg.</u>
		<u>Low</u>	<u>High</u>	
Aerospace Manufacturer	1	-----		12.50
Airline	6	7.50	7.84	7.61
Airport Authority	5	7.00	8.00	7.50
Aviation Advocacy Group	1	-----		6.00
FAA	26	5.00	8.23	7.72
Other Federal Agency	8	7.00	9.46	7.86
Fixed Base Operator	4	4.00	10.00	6.25
Educational/Training Facility	2	4.85	7.50	6.18
Other	2	3.13	10.42	8.32

^a Reported annual, monthly and weekly pay figures were recalculated to determine their hourly equivalents.

cited (e.g., as annual or monthly salaries, as a beginning/ending income range, or, in the case of federal government positions, on GS pay scale rates), considerable data manipulation was necessary. Actual co-op student remuneration amounts could vary, therefore, by as much as plus or minus five to 10% of the average hourly figures shown for each employer.

Two of the airlines and two of the airport authority employers indicated that their co-

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op students are not paid. It should be noted, however, that one of the airlines in question reportedly provides an attractive array of in-kind participatory enticements including cockpit jump seat observation rides on revenue trips, free simulator time and flight engineer training.

Employer Provided Co-op Student Benefits

Eleven student fringe benefits, in addition to or in lieu of salary, were reported by the aerospace manufacturer and a number of airlines, FBOs and government agencies. The benefits provided by these four employer subgroups are listed in Table 6 in order of frequency of mention.

The most frequently indicated co-op student fringe benefit was employer paid/supplemented health insurance. This entitlement was provided by 14 employers.

Although moot, fringe benefit considerations (i.e., longevity/retirement and vacation credit accrual) for other than permanently assigned personnel, were mentioned by only 22 employers, 77% of which were government agencies.

Other reported co-op student benefits included: (a) life insurance, available to students employed by two airlines and four of the FAA co-op sponsors; (b) supplemental living expenses, provided by the aerospace manufacturer and the U.S. Forest Service; (c) scholarship or tuition assistance, available to students employed by the aerospace manufacturer and one of the FAA co-op sponsors respectively; and (d) limited free domestic air travel, provided by one of the air carriers and an airline affiliated FBO.

Benefits exclusive to a particular employer subgroup included promotion and sick leave reported by nine government co-op program sponsors, and reduced rate lodging eligibility plus free round trip transportation from the school to the work site provided by one of

the airline co-op employers.

Co-op Program Participation Requirements

The survey participants were asked to indicate their minimum co-op program enrollment requirements as they pertained to: (a) student classification status, (b) overall grade point average, and (c) other institution or employer specific criteria.

Enrollment Status. The minimum student classification status required for co-op program participation varied considerably, especially at institutions sponsoring multiple aviation degree offerings. One institution, for instance, reported enrollment classification requirements ranging from none to graduate student status, depending on the co-op program supported major in question. The most frequently mentioned student classification related requirement was the holding of sophomore status. This criterion was reported by 11 universities and two of the four year institutions for at least one of their co-op program supported aviation majors. One of the six responding two year colleges also held this requirement. Junior status was reportedly an enrollment prerequisite for at least one co-op program supported aviation major at 38% of the four year institutions and 18% of the universities.

Two 2 year colleges indicated that co-op program participation was contingent on successfully completing the first freshman semester. A university and a two year college reported Avionics and Aero program enrollment as a co-op participation prerequisite.

Twenty percent of the respondents indicated the existence of at least one co-op program supported aviation major for which no student classification related program participation requirements pertained.

Academic Performance. The most frequently indicated scholastic co-op

Table 6 Collegiate Aviation Co-op Students Benefits						
Benefit Provided	Aero Mfg.	Air Line	FBO	Government Agency		Totals
				FAA	Other	
Health Insurance	1	2	2	8	1	14
Longevity and Retirement Credit		2		7	3	12
Vacation Credit		1	2	6	1	10
Life Insurance		2		4		6
Promotions				2	3	5
Sick Leave				4		4
Living Expense Supplements	1				1	2
Limited Free Travel		1	1			2
Scholarship or Tuition Assistance	1			1		2
Reduced Rate Lodging		1				1
Transportation to and from Work Site		1				1
TOTALS:	3	10	5	32	9	59

program participation requirement was the attainment of a 2.5 overall grade point average (GPA). This prerequisite was reported by 75% of the responding universities, but by just one of the four year institutions. Only one of the two year colleges held to this criterion.

Four universities, three 4 year institutions, and two 2 year colleges imposed a 2.0 overall GPA as a co-op program participation requirement. Three institutions, all four year colleges, reported a 3.0 co-op program

participation requirement. Three universities and one 4 year institution reported variable, academic major or employer determined GPA criteria ranging from 2.0 to 3.0. One 2 year college indicated a 2.0 in major (only) requirement. All of the above academic performance based co-op program participation requirements were predicated on a standard 4 point scale.

Institution or Employer Specific Requirements. The survey revealed a number of institution specific co-op program

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participation requirements. These criteria included departmental permission, company/agency interviews, and co-op coordinator/instructor approval.

Employer specific requirements pertained primarily to federal government sponsored and professional pilot related co-op programs. The government requirements included the attainment of requisite scores on written tests (e.g., the Air Traffic Controller examination), passing psychological and physical examinations, and successfully completing a security clearance investigation. Professional pilot related co-op program participation requirements entailed the possession of a Commercial Pilot Certificate with an Instrument and Multi-engine Rating.

CONCLUSIONS

Although the number of institutions participating in this investigation was disappointingly small, sufficient information was acquired to provide: (a) a conceptual point-of-departure for co-op program developers with little or no previous experience in the field and, (b) useful comparative facts and figures for involved institutions interested in assessing their co-op offerings relative to those of other schools.

Among the salient general findings were those evidencing:

1. the prominence of federal government versus private sector co-op employers,
2. the dominance of aviation management among the twelve reported co-op program supported aviation areas of study, and
3. the wide variability in co-op student

salaries and benefit packages.

A number of interesting, if not surprising, trend related findings common to the various co-op program sponsoring institution types (e.g., public/private, two year/four year, etc.) were also revealed.

The low survey return rate is believed to be at least partially attributable to an underlying cognitive impediment not anticipated at the outset of the investigation, i.e., an apparent difficulty in discerning the difference between co-op programs and internships. It is suspected that many survey recipients elected not to respond to the solicitation due to an inability or unwillingness to grapple with this ambiguity or, more likely, because their institution's offering carried an "internship" course title. Co-op and internship programs were reportedly treated as essentially synonymous activities by 20% of the institutions participating in the study. This revelation would suggest that as many as 80% of the respondents viewed co-op and internship offerings as being categorically distinct. The fact that a number of institutions reportedly conducted both types of programs as separate course offerings would support the contention that there is indeed a fundamental difference between them. Perhaps a commonly accepted basis for distinguishing between co-op and internship programs has already been articulated. If so, it has been poorly communicated throughout the collegiate aviation community. If not, the ubiquitous vagaries surrounding this programmatic dichotomy are in need of scholarly attention. □

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