FAA HAS OPPORTUNITIES TO REDUCE ACADEMY TRAINING TIME AND COSTS BY INCREASING EDUCATIONAL REQUIREMENTS FOR NEWLY HIRED AIR TRAFFIC CONTROLLERS

Federal Aviation Administration

Report Number: AV-2006-021
Date Issued: December 7, 2005

Memorandum

U.S. Department of Transportation
Office of the Secretary
of Transportation
Office of Inspector General

Subject: ACTION: FAA Has Opportunities To Reduce Academy Training Time and Costs by Increasing Educational Requirements for Newly Hired Air Traffic Controllers
AV-2006-021

Date: December 7, 2005

From: David A. Dobbs
Assistant Inspector General for Aviation and Special Program Audits

Reply to Attn. of: JA-10

To: Federal Aviation Administrator

This report presents the results of our audit of the Federal Aviation Administration's (FAA) training process for newly hired air traffic controllers. The objective of our audit was to determine if FAA has considered alternative approaches that could expedite the training process and reduce costs associated with training new controllers. Our audit focused on training provided at the FAA Academy and was conducted from April through July 2005. The scope of our audit and the methodology we used in conducting it can be found in Exhibit A. The locations we contacted or visited can be found in Exhibit B.

BACKGROUND

Attrition in FAA's air traffic controller workforce is expected to rise sharply in upcoming years as controllers hired after the 1981 Professional Air Traffic Controllers Organization controllers' strike become eligible for retirement. FAA currently estimates that it will need to hire and train approximately 12,500 new controllers over the next 10 years. The training process to become a Certified Professional Controller is extensive. The first phase is usually initial qualification training at the FAA Academy in Oklahoma City. Initial qualification training at the Academy consists primarily of academic and simulation training.

Classroom instruction includes training on general aviation topics such as dissemination of weather information, traffic separation, and visual operations. Simulation training is an intensive training process where students practice complex

scenarios and become familiar with FAA-specific operations and equipment. As shown in Table 1, the FAA Academy currently allocates the equivalent of approximately 37 class days for initial terminal training and 53 days for initial en route training. Fourteen classroom days (38 percent) are used to teach academics in the terminal option and 16 days (30 percent) in the en route option. The remaining days are used primarily for simulation training.

Table 1. FAA Academy Training

	Terminal Option		En Route Option	
	Days	**Percent**	**Days**	**Percent**
Academic Training	14	38%	16	30%
Simulation Training	21	57%	36	68%
Performance Verification Testing	2	5%	1	2%
Total	**37**		**53**	

Source: FAA Academy, May 2005

A performance verification test is administered at the end of training. Students who fail the test are provided additional training and given one more opportunity to demonstrate their skills. Students who pass the test report to their assigned facility to begin on-the-job training (OJT). OJT consists of a combination of training on live air traffic with an experienced controller, as well as classroom and simulation training specifically tailored to the individual facility. OJT is the longest part of the training process and currently can take from 8 months to 3 years in the terminal environment and from 3 to 5 years in the en route environment.

RESULTS IN BRIEF

During our audit, we observed an opportunity for FAA to reduce the time and costs associated with training new air traffic controllers while maintaining the high quality and standards of those services. Specifically, we found that FAA could reduce new controller training time and costs by identifying specific coursework conducted at the FAA Academy that could be discontinued as part of Government-provided training and instead making the coursework a prerequisite to employment as an FAA controller. For example, a portion of initial qualification training at the Academy includes classroom instruction on general aviation topics, such as the dissemination of weather information, traffic separation, and visual operations. Those topics are also provided as part of existing aviation programs at colleges and universities.

If those general courses were a prerequisite to employment as an FAA air traffic controller, the Academy could concentrate its resources on providing training that focuses more on FAA-specific operations and equipment. This change would ensure that new controllers begin work with a solid background in general aviation principles and still receive standardized training on FAA procedures so that they are sufficiently prepared to start OJT at their assigned facility. We found several compelling reasons for considering this change.

- **Colleges and Universities Offer Courses Similar to Those Taught at the FAA Academy.** At five colleges and universities we visited, we found that many classroom subjects currently taught at the FAA Academy are also taught at the schools. For example, the FAA Academy provides academic instruction on subjects such as aircraft separation for the en route option. This topic was included in the curriculum in all the aviation programs we reviewed. In total, 35 of 38 subjects currently taught by the FAA Academy were also included in the aviation program of one or more of the schools we visited. Exhibit C provides the details of our analysis.

- **There Are Numerous Schools That Already Have Well-Established Aviation Programs.** We found that there are numerous schools throughout the country that already have well-established aviation programs. In fact, the FAA Academy currently uses instructors from the University of Oklahoma to augment its own staff of instructors when needed to meet its training mission. At one university we visited (the University of North Dakota), the Norwegian government previously contracted with the university to provide all initial training for its new air traffic controllers. After completing training, those controllers went directly to their assigned facility to begin OJT.

  We also met with officials from the University Aviation Association and the Council on Aviation Accreditation. These organizations play pivotal roles in the advancement of degree-granting aviation programs at over 100 colleges and universities. The officials stated that they do not currently have a formal relationship with the FAA, but they are hoping to establish one. Exhibit D provides the current listing of schools belonging to the University Aviation Association.

- **Colleges and Universities We Visited Were Interested in Expanding Their Curriculum.** At all the schools we visited, school officials were interested in expanding their course offerings to include academic coursework currently taught at the FAA Academy. This training would be taken at the expense of students, not the Government. For example, school officials at the Metropolitan State College of Denver developed a proposal for a 4-year curriculum that grants a bachelor's degree in air traffic control. According to school officials, they

contacted FAA in May 2005 to request information on expanding their program, but as of July 2005 FAA had not responded to their request. According to FAA, on August 17, 2005, an e-mail message was sent to the school that included the statement of work and criteria used to expand the Agency's Collegiate Training Initiative (CTI) program.

- **Controller Candidates Should Be Expected To Meet Some Educational Requirements.** In our opinion, it is not unreasonable to require new controllers to have a minimum level of air traffic education as a prerequisite to employment, considering fully certified FAA air traffic controllers earned an average base salary of $117,000 in fiscal year (FY) 2005. Many professional positions within the Federal Government require a minimal level of education. For example, applicants for positions such as foresters, physical therapists, librarians, and social workers all must have a degree in their area of expertise as a prerequisite to employment. Exhibit E contains a sample of Federal positions and the educational requirements that must be met to qualify as an applicant for those positions.

- **Changing Educational Requirements Could Save FAA a Minimum of $16 Million.** By identifying specific subjects currently taught at the FAA Academy and making those courses a prerequisite to employment as an air traffic controller, FAA could save between $16.8 million and $21.3 million over the next 9 years (2006 to 2014).[1] Those savings could be substantially higher should FAA determine that other portions of Academy training (such as simulation training) could likewise be converted in the future. Exhibit A shows the methodology we used to estimate this savings.

FAA has embarked on a similar concept in the past. In the early 1990s, FAA established the CTI program, which still exists today. The CTI program is a non-funded partnership with 13 colleges and universities that provides FAA with a hiring pool of graduates who possess a broad-based knowledge of the air traffic management system and the aviation industry. If hired by FAA, however, graduates of the program must still attend the FAA Academy and neither the program nor the coursework is required as a prerequisite to employment with FAA as an air traffic controller.

We recognize that changing the requirements for new air traffic controllers would necessitate a paradigm change on the part of the FAA Academy. In the past, the FAA Academy was the sole "manager" of all phases of initial training for new controllers. Changing the coursework requirements for new controllers would

[1] We revised the estimated savings from our draft report to reflect the estimated savings used by FAA in its response to our draft.

require the Academy to assume responsibility for establishing, communicating, and overseeing the curriculum provided by the academic community in addition to providing FAA-specific training. However, as FAA begins hiring and training the next generation of air traffic controllers, FAA needs to consider other ways of doing business.

In our opinion, this change could provide FAA with a larger pool of candidates that are well-versed in the general academics of aviation and air traffic control, while allowing the FAA Academy to focus its resources on standardized training on FAA policies, procedures, and equipment. With plans to hire 12,500 new controllers over the next 10 years, we believe FAA must carefully evaluate any and all opportunities to reduce the time and costs of training new controllers while maintaining the quality and standards of those services.

We are recommending that FAA identify specific coursework conducted at the FAA Academy and determine if those courses could be made a prerequisite to employment as an air traffic controller. We are also recommending that FAA include that determination in the next update to FAA's Controller Workforce Plan, which is due at the beginning of the FY 2007 appropriations cycle. A complete list of our recommendations can be found on page 9.

Agency Comments and Office of Inspector General Response

On August 17, 2005, we provided FAA with a draft of our report. On October 17, 2005, FAA gave us its formal response to our draft, which is contained in its entirety in the Appendix. FAA concurred with our recommendations but had comments regarding the estimated savings. According to FAA, while the percentage of time spent in academic and simulator training used in our report is correct, the same percentage does not apply directly to the costs. This is because, according to FAA, simulator training is more expensive to provide than academic training. Accordingly we used FAA's estimates in this report. Nevertheless, the Agency agreed that the "potential savings are significant." FAA estimates that total savings could be between $16.8 million and $21.3 million over 9 years.

Additionally, while FAA concurred with our recommendation to determine if certain coursework could be discontinued as part of FAA-provided training, it did not agree to report the results of that determination in the next update of the Agency's Controller Workforce Plan. According to FAA, the next update of the plan is due in December 2005 and, given the time required to complete the necessary staff work, it could not meet that deadline. Instead, FAA proposes reporting its conclusions in the December 2006 update of the Controller Workforce Plan, or sooner if completed.

We agree that a December 2005 deadline is unrealistic but do not agree that an additional year of staff work is necessary. By December 2006, FAA will already be 2 years into its 10-year plan for hiring and training 12,500 new controllers, and FAA's assessment would be needed sooner than a year from today for it to be of meaningful utility to the Agency's stakeholders. Accordingly, we are requesting that FAA reconsider its timeframes for reporting its determination and provide us with new milestones.

OBSERVATIONS

FAA Has Taken Steps To Reduce the Time and Costs To Train New Air Traffic Controllers but Needs To Consider Additional Opportunities

In December 2004, FAA published its "10-Year Strategy for the Air Traffic Control Workforce." This workforce plan details FAA's strategy for managing the hiring and training of approximately 12,500 new controllers from FY 2005 to FY 2014. The plan also includes measures to reduce training costs. For example, in an effort to reduce costs of initial qualification training at the FAA Academy, FAA plans to convert the initial 5-week Air Traffic Basics course to a web-based course. According to the workforce plan, FAA estimates that about 30 percent of all new hires would have been required to attend this course at the Academy. Changing this course to web-based instruction that controller candidates would take individually instead of at the Academy should reduce the costs associated with that portion of training.

FAA also changed the way newly hired controllers (without prior air traffic experience) are compensated while attending the FAA Academy. In the past, those trainees attending initial qualification training were reimbursed for all expenses (e.g., travel costs and room and board) and were paid annual salaries of at least $25,000. FAA now hires those controllers as temporary excepted appointments (not to exceed 6 months) and pays salaries commensurate with an entry-level position (about $18,000 a year). Additionally, while FAA still pays for students' travel costs, it has eliminated reimbursement for room and board.

Components of FAA's Academy Training for New Air Traffic Controllers Are Similar to Subjects Taught at Colleges and Universities

During our audit, we visited five colleges and universities (Auburn University, Metropolitan State College of Denver, University of North Dakota, Community College of Beaver County, and Embry-Riddle University). Three of the schools are CTI schools and the remaining two have well-established aviation education programs. We visited those schools because they provide specific course work in

air traffic control and to compare course offerings and simulation technology at these schools with training provided at the FAA Academy.

We found that a number of subjects taught at the FAA Academy are included in the aviation curriculum at the five schools we visited (see Exhibit C). For example, the FAA Academy provides academic instruction on subjects such as aircraft separation for the en route option. Our analysis showed that this topic was included in the curriculum in all the aviation programs we reviewed. In total, 35 of 38 subjects that are currently taught by the FAA Academy were also included in the aviation program at one or more of the schools we visited.

At one school, the training actually exceeded coursework taught at the Academy. At the Community College of Beaver County, we found students were provided experience controlling live air traffic in a terminal environment. In some cases, these students passed an FAA examination and earned a Control Tower Operator certificate, which authorizes them to control air traffic at a tower. Although these graduates are certified to control live air traffic, FAA managers stated that under the current hiring process these graduates must still attend 37 class days of terminal training at the FAA Academy.

At another university we visited (the University of North Dakota), the Norwegian government previously contracted with the university to provide all initial training for its new air traffic controllers. Upon completion of training, these controllers went directly to their assigned facility for on-the-job training.[2]

Colleges and Universities Are Interested in Providing Initial Air Traffic Controller Academic Training

At all the schools we visited, we found that school officials were interested in expanding their course offerings to include academic coursework currently taught at the FAA Academy. For example, school officials at the Metropolitan State College of Denver developed a proposal for a 4-year curriculum leading to a bachelor's degree in air traffic control. According to school officials, they contacted FAA in May 2005 to request information on expanding their program, but as of July 2005 FAA had not responded to their request. According to FAA, on August 17, 2005, an e-mail message was sent to the school that included the statement of work and criteria used to expand the Agency's CTI program.

We also met with officials from the University Aviation Association and the Council on Aviation Accreditation. These organizations play pivotal roles in the advancement of degree-granting aviation programs at over 100 colleges and

[2] The school no longer provides this training for the Norwegian government because Norway formed a partnership with Denmark and Sweden to conduct training within those countries.

universities (see Exhibit D). The officials stated that while they do not have a formal relationship with the FAA, they are hoping to establish one.

We also asked FAA if they provided any guidance to schools on curriculum taught at the FAA Academy. FAA managers explained that only CTI schools were given details on the Air Traffic Basics course and that no information was released on the curriculum for either the en route or terminal options.

FAA Needs To Consider Other Opportunities To Reduce the Time and Costs To Train New Air Traffic Controllers

With plans to hire 12,500 new controllers over the next 10 years, FAA must consider all opportunities to reduce the time and costs to train new air traffic controllers. One such opportunity would be for FAA to increase the educational requirements for new controllers and discontinue some classroom training currently taught at the FAA Academy at Government expense. Based on our sample of five universities and colleges, we found that:

- schools already provide a substantial portion of classroom training currently taught at the FAA Academy;
- there are numerous schools that have certified aviation programs; and
- schools are willing to alter their curricula to meet FAA requirements, with coursework costs borne by the student and not the Government.

In our opinion, it is not unreasonable to require new controllers to have a minimum level of air traffic education as a prerequisite to employment, considering fully certified FAA air traffic controllers earned an average base salary of $117,000 in FY 2005. Many professional positions within the Federal Government require a minimal level of education. For example, foresters, physical therapists, and social workers all must have a degree in their area of expertise as a prerequisite to employment. Exhibit E contains a sample of Federal positions and the educational requirements that must be met to qualify as an applicant for those positions.

We are recommending that FAA identify specific coursework at the FAA Academy that is currently provided or could be provided by colleges and universities. FAA then needs to determine if those courses could be discontinued as part of FAA-provided training and instead made a prerequisite to employment as an air traffic controller. We are further recommending that FAA include its determination in the next update to its Controller Workforce Plan, which is due at the beginning of the FY 2007 appropriations cycle.

FAA has embarked on a similar concept in the past. In the early 1990s, FAA established the CTI program, which still exists today. The CTI program is a non-

funded partnership with 13 colleges and universities that provides FAA with a hiring pool of graduates who possess a broad-based knowledge of the air traffic management system and the aviation industry. Graduates of the program hired by FAA, however, must still attend the FAA Academy and neither the program nor the coursework is mandatory or required as a prerequisite to employment with FAA as an air traffic controller.

We recognize that changing the requirements for new air traffic controllers would necessitate a paradigm change on the part of the FAA Academy. In the past, the FAA Academy was the sole "manager" of all phases of initial training for new controllers. Changing the coursework requirements for new controllers would require the Academy to assume responsibility for establishing, communicating, and overseeing the curriculum provided by the academic community in addition to providing FAA-specific training. However, as FAA begins hiring and training the next generation of air traffic controllers, FAA needs to consider other ways of doing business.

By increasing the educational requirements for new controllers and discontinuing a portion of classroom training at the FAA Academy, FAA could save between $16.8 million and $21.3 million over the next 9 years (FY 2006 to FY 2014). Those savings could be substantially higher should FAA determine that other portions of Academy training, such as simulation training, could likewise be made a prerequisite to employment for new air traffic controllers.

RECOMMENDATIONS

We recommend that the Federal Aviation Administrator:

1. Identify specific coursework taught at the FAA Academy as part of new controller training that is currently provided or could be provided by colleges and universities.

2. Determine if those courses could be discontinued as part of FAA-provided training and instead made a prerequisite to employment as an air traffic controller with the FAA.

3. Report the results of that determination to the Secretary, Congress, and the Office of Management and Budget as part of the next update to the Agency's Controller Workforce Plan, which is due at the beginning of the FY 2007 appropriations cycle.

AGENCY COMMENTS AND OFFICE OF INSPECTOR GENERAL RESPONSE

On August 17, 2005, we provided FAA with a draft of our report. On October 17, 2005, FAA gave us its formal response to our draft, which is contained in its entirety in the Appendix. FAA concurred with our recommendations but had comments regarding the estimated savings. According to FAA, while the percentage of time spent in academic and simulator training used in our report is correct, the same percentage does not apply directly to the costs. This is because, according to FAA, simulator training is more expensive to provide than academic training. Accordingly, we used FAA's estimates in this report. Nevertheless, the Agency agreed that the "potential savings are significant." FAA estimates that total savings could be between $16.8 million and $21.3 million over 9 years.

While FAA concurred with our recommendation to determine if certain coursework could be discontinued as part of FAA-provided training, it did not agree to report the results of that determination in the next update of the Agency's Controller Workforce Plan. According to FAA, the next update of the plan is due in December 2005 and, given the time required to complete the necessary staff work, it could not meet that deadline. Instead, FAA proposes reporting its conclusions in the December 2006 update of the Controller Workforce Plan, or sooner if completed.

We agree that a December 2005 deadline is unrealistic but do not agree that an additional year of staff work is necessary. By December 2006, FAA will already be 2 years into its 10-year plan for hiring and training 12,500 new controllers. FAA's assessment is needed sooner than a year from today for it to be of meaningful use to the Agency's stakeholders. Accordingly, we are requesting that FAA reconsider its timeframes for reporting its determination and provide us with new milestones.

In its response, FAA also makes several comments about issues that we would like to clarify. First, FAA states that our report does not address the possibility that FAA will face oversight costs if colleges and universities are encouraged to provide more academic training. On page 4 of the report, we state that "Changing the coursework requirements for new controllers would require the Academy to assume responsibility for establishing, communicating, and overseeing the curriculum provided by the academic community in addition to providing FAA-specific training." We recognize that there would be costs associated with oversight activities but expect that they would be minimal in comparison to the costs of providing the training directly.

Second, FAA states that the Agency has already reduced controller training time through the CTI program, which we also agree with and cite in our report. On page 4, we state:

> FAA has embarked on a similar concept in the past. In the early 1990s, FAA established the CTI program, which still exists today. The CTI program is a non-funded partnership with 13 colleges and universities that provides FAA with a hiring pool of graduates who possess a broad-based knowledge of the air traffic management system and the aviation industry.

However, we also point out that if hired by FAA, graduates of the program must still attend the FAA Academy, and neither the program nor the coursework is required as a prerequisite to employment with FAA as an air traffic controller.

Third, FAA states that our report attempts to connect the University of Oklahoma's Department of Aviation with the air traffic instructional services contract currently awarded to the University and that the entities are unrelated. According to FAA, the University was awarded the contract to provide instructors to supplement FAA staffing. We find this comment perplexing as our intent in the report was to simply demonstrate that FAA already uses a university to supplement its own instructors, which it does.

ACTIONS REQUIRED

FAA's planned actions are responsive to all of the report's recommendations. However, as stated in our response, we believe the target completion dates need to be revised. In accordance with Department of Transportation Order 8000.1C, we are requesting that FAA provide us with new milestones for completion of its determination within 30 calendar days.

We appreciate the courtesies and cooperation of FAA representatives during this audit. If you have any questions concerning this report, please call me at (202) 366-0500 or Daniel Raville, the Program Director, at (202) 366-1405.

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cc: FAA Deputy Administrator
FAA Chief of Staff
Anthony Williams, ABU-100

EXHIBIT A. SCOPE AND METHODOLOGY

The audit was conducted in accordance with Generally Accepted Government Auditing Standards prescribed by the Comptroller General of the United States and included such tests as we considered necessary to provide reasonable assurance of detecting abuse or illegal acts. The observations contained in this report were initially identified during our audit "Opportunities To Improve FAA's Process for Placing and Training Air Traffic Controllers in Light of Pending Retirements" (AV-2004-060, June 2, 2004) and were further developed during this review. We used information collected during our initial and current audit efforts in preparing this report.

During the initial review, we also visited the Minneapolis Community & Technical College in Minneapolis, Minnesota. We did not include this school in our analysis because it is currently in the process of changing its program. In the past, graduates from this school went directly to a facility to begin on-the-job training. However, because they are not receiving any congressional funding, the school has elected to apply for the CTI program. Its new program is currently in the approval process with FAA.

To determine whether FAA has considered alternative approaches that could expedite the training process and reduce costs associated with training new controllers, we interviewed officials from the FAA Academy and Headquarters. We also contacted officials from five universities and colleges and two academic associations (see Exhibit B).

We compared course offerings at five colleges and universities with training provided at the FAA Academy (see Exhibit C). To conduct the comparison, we obtained detailed course materials, syllabi, and course outlines and compared them with subjects taught at the FAA Academy. We did not conduct a comparison of time expended teaching a topic.

We also analyzed historical cost data and course information provided by FAA to identify potential cost savings. According to officials at the FAA Academy, the cost of providing option-specific training was about $12,750 for the en route and $10,267 for the terminal option for each student.

We also reviewed course information at the FAA Academy and identified the percentage of time spent on academic instruction for initial training in the en route (30 percent) and terminal (38 percent) options.

We then multiplied the percentage of time spent teaching academics with the cost of providing the training and estimated that FAA incurred costs for teaching academics

of about $3,825 (30 percent x $12,750) for the en route option and $3,901 (38 percent x $10,267) for the terminal option. According to FAA officials, all new hires in the en route option will go to the Academy and, currently, only about half of those in the terminal option.

We then reviewed FAA's 10-year hiring plan and supporting documents to determine how many controllers FAA planned to hire over the next 9 years for each option. Finally, we multiplied the anticipated number of new hires for each option by the cost of providing academic training ($3,825 or $3,901) over 9 years to obtain potential cost savings of between $35 million and $47 million. For the terminal option, we used a range of between 50 and 100 percent of new hires who would attend the Academy (see Tables 2 and 3).

Table 2. Potential Cost Savings: En Route Option

Fiscal Year	FAA 10-Year Hiring Plan	Estimated Number of Students Attending Academics (100 percent of new hires)	Cost of Training Devoted to Academics (30 percent x $12,750)	Potential Cost Savings
2006	1,129	1,129	$3,825	$4,318,425
2007	720	720	$3,825	$2,754,000
2008	576	576	$3,825	$2,203,200
2009	624	624	$3,825	$2,386,800
2010	656	656	$3,825	$2,509,200
2011	704	704	$3,825	$2,692,800
2012	624	624	$3,825	$2,386,800
2013	640	640	$3,825	$2,448,000
2014	656	656	$3,825	$2,509,200
Total				**$24,208,425**

Table 3. Potential Cost Savings: Terminal Option

Fiscal Year	FAA 10-Year Hiring Plan	Estimated Number of Students Attending Academics (50 to 100 percent of new hires)	Cost of Training Devoted to Academics (38 percent x $10,267)	Potential Cost Savings
2006	120	60 to 120	$3,901	$234,060 to $468,120
2007	528	264 to 528	$3,901	$1,029,864 to $2,059,728
2008	528	264 to 528	$3,901	$1,029,864 to $2,059,728
2009	528	264 to 528	$3,901	$1,029,864 to $2,059,728
2010	756	378 to 756	$3,901	$1,474,578 to $2,949,156
2011	804	402 to 804	$3,901	$1,568,202 to $3,136,404
2012	864	432 to 864	$3,901	$1,685,232 to $3,370,464
2013	792	396 to 792	$3,901	$1,544,796 to $3,089,592
2014	816	408 to 816	$3,901	$1,591,608 to $3,183,216
Total				**$11,188,068 to $22,376,136**

FAA agreed with the percentages of time spent in academic and simulator training but did not agree that the same percentage applies directly to the costs (30 percent for terminal and 38 percent for en route). Instead, FAA estimated that the academic portion of Academy training represents about 14.5 percent of the total costs for the terminal option and about 15.5 percent for the en route option. Using those percentages, FAA estimates savings of between $4,258,980 and $8,517,960 for the terminal option and $12,518,762 for the en route option. Over 9 years, FAA estimates the total savings would be between $16.8 million and $21.3 million. We used FAA's estimated savings in this report.

EXHIBIT B. ACTIVITIES VISITED OR CONTACTED

FAA Facilities

- Mike Monroney Aeronautical Center—FAA Academy
- FAA Headquarters

Colleges and Universities

- Auburn University
- Metropolitan State College of Denver
- University of North Dakota
- Community College of Beaver County
- Embry-Riddle University

Academic Associations

- University Aviation Association
- Council on Aviation Accreditation

Other Associations

- National Air Traffic Controllers Association

EXHIBIT C. COMPARISON OF SUBJECTS TAUGHT AT FIVE COLLEGES AND UNIVERSITIES WITH TRAINING PROVIDED AT THE FAA ACADEMY FOR NEW AIR TRAFFIC CONTROLLERS

Terminal Academic Subjects	FAA Academy	Auburn University	Metropolitan State College of Denver	Embry-Riddle University	University of North Dakota	Community College of Beaver County
Human Factors	X		X		X	X
Terminal Controller	X			X	X	X
General Control	X					
Position Relief Briefing	X					X
Tower Equipment	X		X	X	X	X
Strip Marking	X	X	X	X	X	X
Flight Data Input/Output	X	X				X
NWS Tower Visibility Certification	X					
Disseminating Weather	X		X	X	X	X
Automated Surface Observation System	X					
Wind Shear and Low Level Wind Shear Alert System	X				X	
Automatic Terminal Information Service	X		X	X	X	
Clearance Delivery and ATC Clearances	X	X	X	X	X	X
Wake Turbulence and Separation Rules	X	X	X	X	X	X
Ground Control Duties and Responsibilities	X	X		X	X	X
Taxi and Ground Movement Procedures	X		X	X	X	X
Airport Conditions, Uses, and Lighting	X		X	X	X	X

Exhibit C. Comparison of Subjects Taught at Five Colleges and Universities With Training Provided at the FAA Academy for New Air Traffic Controllers

En Route Academic Subjects	FAA Academy	Auburn University	Metropolitan State College of Denver	Embry-Riddle University	University of North Dakota	Community College of Beaver County
Runway Incursions	X	X		X	X	X
Local Control Duties and Responsibilities	X	X		X	X	X
Visual Flight Rules, Arrivals	X			X	X	X
Visual Flight Rules, Departures	X			X	X	X
Instrument Flight Rules, Arrivals and Departures	X			X	X	X
Visual Operations	X			X	X	X
Radio and Interphone Procedures	X		X	X	X	X
Flight Progress Strips	X	X	X	X	X	X
Recording Clearances and Control Information	X		X		X	X
Forward Flight Plan and Control Information	X		X		X	X
General Control and Board Management	X					
Instrument Flight Rules, Clearance, and Route Assignments	X	X	X			X
Departure Procedures	X		X			X
Altimeter Setting and Altitude Assignment Requirements	X		X	X	X	X
Holding Procedures	X	X	X		X	
Arrival/Approach Procedures	X	X	X	X	X	X
Letters of Agreement	X		X	X	X	
Vertical Separation	X	X	X	X	X	X
Lateral Separation	X	X	X	X	X	X
Longitudinal Separation	X	X	X	X	X	X

Exhibit C. Comparison of Subjects Taught at Five Colleges and Universities With Training Provided at the FAA Academy for New Air Traffic Controllers

En Route Academic Subjects	FAA Academy	Auburn University	Metropolitan State College of Denver	Embry-Riddle University	University of North Dakota	Community College of Beaver County
Initial Separation of Arrivals and Departures	X	X	X	X	X	X

To conduct this comparison, we obtained detailed course materials, syllabi, and course outlines and compared them with subjects taught at the FAA Academy. We did not conduct a comparison of time spent teaching a topic.

Exhibit C. Comparison of Subjects Taught at Five Colleges and Universities With Training Provided at the FAA Academy for New Air Traffic Controllers

EXHIBIT D. LIST OF UNIVERSITY AVIATION ASSOCIATION SCHOOLS IN THE UNITED STATES

School	City	State
Auburn University	Auburn	Alabama
University of Alaska—Anchorage	Anchorage	Alaska
Arizona State University	Mesa	Arizona
Embry-Riddle Aeronautical University	Prescott	Arizona
Henderson State University	Arkadelphia	Arkansas
Northwest Arkansas Community College	Bentonville	Arkansas
Mt. San Antonia College	Walnut	California
San Jose University	San Jose	California
Aims Community College	Greeley	Colorado
Metropolitan State College of Denver	Denver	Colorado
Naugatuck Valley Community College	Waterbury	Connecticut
Delaware State University	Dover	Delaware
Broward Community College	Pembroke Pines	Florida
Embry-Riddle Aeronautical University	Daytona Beach	Florida
Florida Community College	Jacksonville	Florida
Florida Institute of Technology	Melbourne	Florida
Florida Memorial College	Miami	Florida
Jacksonville University	Jacksonville	Florida
Lynn University	Boca Raton	Florida
Miami-Dade Community College	Homestead	Florida
Clayton College and State University	Morrow	Georgia
Georgia Aviation Technical College	Eastman	Georgia
Georgia State University	Atlanta	Georgia
Honolulu Community College	Honolulu	Hawaii
Lewis University	Romeoville	Illinois
Southern Illinois University—Carbondale	Carbondale	Illinois
University of Illinois—Institute of Aviation	Savoy	Illinois
Indiana State University	Terra Haute	Indiana
Purdue University	West Lafayette	Indiana
Iowa Lakes Community College	Estherville	Iowa
University of Dubuque	Dubuque	Iowa
Kansas State University—Salina	Salina	Kansas
Eastern Kentucky University	Richmond	Kentucky
Louisiana Tech University	Ruston	Louisiana
The University of Louisiana at Monroe	Monroe	Louisiana
Community College of Baltimore County	Baltimore	Maryland
University of Maryland Eastern Shore	Princess Anne	Maryland
Bridgewater State College	Bridgewater	Massachusetts
North Shore Community College	Danvers	Massachusetts

School	City	State
Andrews University Airpark	Berrien Springs	Michigan
Eastern Michigan University	Ypsilanti	Michigan
Western Michigan University	Battle Creek	Michigan
Academy College	Bloomington	Minnesota
Minnesota State University—Mankato	Mankato	Minnesota
St. Cloud State University	St. Cloud	Minnesota
Delta State University	Cleveland	Mississippi
Central Missouri State University	Warrensburg	Missouri
Parks College of Engineering and Aviation	Saint Louis	Missouri
Rocky Mountain College	Billings	Montana
University of Nebraska—Kearney	Kearney	Nebraska
University of Nebraska—Omaha	Omaha	Nebraska
Community College of Southern Nevada	Boulder City	Nevada
Daniel Webster College	Nashua	New Hampshire
Mercer County Community College	Trenton	New Jersey
San Juan College	Farmington	New Mexico
CUNY Aviation Institute	Jamaica	New York
Dowling College	Shirley	New York
Vaughn College of Aeronautics and Technology	Flushing	New York
Elizabeth City State University	Elizabeth City	North Carolina
Lenoir Community College	Kinston	North Carolina
University of North Dakota	Grand Forks	North Dakota
Bowling Green State University	Bowling Green	Ohio
Kent State University	Kent	Ohio
Ohio University	Albany	Ohio
The Ohio State University	Columbus	Ohio
University of Cincinnati—Clermont College	Batavia	Ohio
Southeastern Oklahoma State University	Durant	Oklahoma
Tulsa Community College	Tulsa	Oklahoma
University of Oklahoma	Norman	Oklahoma
Community College of Beaver County	Beaver Falls	Pennsylvania
Lehigh Carbon Community College	Allentown	Pennsylvania
Inter American University of Puerto Rico	San Juan	Puerto Rico
South Dakota State University	Brookings	South Dakota
Middle Tennessee State University	Murfreesboro	Tennessee
Tennessee State University	Nashville	Tennessee
Baylor University	Waco	Texas
Central Texas College	Killeen	Texas
LeTourneau University	Longview	Texas
Mountain View College	Dallas	Texas
San Jacinto College	Pasadena	Texas

Exhibit D. List of University Aviation Association Schools in the United States

School	City	State
Tarleton State University	Killeen	Texas
Texas Southern University	Houston	Texas
Texas State Technical College—Waco	Waco	Texas
Salt Lake Community College	Salt Lake City	Utah
Utah State University	Logan	Utah
Utah Valley State College	Orem	Utah
Westminster College	Salt Lake City	Utah
Averett University	Danville	Virginia
Hampton University	Hampton	Virginia
Liberty University	Lynchburg	Virginia
South Seattle Community College	Seattle	Washington
Walla Walla College	College Place	Washington
Fairmont State University	Bridgeport	West Virginia
Blackhawk Technical College	Janesville	Wisconsin
Fox Valley Technical College	Oshkosh	Wisconsin
Gateway Technical College	Kenosha	Wisconsin

Exhibit D. List of University Aviation Association Schools in the United States

EXHIBIT E. EXAMPLES OF EDUCATIONAL REQUIREMENTS FOR A SAMPLE OF FEDERAL JOBS

Job Title	Education Requirements
Accountant	Completion of a 4-year course at an accredited college or university leading to at least a bachelor's degree in accounting or in a related field that included 24 semester hours of accounting.
Clinical Nurse	A degree or diploma from a professional nursing program approved by the legally designated state accrediting agency. Must have active, current registration as a professional nurse.
Contract Specialist	Completion of a 4-year course of study leading to a bachelor's degree in any field or completion of at least 24 semester hours in any combination of various majors.
Criminal Investigator	Bachelor's degree with overall GPA of 2.95 or above.
Editor	Master's or equivalent graduate degree or 2 full years of progressively higher level graduate education leading to a degree.
Electronics Engineer	Completion of a 4-year course of study leading to at least a bachelor's degree in a school of engineering with at least one curriculum accredited by the Accreditation Board for Engineering and Technology.
Forester	Successful completion of a 4-year course of study leading to a bachelor's degree with a major in forestry or a related subject that includes 30 semester hours in any combination of biological, physical, or mathematical sciences or engineering, of which at least 24 hours of course work is in forestry.
Information Technology Specialist	Successful completion of at least 2 years of graduate education leading to a master's degree in a related field.
Internal Revenue Agent	Bachelor's degree in any field that includes 30 semester hours of accounting.
Librarian	Successful completion of 2 years of higher level related graduate education or a master's degree in library science or a related master's degree.
Mathematical Statistician	A degree that includes 24 semester hours in mathematics and statistics.
Physical Therapist	A bachelor's degree in physical therapy or an equivalent certificate in physical therapy from an accredited college or university and completion of a physical therapy clinical practice program. Must have a license to practice physical therapy.
Social Worker	Master's Degree in Social Work from a school of social work accredited by the Council on Social Work Education. Must be licensed or certified at the master's level to independently practice social work in a state.
Wildlife Biologist	Must possess a degree in biological science.

Source: USAJOBS, the Office of Personnel Management's official web site for employment with the Federal Government (www.usajobs.opm.gov).

APPENDIX. MANAGEMENT COMMENTS

Subject: **INFORMATION:** FAA's Response to the OIG's Draft Report: FAA Has Opportunities to Reduce Academy Training Costs by Increasing Educational Requirements for Newly Hired Air Traffic Controllers

Date: Oct 17 2005

From: Assistant Administrator for Financial Services and Chief Financial Officer

Reply to Attn. of:

To: Assistant Inspector General for Aviation and Special Program Audits

This document represents the Federal Aviation Administration's (FAA) response to the subject Office of Inspector General's (OIG) draft report presented to the FAA on August 17, 2005. We appreciate the cooperation provided by your staff over the past two years as they examined the hiring and training processes for air traffic controllers.

We agree with your observation that the FAA faces a significant challenge to hire and train approximately 12,500 new controllers over the next ten years. To address this challenge, the FAA developed a comprehensive plan detailing our strategy and presented it to Congress in December 2004. Included in this plan are strategies to reduce the time and costs associated with training controllers. While the Air Traffic – Collegiate Training Initiative (AT-CTI) program is a valuable partner to achieve this goal, it is not our only strategy.

In reviewing the data and observations in this report, we have determined that a number of assumptions were made to reach the level of potential cost savings stated in the report. The following general comments will address these assumptions followed by the agency's response to each recommendation.

Potential Cost Savings Overstated by at Least 53 Percent

The report states that academic curriculum taught at the FAA Academy is currently taught at colleges and universities and could be made a prerequisite to employment as a controller. This section will discuss cost data and the viability of the report's observations will be discussed in the next section.

Over nine years, the report estimates savings of between $11,188,068 to $22,376,136 for Terminal and $24,208,425 for En Route. Combined, the report estimates a total projected savings of between $35 to $47 million over nine years. The report overstates the potential cost savings by $18.6 million to $25.5 million

dollars (53 to 55 percent). Despite this, the FAA agrees that the potential savings are significant.

Although the report accurately shows the percentage of time spent in academics, the report assumes this same percentage represents the total cost to deliver that portion of the course. It is the FAA's determination that the percentage of time spent in delivering academics is not the same as the percentage of cost of delivering that portion of the course. Simulation portions of both courses require more instructors and thus cost more to deliver. For example, the report indicates the time spent in the academic portion of the En Route course is 30 percent of the entire course. It then uses this percentage in Table 2 of the report to estimate savings of approximately $24 million over nine years. However, while the academic portion of En Route training represents 30 percent of the time to train at the academy, the academic portion of the En Route course represents only 10.3 percent of the cost to deliver the course. Likewise, the academic portion of the Terminal course represents only 7.4 percent of the cost to deliver the course and not 38 percent.

Additionally, the report does not factor in the costs associated with the daily salary paid to the students nor does it include the costs associated with ghost pilot salaries. Although there are no ghost pilot costs associated with the academic portion of the course, the costs associated with ghost pilot instruction would factor into the overall percentage of cost savings. In order to accurately calculate the overall cost to deliver the academic portion of the course, the total cost should incorporate the daily student salary costs plus the total cost of course instruction. The table below shows the percentage of time for each portion of the course and the estimated percentage cost for that portion.

Table 1. Percentage of Time and Cost for Terminal and En Route Courses

	Terminal Option			**En Route Option**		
	Days	**Time**	**Cost**	**Days**	**Time**	**Cost**
Academic Training	14	38%	7.4%	16	30%	10.3%
Simulation Training	21	57%	91.5%	36	68%	88.6%
Performance Verification Testing	2	5%	1.1%	1	2%	1.1%
Total	**37**			**53**		

Based on the true cost of delivering academics, we have re-calculated the estimated savings from Tables 2 and 3 from the OIG's report. The tables below show a more accurate estimate of savings if the academic portions of the Terminal and En Route courses were delivered outside of the Academy.

Appendix. Management Comments

Table 2. Adjusted Costs for Academic Training for the Terminal Option

COURSE BREAKDOWN:	STUDENT TERMINAL OPTION	STUDENT SALARIES ASSOCIATED WITH ACADEMIC TRAINING	INSTRUCTOR TERMINAL OPTION	CLASS SIZE 16 STUDENTS	INSTRUCTOR COSTS ASSOCIATED WITH ACADEMIC TRAINING	ADJUSTED PERCENTAGES	ADJUSTED PER STUDENT COSTS
Academic Days	14	(14 days X $69)		25		Student Time in Academics	
Total Class Days	37		Total Instr. Days	307		38%	
Salary Per Day	$69	$966	Average Instr. Salary per Day	$332			
Instruction Costs			Cost for Academics	$8,300	$8,300		
			Cost for Instruction	$101,924			
			Ghost Instr. Costs	$12,312			
			Total Instruction Cost	$114,236		Associated Costs	
Per Student Cost		$966			$519	**14.5%**	**$1,485**

Table 3. Adjusted Costs for Academic Training for the En Route Option

COURSE BREAKDOWN:	STUDENT EN ROUTE OPTION	STUDENT SALARIES ASSOCIATED WITH ACADEMIC TRAINING	*INSTRUCTOR* EN ROUTE OPTION	CLASS SIZE 16 STUDENTS	INSTRUCTOR COSTS ASSOCIATED WITH ACADEMIC TRAINING	ADJUSTED PERCENTAGES	ADJUSTED PER STUDENT COSTS
Academic Days	16	(16 days X $69)		46		Student Time in Academics	
Total Class Days	53		Total Instr. Days	405		30%	
Salary Per Day	$69	$1,104	Average Instr. Salary per Day	$304			
Instruction Costs			Cost for Academics	$13,984	$13,984		
			Cost for Instruction	$123,120			
			Ghost Instr. Costs	$12,960			
			Total Instruction Cost	$136,080		Associated Costs	
Per Student Cost		$1,104			$874	**15.5%**	**$1,978**

Table 4. Estimated Terminal Cost Savings

Fiscal Year	New Hires According to FAA's 10-Year HIRING PLAN	Estimated Number of Students Attending Academics (50%-100% of New Hires)	Portion of Training Cost Devoted to Academics Per Student (14.5% x $10,267)	Potential Cost Savings (# of Students Attending x Per Student Cost)
2006	120	60 to 120	$1,485	$89,100 to $178,200
2007	528	264 to 528	$1,485	$392,040 to $784,080
2008	528	264 to 528	$1,485	$392,040 to $784,080
2009	528	264 to 528	$1,485	$392,040 to $784,080
2010	756	378 to 756	$1,485	$561,330 to $1,122,660
2011	804	402 to 804	$1,485	$596,970 to $1,193,940
2012	864	432 to 864	$1,485	$641,520 to $1,283,040
2013	792	396 to 792	$1,485	$588,060 to $1,176,120
2014	816	408 to 816	$1,485	$605,880 to $1,211,760
Total				$4,258,980to $8,517,960

Table 5. Estimated En Route Cost Savings

Fiscal Year	New Hires According to FAA's 10-Year Hiring Plan	Estimated Number of Students Attending Academics (100% of New Hires)	Portion of Training Cost Devoted to Academics Per Student (15.5% x $12,750)	Potential Cost Savings (# of Students Attending x Per Student Cost)
2006	1,129	1,129	$1,978	$2,233,162
2007	720	720	$1,978	$1,424,160
2008	576	576	$1,978	$1,139,328
2009	624	624	$1,978	$1,234,272
2010	656	656	$1,978	$1,297,568
2011	704	704	$1,978	$1,392,512
2012	624	624	$1,978	$1,234,272
2013	640	640	$1,978	$1,265,920
2014	656	656	$1,978	$1,297,568
Total				$12,518,762

Over nine years, the Terminal estimated savings is between $4,258,980 and $8,517,960. The En Route estimated savings is $12,518,762. Combined, the estimated savings for both Terminal and En Route is between $16.8 million to $21.3 million over nine years; not $35 to $47 million as estimated in the report.

The report does not address the possibility the FAA will face oversight costs if colleges and universities are encouraged to provide more academic training. Potential savings could be partially offset by corresponding cost increases to the FAA due the expanded oversight role. The FAA will be required to ensure consistency and quality of expanded out-of-agency training programs, without resorting to subsidizing private training or other measures that would reduce efficiency and the potential for savings.

Discussion of the FAA Academy Training and Collegiate Curriculum

The report states that the FAA could reduce new controller training time and costs by identifying specific coursework conducted at the FAA Academy that could be discontinued as part of government provided training and instead made a

prerequisite to employment as a controller. In fact, the FAA has done that through the AT-CTI program.

Currently, controllers hired through the AT-CTI program by-pass the first five weeks of training at the FAA Academy. The first five weeks of FAA Academy training consist of air traffic "basics", or the foundational academic knowledge required of all new controllers regardless of what type of air traffic facility in which they will work. While the OIG observed that this basic classroom instruction is provided as a part of existing aviation programs at colleges and universities, we found that colleges have a wide variety of coursework that may or may not meet FAA requirements. This was evident during the evaluation of colleges during the AT-CTI expansion process from the original five colleges to our current thirteen colleges. To address these inconsistencies, the FAA provides the AT-CTI colleges with the exact curriculum taught at the FAA Academy on an annual basis.

Other Comments

The report attempts to connect the University of Oklahoma's (OU's) Department of Aviation with the air traffic instructional services contract currently awarded to OU. The two entities are entirely unrelated. OU was awarded the contract to provide instructors to supplement FAA staffing. They do that by hiring retired air traffic controllers with recent operational experience. This contract is not related to classes or students in the aviation degree programs at OU.

The report stated that officials at the Metropolitan State College of Denver (MSCD) developed a proposal for a 4-year curriculum that grants a bachelor's degree in air traffic control. They state that the school informed the FAA of their proposal in May 2005, and did not receive a response. A review of our records indicates that the FAA did not receive a proposal from MSCD describing their new bachelor's degree. Our records do indicate that a representative from MSCD contacted the FAA on June 27, 2005 inquiring about the AT-CTI program. That message was returned. Additional contact was made by MSCD on August 15, 2005, with a request for information. An e-mail message was sent to MSCD on August 17, 2005, that included the Statement of Work and evaluation criteria used to expand the current AT-CTI Program and a list of the teaching objectives required of all the AT-CTI colleges.

The FAA is committed to further training improvements, but recognizes there will always be a need for training programs at the FAA Academy to insure consistency across all controller applicants.

OIG Recommendations:

Recommendation 1. Identify specific coursework taught at the FAA Academy as part of new controller training that is currently provided or could be provided by colleges and universities.

Response: Concur. The FAA is committed to finding the most efficient process possible to meet our goal of hiring and training 12,500 new controllers over the next 10 years. The FAA will review the initial qualification curriculum taught at the FAA Academy in order to determine if that training could be provided by colleges and universities on a more cost-effective basis while ensuring the required level of quality.

Recommendation 2. Determine if those courses could be discontinued as part of FAA provided training and instead made a prerequisite to employment as an air traffic controller with the FAA.[3]

Response: Concur. Preliminary indications are that changing the basic qualifications for the air traffic profession is possible. Give the current state of ATC automation and technology, and the development of NGATS, the FAA is reviewing the existing qualifications to determine whether changes are required.

Recommendation 3. Report the results of that determination to the Secretary, Congress, and the Office of Management and Budget as part of the next update to the Agency's Controller Workforce Plan, which is due at the beginning of the FY 2007 appropriations cycle.

Response: Concur. The next update to the Agency's Controller Workforce Plan is due to Congress in December 2005 and is nearing completion. However, given the time required to complete the necessary staff work, the FAA will report our findings in the December 2006 Controller Workforce Plan, or sooner if complete.

Ramesh K. Punwani

[3] As a general practice, airlines hire pilots from a variety of sources with both civilian and military backgrounds. All newly hired pilots are required to undergo basic training regardless of experience level. The FAA correlates that this practice is also prevalent in training air traffic controllers.