FAA Independent Review Panel on the Selection, Assignment and Training of Air Traffic Control Specialists

FINAL REPORT

September 22, 2011

Mr. Michael Barr, Chairman
Dr. Tim Brady
Mr. Garth Koleszar
Dr. Michael New
Dr. Julia Pounds

Certification of Report

We, the undersigned, delivered the "FAA Independent Review Panel on the Selection, Assignment, and Training of Air Traffic Control Specialists" report to Randy Babbitt, FAA Administrator, on Thursday, September 22, 2011, at FAA Headquarters in Washington, D.C.

We have completed the work as specified by our May 2011 charter.

Michael L. Barr, Chairperson

Dr. Tim Brady

Garth Koleszar

Dr. Michael New

Dr. Julia Pounds

Executive Summary

The Independent Review Panel convened by the FAA Administrator has produced a comprehensive set of recommendations on air traffic controller selection, assignment and training. The Panel reviewed hiring sources, screening, selection and facility assignments; instructor selection, training content and delivery; organizational structure; and professional standards.

Hiring Sources and Selection: An extensive review of the Air Traffic Collegiate Training Initiative (AT-CTI) program revealed significant differences in the air traffic controller curriculum among the various institutions that participate. A number of recommendations relate specifically to weaknesses in this program as well as the predictive value of the Air Traffic Selection and Training (AT-SAT) test as a hiring tool.

Training Content and Delivery: During the course of the review, the Panel identified opportunities to improve the preparation of new controllers. Several of the recommendations address the need to have quality content delivered using effective practices and well-integrated processes.

Organizational Structure: The panel feels it is very important that one office holds the responsibility for coordinating the provision of air traffic technical training, as well as the means to fund and execute this responsibility. The Panel also found a lack of common understanding of the specific roles, responsibilities and contributions of the Air Traffic Organization (ATO) Office of Technical Training and the FAA Academy.

Professional Standards: The Panel looked at all levels of ATC specialist training and included recommendations to increase awareness and reinforce professional standards.

The recommendations address issues in these broad categories:

Selection Process: Initial hiring process and sources; effectiveness of the AT-SAT; use of the Centralized Selection Panel; and role and effectiveness of the AT-CTI programs;

Academy Training and Facility Assignment: Links between candidate performance and facility level assignment;

Field training: Content and delivery from initial to refresher, learning technology, classroom, simulator and on-the-job-training instructor selection, preparation, and evaluation;

Professional standards: First exposure and throughout the entire career;

Data and systems: Availability, quality and use to support hiring, placement, program review and evaluation, and application of new technologies for learning;

Coordination: Within the Air Traffic Organization (ATO) and throughout the FAA; and

Other observations: General observations, areas of concern and issues not covered in other sections.

The report that follows provides a detailed description of the observations in each area of study and specific recommendations to improve the hiring, assignment and training of air traffic controllers. The panel drew from presentations by various FAA departments, visits to the FAA Academy, field units and AT-CTI institutions. During these visits, the Panel met with potential applicants, newly hired controllers, Air Traffic Control Specialists, On-the-Job-Training Instructors (OJTIs), training managers and operational leaders. The Panel also reviewed previous studies conducted by both internal FAA and external organizations such as ATO Safety, ATO Office of Technical Training, FAA Human Resources Management, the Department of Transportation Office of the Inspector General (DOT IG) and the MITRE Corporation.

This in-depth review and subsequent recommendations can serve as a significant roadmap to increase workforce effectiveness for the FAA.

Table of Contents

EXECUTIVE SUMMARY 3

TABLE OF CONTENTS 5

LIST OF FIGURES 6

SECTION 1: COLLEGIATE TRAINING INITIATIVE PROGRAMS AND THE SELECTION PROCESS 7

KEY OBSERVATIONS 7
RECOMMENDATIONS 17

SECTION 2: ACADEMY TRAINING AND THE ASSIGNMENT PROCESS 19

KEY OBSERVATIONS 20
RECOMMENDATIONS 23

SECTION 3: FIELD TRAINING 26

KEY OBSERVATIONS 26
RECOMMENDATIONS 31

SECTION 4: PROFESSIONAL STANDARDS 34

KEY OBSERVATIONS 34
RECOMMENDATIONS 36

SECTION 5: ORGANIZATIONAL STRUCTURE AND ASSOCIATED AREAS OF RESPONSIBILITY 37

KEY OBSERVATIONS 37
RECOMMENDATIONS 40

SECTION 6: OTHER OBSERVATIONS AND RECOMMENDATIONS 41

KEY OBSERVATIONS 41
RECOMMENDATIONS 42

SECTION 7: SUMMARY OF RECOMMENDATIONS 43

APPENDICES 48

APPENDIX A: FAA PRESS RELEASE 49
APPENDIX B: PANEL BIOGRAPHIES 51
APPENDIX C: PANEL CHARTER 54
APPENDIX D: PANEL METHODOLOGY 56
APPENDIX E: LIST OF REFERENCES 59
APPENDIX F: LIST OF ACRONYMS 61

List of Figures

Figure 1-1 The USAF selection process for Undergraduate Pilot Training

Figure 1-2 Awarding points for AT-SAT scores

Figure 1-3 Awarding points for GPA scores

Figure 1-4 A proposed model for ATCS selection (AT-CTI hiring source only)

Figure 1-5 A graphical representation of the recommended changes to ATCS selection processes

Figure 2-1 A graphical representation of the recommended changes to ATCS initial training and assignment processes

Section 1: Collegiate Training Initiative Programs and the Selection Process

This section looked deeply into the Air Traffic Collegiate Training Initiative (AT-CTI) program. The Panel noted that not all AT-CTI programs are equal, and prescribed actions to address the issue. The Panel also delved into the selection process for controller candidates without prior experience in air traffic control and provided a model by which these selections can be more effective. See Section 7 for a summary of the recommendations.

Key Observations

Air Traffic Collegiate Training Initiative

Distinguishing Between AT-CTI Programs

There are 36 AT-CTI programs around the country, each with varying capabilities. Some teach only Air Traffic Basics, the only course required by the FAA for approved AT-CTI schools; others teach a full air traffic control curriculum, which includes courses and laboratories (some include practice in high-fidelity simulators) in Tower, Terminal Radar, En Route and Non-Radar operations. Yet, the FAA does not break down each school's capability and further discriminate how in-depth the curriculum is at the different schools; all AT-CTI schools are in the same category. Failing to understand the capabilities of each approved school deprives the FAA of accurately assessing the full benefit from each of the programs. Some distinction should be made of the capabilities regarding each program and the distinction should be carried forward into the selection process for Air Traffic Control Specialists (ATCS).

Tracking Performance

The Panel also concluded that the FAA should track the success of each hiring source so that it can determine from which source(s) success is prevalent. The use of this data would reduce the total training cost to the FAA. Currently, there is no means for tracking AT-CTI graduates through the process from AT-CTI program entrance to selection to full proficiency as a Certified Professional Controller (CPC). The data most likely resides in a variety of sources, but it has not been consolidated, collated and studied. This conclusion is supported in the ATC Hiring Process Tiger

Team Report[1] in which the team stated as a "short term modification" the need to "improve reporting capabilities and applicant tracking."

AT-CTI Levels

The Panel has concluded that the FAA needs to categorize AT-CTI schools by levels based upon the strength of a program's curriculum. An FAA team similar in function to accreditation teams used to evaluate other programs of higher learning would evaluate these schools. In this case, controllers from the field and instructors from the FAA Academy would participate as part of the evaluation team.

A proposed categorization having four levels could be:

- Level 4: Those institutions that teach Air Traffic Basics and all options (Tower, Terminal Radar, En Route and Non-Radar) with supporting labs for each option.

- Level 3: Those institutions that teach Air Traffic Basics and at least one option with supporting lab(s).

- Level 2: Those institutions that teach Air Traffic Basics and the theory of at least one option with no supporting lab(s).

- Level 1: Those institutions that teach only Air Traffic Basics including aircraft identification and performance.

Tracking Selectees by AT-CTI Levels and Other Categories

As briefed by the National Air Traffic Controllers Association (NATCA) working group[2], "an improved training and screening process should reduce attrition rates." Combining the methodology of evaluating AT-CTI schools and assigning a level to each program with the idea of tracking all selectees by hiring source (and, if AT-CTI, by level) from initial selection through full qualification will allow the FAA to determine the most efficient and most cost-effective groups to be trained as air traffic controllers. This, in turn, should reduce attrition rates of those selected for training.

Sharing Performance Information with AT-CTI Programs

It will become increasingly important for the FAA to share AT-CTI selectee training performance data with the institution from which the individual was graduated. Through these means, the institution can discover its

[1] FAA Air Traffic Controller Hiring Process Tiger Team Report, 2008
[2] Concurring Recommendations, July 2011

weaknesses and strengthen its curriculum to better serve the needs of the FAA.

Air Traffic Selection and Training (AT-SAT) Battery and Selection Testing

Predictive Value

The Panel could not find any completed studies that determined if the AT-SAT actually predicted job performance success among those who took the exam, were accepted for Academy training, and who subsequently entered and completed on-the-job training in the field. Without having an understanding of this type of longitudinal data, the FAA cannot be sure that the AT-SAT is accomplishing its original goals of predictability.

Bands Rather than Specific Scores

Also unknown is whether AT-SAT scores relate to training success. "Candidates who score from 70 to 84.9 are ranked in a band termed 'Qualified' while those who score from 85 to 100 are ranked as 'Well Qualified.'"[3] In a 2009 study relating to training failures, the Department of Transportation's Office of the Inspector General (DOT OIG) identified "a series of factors that could indicate trends and potential root causes of training failures. Those include: "… (3) hiring source and previous experience, (4) AT-SAT test scores and (5) Academy Performance Verification (PV) scores… there were not sufficient data on these factors to identify trends… aggregated data on these types of factors will become increasingly important."[4] To improve the predictability of the AT-SAT battery, it is important for the FAA to attempt to correlate controller training success and failure with specific scores on AT-SAT.

AT-SAT and Test Robustness

Several groups at various levels of field facilities question the robustness of the AT-SAT as a major factor in selecting candidates for air traffic control training. A recent DOT OIG study stated that "… overall AT-SAT scores have been higher than originally expected. Although the FAA scientists who designed the AT-SAT predicted that only 67.5 percent of all applicants would pass AT-SAT as originally designed, nearly 93 percent of all applicants currently achieve a passing score. AT-SAT has a high pass rate primarily because FAA reweighed elements from the original test…"[5] The Panel has concluded that, in addition to AT-SAT test scores, other factors should also be given appropriate weight in the selection decision.

[3] DOT OIG, Report #AV-2010-049
[4] Training Failures Among Newly Hired Air Traffic Controllers, 2009
[5] DOT OIG, Report #AV-2010-049

Exam Administration

Currently, a vendor administers the computer-based AT-SAT exam at various times and at various locations throughout the U.S. The FAA and the vendor, with input from AT-CTI program administrators, agree to the times and locations. This scheduling process results in making the test available only at specified times and places, which can result in a significant scheduling problem for the test taker, who has to try to match academic and personal schedules with testing times and test sites. The agency offers other FAA exams, such as those for pilots and aviation mechanics, through FAA-approved testing centers. The test taker can schedule the exam at his/her convenience at these centers. The Panel has concluded that the agency should offer the AT-SAT test through the existing FAA testing center system.

Frequency of Exam Retakes

Currently, the time span to re-take the AT-SAT is three years. The Panel concluded that this protracted time does not serve the interests of the FAA or the applicant. The Panel recommends that FAA reduce the time to one year.

Selection Process for Air Traffic Control Specialists

Current Selection Methodology

As reported in a 2010 DOT OIG report, “FAA currently assigns new controller candidates to facilities by considering candidates’ location preference, a summary of information from their employment application and a list of job openings.... Controller candidates are assigned to a facility before they undergo medical and security screening, receive a tentative employment offer from the Agency, or attend the FAA Academy for initial training. Candidates are not even given a face-to-face interview with FAA officials prior to receiving their facility assignment.”[6]

This one-step process deprives the FAA from making facility assignments relative to a candidate’s strengths. Quite likely, the process also results in protracted training time in the field with its attendant added costs. The Panel concluded that selection for ATCS training and selection for assignment to a facility should be a two-step process. This section covers selection for initial training at the FAA Academy. Selection for assignment to a facility is covered in Section 2 of this report.

[6] DOT OIG, Report #AV-2010-049

Centralized Selection Panel

"The facility placement process is conducted by a Centralized Selection Panel, consisting of managers from selected air traffic facilities, that assigns candidates using a referral list… these Panel members have only limited data on candidates' AT-SAT results… They primarily base facility assignments on applicants' geographical choices by state… and applicants' choices on their desired type of facility—either En Route or terminal…"[7] Essentially, having been supplied with very little information, the Centralized Selection Panel is operating in the blind and is making selections that will obligate the FAA for years to come. The Panel confirmed this by conversations with several air traffic professionals who had served on a Centralized Selection Panel. In attempting to compare this process with that of other government agencies, the Independent Review Panel looked at the method used by the United States Air Force (USAF) to select pilots for undergraduate pilot training (UPT).

The *Air Force Method*

"(The Air Force) selection for UPT is accomplished via an Order of Merit (OM) listing of qualified cadets that volunteer for rated duty. The OM list is a product of three objective components: Cumulative Grade Point Average (CGPA), Physical Fitness Assessment (PFA) score and Pilot Candidate Selection Model (PCSM) score; and two subjective components: detachment commander rankings as Relative Standing Score (RSS) and field training ranking. PCSM is an index whose value is derived from a cadet's score on the Air Force Officer Qualification Test-Pilot Index. . . Within the OM algorithm, RSS is weighted 50 percent, CGPA is weighted 15 percent, PFA score is weighted 10 percent, field training ranking is weighted 10 percent and PCSM is weighted 15 percent research done in the 90s demonstrated PCSM score had very high validity with regard to UPT attrition."[8]

Figure 1-1 represents this model.

[7] DOT OIG, Report #AV-2010-049
[8] Email correspondence with Frederick I. Guendel Jr., Colonel, USAF AETC, 2011

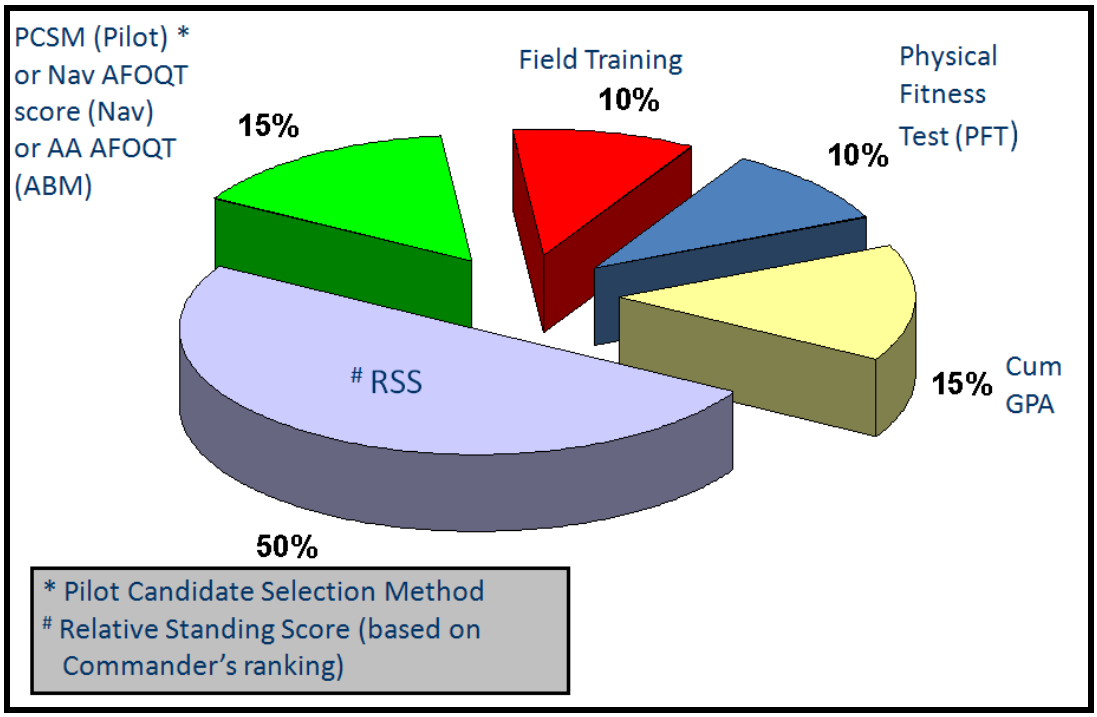

Figure 1-1 The USAF selection process for Undergraduate Pilot Training

It is interesting to note that the PCSM component, which is the USAF Air Force Officers Qualifying Test (AFOQT), is comparable for selection purposes to the AT-SAT.

A Model for ATCS Selection

This model described below is based largely on the concepts of the Air Force pilot selection model, but is tailored to fit the unique requirements of the FAA. It is a starting point for a similar model that could be developed for selecting ATCS candidates.

The model is composed of four objective (AT-SAT specific score, college GPA, Air Traffic Basics exam score and AT-CTI level) and two subjective (candidate interview and selection panel assessment) components. The algorithm for the model is based on a maximum of 100 points with the following maximum point count for each component.

Objective	Points	Subjective	Points
AT-SAT	15	Interview	15
College GPA	10	Selection Panel Assessment	15
Air Traffic Basics Score	5		
AT-CTI Level	40		

The reasoning for this algorithm is as follows:

AT-SAT Specific Score (15 points): Under the assumption that the higher the AT-SAT score, the greater probability of success in training, a higher AT-SAT score would be awarded a higher number of points. Figure 1-2 shows how points can be awarded for specific AT-SAT scores. By assigning specific scores, the basic assumption could be tested and modified as necessary in a continuing longitudinal data collection effort to correlate training performance with test scores. The value of this score (15) relates well to that of the USAF in a similarly purposed exam, the AFOQT (15).

AT-SAT Score	99-100	97-98	96	95	94	93	92	91	90	89	88	87	86	85	<85
Points	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

Figure 1-2 Awarding points for AT-SAT scores

College GPA (10 points): This number of points assigned to this component somewhat mirrors that of the USAF UPT selection algorithm, which assigns 15 points.

Figure 1-3 illustrates how GPA points can be awarded.

GPA	4	3.9	3.8	3.7	3.6	3.5	3.4	3.2	3.1	3.0	2.9	2.8	2.7	2.6	2.5	<2.5
Points	10	10	9	9	8	8	7	6	5	4	3	3	2	2	1	0

Figure 1-3 Awarding points for GPA scores

AT-CTI level (40 points): The quality and thoroughness of a candidate's undergraduate education, as reflected in the AT-CTI levels, is quite likely the strongest predictor of success in training. However, the FAA has failed to adequately track and evaluate the success of students from the varying AT-CTI levels. FAA is currently unable to identify potential efficiency gains based on the advanced education provided by the higher-level AT-CTI institutions. Each AT-CTI program will have been evaluated by air traffic professionals and a level will have been assigned by that team. A total of 40 points can be assigned as follows:

- Level 4 – 40
- Level 3 – 30
- Level 2 – 20
- Level 1 – 10

Candidate interview (15 points): The current candidate interview process was criticized by several in the field as being a shallow selection component. The current interview data collection form (questionnaire) is titled "Air Traffic Control Specialist Interview

Evaluation Template," and is composed of six questions with three choices each (Poor, Satisfactory, Excellent) and one "Overall Recommendation" (Recommended, Marginal, Not Recommended). This three-choice type of scale is both difficult to quantify and provides the interviewer too few choices. The questionnaire could be simplified, strengthened and made quantifiable by using the widely accepted five-choice Likert scale. The purpose of the interview is not to determine if the candidate has the technical skills to become a good controller (that function should belong to the Academy), but rather to determine if the candidate would make a good FAA employee. Therefore, the questionnaire could be reduced to these three statements:

- the candidate is motivated to become an effective air traffic controller;
- the candidate seems dependable; and
- the candidate is an effective communicator.

The three statements would be evaluated on a five-point Likert scale of:

5	4	3	2	1
Strongly agree	Agree	Neutral	Disagree	Strongly disagree

Therefore, a candidate who was strong in all three would score 15.

The "ATCS Interview Guide for New Hires" is a 41-page document that, while politically and legally correct, can be daunting and off-putting. The same purpose could be achieved with a two-page handout on the do's and don'ts of interviewing, which could accompany the revised "Air Traffic Control Specialist Interview Evaluation Template."

Selection Panel Assessment (20 points): The selection panel would examine and evaluate the candidate's entire package and award up to 20 points.

Figure 1-4 reflects this model. It is important to note that the algorithm in this model applies only to AT-CTI graduates. A similar algorithm would need to be developed for the evaluation of public-hire candidates.

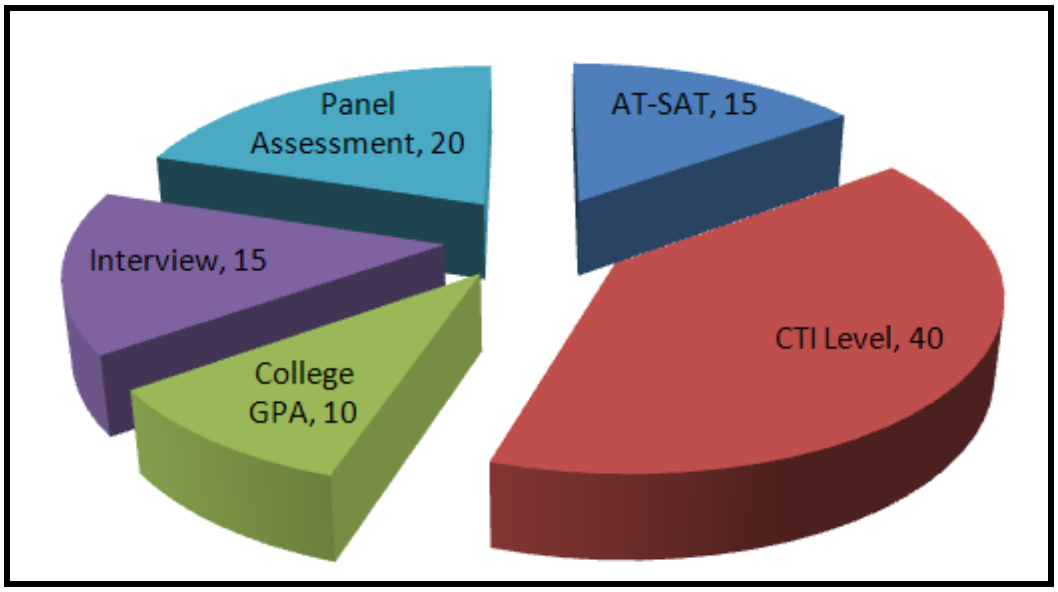

Figure 1-4 A proposed model for ATCS selection (AT-CTI hiring source only)

Air Traffic Basics Course and Exam Score (pre-Academy)

The Independent Review Panel has concluded that the Air Traffic Basics exam should be completed by the candidate prior to entry into ATCS training to assure the candidate can pass an established minimum knowledge assessment. A minimum score of 70 percent would be required to pass the test, and one retake of the test would be permitted. This exam would be developed by the FAA Academy, offered through an approved FAA testing center and be taken by the controller candidate within six months before entering the FAA Academy. Preceding this exam, the candidate could take an online Air Traffic Basics course developed by the FAA Academy. This web-based course would be optional for AT-CTI graduates from Level 2 or higher AT-CTI programs but would be required for graduates of Level 1 AT-CTI programs or public-hire selectees. In addition, this online course would provide the opportunity for those AT-CTI graduates who completed the program as much as three years earlier to refresh their knowledge before taking (or retaking) the exam for entry into an ATCS qualification program.

Figure 1-5 describes the proposed selection process.

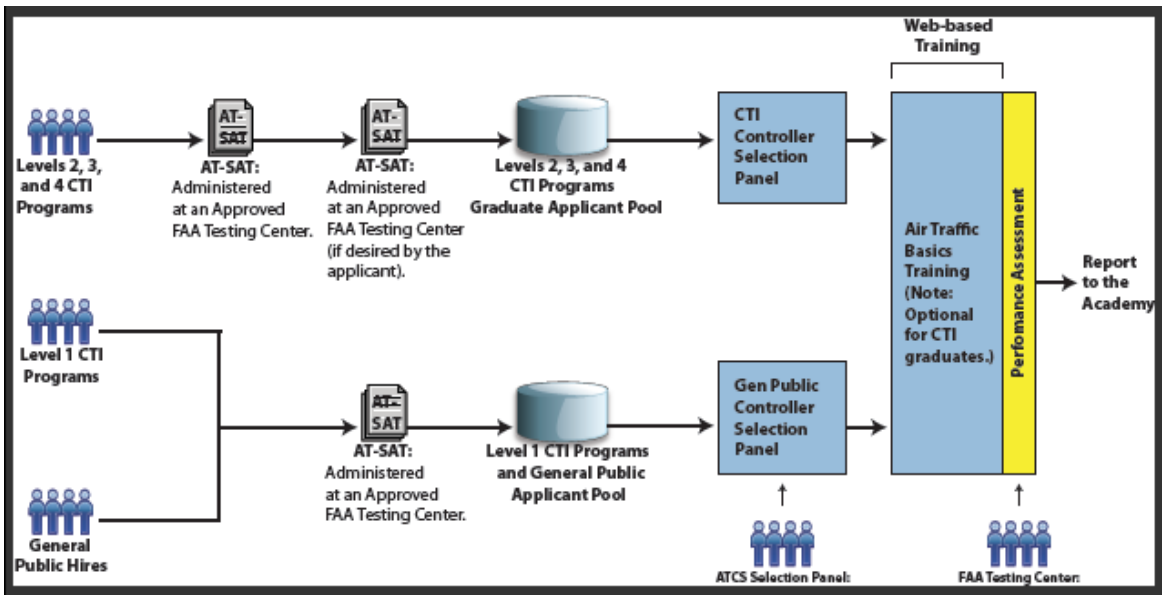

Figure 1-5 A graphical representation of the recommended changes to ATCS selection processes

Application Form

The current online application form for AT-CTI graduates limits the applicant's facility location choices to two states. It is unclear if the public hires have more choices. This facility choice limitation narrows the opportunity for both the applicant and the FAA. Some applicants may be willing to go anywhere, so that option should also be provided. In addition, the FAA would have greater placement flexibility if the applicant indicated a preference by region rather than by state.

AT-CTI and Public Hires

The FAA has expended significant resources and time to create an AT-CTI program, yet it has failed to use that resource appropriately. In Fiscal Year (FY) 2010 and FY 2011 (at the time of the Panel's inquiry), the FAA has hired 1,000 students from AT-CTI air traffic controller programs and from general public sources. The agency hired more than twice the number of public hires (674) than AT-CTI students (326). On a field interview one trainer remarked, "Please tell them not to send me any more public hires." This type of comment, with other information reviewed by the Panel, indicates that the FAA needs to review its hiring practices to take advantage of the AT-CTI system it has created.

Facility Assignment

"FAA currently assigns new controller candidates to facilities by considering candidates' location preference, a summary of information from their employment application and a list of job openings.… Controller

candidates are assigned to a facility before they undergo medical and security screening, receive a tentative employment offer from the Agency, or attend the FAA Academy for initial training. Candidates are not even given a face-to-face interview with FAA officials prior to receiving their facility assignment."[9] The Panel has concluded that the facility assignment decision should be made based on the candidate's performance during initial training at the FAA Academy. The Panel details this process in Section 2 of this report.

Recommendations

1.1 Evaluate AT-CTI schools based upon the strength of the ATC-related curriculum and assign levels (1 through 4).

1.2 Use AT-CTI levels in the selection process (e.g., a CTI graduate from a Level 4 institution would be accorded more selection credit than one from a Level 1 institution).

1.3 Share AT-CTI selectee training performance data with the source institutions.

1.4 Track all selectees by source (including CTI levels) from selection through full qualification as a CPC.

1.5 Conduct a longitudinal study to determine the predictive value of the AT-SAT. Institutionalize this process so that definitive decisions can be made about the value of the AT-SAT in the selection process.

1.6 Correlate specific AT-SAT scores with candidate training performance.

1.7 In addition to AT-SAT, other factors should be given appropriate weight in the selection decision for ATCS. (A model is offered in Section 2 of this report.)

1.8 Offer the AT-SAT exam through existing FAA testing centers. Include this requirement in the next AT-SAT vendor requirement.

1.9 Provide an ATCS candidate the opportunity to take the AT-SAT exam once each year.

1.10 Selection for ATCS training and selection for assignment to a facility should be a two-step process. Step one is selection to ATCS; step two is assignment to a facility based on performance in ATCS. The Centralized Selection Panel for candidates for ATCS is operating in the blind and is

[9] DOT OIG, Report #AV-2010-049

making selections that will obligate the FAA for years to come. FAA should study selection methods used by other federal entities. The USAF Undergraduate Pilot Training candidate selection model is included in this report.

1.11 A selection algorithm should be developed to help guide the selection panel's decisions. One is included in this report to provide, at least, a starting point.

1.12 Change the air traffic control candidate interview form to three questions which the manager would evaluate using a five-choice Likert scale. Reduce the 41-page Interview Guide to a two-page handout listing the dos and don'ts of interviewing.

1.13 The FAA Academy should create a web-based Air Traffic Basics course. Completion of this course should be required of all candidates entering ATCS training with the exception of those graduates from Levels 2, 3 and 4 AT-CTI schools for whom it would be optional.

1.14 The FAA Academy should create an Air Traffic Basics exam to be offered at all FAA-approved testing centers. Selectees for ATCS would be required to take the exam within six months before attending training at the FAA Academy. A minimum score of 70 percent would be required to pass the exam and begin formal training.

1.15 Change the air traffic controller application form so that applicants could select one region, one state, or anywhere.

1.16 The FAA needs to review its hiring practices for controller candidates and take advantage of the AT-CTI system it has created.

Section 2: Academy Training and the Assignment Process

In addition to attending presentations provided by various FAA organizations, the Panel visited the FAA Academy, field units and educational institutions participating in the Air Traffic-Collegiate Training Initiative (AT-CTI) program. During these visits, Panel members met with potential applicants, newly hired controller candidates, On-the-Job-Training Instructors (OJTIs), training managers and operational managers. The Panel based its observations and recommendations in this section on those meetings as well as previous studies conducted by internal FAA and external organizations. These organizations include Air Traffic Organization (ATO) Safety, ATO Technical Training, FAA Human Resources Management, DOT OIG and the MITRE Corporation[10].

During the course of the Panel's review, opportunities to improve the preparation of new controllers became apparent. Specifically, these include:

- improve the retention of basic ATCS knowledge by presenting the Air Traffic Basic course material as early in the educational process as possible via online training;
- decrease the amount of initial training conducted in the field by (a) reinforcing previously learned material through a cumulative testing strategy, and (b) providing "advanced courses" for Terminal and En Route ATCS candidates prior to reporting to the field;
- improve the quality of Academy-based training by (a) capturing additional performance samples during training, (b) replacing the "pass/fail" grading strategy with multi-level performance measures, and (c) providing detailed Academy training records to the gaining facility manager; and
- incorporate performance criteria in the assignment decision by basing track and facility assignments on objective measures and using "just-in-time" processes (such as the Facility Assignment Panel) to fill vacancies as soon as the resources are available.

The Panel discusses these items in the following paragraphs and offers recommendations for implementation into the current system at the end of this section.

[10] MITRE is a not-for-profit national technology resource that provides systems engineering, research and development, and information technology support to the government.

Key Observations

Retention of Basic ATCS Knowledge

Most field managers and OJTIs interviewed by the Panel reported frustration with the lack of basic knowledge possessed by new controllers assigned to their facility. Similar comments were documented in previous studies of ATC operations, which the Panel reviewed as part of this inquiry. For example, in 2007 the ATO Training organization reported that FAA Academy graduates did not possess adequate knowledge about:

- aircraft separation requirements;
- correct phraseology;
- aircraft performance characteristics; and
- reading or using maps and approach plates.[11]

Additionally, a report released by the DOT OIG in 2010 stated, "As currently structured, the FAA Academy does not provide new controller candidates with sufficient instruction in the fundamental air traffic control knowledge and skills necessary to become certified controllers. Air traffic managers the Panel interviewed cited weak basic skills in all candidates when they arrive at their assigned location to begin their facility training. This is largely due to the training and testing procedures at the FAA Academy, which facilitate student learning for the purpose of passing a specific test, instead of long-term retention of basic air traffic control procedures."[12]

Fortunately, the MITRE Corporation developed a strategy to facilitate long-term retention of required material in a study released in 2005[13]. In short, they recommend presenting the foundational courseware as early as possible in the educational process via online training. In addition to controlling for instructor variability and skill, this delivery strategy allows students to review the content several times at their own pace prior to being presented with more advanced material.

Amount of Initial Training Conducted in the Field

It is widely acknowledged within the operational units that field-based training programs are struggling because a record number of inadequately prepared Academy graduates are being assigned to their facilities.[14] As a result, some newly hired controllers experience extended delays while

[11] Welp, Kelley, Doskow, Rounsavell, & Morrison, 2007
[12] DOT OIG, Report #AV-2010-049
[13] Celio, Jarvis, & Poore, 2005
[14] DOT OIG, Report #AV-2010-049

attempting to advance to the next level of certification and OJTI resources are strained to accommodate the increased training demands.

To address this problem, several studies[15] have recommended establishing "advanced" Academy-based courses within each assignment track. This solution allows the FAA to:

- leverage the centralized resources at the Academy;
- introduce a high degree of standardization within the ATCS population;
- introduce facility-specific content prior to reporting to the field unit; and
- "over train" the basic skills to help with knowledge retention.

Quality of Academy-Based Training

The future success of ATO training relies on the FAA Academy being able to provide properly prepared ATCSs to the field units. In order for the FAA Academy leadership to meet this obligation and continuously improve their level of service, they must be able to monitor the performance of students and share that information with their stakeholders.

Unfortunately, current strategies for knowledge and skill validation in place at the Academy are of little benefit to their ATO stakeholders. For example, the OIG reported[16] that, for the knowledge-based portion of the Academy exit exam, "every candidate that has taken this test has passed." In the same report, they state that 95 percent of the candidates also pass the skills assessment portion of the same test. When a minimum number of performance measures are combined with a "pass/fail" assessment strategy, the field managers are left without insight as to the relative strengths and weaknesses of their incoming controllers and the FAA Academy is left without metrics to monitor the quality of their programs. Providing detailed Academy training records to gaining facilities will allow training managers to customize individual training plans.

An internal report[17] developed by the FAA Academy team provides a method for improving the ability of the Academy to monitor report and improve their level of service to the ATO. Specifically, they recommend:

- capturing additional performance samples during training;
- reinforcing previous knowledge by incorporating a cumulative testing strategy; and
- implementing multi-level performance measures.

[15] Celio et al., 2005; Federal Aviation Administration Academy, 2010; Welp et al., 2007
[16] DOT OIG, Report #AV-2010-049
[17] Welp et al., 2007

Incorporate Performance Criteria in the Assignment Decision

A recent study[18] by the DOT OIG found that "new controller candidates are being assigned to some of the busiest air traffic control facilities in the nation with little consideration of whether they have the knowledge, skills and abilities necessary to become certified controllers at those locations." Later, the same report states, "The FAA Academy provides an opportunity for many experienced controllers to evaluate candidates in a controlled environment. However, FAA does not use candidates' performance during initial training in determining the level of facility in which the candidates are placed. FAA personnel at FAA Headquarters, the FAA Academy and selected air traffic control facilities almost unanimously supported making facility assignments after Academy graduation."

The resulting inefficiency of the current assignment policy – making the assignment decision prior to Academy training – becomes apparent when the success rates for newly hired ATCSs are calculated. For example, according to an OIG report released in 2011[19], the attrition rates for controllers hired in FYs 2008, 2009 and 2010 were 31 percent, 21 percent and 22 percent respectively. Additionally, managers of some of the most complex ATC facilities told Panel members that it is very rare for a new controller to achieve certification. This usually results in the apprentice controller either resigning from the FAA or transferring to a lower level facility. In either case, this represents a suboptimal outcome for the FAA and the individual.

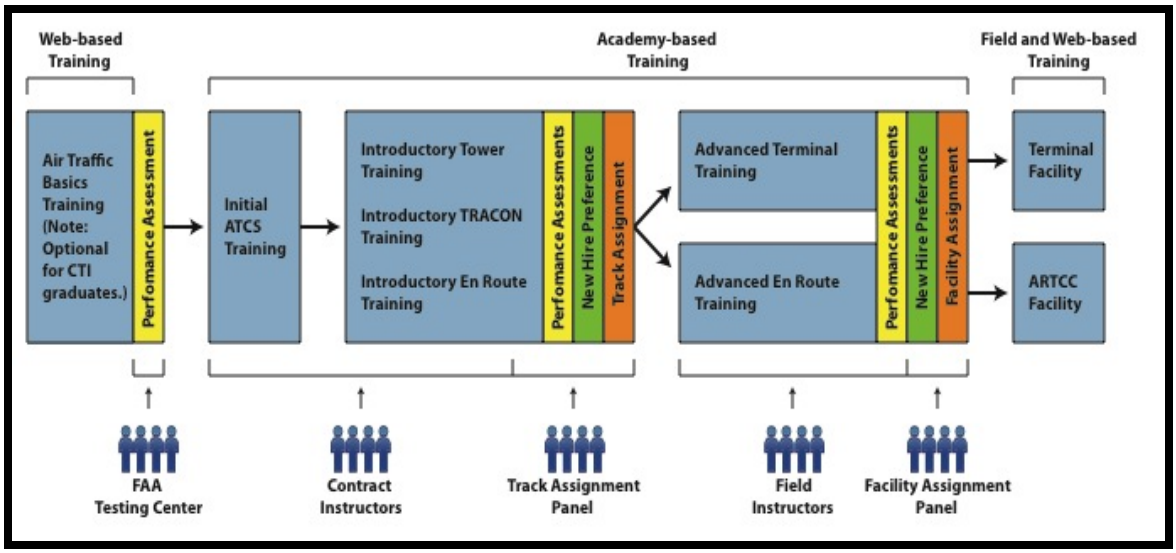

Figure 2-1 A graphical representation of the recommended changes to ATCS initial training and assignment processes

[18] DOT OIG, Report #AV-2010-049
[19] DOT OIG, Report #AV-2011-072

Recommendations

Based on the observations detailed above, the Independent Review Panel offers the following recommended changes to the current Academy-based training and facility assignment processes. Figure 2-1 provides a summary.

2.1 Provide Air Traffic Basics training via an online module. In addition to the recommendations made by the ATO Office of Technical Training, the DOT OIG and the MITRE Corporation outlined in the previous paragraphs, ATO Safety also suggests presenting the material via an online method as the most effective solution. The details of their proposal[20] include, "Redesign course materials to reflect the study/application method for learning and make the materials available online along with practice exams. When the applicant has demonstrated mastery of the material through practice exams, an endorsement to take the knowledge test is issued. The knowledge test could be proctored in FAA facilities and a passing grade made prerequisite for hiring."

2.2 Incorporate the Professional Standards module within the Academy-based ATCS curriculum and use contract instructors (augmented by field management and NATCA representatives, as needed) in this role. During the review of Academy courseware, Panel members noted that newly hired ATCSs were not provided an opportunity to study the professional components of their new career. The proposed "Initial ATCS Training" module is offered as a possible solution to fill this gap. Section 4, "Professional Standards" has additional details.

2.3 Expose Academy students to all ATCS track specialties and use contract instructors and OJTIs in this role. As described in this report, a key aspect of the Panel's recommendation is to delay the facility assignment decision until after the student has demonstrated competence and aptitude in a specific area. In an effort to facilitate this performance-based approach (and provide broader exposure to the prospective ATCS to potential career paths), the Panel recommends that students be exposed to all ATC specialties prior to stating a preference for, and being assigned to, a particular track.

2.4 Incorporate an "advanced" course for all candidates prior to reporting to the field units and use OJTIs in this role. As discussed in this section, several organizations have made a compelling case to add "advanced" courses to the FAA Academy curricula in an effort to reduce the training burden on field units. An additional benefit of this approach is the

[20] Federal Aviation Administration, Air Traffic Organization Safety Services, 2007

opportunity to further assess the prospective controller's ability to perform at more complex facilities in anticipation of the final assignment decision.

2.5 Improve the quality of Academy-based training by (a) capturing additional performance samples during training, (b) replacing the "pass/fail" grading strategy with multi-level performance measures, and (c) providing detailed Academy training records to the gaining facility manager.

2.6 Delay the *track assignment* until after the candidate's aptitude is assessed during initial training at the FAA Academy training and use OJTIs in this process. Given that different skills are required for each ATCS specialty, the Independent Review Panel recommends that the track assignment decision be delayed until after the candidate has the opportunity to demonstrate his or her aptitude for a particular specialty. Toward this goal, the Panel recommends establishing a "Track Assignment Panel" following the student's completion of the "Introductory" course. The decisions of the Track Assignment Panel should be based on the following objective measures:

- Air Traffic Basics test;
- Introduction Tower Training evaluation;
- Introduction TRACON Training evaluation;
- Introduction En Route Training evaluation;
- candidate preference; and
- needs of the FAA.

2.7 Delay the *facility assignment* until after the candidate's aptitude is assessed during Academy training and use field management in this process. The Panel recommends that the facility assignment decisions incorporate Academy based performance criteria. Toward this goal, the Independent Review Panel recommends establishing a "Facility Assignment Panel" following the students' completion of the "Advanced" courses. Additionally, the Panel recommends that only candidates with previous controller experience be assigned to facilities greater than Level 9. The Facility Assignment Panel should base its decisions on the following objective measures:

- Air Traffic Basics test;
- Introduction Tower Training evaluation;
- Introduction TRACON Training evaluation;
- Introduction En Route Training evaluation;
- Advanced Terminal or En Route Training evaluation;
- candidate preference; and
- needs of the FAA.

2.8 Establish and maintain an integrated employment/training database across stakeholder offices that captures employees' data from application to retirement date.

Section 3: Field Training

Once a student successfully completes the required curriculum at the Academy, they report to their assigned facility to begin facility-specific field qualification training. The goal of this training is to allow the student to achieve the CPC status. This training can take from two to five years, depending on the type and complexity of the facility to which they are assigned, and "is the longest and most expensive part of the training process."[21]

Field training consists of a combination of classroom, simulation and on-the-job training (OJT). OJT constitutes the majority of field training. Classroom and simulation training is provided by either non-FAA contract instructors or FAA instructors. Only operationally current CPCs who have successfully completed a required OJTI course provide OJT training.

The observations and recommendations in this section are based on field visits and discussions with students, OJTIs and training managers. The Panel also considered the work by numerous collaborative FAA and NATCA working groups currently in place to address field-training issues. Those workgroups include: OJTI Redesign, Terminal Redesign and En-Route Stage Redesign.

This section reports the Panel's observations on field training and identifies areas recommended for improvement.

Key Observations

Instructors

Classroom and Simulation Instructors

Classroom and simulation instructors, whether contractor or FAA, are required to go through cadre instruction and certification at the Academy in Oklahoma City. Contractor instructors are required to undergo a semi-annual performance evaluation that uses a systematic process identifying key elements of instructional performance. This evaluation is part of the quality assurance and oversight of the contractor that provides contractor instructors. The contractor provides regular performance and development feedback, best practices and lessons learned and modern learning theory to their employees. These evaluations and performance and development feedback are not provided to FAA instructors. Establishing the same systematic key element skill evaluation process would prevent a

[21] DOT OIG, Report #AV-2008-055

divergence of skills and training techniques between the two types of instructors.

Nearly every current contractor instructor was a previously certified CPC. While these contractor instructors are provided best practices and lessons learned from the contractor, they are unable to assess those practices and lessons against the ever-changing environment (live traffic) for which they are preparing their trainees. This is especially critical in the development of new training technologies that may be applied by the contractor in field instruction. As the time increases between the termination of FAA employment and employment as a contractor instructor, the ability to assess the impact of any new technologies decreases.

Simulation Technology

Implementation

It has been recognized for years that an increase in facility simulation training and availability would have an impact on reducing overall training times. This is especially true in less complex terminal facilities that traditionally have little to no simulation technology available. The cost savings can be significant. Net estimated cost avoidance with a six-month reduction on training time under the En Route option is $41,975. A 2005 MITRE report[22] estimated a potential cost savings (En Route and Terminal combined) of over $48 million per year beginning in FY 09.

The FAA has made some strides in increasing the use of simulators. A 2008 Inspector General report[23] credited the FAA for installing high-fidelity simulators at Chicago O'Hare, Miami, Ontario and Phoenix. The report cited a reduction in training days to certify on Ground Control in the range of 31-60 percent throughout the above facilities. The ATO reported to the Panel that twenty-two simulators identical to the Academy's tower simulators have been deployed in the field with four more to be added. Terminal Radar Approach Control (TRACON) facilities have received sixty desktop simulators.

The strategy for best using the simulators deployed to the field was to position them where they could be accessed by multiple facilities for controller training. For example, the new simulator for Cleveland-Hopkins International Airport Traffic Control Tower (ATCT) is used to also train controllers from the Akron-Canton ATCT (approximately 53 miles away), the Toledo ATCT (approximately 111 miles away) and the Detroit Metropolitan Wayne County ATCT (approximately 150 miles away).

[22] Celio, Jarvis, & Poore, 2005
[23] DOT OIG, Report #AV-2008-055

Anecdotal reports suggest that the deployed tower simulators may be under-utilized because of factors such as distance, travel time, available training time remaining and facility staff scheduling. Other issues with simulations include effectiveness of the simulation's communication capabilities for skills training scenarios, availability of expertise and staff resources across facilities having scenario development expertise and adequate numbers of simulation instructors. The Panel was advised that the ATO was only beginning to track usage information. The Panel is not clear if the ATO is monitoring the expected versus actual benefits from making these resources available for facility training.

Providing broad access to simulation technology continues to provide an additional difficulty. This holds true for both the En Route and Terminal options. The En Route environment is currently undergoing a transition to En Route Automation Modernization (ERAM), and the transition process places a restriction on the availability of the simulation equipment at each facility. This is caused by not only the transition itself, but also by the extensive retraining required of the current workforce, which results in the simulation equipment being unavailable for months at a time. In the terminal environment, access to current tower simulators is inhibited by both distance and use by the facilities in which it is installed.

The Panel observed several levels of simulation fidelity. There were benefits in training that appear to be available by using each level of simulation fidelity.

Voice Recognition and Synthesis

The efficacy of voice recognition technology has improved significantly in past years and provides additional possibilities for efficiencies. Voice Recognition and Synthesis (VR&S) allows the trainee to practice and operate simulations alone. Trainees can increase skills development and situational awareness at their own pace when deficiencies are identified or in advance of traditional instructor based lessons. This can increase competency and reduce overall OJT training time. "The experience…of voice recognition in tower simulations has confirmed that VR&S technology has significantly matured and is viable for air traffic control simulation applications."[24]

On-the-Job Training Instructors (OJTI)

Selection

The selection process for OJTIs is dictated by FAA Order 3120.4M, *Air Traffic Technical Training*. FAA Order 3120.4M states, in part:

[24] Celio, Jarvis, & Poore, 2005

3. On-the-Job Training and Position Certification.

a. Selection of OJTIs. *To be eligible to be selected as an OJTI, individuals must meet the following criteria:*

(1) Certified at the CPC/FPL level;

(2) Certified Air Traffic Assistants, FV-2154, may provide OJT on positions on which they are certified;

(3) Certified a minimum of 6 months on positions involved; and

Note: *Controllers with previous OJTI experience on the same type position(s) are exempt from this requirement or as identified in the local training order. Transferring Certified Professional Controllers-in-Training (CPC-ITs) on the same-type position shall be certified on the positions involved for a minimum of 60 hours prior to conducting OJTI. This requirement may be waived at the Air Traffic Manager's (ATM) discretion for non-control positions.*

(4) Recommended by the employee's Front-Line Manager (FLM).

b. Selection Panel. *The ATM will designate a panel to recommend OJTI candidates. The panel is composed of a minimum of two (2) people, including any participant identified in current collective bargaining agreement(s). The panel must consider, at a minimum, the nominee's performance, human relation skills, motivation and attitude and objectivity. They must forward a recommendation to the ATM or their designee for their selection.*

While this guidance identifies the minimum the Panel must consider, there is no consistent guidance or direction in how those minimums should be evaluated or considered. There is no clear understanding on how they relate to particular necessary instructor attributes. A joint FAA/NATCA workgroup, tasked with redesigning the OJTI process, completed the first of several surveys last month of current OJTIs and trainees. The workgroup interviewed 39 subjects in the Central Region from high- and low-level terminal facilities, TRACON facilities and En Route centers. The interviewers found a wide and varied list of what qualities and attributes the subjects felt contributed to someone being a good OJTI.

OJTI Requirements

The current requirements to become an OJTI are in FAA Order 3120.4M as shown above. Additionally, the 3120.4M requires that OJTI candidates complete an FAA Air Traffic OJTI course or OJTI Cadre course. Once successfully completed, the employee must be directly observed by their FLM during their first training session in order to be certified. A FLM must also conduct an annual evaluation of OJTIs while they are performing instructional duties.

There is little guidance to the FLMs on exactly what to look for and, in most cases; both the certification and evaluation take place during observations under live traffic situations. This ignores the debriefing session required after every OJTI training session. This debriefing session is typically where a large portion of the actual instruction takes place by reviewing actions taken during the past session and defining alternative solutions and means for improvement. Additionally, there are no courses or instructional methods available to assist OJTIs who have been identified as needing help to improve their teaching skills. The initial certification course is the only course available and is only assigned upon initial selection as an OJTI.

There are no clear defined key elements of instruction to be evaluated. In many cases, the FLMs certifying and evaluating the OJTIs have not provided instruction since becoming FLMs. They do not have recurrent training to identify best practices or new learning theory to help in their evaluations.

The current requirement to become an OJTI requires that a candidate be a CPC and has been certified for six months on the training sector involved. The interviews completed by the joint FAA/NATCA workgroup on OJTI redesign indicate the majority of those surveyed felt that six months did not provide enough experience to become an OJTI.

Instruction

There are no current mechanisms in place to provide OJTIs with access to any current learning tools. There is no national database available to improve their current training techniques or lessons learned from either a local or a national perspective. There is no ability to share best practices amongst other OJTIs

The ATO’s Training Technology Strategy, updated in February 2011, identifies both a Content Management System (CMS) and a Learning Content Management System (LCMS) as being able to provide access for a large number of people to share and store data and improve

communication. ATO Technical Training is currently in the process of acquiring and implementing both a CMS and an LCMS.

The Panel believes there is still much room for improvement by taking advantage of existing and emerging technologies to leverage the classroom learning experience, improve training programs and better manage available information within the organization.

Proficiency

As part of the analysis, the Panel requested the following data from 32 FAA facilities including four En Route centers:

- the OJT certification date for every OJTI at each facility;
- the CPC certification date for each OJTI; and
- hours of OJTI provided over the last 90 and 180 days.

The Panel did not receive data from any of the four En Route centers. Twenty-four Terminal facilities of varying complexity, including TRACONS provided data. The Panel evaluated the length of time from certification to the date of the Panel's request for over 700 OJTIs.

The Panel discovered that the average length of time from initial OJTI certification to the present for this group was approximately 10.5 years. While some facilities averaged as low as 6.6 years, at least one facility averaged over 15 years and several individual OJTIs exceeded 25 years since certification.

The significance of these times is important considering that the FAA provides no recurrent or refresher training to these OJTIs. With the exception of the annual evaluation discussed earlier in this section, there is no ongoing effort to improve and utilize modern training technologies for the instruction the OJTIs provide. The ability to adapt and transfer new training skills and techniques to OJTIs becomes critical given that they provide the majority of field training necessary to become a CPC.

Recommendations

3.1 Identify key elements of instructional performance for FAA classroom and simulation instructors. Ensure that both contract and FAA classroom and simulation instructors are provided the same up to date teaching, best practices and learning theories in a similar and concurrent manner.

3.2 Establish a group of early career controllers to evaluate changes in teaching methodology utilized by both non-FAA and FAA instructors and assess those changes against the current Air Traffic Control environment.

3.3 Continue current actions to implement both a CMS and an LCMS and continue the planned technical training strategy to maintain the currency and accuracy of training by integrating training materials with the related source documentation. This is also in line with the related effort by ATO's Mission Support organization to integrate FAA Orders across the repository.

3.4 Collect and monitor information to measure the effectiveness of the technologies used for classroom and facility training.

3.5 Continue to move forward with the implementation of simulation technology in field training. The FAA should consider the implementation of simulation of differing degrees of fidelity. A laptop pc based simulation program can provide gains in training efficiencies at smaller facilities reducing the OJT training time needed. While it may not provide the same gains as a high fidelity system, it offers an alternative to an outlying, low-complexity facility.

3.6 Develop a mobile simulator lab(s). This will provide a broader access to simulation environment. They can be used to address a lack of simulation equipment or temporary restrictions in facility simulation availability.

3.7 Develop a voice recognition-training tool to be used supplement instructor based field training.

3.8 Establish a list of key elements and guidance to be used when selecting OJTI candidates. It should relate to current training theories, be uniform for all facilities and be readily accessible. The list of attributes needed and desired should be communicated to all employees.

3.9 Develop instructor skill enhancement courses for OJTIs that address specific areas to be improved.

3.10 Develop refresher training for FLMs to assist in evaluating current training techniques and best practices in their certification and evaluation of OJTIs.

3.11 Develop a skills assessment form that can help evaluate specific instructional skills for both FLMs and OJTIs.

3.12 Require OJTI evaluations to go through all pieces of a training session, including the debriefing.

3.13 Extend the current six-month requirement for OJTIs, identified in FAA Order 3120.4M, to one year.

3.14 Develop a national database of best practices, lessons learned and current training techniques that are easily available to OJTIs. Capturing the time to utilize this data in any training plan is necessary.

3.15 Establish an annual refresher course for OJTIs. This course must include classroom exercises applying any new modern training techniques while refreshing competency on established key training elements.

Section 4: Professional Standards

Recent publicized events involving controller professionalism have brought attention to the question of ATCS professional standards. In response to these events, the FAA and NATCA initiated a nationwide “Call to Action” to increase awareness of professionalism for air traffic controllers.

NATCA, in developing a Professional Standards program, created the following code of conduct for Air Traffic Controllers:

- A Professional Air Traffic Controller’s performance and actions are a demonstration of their personal commitment to safety, excellence and upholding their oath to the public trust, most specifically to the users of the National Airspace System. They shall conduct themselves in a manner that instills trust and merits the confidence bestowed on them by the public they serve.

- A Professional Air Traffic Controller, through his or her own conduct and performance, should inspire, motivate and provide examples of professionalism to others. The safety of the Airspace system is of the greatest importance and their performance should always demonstrate the highest standard of excellence.

- A Professional Air Traffic Controller accepts that their actions represent the conduct and character of all members of the profession. They shall act in a manner that brings honor and respect to the profession, establishes public trust and sets a global standard for excellence.

The Panel looked at the training of ATCSs at all levels for the application of the concepts of professionalism.

Key Observations

Training

Current training on professionalism deals little with the overall concepts of professionalism and is only provided in the FAA Academy curriculum. This is certainly a deficiency as “the development of professional conscience among new entrants into a profession is as important for the public welfare as technical competence.”[25]

[25] Ethics and Professionalism, Kultgen, 1988

Air Traffic Collegiate Training Initiative

One of the key hiring sources for air traffic controllers are graduates of one of the 36 AT-CTI schools. The FAA identifies a basic curriculum that is taught at each of the schools. While that curriculum identified Air Traffic Basics, it provides little guidance to the AT-CTI schools in the way of any formalized and uniform professional standards training requirements.

FAA Academy

The current training provided at the Academy does not adequately establish a true concept in professionalism. “The professional school is the primary socializing agency that initiates novices into the profession….The individual typically follows the technical and ethical standards acquired through professional socialization.”[26]

Consideration should be given to the possibility that the high success rate at the Academy removed a sense of ‘uniqueness’ for completion of the overall training process and resulted in an overall decrease in professionalism. The insertion of a screening mechanism into the FAA Academy, closer to the point at which socialization of professionalism is critical, may have a positive impact on overall long-term professional performance. If the ultimate placement of an individual out of the Academy is based on academy performance, as is suggested elsewhere in this report, the FAA can again move an evaluation point closer to that critical juncture of professional socialization.

Nearly all well-known professions (i.e. medical and legal) require an ethics and professionalism-based course for completion of a particular study. There is no current requirement for a course similar to these for air traffic controllers.

Field Training

Because of the Collective Bargaining Agreement (CBA) between NATCA and the FAA, a joint national workgroup established to create a Professional Standards (ProStan) program. The goal of the ProStan is to promote and maintain the highest degree of professional conduct among participants. The ProStan group does that in compliance with the code identified in the introduction to this section. This program will create a peer-to-peer assessment of professionalism, provide mentorship and a lead-by-example approach to improving professionalism.

This program will be taught to ProStan committee members in three test areas – Dallas-Fort Worth, Chicago and Anchorage Air Route Traffic

[26] Kultgen, et.al.

Control Centers (ARTCCs) in October. These test programs will then be initiated on November 1, 2011, and will be followed by a roll-out to all En Route centers in 2012.

Recommendations

4.1 Develop an introductory professionalism curriculum. This curriculum could be added to the Air Traffic Basics course as required curriculum for all AT-CTI programs. It would provide initial exposure to the Code of the Professional Air Traffic Controller.

4.2 Develop a complete Academy-level class on professional standards. This class should provide exercises and demonstrations on both ethics and professionalism and be taught upon initial entry to the FAA. It would contain the Code of the Professional Air Traffic Controller and should be taught by members of the Professional Standards Committee. It should be reinforced throughout Academy training. Consideration should be given to include professionalism as a key element in performance assessment.

4.3 Continue to expand and develop the joint ProStan Program at the field level. Develop a refresher class on professional standards and require annual training.

Section 5: Organizational Structure and Associated Areas of Responsibility

Organizational performance, like individual performance, often depends on good teamwork. Effective teamwork depends on having a leader with the vision and ability to keep the team oriented toward the team's goal, the right balance of the right people on the team and maintaining clear channels for communication and feedback. The Panel considered how the FAA organizational structure supports delivery of air traffic technical training including, but not limited to, the stakeholders in successful delivery, their relationships, roles and responsibilities, communication, and coordination. Successful training outcomes, like any other improvement process, depend on quality content delivered using effective practices and well-integrated processes.

Key Observations

Stakeholders

Multiple offices in the organizational hierarchy are stakeholders via their contribution either directly or indirectly to the training delivery process. For example, the annual number of new hires needed is reportedly determined by both budget and staffing numbers. These numbers are reportedly identified, in turn, by Headquarters offices and by facilities' staffing needs. Facility staffing needs result from coordination between the facility managers and the Service Center offices.

As noted in the Panel's review of training technologies, these stakeholders do not have an integrated process for following trainees through their training progression and professional development. Organizationally, this gap extends to ineffective execution in other important areas as well.

The variety of roles and responsibilities requires that all stakeholders acknowledge and execute clear and formal processes for coordination and communication. Information provided to the Panel indicates that needed communications between stakeholders are either not formally documented or not accomplished. These organizational characteristics do not support development of quality content or execution of effective training delivery practices. For example, once a new hire receives and accepts the firm job offer by the FAA and begins training at the Academy, a variety of stakeholders are involved to varying degrees, including (but probably not limited to) ATO Service Units' training staff, the Headquarters ATO Office for Air Traffic Technical Training, and the FAA Academy's Air Traffic Division at Mike Monroney Aeronautical Center in Oklahoma City.

Based on interviews with stakeholders about the Service Centers' role in ATC technical training, the Panel noted several issues related to organizational structure. The anecdotal evidence suggests that the realignment of the Air Traffic Service (ATS) into the Air Traffic Organization (ATO) included changes that have impacted training delivery. For example, prior to the ATO structure of three Service Areas (Western, Central and Eastern), the ATS training functions were organized and co-located with other FAA units in nine Regions, each coordinated through a regional office structure with a traditional vertical hierarchy that reported to Headquarters offices. The realignment changed this vertical structure. Service Area offices now functionally report directly to Headquarters Service Unit offices while Service Center offices, William J. Hughes Technical Center and Mike Monroney Aeronautical Center are in line with the regional offices, which remained organized around the legacy regional structure and functionally report through that structure. At present, the FAA still uses both regional and service area structures for organizing the various field offices

The decision to place the functions in the Service Centers but outside the direct vertical report to the Service Units has evidently had unintended consequences on the offices which support ATO delivery of technical training. Reportedly, there is now an organizational attitude that the Service Centers are outside the Service Unit structure and thus being in different lines of business has apparently resulted in a subtle "us vs. them" dynamic and this has resulted in gaps in coordination and communication. This organizational environment reportedly forces Service Center staff to ferret out information that should be readily available. Such a dysfunctional dynamic between groups sets up the organization to be ineffective with unproductive use of resources and ill-informed decisions. For example, the Service Center staff are finding that they are not included in communications, organizational updates, coordination, etc. between the Service Unit, Service Areas and facilities, although the Service Centers are tasked to perform functions to enable facility performance (i.e., coordinating annual staffing). Panel members observed instances during the visits to Service Centers.

Stakeholder Roles and Responsibilities

Another outcome from the realignment was the distribution of technical training responsibilities between Service Unit (i.e., terminal and En Route), Service Area and Service Center offices. This redistribution also had the unintended consequence of disrupting networks of individuals who had organizational knowledge about how to accomplish the day-to-day routine coordination and communications to fill in any information shortfalls. Despite the disruption, some employees have deciphered how to make it

work in the new organizational structure; however, relying on specific individuals' to "make it work" makes the organization vulnerable when that knowledge is not documented or available to others. When an employee with a critical bit of knowledge leaves the organization through change of position, retirement, etc. the informal knowledge about "how things get done" walks with them.

Historically, the ATC Technical Training process has suffered from unclear lines of responsibilities, fragmented organization and lack of leadership. In 2005, a team appointed by the Administrator to examine controller training recommended a focused, managed training system. The Administrator executed several of the Team's recommendations including the appointment of an ATO training executive. Despite the changes, needs were still not being met. FAA offices and operational facilities continued to establish training requirements and to develop technical training programs without clear coordination, resulting in a national training program without a clear focus. For example, the Panel was unable to find out how the recommended ratio of a 35percent trainee-to-total-controllers gauge for facility staffing was initially determined. However, handling this training burden while maintaining safe operations continues to be expected of facilities.

Audits of the technical training process by the ATO and by the ATO's oversight organization (AVS Air Traffic Safety Oversight Service, AOV) have repeatedly found lapses in these areas. Consequences included safety concepts missing from training materials, instructors with outdated technical knowledge and lacking teaching proficiency, performance expectations constrained by limitations of classroom and lab technology, ineffective methods of technical skills training, unclear and subjective testing practices and performance standards. Feedback from facilities highlighted that students were not being prepared for the performance demands at high-density operational facilities.

A need existed to consolidate and coordinate the flow of disparate training requirements that various FAA offices were levying on the Academy and ATC operational facilities; and to ensure the development and delivery of quality, accuracy and appropriateness of technical training materials. The Academy's Air Traffic Division functions as a quasi-contractor to provide controller training services, such as instruction and instructional design, to the ATO.

Recommendations from several groups supported creation of the ATO Air Traffic Technical Training Directorate (AJL). The Research, Engineering and Development Advisory Committee's (REDAC) 2005 report to the Administrator called for the FAA to designate an individual to be responsible and accountable for all the interdependent activities

associated with the implementation of the “Plan for the Future.” The individual should have executive and budgetary authority for implementing the plan, including all efforts regarding recruiting, selection, staffing and training; coordination of the AT-CTI program, the Academy’s technical training activities, on-the-job training in facilities and evaluation of workforce initiatives for present requirements as well as for future NAS operations.

Recommendations

5.1 Clarify and document the specific roles and responsibilities of personnel *within each office* that contributes, receives or uses information related to provisioning of air traffic technical training, inclusive of the ATO Service Units, Service Areas, Service Centers and facilities, as well as any other FAA offices.

5.2 Clarify and document the specific roles and responsibilities *between offices* that contribute, receive or use information related to provisioning of air traffic technical training, inclusive of the ATO Service Units, Service Areas, Service Centers and facilities, as well as any other FAA offices.

5.3 Clarify and document the specific roles and responsibilities between the ATO and the FAA Academy, as each contributes to air traffic technical training.

5.4 Empower one office with the responsibility, as the REDAC advised the Administrator in 2005, for coordinating the provisioning of air traffic technical training, including the means to fund and execute this responsibility.

Section 6: Other Observations and Recommendations

This section covers observations, areas of concern or issues not addressed elsewhere in the report.

Key Observations

Outcomes-Based Learning

Traditional teaching methodology focuses on what is being taught rather than what is being learned. Outcomes-based learning shifts the focus to the student and on what is being learned. All of higher education has moved or is moving to outcomes-based learning. Regional Accreditation bodies such as the Southern Association of Schools and Colleges have embraced the concept. Program accrediting bodies such as the Accreditation Board for Engineering Technology (ABET) and the Aviation Accreditation Board, International (AABI) have completed the transition to the outcomes-based concept.

It is the Panel's view that the FAA Academy should embrace this modern model of learning and it should develop a plan to restructure its curriculum on the outcomes-based model over the next five years.

Franchise Fund

While at the FAA Academy, the Panel received an excellent briefing on the FAA Franchise Fund, which is active at the Mike Monroney Aeronautical Center. This fund provides several advantages over traditional budgeting. A revolving fund crosses traditional fiscal periods and provides a great deal of flexibility for those who participate. It allows economies of scale, creates an operating reserve and maintains retained earnings for specified purposes. From a practical standpoint, it creates budget efficiency by preventing the fiscal year-end rush to buy more paper clips and take more trips just to fully consume the budget. Technical Training is not currently a member of the fund but its ability to react to unplanned needs such as additional courses at the FAA Academy would be enhanced if it joined the program. The Panel concluded that AJL should join the franchise fund to better serve its mission.

Use of the Term "Developmental"

The FAA uses the term "developmental" to describe someone who is in training to become a CPC. In other parts of society, the term has a less

than positive meaning. Air traffic Controller trainees who come into the FAA are the products of the American public school system for the most part. Most likely, they have heard the term developmental used by their teachers and others to indicate someone who needs some level of remediation.

Recommendations

6.1 The FAA Academy should shift curriculum to the outcomes-based model over the next five years.

6.2 AJL should join the franchise fund at the Mike Monroney Aeronautical Center to better serve its mission.

6.3 The use of the term “Developmental” has a less than positive connotation. A better descriptor should be used.

Section 7: Summary of Recommendations

This section provides a summary of the recommendations agreed to by the Independent Review Panel for the Selection, Assignment and Training of Air Traffic Control Specialists. The 49 recommendations are numbered sequentially and organized by categories to facilitate tracking of the recommendations, but a cross-reference number refers back to the specific section in this report, where the entire recommendation is listed. For example, **Recommendation 20 (2.4)** is the Panel's twentieth recommendation, and refers to the fourth recommendation found in Section 2 of the report and discusses a recommendation that deals with FAA Academy training.

Collegiate Training Initiative Programs

Recommendation 1 (1.1) Evaluate AT-CTI schools based upon the strength of the ATC-related curriculum and assign levels (1 through 4).

Recommendation 2 (1.2) Use AT-CTI levels in the selection process.

Recommendation 3 (1.3) Share AT-CTI selectee training performance data with the source institutions.

Selection Process

Recommendation 4 (1.4) Track all selectees by source from selection through full qualification as a CPC.

Recommendation 5 (1.5) Conduct a longitudinal study to determine the predictive value of the AT-SAT and institutionalize the process.

Recommendation 6 (1.6) Correlate specific AT-SAT scores with candidate training performance.

Recommendation 7 (1.7) In addition to AT-SAT, other factors should be given appropriate weight in the selection decision for ATCS.

Recommendation 8 (1.8) Offer the AT-SAT exam through existing FAA testing centers.

Recommendation 9 (1.9) Provide an ATCS candidate the opportunity to take the AT-SAT exam once each year.

Recommendation 10 (1.10) Selection for ATCS training and selection for assignment to a facility should be a two-step process.

Recommendation 11 (1.11) A selection algorithm should be developed to help guide the selection panel's decisions.

Recommendation 12 (1.12) Change the air traffic control candidate interview form to three questions which the manager would evaluate using a five-choice Likert scale. Reduce the 41-page Interview Guide to a two-page handout listing the dos and don'ts of interviewing.

Recommendation 13 (1.13) The FAA Academy should create a web-based Air Traffic Basics course. Completion of this course should be required of all candidates entering ATCS training.

Recommendation 14 (1.14) The FAA Academy should create an Air Traffic Basics exam to be offered at all FAA-approved testing centers. Selectees for ATCS would be required to take the exam.

Recommendation 15 (1.15) Change the air traffic controller application form so that applicants could select one region, one state, or anywhere.

Recommendation 16 (1.16) The FAA needs to review its hiring practices for controller candidates and take advantage of the AT-CTI system it has created.

Academy Training

Recommendation 17 (2.1) Provide Air Traffic Basics training via an online module.

Recommendation 18 (2.2) Incorporate the Professional Standards module within the Academy-based ATCS curriculum and use contract instructors (augmented by field management and NATCA representatives, as needed) in this role.

Recommendation 19 (2.3) Expose Academy students to all ATCS track specialties and use contract instructors and OJTIs in this role.

Recommendation 20 (2.4) Incorporate an "advanced" course for all candidates prior to reporting to the field units and use OJTIs in this role.

Recommendation 21 (2.5) Improve the quality of Academy-based training by (a) capturing additional performance samples during training, (b) replacing the "pass/fail" grading strategy with multi-level performance

measures, and (c) providing detailed Academy training records to the gaining facility manager.

Assignment Process

Recommendation 22 (2.6) Delay the *track assignment* until after the candidate's aptitude is assessed during initial training at the FAA Academy training and use OJTIs in this process.

Recommendation 23 (2.7) Delay the *facility assignment* until after the candidate's aptitude is assessed during Academy training and use field management in this process.

Employee Records

Recommendation 24 (2.8) Establish and maintain an integrated employment/training database across stakeholder offices that captures employees' data from application to retirement date.

Field Training

Recommendation 25 (3.1) Identify key elements of instructional performance for FAA classroom and simulation instructors.

Recommendation 26 (3.2) Establish a group of early career controllers to evaluate changes in teaching methodology utilized by both non-FAA and FAA instructors, and assess those changes against the current Air Traffic Control environment.

Recommendation 27 (3.3) Continue current actions to implement both a CMS and an LCMS and continue the planned technical training strategy to maintain the currency and accuracy of training.

Recommendation 28 (3.4) Collect and monitor information to measure the effectiveness of the technologies used for classroom and facility training.

Simulation Strategy

Recommendation 29 (3.5) Continue to move forward with the implementation of simulation technology in field training.

Recommendation 30 (3.6) Develop a mobile simulator lab(s).

Recommendation 31 (3.7) Develop a voice recognition-training tool to be used supplement instructor based field training.

On-the-Job Training Instructors

Recommendation 32 (3.8) Establish a list of key elements and guidance to be used when selecting OJTI candidates.

Recommendation 33 (3.9) Develop instructor skill enhancement courses for OJTIs that address specific areas to be improved.

Recommendation 34 (3.10) Develop refresher training for FLMs to assist in evaluating current training techniques and best practices in their certification and evaluation of OJTIs.

Recommendation 35 (3.11) Develop a skills assessment form that can help evaluate specific instructional skills for both FLMs and OJTIs.

Recommendation 36 (3.12) Require OJTI evaluations to go through all pieces of a training session, including the debriefing.

Recommendation 37 (3.13) Extend the current six-month requirement for OJTIs, identified in FAA Order 3120.4M, to one year.

Recommendation 38 (3.14) Develop a national database of best practices, lessons learned and current training techniques that are easily available to OJTIs.

Recommendation 39 (3.15) Establish an annual refresher course for OJTIs.

Professional Standards

Recommendation 40 (4.1) Develop an introductory professionalism curriculum.

Recommendation 41 (4.2) Develop a complete Academy-level class on professional standards.

Recommendation 42 (4.3) Continue to expand and develop the joint ProStan Program at the field level. Develop a refresher class on professional standards and require annual training.

Organizational Structure

Recommendation 43 (5.1) Clarify and document the specific roles and responsibilities of personnel *within each office* that contributes, receives or uses information related to provisioning of air traffic technical training,

inclusive of the ATO Service Units, Service Areas, Service Centers and facilities, as well as any other FAA offices.

Recommendation 44 (5.2) Clarify and document the specific roles and responsibilities *between offices* that contribute, receive or use information related to provisioning of air traffic technical training, inclusive of the ATO Service Units, Service Areas, Service Centers and facilities, as well as any other FAA offices.

Recommendation 45 (5.3) Clarify and document the specific roles and responsibilities between the ATO and the FAA Academy, as each contributes to air traffic technical training.

Recommendation 46 (5.4) Empower one office with the responsibility, as the REDAC advised the Administrator in 2005, for coordinating the provisioning of air traffic technical training, including the means to fund and execute this responsibility.

Other Recommendations

Recommendation 47 (6.1) The FAA Academy should shift curriculum to the outcomes-based model over the next five years.

Recommendation 48 (6.2) AJL should join the franchise fund at the Mike Monroney Aeronautical Center to better serve its mission.

Recommendation 49 (6.3) The use of the term “Developmental” has a less than positive connotation. A better descriptor should be used.

APPENDICES

APPENDIX A: FAA Press Release

APPENDIX B: Panel Biographies

APPENDIX C: Panel Charter

APPENDIX D: Panel Methodology

APPENDIX E: List of References

APPENDIX F: List of Acronyms

APPENDIX A: FAA Press Release

Federal Aviation Administration

Press Release – FAA Announces Additional Actions as Part of Air Traffic Control Review

For Immediate Release
April 29, 2011
Contact: FAA Press Office
Phone: 202-267-3883

WASHINGTON – Federal Aviation Administration Administrator Randy Babbitt announced additional management changes and other actions today as part of the FAA's comprehensive review of the air traffic control system.

Three veteran FAA managers will be repositioned to assume oversight of critical air traffic roles:

Walt Cochran will oversee Terminal Operations, where he will be responsible for all of the Agency's airport towers and TRACONS (approach and departure control).
Chris Metts will oversee all of the Agency's En Route and Oceanic operations.
Glen Martin will become the Air Traffic Manager at the Cleveland Air Route Traffic Control Center. He is currently the deputy air traffic manager at Chicago Center.

The FAA is also assessing key mid-level management positions to ensure that both technical and leadership expectations are being met.

Teams of FAA experts are also examining some of the agency's more complex facilities, including Cleveland and New York Centers, in an effort to make certain that operational policies and professional standards are being upheld.

"We are continuing to do everything in our power to ensure that our nation's aviation system remains the safest in the world. This is just the beginning of the process to make sure we have the best possible team in place," said Transportation Secretary Ray LaHood.

"The FAA's focus is safety. These changes ensure that we have the right people in the right places to help us carry out our mission," said FAA Administrator Babbitt. "I am confident our top-to-bottom review is making our air traffic system even safer."

Secretary LaHood and Administrator Babbitt announced earlier this month that the FAA would place an additional air traffic controller on the midnight shift at air traffic control towers and facilities around the country that were staffed with only one controller during that time.

Three controllers in Knoxville, Miami and Seattle were fired for sleeping while working an operational position. These employees have a due process right to respond to these actions.

Additionally, the FAA instituted changes to air traffic controller scheduling practices that will allow controllers more time for rest between shifts. The FAA and the National Air Traffic Controllers Association (NATCA) are continuing to work together on additional changes that will help reduce controller fatigue, including a fatigue education program.

On Friday, the FAA also announced the members of an independent review panel that will evaluate the agency's air traffic control training curriculum, qualifications and placement process to make sure new controllers are properly prepared. The members of the panel are: Michael Barr, University of Southern California Aviation, Safety & Security program; Tim Brady, Embry Riddle Aeronautical University; Garth Koleszar, NATCA; Michael New, United Airlines; and Julia Pounds, FAA. The panel will submit a report to FAA Administrator Babbitt this fall.

The in-depth look at air traffic controller training is part of the FAA – NATCA Call to Action on air traffic control safety and professionalism. Administrator Babbitt, NATCA President Paul Rinaldi and members of their leadership teams have been visiting air traffic facilities around the country to reinforce the need for all air traffic personnel to adhere to the highest professional standards.

During the Call to Action, FAA and NATCA teams have so far visited air traffic personnel and facilities in and around: Atlanta; Boston; Chicago; Cleveland; Columbus; Dallas–Ft. Worth; Denver; Kansas City; Knoxville; Lincoln; Louisville; Miami; Minneapolis; New York; Oklahoma City; Oakland; Omaha; Reno; Sacramento; and Salt Lake City.

###

APPENDIX B: Panel Biographies

Michael L. Barr (Chairperson)

Former Director - Aviation Safety and Security Program
University of Southern California

Michael L. Barr currently teaches aviation safety management systems in the Aviation Safety and Security Program at University of Southern California's Viterbi School of Engineering. He joined the USC faculty in 1985, and was selected in 1993 as Director of the prestigious USC Aviation Safety and Security Program, a position he held for 13 years. He has taught in Israel, Indonesia, Singapore, Canada, Denmark, Norway, Sweden, Mexico, Brazil, Spain, South Africa, Trinidad, Korea, Taiwan and New Zealand, and is nationally and internationally known for his studies on management culture, Safety Management Systems and risk management programs. On September 12, 2001, Mr. Barr appeared on CNN's Larry King Show to discuss aviation safety risks involving commercial airlines following the 9/11 terrorist attacks. He is frequently asked by both national and international media to discuss aviation safety matters. In 2005, he was selected outstanding presenter at a Mitre seminar in Washington, D.C., having spoken about worldwide acceptance of Safety Management Systems. Mr. Barr is an invited member of Flight Safety Foundation's Corporate Advisory Committee. Mr. Barr was an Air Force Master Instructor Pilot and a decorated F-100 fighter pilot who flew 137 combat missions in the Republic of Vietnam. He earned the Distinguished Flying Cross for Heroism with Combat "V," seven Air Medals, two Meritorious Service Medals, two Air Force Commendation Medals, two Army Commendation Medals, two Presidential Unit Citations, and among other awards. Michael Barr graduated from the United States Naval Academy with a B.S. in Engineering and was awarded a M.A. in Human Relations from Webster College of St. Louis. He is a graduate of the USC Flight Safety Officers and Advanced Safety Management courses. He holds a commercial pilot's certificate and is a member of the International Society of Air Safety Investigators.

Tim Brady, Ph.D.

Dean of the College of Aviation - Daytona Beach Campus
Embry-Riddle Aeronautical University

Dr. Tim Brady, host and originator of National Training Aircraft Symposium, is a professor, aviator and administrator of a preeminent education program. As Dean of the College of Aviation, Dr. Brady provides the resources of Embry-Riddle's Daytona Beach Campus to enhance the experience for NTAS participants through use of the college's excellent facilities, warm social gatherings, and demonstrations of contemporary education and training technology. He was past president of the University Aviation Association and the Aviation Accreditation Board International, and has been called to represent the collegiate flight training community at a crucial time in the evolution of training technologies, education pedagogy and regulatory practice. Through testimony in Congress, participation in FAA aviation rulemaking committees and outreach to colleagues, Dr. Brady has illuminated the issues surrounding preparation of first officer aspirants for aviation careers. He holds the Airline Transport Pilot Certificate, a Ph.D. in Education with a specialization in Higher Education Administration from St. Louis University, an M.S. in Management from Abilene Christian University, and a B.S. in Social Science from Troy State University. He has more than 30 years of experience in higher education, administration and teaching. Before joining Embry-Riddle, he was chairman of the aviation department at Central Missouri State University. He also served as Dean of Institutional Advancement and External Programs at St. Louis University’s Parks College. Brady saw active duty with the U.S. Air Force from 1958 to 1980 as a pilot and was twice decorated with the Distinguished Flying Cross in addition to several air medals.

Garth Koleszar

Facility Representative - Los Angeles Center
National Air Traffic Controllers Association

Garth Koleszar is a 20-year veteran controller at Los Angeles Air Route Traffic Control Center, where he also serves as the Center's Facility Representative for the National Air Traffic Controllers Association (NATCA). Mr. Koleszar is a member of the NATCA/FAA professional standards committee and was recently appointed as NATCA's national representative for training and professional standards. Koleszar has been nationally recognized for his contributions as an on-the-job training instructor, and he is an arbitration advocate who has served as a national legislative advocate for air traffic controllers. For the past 15 years, he has served in a leadership position for NATCA and has held every locally elected post for the organization. Mr. Koleszar was also part of the 2009 NATCA contract team that achieved a pivotal agreement that solidified a collaborative relationship between NATCA and the FAA. He earned his Bachelor of Arts degree in Business Management from California State University San Bernardino.

Michael D. New, Ph.D.

Vice President - Corporate Safety, Quality Assurance, and Training
Aveos Fleet Performance, Inc.

Michael New began his flying career as a U.S. Air Force F-15 fighter pilot, instructor and evaluator. While in the Air Force, he served as the Supervisor of Flying, Chief of Training, Chief of Standardization and Evaluation, and regularly supplemented the Inspector General's office. After eight years in the USAF, he joined Delta Air Lines as a pilot and held several management positions at the airline including instructor, evaluator, General Manager of the fleet research and development group, and Director of the aviation safety department. He earned M.S. and Ph.D. degrees from Georgia Institute of Technology in engineering psychology (human factors engineering). Dr. New was a Delta Captain on the B-737NG aircraft and consulted for the Lockheed-Martin Corporation and the U.S. Navy. He also served as a member on several industry working groups including the Aviation Rulemaking Advisory Committee (Human Factors Harmonization Working Group), NASA Data-Mining Working Group (aviation industry co-chair), and the Flight Safety Foundation Icarus Committee. He has led several operational initiatives including modifications of aircraft hardware and operational procedures. As an operational leader, he has successfully instituted risk management programs in several countries and developed innovative analysis techniques to support data-driven decision-making. Prior to joining Aveos as the leader of the safety, quality assurance, and training organizations, Dr. New served as the Managing Director of Operations Training at United Airlines, where he was responsible for all pilot and dispatcher training programs, served on the Single Operating Certificate Steering Committee, and sponsored the development of the Controller-Pilot Awareness Program (an aircraft simulator-based program designed to increase ATCS awareness of aircraft performance and operational issues faced by the airline pilot community).

Julia Pounds, Ph.D.

Research Psychologist - Aviation Safety
Federal Aviation Administration

Dr. Julia Pounds currently manages the Research and Analysis Branch of the Federal Aviation Administration's Air Traffic Safety Oversight Service. Prior to joining that office, she was an engineering research psychologist for the agency's Civil Aerospace Medical Institute's Division of Aerospace Human Factors Research in Oklahoma City. Since joining the FAA, she has been technical lead on several projects to optimize performance by understanding the role of cognitive processes in human performance, particularly judgment and decision-making associated with expert performance in air traffic control. She participated as the FAA technical lead for Action Plan 12: Management and Reduction of Human Error in Air Traffic Management, a research and development collaboration between the FAA and EUROCONTROL. She was the human factors representative on the FAA's team to support an Italian accident investigation at Linate Airport in Milan. Her research projects have included human factors centered techniques to identify system vulnerabilities contributing to air traffic operational errors, a 360-degree method for runway safety to identify interaction failures between air traffic control, flight, and/or ground operations, an innovative state-of-the-art approach to Air Traffic Control Specialist skill enhancement, and development of performance metrics to distinguish experts from lesser performers. Before joining the FAA, Dr. Pounds worked with the U.S. Army Research Institute at Ft. Leavenworth, Kansas on projects to identify and enhance the problem-solving skills of battlefield commanders and to develop class materials based on these skills for the Command and General Staff College.

APPENDIX C: Panel Charter

Charter of the
FAA Independent Review Panel on Air Traffic Control Specialist Training

Purpose: The purpose of this Panel is to review the Federal Aviation Administration's (FAA) air traffic control technical training program, as well as the screening and assignment processes. The Panel will provide recommendations to the Administrator based on the results of the review.

The official title of this panel is the "FAA Independent Review Panel on Air Traffic Control Specialist Training."

Scope: The Panel will review the controller training program and make recommendations to address the FAA's approach to air traffic technical training to include, at a minimum, professional standards, hiring (qualifications, selection and screening) of air traffic controller candidates and assignment of air traffic controllers to operational facilities.

Goal: As a product of the review, the Panel will provide their findings and recommendations to the FAA Administrator.

Structure and Operations: The Panel will act by a four to one majority vote on each recommendation. A dissenting member may elect to provide a dissenting opinion to any recommendation within the final report.

The Panel is expected to meet as often as necessary to accomplish its purposes under this charter. The Panel may conduct meetings in public or in private, as it deems necessary, and is not precluded from meeting in any specific location.

The Panel will not release information to the public without first coordinating with the FAA Administrator and the FAA Press Office.

Resources: The Vice President of the Air Traffic Organization's Office of Technical Training will serve as the Agency's primary representative to the Panel. Additional support will be provided through the Superintendent of the FAA Academy and the directors of the Mike Monroney Aeronautical Center and the William J. Hughes Technical Center.

The Agency will provide to the Panel access to relevant guidance, coordination procedures, training materials, program plans, schedules, reports, records, audits, business cases, white papers and other documents and databases, as available, so long as such materials are not protected by the Privacy Act or by other agreements.

The Agency will arrange access to government facilities, employees and contractors in accordance with established procedures, so long as such activities do not impact FAA operations and individuals have expressly agreed to participate.

Panel members will serve without compensation. However, each appointed member may be reimbursed for per diem and travel expenses incurred while participating in Panel activities, in accordance with Federal Travel Regulations.

The FAA will be responsible for the Panel's financial and administrative support. Within the Agency, this support will be provided by the Air Traffic Organization's Office of Technical Training.

Expected Outcomes and Timelines:

Status Report: The Panel will provide a status report to the FAA by July 29, 2011, describing progress made and any additional assistance required.

Draft Report: The Panel will use its best efforts to deliver a draft report to the FAA by August 31, 2011, or as established in the July 29th Status Report. The FAA will have the opportunity to ask questions and provide comments to the draft report.

Final Report: Within 30 days after the receipt of any Agency comment(s) to the draft report, the Panel will deliver a final written report to the FAA Administrator. While the Agency may comment on the report and may seek correction of any factual inaccuracies, the Panel is solely responsible for the report's content.

Panel Outbrief: The Panel will provide a briefing of findings and recommendations to the FAA Administrator within 14 days after the delivery of the final written report.

Membership:

Michael Barr, former Director, Aviation Safety and Security Program
University of Southern California

Tim Brady, Ph.D., Dean, College of Aviation – Daytona Beach Campus
Embry-Riddle Aeronautical University

Garth Koleszar, Facility Representative, Los Angeles Center
National Air Traffic Controllers Association

Michael New, Ph.D., Managing Director, Operations Training
United Airlines

Julia Pounds, Ph.D., Research Psychologist, Aviation Safety
Federal Aviation Administration

NOTE: During the course of the Panel's investigation, Dr. Michael New became the Vice President for Corporate Safety, Quality Assurance and Training at Aveos Fleet Performance, Inc.

APPENDIX D: Panel Methodology

The Panel used the following methods to collect data and other sources of information in order to produce this report. The members prepared the final report and recommendations to the Administrator based on the methodology and materials described in this appendix.

Meetings

Panel meetings: There were three consolidated Panel meetings that were each approximately three-and-a-half days long. At the final meeting, the Panel presented its findings and recommendations to the FAA Administrator.

- May 24-26, 2011, in Washington, D.C. At this meeting, the FAA Administrator gave the Panel its tasking. The Panel established its Charter (see Appendix C). Agency personnel presented detailed organizational briefings.

- June 21-23, 2011, in Oklahoma City, OK. The Director of the Mike Monroney Aeronautical Center and the Acting Superintendent of the FAA Academy briefed the Panel on the role of the Academy in training CPCs. The Panel observed training sessions, and key personnel provided briefings on delivery of educational material. The Aeronautical Center Director explained the Franchise Fund system for funding and providing services or deliverables between participating organizations. The Panel also had a briefing on the history and current status of the AT-CTI program as well as distance learning programs.

- July 26-28, 2011, in Washington, D.C. The previous Vice President of ATO Technical Training briefed the Panel on the history of the ATO training program. A NAV CANADA representative presented a detailed briefing via telephone on NAV CANADA's training program. At this meeting, the Panel began discussing its review and analysis of the information collected during site visits, document reviews and personal interviews.

- September 22, 2011, in Washington, D.C. The Panel presented the FAA Administrator with its report and recommendations.

Facility Visits

Panel members visited the following sites as part of the information-collection process. The Panel conducted in-depth discussions and presented questions to management, union representatives, on-the-job

training instructors, certified controllers, certified controllers-in-training and developmental controllers. The Panel also reviewed different simulator programs.

- ATO Terminal Services facilities:
  - Chicago TRACON (C90), IL
  - Jacksonville International ATCT/TRACON (JAX), FL
  - Long Beach ATCT (LGB), CA
  - Los Angeles ATCT (LAX), CA
  - Midway International ATCT (MDW), Chicago, IL
  - O'Hare International ATCT (ORD), Chicago, IL (via telephone)
  - Orlando Sanford International ATCT (SFB), FL
  - Purdue University ATCT (LAF), Lafayette, IN

- ATO En Route and Oceanic Services facilities:
  - Chicago ARTCC (ZAU), Aurora, IL
  - Jacksonville ARTCC (ZJX), Hilliard, FL
  - Los Angeles ARTCC (ZLA), Palmdale, CA
  - Seattle ARTCC (ZSE), Auburn, WA

- ATO Service Centers:
  - Central Service Center, Fort Worth, TX
  - Eastern Service Center, College Park, GA
  - Western Service Center, Renton, WA

- Mike Monroney Aeronautical Center:
  - FAA Academy, Oklahoma City, OK

- AT-CTI programs:
  - Embry-Riddle Aeronautical University, Daytona Beach, FL
  - Lewis University, Romeoville, IL
  - Mt. San Antonio College, Walnut, CA
  - Purdue University, Lafayette, IN

Document Reviews

Panel members conducted an extensive review of reports and other materials. Materials are available on the Technical Training Knowledge Sharing Network (KSN).

Sources included:

- DOT OIG
- MITRE

- ATO
- AOV

Material types included:

- White Papers
- Training Reviews
- Curriculum Reviews
- Controller Workforce Plans
- Audit Reports
- Air Traffic Controller Workforce Recommendations
- Strategic Plans
- Business Plans

Candidate Selection Process

The Panel reviewed for each hiring source, Academy PV and facility assignment procedures.

Time to CPC

The Panel looked at the time required to complete training at the facilities according to the complexity of a facility's operations as well as differences in complexities between En Route and terminal facilities.

Professional Standards and Refresher Training

The Panel evaluated programs for currency and adequacy.

Effectiveness of the Current Training Organization

The Panel interviewed current and former leaders throughout the ATO and used the materials and briefings provided.

APPENDIX E: List of References

Celio, J. C., Jarvis, K., & Poore, D. S. (2005). *Review and Analysis of Air Traffic Controller Education and Training, Revised* (MTR 04W0000098R01). Washington D.C.: MITRE Corporation.

Concurring Recommendations (2011). A Report Briefed to the FAA Independent Review Panel by the NATCA Placement Working Group on July 27, 2011. Washington D.C.

Department of Transportation Office of Inspector General (2011). *FAA Must Improve its Controller Training Metrics to Help Identify Program Needs* (AV-2011-72). Washington D.C.: U.S. Government Printing Office.

Department of Transportation Office of Inspector General (2009). *Report on Training Failures Among Newly Hired Air Traffic Controllers* (AV-2009-059). Washington D.C.: U.S. Government Printing Office.

Department of Transportation Office of Inspector General (2010). *Review of Screening, Placement and Initial Training of Newly Hired Air Traffic Controllers* (AV-2010-049). Washington D.C.: U.S. Government Printing Office.

Federal Aviation Administration Academy (2010). *Academy: Initial qualification Realignment Program.*

Federal Aviation Administration, AHR-1, (2008) Air Traffic Controller Hiring Process Tiger Team Report. Washington D.C.

Federal Aviation Administration, Air Traffic Organization Safety Services (2007). *Air Traffic Controller Stage I Training Program Assessment.*

Guendel, F.J. Colonel, USAF, (2011). *Criteria for UPT Selection (August 10, 2011 email to T. Brady)*. Air Education and Training Command, Maxwell AFB, Montgomery, AL.

Hardison, C. M., Sims, C. S., Wong E. C. (2010). *The Air Force Officer Qualifying Test*. Santa Monica, CA: RAND Corporation.

Komons, N. A. (1978). Bonfires to Beacons: Federal Civil Aviation Policy Under the Air Commerce Act 1926-1938. Ann Arbor, MI: University of Michigan Library.

Welp, R., Kelley, S., Doskow, J., Rounsavell, L., & Morrison, M. (2007). *En Route Initial Qualification (Stage I) Training Redesign Front End Analysis.*

Kultgen, John H. *Ethics and Professionalism,* University of Pennsylvania Press, 1988

Federal Aviation Administration, AJL-41, (2011). Training Technology Strategy, The Future of Training-Closed Loop Training System. Washington D.C.

APPENDIX F: List of Acronyms

Acronym	Description
AABI	Aviation Accreditation Board, International
ABET	Accreditation Board for Engineering Technology
AFOQT	Air Force Officers Qualifying Test
AJL	Air Traffic Organization's Office of Technical Training
AOV	Aviation Safety's Air Traffic Oversight Service
ARTCC	Air Route Traffic Control Center
ATC	Air Traffic Control
ATCS	Air Traffic Control Specialist
ATCT	Airport Traffic Control Tower
ATM	Air Traffic Manager
ATO	FAA's Air Traffic Organization Line of Business
ATS	Air Traffic Services (pre-Air Traffic Organization)
AT-CTI	Air Traffic Collegiate Training Initiative
AT-SAT	Air Traffic Selection and Training
AVS	FAA's Aviation Safety Line of Business
CBA	Collective Bargaining Agreement
CGPA	Cumulative Grade Point Average
CMS	Content Management System
CPC	Certified Professional Controller
CPC-IT	Certified Professional Controllers-in-Training
CTI	Collegiate Training Initiative
DOT	Department of Transportation
ERAM	En Route Automation Modernization
FAA	Federal Aviation Administration
FLM	Front Line Manager
FPL	Full Performance Level
FY	Fiscal Year
GPA	Grade Point Average
KSN	Knowledge Sharing Network
LCMS	Learning Content Management System
NATCA	National Air Traffic Controllers Association
NTD	National Training Database
OIG	Office of the Inspector General
OJT	On-the-Job Training
OJTI	On-the-Job Training Instructor

OM	**Order of Merit**
PCSM	**Pilot Candidate Selection Model**
PFA	**Physical Fitness Assessment**
PFT	**Physical Fitness Test**
ProStan	**Professional Standards**
PV	**Performance Verification**
REDAC	**Research, Engineering and Development Advisory Committee**
RSS	**Relative Standing Score**
TRACON	**Terminal Radar Approach Control**
UPT	**Undergraduate Pilot Training**
USAF	**United States Air Force**
VRA	**Veterans Recruitment Appointment**
VR&S	**Voice Recognition and Synthesis**