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Report to Langhorne M. Bond, Administrator, Federal Aviation Administration; by Hugh S. Wessinger, Associate Director, Community and Economic Development Div.

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A review of the Federal Aviation Administration's (FAA's) management of air traffic controller activities showed that: air traffic control terminals and centers had fewer controllers than provided for by FAA's staffing standards, controllers are not receiving sufficient training in the use of broadband radar, and interviews and psychological tests have not been effective in screening controller candidates. The FAA should: review the air traffic control staffing standard system to assure that it adequately reflects staffing needs, assure that controllers have achieved acceptable levels of proficiency in the use of broadband radar, evaluate the role and effectiveness of interviews and psychological testing in the screening of controller candidates and the need for providing interviewers with special training, consider strengthening the research program at the Civil Aeromedical Institute, and evaluate whether incentives should be provided to encourage air traffic control instructors to serve 4 years at FAA's training academy. (Author/HTW)

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

RESTRICTED

COMMUNITY AND ECONOMIC DEVELOPMENT DIVISION

MAY 11 1978

Mr. Langhorne M. Bond, Administrator
Federal Aviation Administration
Department of Transportation

Dear Mr. Bond:

The General Accounting Office has completed a survey of the Federal Aviation Administration's (FAA) management of air traffic controller activities and programs. Our purpose was to obtain information on controller activities and programs and identify matters that may warrant more detailed review or analysis. Based on our survey, we reviewed the Second Career Program for air traffic controllers authorized by Public Law 92-297. A draft report to the Congress on that review was sent for comment t the Secretary of Transportation on April 6, 1978.

This letter is to bring to your attention other matters identified in our survey which we believe are in need of further study or corrective action by your agency. Specifically, we recommend that you:

--Review the air traffic control staffing standard system to assure that it adequately reflects staffing needs. (We understand such a review was recently started.)

--Assure that controllers have achieved acceptable levels of proficiency in the use of broadband radar.

--Evaluate the role and effectiveness of interviews and psychological testing in the screening of controller candidates and the need for providing interviewers with special training.

--Consider strengthening the research program at the Civil Aeromedical Institute.

--Evaluate whether incentives should be provided to encourage air traffic control instructors to serve 4 years at FAA's training academy in Oklahoma City, Oklahoma.

SCOPE OF SURVEY

We reviewed FAA policies, procedures, reports, and records relating to the recruitment/selection and training of controllers and the staffing of air traffic control facilities. We interviewed officials from FAA, including controllers, the Civil Service Commission, an airline, Canada, and the United Kingdom. Our survey was made at FAA Headquarters, Washington, D.C.; FAA's Eastern and Southern regional offices; and FAA's training academy and Civil Aeromedical Institute (CAMI) at Oklahoma City, Oklahoma.

STAFFING AIR TRAFFIC CONTROL FACILITIES

A comparison of FAA staffing requirements with actual staffing as of September 30, 1977, showed that air traffic control terminals and centers had noticeably fewer controllers than provided for by FAA's staffing standards. Further, the budget process over the past 4 years showed a pattern of reducing staffing levels below the level indicated by FAA's staffing standards.

FAA's air traffic control staffing standard system is used to support FAA's budget request for staffing air traffic control terminals and centers and flight service stations. To determine staff requirements, the system employs engineered staffing standards which are based on the relationship of staff hours expended, as measured by some statistical valid method, and work units produced. In comparison to other FAA guides and formulas used to develop and review staffing requirements, the engineered staffing standards are considered more precise.

Application of the staffing standards to either actual or forecasted aviation activity gives management the number of fully qualified controllers needed to staff air traffic control terminals and centers. For budget purposes, forecasted aviation data is used to determine staffing requirements because the budget process begins almost 2 years before the fiscal year being budgeted. Staff requirements are updated to reflect the most recent forecasted aviation activity about 7 months before submission of the budget to Congress or about 15 months before the start of the fiscal year being budgeted.

In addition, the air traffic control staffing standard system uses an advance recruitment model in conjunction with approved staffing standards to determine overall staffing requirements. Besides fully qualified controllers, facilities are also staffed with developmental controllers, or trainees. As developmental controllers progress, they achieve degrees of full proficiency which enable them to work some, but not all, control positions without close supervision. FAA uses the advance recruitment model to determine whether staffing requirements need to be increased to insure that there will be sufficient developmental controllers who will be fully trained in time to fill controller vacancies.

At air traffic control terminals, the staffing standard and actual workloads during fiscal year 1977 indicated that about 8,800 fully qualified controllers were needed. But as of September 30, 1977, FAA regions only had about 7,500 fully qualified controllers on board at terminal facilities, or 1,300 fewer than required by the standard. Understaffing at terminal facilities was prevalent in 10 of the 11 regions with shortages ranging from 11 percent in the Pacific Region to 32 percent in the Great Lakes Region. (See Enclosure I.)

At the 22 air traffic control centers in the United States, about 8,100 fully qualified controllers were needed based on the standards and actual workloads during fiscal year 1977. However, as of September 30, 1977, the 22 centers only had 5,750 fully qualified controllers or 2,350 fewer than required by the standards. Understaffing occurred at 20 of the 22 centers and ranged from 4 percent at the Washington Center to 44 percent at the Atlanta Center. (See Enclosure II.)

As can be seen from Enclosures I and II, developmental controllers were available to help cover shortages. However, because developmentals had not yet reached the full proficiency level of controllers, they can not replace shortages on a one-for-one basis. Also, in 6 regions and 7 centers, developmentals were not even sufficient in terms of numbers to cover shortages in the number of fully qualified controllers required by the standards.

We understand that FAA recently established a task force to review its staffing standard as a result of an investigative report prepared by the Surveys and Investigation Staff of the House Committee on Appropriations. Certainly our survey confirms the need for this review.

TRAINING ON BROADBAND RADAR

Controllers reportedly are not receiving sufficient training, or opportunities to maintain proficiency, in the use of broadband radar thus presenting a potential hazard to aviation safety.

At air traffic control centers, narrow band radar is the primary system to control air traffic. With narrow band radar, computers are used to screen radar targets to identify aircraft within a specified area of airspace and to reproduce the aircraft along with its speed, altitude and identifier code on the radar screen. When the computer fails or is shut down, controllers must resort to broadband radar which requires the controller to manually identify and flag from all aircraft targets those within the airspace being controlled. According to Eastern Region officials, FAA policy provides for training controllers on broadband radar during the midnight shift when the computers are generally shut down.

Officials at the New York Center, however, did not believe training on broadband radar during the midnight shift was sufficient, because of the light traffic volume handled, to provide adequate training and experience to switch from narrow-to broad-band radar conditions when a failure occurs during heavy traffic conditions.

Recently, an air traffic controller at the Washington (Leesburg) Center complained in a letter to radio station WMAL, Washington, D.C., that new controllers at the center were not trained on broadband radar and that very little opportunity existed for veteran controllers familar with broadband to remain proficient.

In addition, in March 1978, the newsletter "Monitor," published by The Aviation Safety Institute, stated that on March 8, 1978, the computer at the Jacksonville Center was down for 18 hours during which time 3,500 aircraft were handled by controllers using broadband radar. Although no accidents or apparent near misses occurred, the newsletter said that very few of the Jacksonville controllers were proficient in the use of the broadband radar system. One experienced controller was reported to comment that:

"Lots of scarey things were happening. We will never know how many near-misses or system errors there were. We had extensive delays throughout the Jacksonville area. I predict that we are ripe for a mid-air collision or a near-miss that will result in injury."

Equipment failures can and do occur. In the Jacksonville situation, a small printed circuit card was reportly at fault. While efforts can be made to minimize equipment failures, controllers should achieve acceptable levels of proficiency in the use of broadband radar so long as this remains the primary backup system.

SCREENING CONTROLLER CANDIDATES

Interviews and psychological test have not been effective in screening controller candidates. Interviewers did not have the training, skills and experience necessary to make the interview an effective tool. Further, a well designed interview conducted by qualified interviewers, could prove to be a better evaluative tool than the psychological test now administered by FAA.

Candidates for air traffic controllers are obtained from registers maintained by the Civil Service Commission's area offices. A candidate selected from the register is given a physical examination, a psychological test, a personal interview, and a security clearance. Candidates making it through this initial screening are offered jobs as controllers and, if accepted, are sent to FAA's training academy in Oklahoma City for extensive training.

Interviews

FAA instructions provide for candidates to be interviewed by at least two FAA employees, a personnel specialist and one individual with experience as a full performance controller. According to the instructions, candidates are to be interviewed and rated for their suitability for air traffic control work based on such factors as appearance, oral expression, attitude, and speech patterns.

In FAA's Eastern Region, where most of our survey work on screening took place, 3 of the 4 interviewers we talked to expressed differing views on the effect the interview had on the selection of controller candidates and whether the interviewers' opinion made a difference.

A regional official from the personnel division told us that he never disqualified an applicant on the basis of an unacceptable interview. In fact, of 39 cases we reviewed in the Eastern Region, only one candidate received a below average rating on the interview and none were rated unacceptable. In the Southern Region, 2 of the 22 unsuccessful candidates were rejected on the basis of the interview.

Although interviewers understand and have insight into the job requirements of controllers, interviewers also should possess special skills and be trained in interviewing for this function to be fully effective. However, the Eastern Region Director of Personnel and the Regional Flight Surgeon told us that interviewers were not trained to interview controller candidates.

In addition, our review of cases in the Eastern Region showed that about 50 percent of the controller candidates were interviewed by one FAA employee rather than the two required by FAA instructions.

We understand that the New England and Southwest regions each have programs underway to train interviewers. However before these programs are expanded to other regions, we believe you may wish to evaluate the role and effectiveness of the interview in the selection process and the effects thereon of providing interviewers with special training.

Psychological Testing

All controller candidates are given a psychological test, "Cattel's Sixteen Personality Factor Questionnaire." Test results are examined in Washington by FAA's Office of Aviation Medicine and returned to the regions so that candidates with unsatisfactory test results can be referred to a consulting psychiatrist for further evaluation to determine their fitness for air traffic control work.

In the Eastern Region, the personnel division and medical office were of the opinion that Cattel's Questionnaire as presently interpreted, was useless as a screening device. The Regional Flight Surgeon told us that the Questionnaire identifies about 1 percent of the candidates for further psychiatric evaluation but that the test could be interpreted to screen out a greater number of candidates.

To test the effectiveness of Cattel's Questionnaire as a screening tool, we reviewed the record of eight candidates who had been rejected based on information in their military medical files. Although five of the eight candidates had been rejected for psychological reasons, such as attempted suicide or an apathetic and defective attitude, all five candidates had satisfactory profiles based on FAA's interpretation of Cattel's Questionnaire.

An official from the Office of Aviation Medicine told us Cattel's Questionnaire identified about 1 in 100 candidates for further testing and evaluation and that about one-half of the candidates referred for further testing eventually were not hired. According to our medical advisor, this rejection rate did not seem to be very high. Also, our advisor was of the opinion that a trained, skilled interviewer, using a well designed interview, could obtain as much information and perhaps make a better evaluation than now provided by Cattel's Questionnaire.

Recommendations of the Southern Region

Because of a high attrition rate in classroom and on-the-job training, the Southern Region, in June 1974, recommended to headquarters that the screening and selection process be revamped. Although some changes have been made, particularly in the training program, we found no evidence that the following recommended screening techniques, which seem to have merit, have been acted on:

--Review of past social and employment history, including contact with employers and references.

--Psychomotor testing.

--At least two interviews by specially trained panels.

--An expanded and more discriminating version of Cattel's Questionnaire.

USE OF CAMI RESEARCH

We believe you may wish to consider strengthening the research program at CAMI. For example, between March 1974, and June 1976, CAMI issued 13 reports on air traffic control subjects. Although these reports contained conclusions, they were not addressed to any specific organization

or individual and did not contain any specific recommendations. In addition, the CAMI Chief told us that the Institute does not receive feedback, nor does it follow-up, on the actions taken on, or use made of, these reports.

In some instances, the air traffic control subjects studied originated with academy instructors and CAMI researchers. We did not attempt to determine whether potential users, such as Air Traffic Service, had a need for these research studies and made this need known to CAMI before the research was undertaken.

We believe a well conceived research program should

--consist of research that is based on identifiable needs of the user,

--result in research reports that are addressed to the intended user and contain appropriate recommendations, where warranted, and

--provide for a system to monitor and provide feedback on the actions taken on research results.

AIR TRAFFIC CONTROL INSTRUCTORS

Air traffic control instructors at FAA's training academy have the option of remaining at the academy as instructors for up to 6 years but few stay longer than 2 years. Academy officials prefer that instructors stay for 4 years because they believe an instructor's teaching ability will increase during the third and fourth years, thus increasing the instructor's value to students. Although this seems logical, incentives would be needed to encourage instructors to stay for 4 years. Whether such incentives can be justified by expected benefits is a matter that you may wish to evaluate.

Under FAA's present training program for air traffic controllers, developmental controllers (trainees) are sent to the academy for about 16 weeks of training. Instructor vacancies are filled by volunteers from air traffic control facilities. On acceptance, instructors agree to serve a 2-year tour with the option of extending for two more 2-year tours.

Our analysis of the controller instructor workforce showed that few instructors stayed more than 2 years. For example, on March 1, 1977, only about 11 percent of the controller instructors had been at the academy for more than 2 years. Similarly, on November 13, 1977, some 8 months later, only about 10 percent of the controller instructors had been at the academy more than 2 years. Academy officials confirmed that few instructors exercise their options to extend beyond their first 2-year tour.

Academy officials believe that 2 years is not enough time to develop instructor skills and abilities to the highest level. However, they gave the following reasons for instructors not staying for a longer period:

--Many instructors go to the academy to obtain a promotion or to move into a management position. With little likelihood of further promotion at the academy they begin making plans to return to a facility as soon as possible because of the promotion opportunities.

--Time spent as an instructor does not count toward eligibility for early retirement benefits provided by Public Law 92-297.

--Loss of status in the controller's union.

--Reluctance by some regions to let good controllers go for 2 to 6 years.

Incentives could be provided to overcome most of these reasons. Additional promotion opportunities could be extended to controller instructors who remain longer than 2 years. Creditable service for early retirement benefits could be redefined to include time spent as an instructor at the academy, however, a change in Public Law 92-297 may be required to accomplish this change. Further, the region's loss of good controllers to the academy is constant regardless of tour length, assuming instructors are recruited on some equitable basis from all regions and are replaced upon their return to the region by other good controllers.

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We would appreciate being advised as to any actions you may take on matters discussed in this report.

Sincerely yours,

Hugh J. Wessinger

Hugh J. Wessinger
Associate Director

Enclosures (2)

ENCLOSURE II

STAFFING AT AIR TRAFFIC CONTROL CENTERS

Center	Number of fully qualified controllers: Based on standard (note a)	On board 9/30/77	Under (over) standard	Under (over) as percent of standard	Number of developmentals on board
chorage	92	78	14	15	45
nsas City	391	291	100	26	115
shington	463	399	64	14	127
w York	445	366	79	18	133
icago	516	372	144	28	214
dianapolis	516	345	171	33	142b/
nnesota	326	238	88	27	98
eveland	720	416	304	42	107
ston	336	359	(23)	(7)	31
attle	235	169	66	28	53b/
nolulu	93	99	(6)	(6)	24
nver	332	265	67	20	42b/
lt Lake City	246	167	79	32	49b/
cksonville	297	218	79	27	183
ami	316	194	122	39	153
mphis	381	226	155	41	202
lanta	507	284	223	44	227
buquerque	310	202	108	35	127
rt Worth	422	291	131	31	131
uston	396	285	111	28	74b/
s Angeles	442	256	186	42	90b/
kland	333	230	103	31	26b/
Total	8,115	5,750	2,365	29	2,393

a/Based on actual activity levels during fiscal year 1977 and adjusted to reflect a 11 percent productivity gain.

b/Number of developmentals is less than the shortage in fully qualified controllers.