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Report to the Chairman, Committee on Transportation and Infrastructure, House of Representatives

October 2001

AIR TRAFFIC CONTROL

FAA Enhanced the Controller-in-Charge Program, but More Comprehensive Evaluation Is Needed

G A O

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Abbreviations

CIC	Controller-in-Charge
FAA	Federal Aviation Administration
FMA	Federal Managers Association
NATCA	National Air Traffic Controllers Association
OIG	Office of the Inspector General

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United States General Accounting Office
Washington, DC 20548

October 31, 2001

The Honorable Don Young
Chairman, Committee on Transportation and
Infrastructure
House of Representatives

Dear Mr. Chairman:

Each day, over 25,000 flights and their nearly 2 million passengers—as well as innumerable cargo, military, and general aviation flights—depend on the 15,000 air traffic controllers working in the Federal Aviation Administration's (FAA) Air Traffic Control (ATC) system to safely reach their destinations. Working in airport towers and radar facilities, these controllers monitor and direct aircraft on the ground, during landings and takeoffs, and en route between airports. In doing so, the controllers ensure that the aircraft maintain a safe distance between one another and that each aircraft is on proper course to its destination. Because the ATC system requires thousands of controllers, each of whom typically manages just a section of airspace or one aspect of an aircraft's takeoff or landing, FAA depends on supervisors to monitor air traffic operations and controllers' workload and performance to ensure that the system is operating safely.

In negotiating its 1998 collective bargaining agreement with its controllers' union (the National Air Traffic Controllers Association, or NATCA), FAA agreed to a national plan that would reduce by attrition the number of supervisors that oversee air traffic controllers (that is, not replacing those who leave), ultimately bringing the controller-to-supervisor ratio from 7-to-1 to 10-to-1. To do so without compromising safety, FAA will increasingly have its controllers performing supervisory duties as Controllers-in-Charge (CIC) when supervisors are not present. While some FAA facilities have been using CICs for over 40 years, FAA recently expanded the duties and responsibilities of CICs and made them accountable for the performance and safe operation of the facility while they are in charge. Because of concerns about FAA's plans to make greater use of CICs, you asked us to review FAA's implementation of the expanded CIC program. Specifically, as discussed with your office, this report answers four questions: (1) how is FAA implementing the national plan for supervisory reductions and what is the resulting number of CICs it has selected to provide watch supervision?; (2) how adequate is the training FAA provided controllers for their new duties and responsibilities?; (3) how adequate are FAA's

quality assurance procedures for measuring any safety-related effects of the CIC expansion?; and (4) what is the status of FAA's progress toward meeting its estimates of savings and productivity gains from the CIC expansion?

To conduct this work, we obtained and analyzed nationwide data from FAA's Air Traffic Services Division on the implementation of the expanded CIC program. We also visited 12 air traffic control facilities and 6 of FAA's 9 regional offices to review their implementation of the CIC selection process, training, and quality assurance measures. We selected regional offices to ensure geographic diversity and, within those regions, we chose facilities that handle different levels of traffic (in terms of volume and complexity) and that represented a cross-section of the types of air traffic control facilities FAA operates. We assembled an independent panel of four experts in air traffic control training to assess the adequacy of the CIC training program in addition to reviewing all available student evaluations of the CIC training. Our detailed scope and methodology, including a list of the FAA facilities we visited, are presented at the conclusion of this report.

Results in Brief

FAA is implementing its national plan to reduce the number of supervisors for air traffic control through its regional offices, which are doing so by considering the supervisory staffing needs of each of their facilities or by applying the 10-to-1 ratio across the board. Nationwide, FAA has selected 8,268 controllers to serve as CICs, which is about 55 percent of its air traffic controller workforce. Although this is slightly fewer CICs than FAA had prior to the 1998 agreement, FAA expects to certify about 10,000 controllers as CICs by the end of 2003. At individual facilities, the numbers of controllers selected varied by the size and type of facility. Over half of FAA's 316 facilities, including 6 of the 12 we visited, selected all or nearly all of their controllers to be CICs. Most of these were small facilities with 30 or fewer controllers. Towers, particularly those with lower volume and complexity of air traffic, selected the highest percentage of their controllers as CICs (about 82 percent) whereas the terminal radar approach control facilities (TRACONs) and en route centers selected smaller percentages of their controller workforce (59 and 27 percent, respectively). According to managers of the facilities we visited, they needed the number of CICs they selected in order to have watch supervision in place at all times; as a result, being certified as a CIC was often a requirement. Also, facilities cited their current and projected supervisory staffing and facility-specific operational requirements as reasons for their selections.

In the view of our expert panel, the materials for FAA's CIC training program were thorough and comprehensive, but FAA has little assurance that the training was effectively presented nationwide and achieved its objectives. While FAA conducted some assessment of training at a limited number of facilities, the agency has not obtained student evaluations from most of those who completed the course or conducted an overall evaluation of whether the training was effective. Moreover, the effectiveness of the training may diminish for those controllers who spend little time as CICs and thereby might have difficulty maintaining the skills needed to perform CIC duties. Refresher training might be necessary to retain or improve CIC skills. As a result, we are making recommendations that FAA more comprehensively evaluate the CIC training program and provide periodic refresher training as needed for CICs at all of its facilities.

FAA has not consistently implemented its quality assurance procedures for the CIC expansion. FAA developed a CIC "success metric," which is a series of questions each facility is supposed to use as part of their overall facility quality assurance program to evaluate whether the facility was operating satisfactorily after expanding the duties of CICs. However, we found that 5 of the 12 facilities we visited did not have quality assurance measures in place for the CIC expansion because, for example, they were unaware of the requirement to have the measures or said they had not been instructed to use them. The remaining seven facilities relied on their existing quality assurance programs to monitor the impact of the CIC expansion. At 15 of its facilities, FAA also found facilities had inconsistently implemented their CIC quality assurance measures. Nonetheless, FAA reports that, to date, no CICs have been found to have caused or contributed to operational errors. FAA also noted that supervisors are rarely the cause of or a contributing factor to these errors. FAA does biennial evaluations of its facilities' operations and these now include a focus on their implementation of the CIC expansion so that FAA will identify those that do not have CIC quality assurance. However, because these evaluations will not have been done at all of FAA's facilities until fiscal year 2003, FAA will not know until then whether all of its facilities are adequately monitoring the effects of the CIC expansion. As a result, we are making a recommendation that FAA better enforce its requirement that its facilities are measuring the effects of the CIC expansion through their quality assurance programs.

FAA's reduction of supervisors will save the agency $141.5 million, or about $23.1 million less than it estimated. In September 2000, FAA estimated that the reduction in supervisors to a 10-to-1 ratio of controllers to supervisors would produce savings of $164.6 million. The difference

between FAA's estimate and ours is the result of two factors—one that reduces its savings and one that increases them. The first of these is that FAA's estimate did not factor in the 10-percent premium FAA pays controllers for serving as CICs, which we estimate will cost $41.5 million over the 5-year life of the agreement (reducing its net savings). The second factor is that supervisory attrition has, so far, been happening faster than FAA estimated, increasing its net savings by about $18.4 million. Because FAA has said that it will reduce supervisors only through attrition, it will be fiscal year 2004 before it knows conclusively what its net costs or savings from supervisory reductions will be. FAA has not measured productivity gains from the CIC expansion. To fully assess productivity gains from both the CIC expansion and other increases in controllers' duties, FAA believes it needs more data than it currently has, but it has not yet implemented systems that capture all of the productivity data it needs to do so. FAA expects to have such a system in place that would allow it to begin collecting productivity data in fiscal year 2002. As a result, we are making a recommendation that FAA assess the productivity of its controllers in future status reports on the 1998 agreement.

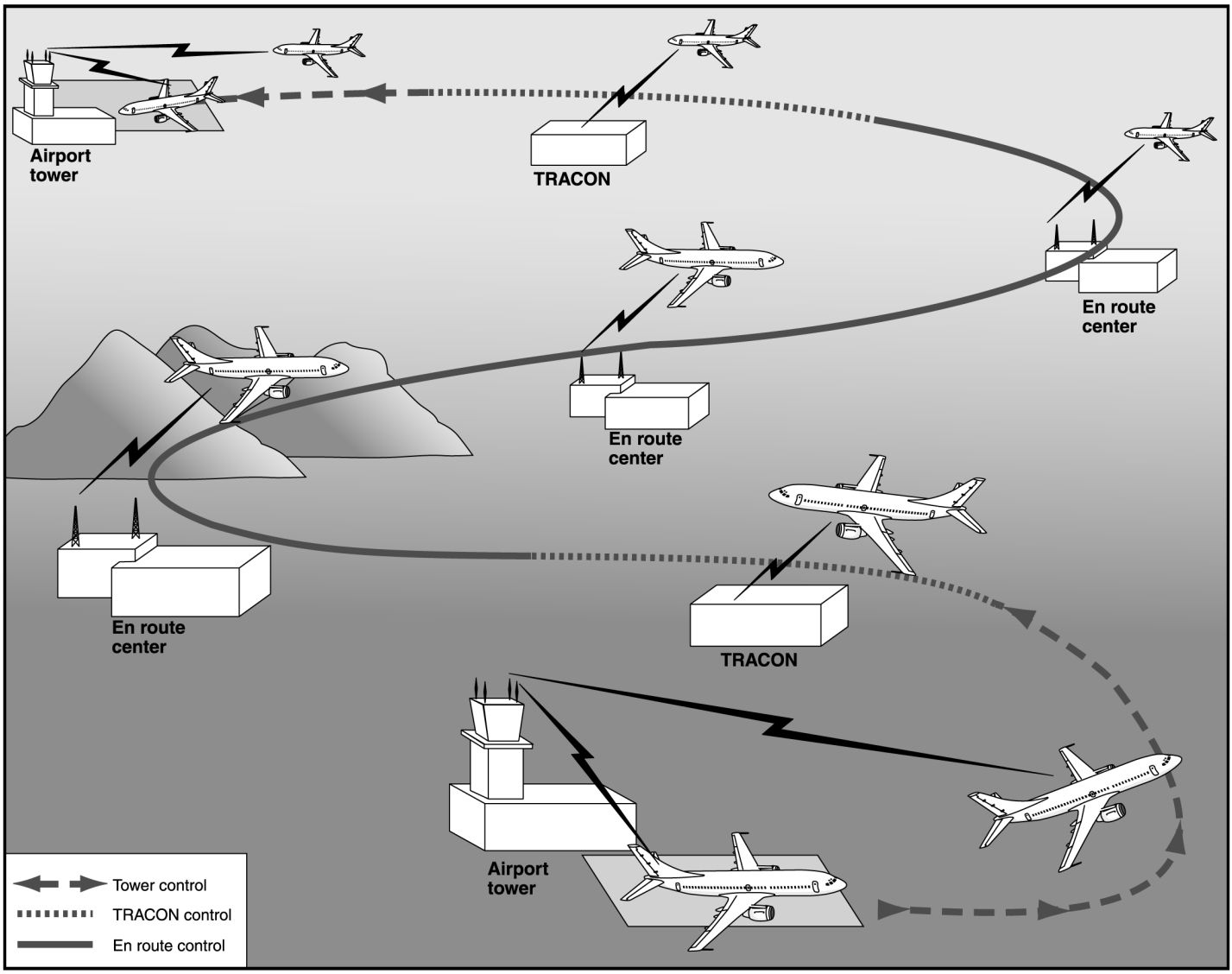
In commenting on a draft of this report, FAA agreed with our findings and conclusions and stated that it has begun taking steps to address our recommendations. For example, FAA has begun developing refresher training for CICs. The Federal Managers Association, a professional association representing some FAA managers and supervisors, disagreed with our findings because it questions the accuracy of the information FAA provided us. However, we see no reason to question the accuracy of the information FAA provided and note that we used additional means, such as consulting an expert panel and obtaining documentation of facilities' practices, to develop our findings. The air traffic controllers' union agreed with our findings and conclusions and considers our recommendations necessary steps for improving the CIC program.

Background

FAA's mission is to promote the safe, orderly, and expeditious flow of air traffic in the United States. To accomplish this, FAA provides uninterrupted air traffic control services throughout the year. A key component of these services is FAA's air traffic controller workforce, which includes its air traffic controllers and their supervisors. Controllers manage and direct air traffic throughout the country at three primary types of facilities to provide complete airport-to-airport air traffic management:

- Airport towers—controllers at these facilities direct the flow of aircraft before landing, on the ground, and after takeoff within 5 nautical miles of the airport and up to 3,000 feet above the airport.
- TRACONs—controllers here provide radar separation to arriving and departing flights. They direct aircraft within the airspace that extends from the point where the tower control ends to about 50 nautical miles from the airport. Some TRACONs are located outside of the airport. However, most are not only collocated with the airport tower, but the controllers there work at both the tower and the TRACON.
- Air Route Traffic Control Centers (called en route centers)—controllers at these facilities manage aircraft in routes outside or above TRACON airspace and over parts of the Atlantic and Pacific oceans. Typically, an en route center has responsibility for more than 100,000 square miles of airspace.

Figure 1: Air Traffic Control System



At each facility, controllers manage and direct one area or aspect of air traffic. For example, in a tower, one controller is responsible for directing the ground movement of aircraft until they reach the runways, while others are responsible for air traffic control service to departing aircraft or sequencing aircraft on their final approaches into the airport. Control of an aircraft passes from one controller to another as the plane moves to its destination. For example, the controller directing ground movement of

aircraft hands off responsibility for them to the controller directing departures from the airport. As departing aircraft near the end of the tower's airspace, controllers transfer control of the plane to a controller at a TRACON who, in turn, transfers the aircraft to an en route center as it leaves the TRACON's airspace.

Figure 2: Air Traffic Controllers in a Tower

Source: FAA.

Figure 3: Air Traffic Controllers in a TRACON

Source: FAA.

FAA's standards for its facilities require that they maintain "watch supervision" over air traffic operations at all times. To do this, FAA employs supervisors who have a range of operational, managerial, and administrative responsibilities. Supervisors provide oversight of the control area and ensure operational awareness among the controllers directing air traffic in different areas or positions within the facility. They monitor and manage the flow of air traffic, distribute workload among controllers, and adjust and monitor the equipment (such as radar) on which the controllers depend. Supervisors are also responsible for other duties such as evaluating performance, considering promotions, granting awards, taking disciplinary actions, and coordinating testing for drugs or alcohol. Historically, FAA has also had CICs provide watch supervision when supervisors were not available, but the role of the CIC was limited to overseeing the operations in the control area.

In July 1998, in negotiating with its air traffic controllers' union, NATCA, FAA agreed to a national plan to reduce the number of supervisors and

increasingly use CICs to provide watch supervision.[1] Specifically, FAA agreed to (1) reduce through attrition about 560 supervisory positions, moving from a controller-to-supervisor ratio of 7-to-1 toward 10-to-1, (2) pay controllers a 10-percent premium for the time each spends as a CIC, and (3) increase the supervisory duties that CICs would perform. In agreeing to these terms, FAA said a 10-to-1 ratio would be consistent with the National Performance Review goal of reducing employee-to-supervisor ratios.[2] After the agreement took effect, FAA estimated that supervisory attrition would partially offset the costs of certain personnel reforms in the 1998 agreement as well as subsequent pay increases for supervisors and air traffic managers.[3] The 10-percent CIC premium took effect in 1998 and the added responsibilities for CICs took effect January 1, 2001. At that time, FAA began to allow for supervisory attrition at facilities that had completed the training and other steps it required in preparation for the CIC expansion.

After FAA completed the 1998 agreement with the air traffic controllers, members of the Congress, the Federal Managers Association (FMA), and others raised concerns about the potential safety implications of reducing the number of air traffic control supervisors. In response to these concerns, the Department of Transportation's Office of Inspector General (OIG) reported that the agreement to reduce the number of supervisors will not have an adverse impact on the safety of air traffic operations as long as FAA enhances the program by (1) identifying the duties CICs will assume from supervisors, (2) ensuring that FAA management retains the right to select CICs, (3) developing and providing CIC training courses,

[1]FAA agreed to the 10-percent premium in article 18 of its 1998 collective bargaining agreement; it spelled out other provisions of the CIC expansion, such as the move to a 10-to-1 controller-to-supervisor ratio, in related implementing agreements (including a "Principal Memorandum of Agreement" that addresses controller staffing, hiring, and compensation issues) and revisions to its watch supervision requirements and the controllers' performance standards. Article 18 of FAA's 1998 agreement with NATCA appears as appendix I of this report.

[2]The National Performance Review, issued in September 1993, identified methods to make government work better and cost less. The review identified the federal government's average of one supervisor to every seven employees as a concern and directed executive agencies to double the managerial span of control.

[3]Specifically, FAA agreed to base controller pay on the complexity of the operations they manage and the volume of air traffic they control, increasing its costs by an additional $825 million over the 5-year life of the agreement. FAA estimated that pay increases for its air traffic managers and supervisors would cost an additional $260 million.

and (4) developing quality assurance procedures to measure the impact of supervisory reductions.[4]

FAA identified the additional supervisory functions that CICs will perform as well as those, such as performance evaluations, which remain with supervisors. As shown in appendix II, CICs must now perform three additional duties that they could not perform before the expansion: preparing initial reports on operational errors and deviations, monitoring the movement of presidential aircraft, and making on-the-spot corrections of controllers' performance while overseeing facility operations. However, FAA officials emphasize that, more so than the number of additional duties, the most important difference between the pre- and post-expansion CIC program is the increased accountability FAA now places on controllers for their performance of CIC duties. Prior to the 1998 agreement, CIC duties were not a critical job element in the performance standards that FAA uses to evaluate individual controllers' performance and, according to FAA, it had limited ability to hold controllers accountable for their performance as CICs. As part of the CIC expansion (and in consultation with NATCA), FAA has made those duties a critical job element for the controllers. In doing so, FAA officials believe they have set an expectation that controllers are now accountable for their performance as CICs in the same manner that they are held accountable for controlling air traffic.

FAA took a number of actions to address the report's other concerns and to implement the expanded CIC program. Specifically, it (1) determined that each of its ATC facilities would be responsible for selecting controllers to serve as CICs and spelled out a CIC selection process for them to use, (2) developed training for CICs to meet their new responsibilities, and (3) developed safety and efficiency quality assurance metrics for evaluating the CIC program. FAA also determined that it would not allow attrition to begin until each facility had completed all of the steps necessary to prepare its controllers and certified that it had a sufficient number of controllers to serve as CICs and the expansion of CIC duties was working satisfactorily.

[4]*Staffing: Reductions in the Number of Supervisors Will Require Enhancements to FAA's Controller-in-Charge Program*, Office of Inspector General, U. S. Department of Transportation, Report number AV-1999-020, November 16, 1998.

FAA's Facilities Have Certified Over Half of All Controllers As CICs Because of Shift Coverage Rules, Supervisory Staffing, and Local Operational Needs

FAA's regional offices are responsible for carrying out the agency's efforts to meet its national goal of a 10-to-1 ratio of controllers to supervisors. The regional offices did so either by determining appropriate ratios or staffing levels for each of their facilities or by applying the 10-to-1 ratio across the board to all of their facilities. Nationwide, FAA's facilities selected over 8,250 air traffic controllers to be CICs. Although this represents over 55 percent of FAA's controllers, it is slightly less than the number of CICs FAA had prior to the 1998 agreement. The percentage of controllers selected varied considerably among different types and sizes of facilities. Over half of FAA's facilities—primarily small and mid-size towers—selected all or nearly all of their controllers. However, larger facilities, such as the busiest airports and FAA's en route centers, typically selected fewer controllers to be CICs. At the 12 facilities we visited, their need for CICs—and, as a result, the number of controllers they selected—was governed by a combination of FAA's requirement to have watch supervision on all shifts, their level of supervisory staffing, and their operational requirements.

FAA's Regional Offices Are Implementing Supervisory Reductions

FAA tasked each of its regional offices with planning for and managing the attrition of supervisors on a facility-by-facility basis so that it could reach its national goal of a 10-to-1 ratio of controllers to supervisors. FAA's expectation was that each region would (1) work towards achieving a 10-to-1 ratio, but that individual facilities within the region could have different ratios—either higher or lower—until the region reached 10-to-1; (2) consider the staffing and operational requirements of each facility to determine an appropriate controller-to-supervisor ratio at each facility; and (3) reach the 10-to-1 ratio only through normal attrition, such as retirements, resignations, and voluntary transfers.

One of the 6 regions we visited has chosen to uniformly apply the 10-to-1 controller to supervisor ratio to each of their facilities. The remaining five regions we visited are adjusting supervisory levels on a facility-by-facility basis. They plan to keep supervisory staffing at or close to current levels at the larger facilities such as en route centers, TRACONs, and terminals with high-density traffic (such as O'Hare in Chicago), and will reduce the number of supervisors at smaller facilities that have less traffic. As a result, controller-to-supervisor ratios at facilities in these regions will vary. For example, in one region there will eventually be no supervisors at some of its smaller facilities, such as the North Las Vegas air traffic control tower. FAA plans for North Las Vegas to have no supervisor and, instead, operate with 1 manager and 15 controllers. Similarly, the Billings

terminal—once the attrition of the 3 supervisors currently assigned there has occurred—will have 1 manager, no supervisors, and 18 controllers. At this facility, CICs will perform all of the watch supervision duties and the facility manager will perform all of the other duties that CICs may not (such as performance evaluations of the controllers).

FAA's Facilities Selected Most Controllers to Be CICs, but Fewer Than Were Used in the Past

By the end of March 2001, managers at FAA's facilities decided to select and certify most of FAA's air traffic controllers as CICs. A total of 8,268 controllers—over 55 percent of the 15,000 controllers at FAA facilities[5]—have been certified as CICs. The number of controllers selected as CICs under the expanded program, although large, is smaller than the number of CICs FAA had under its previous program. In September 2000, prior to the selection of controllers for the expanded program, FAA had over 10,600 CICs at its facilities. According to FAA program officials, in assessing their needs for CICs under the expanded program, some facilities determined that they did not currently need as many CICs as in the past. Therefore, some controllers who were CICs under the previous program have been decertified and are not CICs under the expanded program. However, the number of CICs in the expanded program is expected to grow as the number of supervisors is reduced. According to projections submitted by FAA facility managers, a total of 10,200 controllers will be certified as CICs when the program is fully implemented in 2003.

[5]To be eligible to be a CIC, a controller must have been certified for 6 months in the area or facility CIC duties are to be performed. The other controllers in the FAA workforce who are part of the NATCA bargaining unit are certified professional controllers-in-training and developmental controllers. The percentage of CICs to controllers is based on the total number of controllers at a facility.

Number of Controllers Selected to Be CICs Varied Depending on the Size and Type of Air Traffic Control Facility

The percentage of controllers selected to be CICs varied depending on facility size. Many of FAA's facilities selected all of their controllers to be CICs. Of the 316 traffic control facilities, 165—over 50 percent—selected or planned to select all or nearly all of the controllers to be CICs.[6] Most of those selecting all of their controllers to be CICs were relatively small—with 30 or fewer controllers—whereas none of the larger facilities (those with 100 or more controllers) selected all controllers to be CICs. On the basis of facility type, the largest number of controllers selected to be CICs—and the highest percentage of the controller staff—were at towers. This was particularly so at those towers at FAA levels 5 through 10,[7] where 82 percent of all controllers at these facilities were selected to be CICs. At the TRACONs, about 59 percent of the controllers were made CICs, although some TRACONs that have relatively low traffic and fewer controllers selected all controllers. The en route centers, almost all of which have large staffs, selected significantly lower proportions of their controllers to be CICs. Table 1 shows the numbers of controllers and CICs at each type of facility.

[6]Controllers in training or not certified as full performance controllers are not eligible to be CICs. There were 165 facilities that selected or planned to select between 95 and 100 percent of all controllers assigned to those facilities. The percentage calculation includes those controllers not eligible to be CICs.

[7]FAA activity levels of the towers (and other air traffic facilities) indicate the volume and complexity of air traffic at that location. Facility size is also reflected in the numbers of controllers assigned to that facility. For example, O'Hare is a level 12 facility with about 65 controllers, and North Las Vegas is a level 7 with about 12 controllers.

Table 1: Controllers Selected to Be CICs by Type and Size of Facility

Facility Type/Size[a]	Number of Facilities	Number of CICs, as of March 2001	Percent of Controllers as CICs, as of March 2001	Projected CICs, January 2003
En route Centers	23	1,782	27	2,612
TRACONs[b]	28	981	59	1,200
Towers[c] (Level 11-12)	20	981	75	1,062
Towers (Level 9-10)	42	1,436	82	1,654
Towers (Level 5-8)	203	3,088	82	3,672
National total	316	8,268	55	10,200

[a]Levels of the towers indicate the amount and complexity of air traffic at that location.

[b]TRACONs include combined control facilities that have consolidated the operations of more than one TRACON.

[c]Towers include towers with radar, towers without radar, and combined tower/TRACON facilities.

Source: GAO's analysis of FAA's Quarterly Reports.

Watch Supervision Requirements, Supervisory Staffing, and Facility Operational Needs Accounted for CIC Selections at 12 FAA Facilities

At the 12 facilities we visited, the number of controllers selected to be CICs is the result of a combination of factors. These included FAA's watch supervision requirements, current and projected facility supervisory staffing, and each facility's operational requirements.

Watch Supervision Requirements

The managers of the facilities we visited that selected all controllers pointed out that their need for CICs is based on watch coverage requirements, not on concerns that controllers are entitled to share in the CIC duties and the accompanying 10-percent pay premium. In fact, the managers stressed that becoming a CIC was now a requirement at their facility, and that if a controller did not become CIC certified, he or she could no longer work at the facility. The managers said that they would have tremendous difficulty trying to schedule staff if they had to consider whom was or was not a CIC to ensure proper watch supervision and adequate backup to accommodate breaks, vacations, and unplanned absences.

Similarly, managers of facilities that did not need all of their controllers to be CICs also said that coverage requirements dictated their needs. At the

Los Angeles en route center, for example, managers said that controllers and CICs are certified to work in only one of the six air traffic control areas at the facility and are not interchangeable among areas on a day-to-day basis without undergoing months of recertification training. Consequently, the number of CICs selected—69 of the total controller workforce of 294—is necessary to ensure coverage. Lower numbers of CICs would result in scheduling difficulties and a lack of sufficient CICs to be available when needed, according to the center's manager.

Current and Projected Facility Supervisory Staffing

FAA headquarters directed each region to determine how it wanted to allocate supervisors at its facilities to achieve the 10-to-1 controller-to-supervisor ratio regionwide. Consequently, some facilities are to have proportionally more supervisors than others and have less need for CICs. Managers at the en route centers and TRACONs that had a higher allocation of supervisors selected proportionally fewer controllers to be CICs. For example, the TRACON in Elgin, Illinois, is being allocated a 7.8-to-1 controller-to-supervisor ratio, and the management of this facility selected 30 percent of its controllers to be CICs. The en route center in Atlanta, however, is being allocated only enough supervisors for a 9-to-1 controller-to-supervisor ratio, and its management determined it will need to select 161 of its 399 controllers (40 percent) to provide adequate CIC coverage based on its projected supervisory staffing for 2003.

Facility Operational Requirements

Most FAA facilities operate 24 hours per day, and controllers work various shifts, including weekends and overnight (termed midnight shifts). According to the managers at some facilities we visited, local labor agreements require that controllers rotate through various shifts, many of which are not overseen by supervisors. Although some of these shifts, such as the midnight shift, do not need many controllers, all must be certified as CICs to ensure continual watch supervision. At Dulles airport, for example, all 82 controllers must at times work a 3-person midnight shift to staff both the tower and TRACON at the facility. No supervisors are scheduled for this shift, and because of FAA's watch supervision requirements, the three controllers on the shift must be CICs in order to monitor both the tower and TRACON and provide required breaks. Managers at the Dulles facility said that they need all 82 controllers to be CICs to satisfy both shift coverage and watch supervision requirements. For the same reasons, 30 or fewer controllers staffed 4 of the towers we visited, and managers there needed to certify all controllers as CICs. Supervisors at these facilities are scheduled to work when air traffic was heaviest, but controllers had to supervise the facilities' operations (as CICs) at all other times. For example, the North Las Vegas and Billings towers currently have one and three supervisors, respectively, and are

projected to have no supervisors by October 2003. As a result, all of their controllers have been trained and certified as CICs.

Overall Effectiveness of FAA's CIC Training Program Is Uncertain

The materials for FAA's CIC training program were comprehensive and complete, according to a review for us by a panel of training experts and our interviews with training participants, but little assurance exists that the training was adequately delivered and achieved its objectives. Although supervisors certified that most controllers who took the training were qualified to be CICs and FAA conducted assessments of training at 15 facilities, FAA has not obtained student evaluations from most of those who completed the course or conducted an overall evaluation of the training's effectiveness. Moreover, the effectiveness of the training may diminish for some controllers who spend little time as CICs and thereby might have difficulty maintaining, much less improving, the skills needed to perform CIC duties. Refresher training might be necessary.

Training Material Is Comprehensive

FAA officials involved with designing the training and a panel of experts that reviewed the training materials for us agreed that the material was comprehensive. Development of the training material began shortly after the 1998 agreement was signed. FAA established a CIC Workgroup, consisting of FAA management, supervisors, and controllers, to make recommendations to the CIC Executive Steering Committee on the roles and responsibilities, guidelines for selection, quality assurance measures, and training for the CIC program. As part of this effort, FAA asked several members of the group to develop a CIC training program. Team members worked with FAA's training academy in Oklahoma City to develop a course based on the task and skill requirements contained in supervisor training courses and in CIC training courses developed by various regions and facilities. Ultimately, the team developed a minimum 2½-day training course that included a 3 to 5-hour computer-based instruction program and 2 days of classroom training. The training was to end with a minimum of 2 hours of on-the-job training overseen by a supervisor.

The training materials covered a broad range of subjects and supervisory duties. The computer-based training provided an introduction to CIC duties, and the classroom training materials contained 17 different modules that addressed both national and local CIC requirements and skills. On the national level, the training materials covered areas such as watch supervision requirements, human relations and communications, operations management, and the handling of unusual situations. The local-level training materials emphasized specific guidance needed for the local

facility. It included information on the local work environment, operational staffing, leave administration, and labor management relations. FAA's CIC training team recommended that supervisors deliver all aspects of the training, both national and local, and FAA required that the CIC on-the-job training be given by supervisors.

The FAA officials noted that, as it requires of all of its training courses, the CIC training program was validated in March 2000. Validation is a process through which instructional materials and associated documentation are examined and approved for delivery to the target population. The CIC training program's validation included a pilot test of the national component of the classroom training with controllers and a critique by subject experts, and in May 2000 the course was approved by FAA's Training Manager. FAA officials added that this training is more comprehensive than that given to new supervisors and that current supervisors have asked to take the training.

Controllers and supervisors who participated in the training at the 12 facilities we visited believed that the CIC training was useful. They said that the CIC training was a good overview of watch supervision and was better than that given to new supervisors. However, some supervisors did express concerns about how effectively the training prepared controllers to conduct watch supervision. For example, supervisors at one tower said that the training was the "bare minimum," and at another facility a supervisor told us that a 3-day course is not enough to provide a controller the necessary skills to handle the tasks associated with watch supervision.

An independent panel of training experts we assembled concurred with FAA's assessment of the training materials, but had other concerns about the training's delivery. The panel—consisting of individuals involved in the development and delivery of air traffic control courses at one U.S. college and two universities—stated that the design of the CIC training materials was among the best of FAA training programs they had seen. They pointed out that the course materials fully matched the tasks and skills FAA requires for a CIC and that the materials covered areas, such as human relations, that are very important. The panel members stated that the CIC position requires providing advice and counseling and may require significant sensitivity.

FAA Has Not Assessed Overall Effectiveness of Training

Although the training materials are thorough, concerns exist about the effectiveness of the CIC training. Our expert panel questioned whether the training could be adequately given in the time and method provided by FAA. All members stated that the 2 days of classroom training appeared to

be too short to allow for an in-depth presentation of the information contained in the training program's 17 modules. For example, the panel stated that the instructors should spend considerable time instructing CICs on how to provide on-the-spot corrections and on handling the workload and staffing demands at a facility. They said that these are important safety-related skills and duties that are not the responsibility of all controllers, only those who are supervisors or CICs. They pointed out that they did not have the opportunity to observe how the training was delivered at any facility, but given the amount of information covered in the training program, they were concerned that some areas would not be adequately addressed. Furthermore, the panel members said that using local supervisors to provide all the training might not be optimal. FAA often employs teams trained to provide instruction on key matters nationwide. They said these teams are thoroughly familiar with the training material, provide realistic examples, and provide a consistent level of training throughout the country. In the panel's view, using local supervisors to conduct all of the training—instead of these teams—raises questions about its consistency and quality.

Concerns about the overall effectiveness of training can be addressed if assessments are used to examine whether deficiencies exist. One potential source of assessment information for an early nationwide view of the training program is student end-of-course evaluations. FAA's Air Traffic Services Training Orders requires that such evaluations be made available to students. However, nearly 60 percent of those who completed the CIC training program did not turn in a written evaluation. We asked FAA to provide us the student evaluations from all 316 facilities; however, its facilities were only able to provide evaluations from 3,396 students, or about 41 percent of all the students who took the training. FAA officials told us that the evaluation forms were available to students, as FAA's training order required, but that FAA cannot force students to complete the forms. They told us that students frequently returned blank forms and were more likely to provide feedback orally to the instructors after the class. Moreover, while the majority of the evaluations we did obtain showed a favorable response to the training, the evaluation forms were not standardized nationwide and consequently do not provide a consistent basis for evaluating the training. For example, about 2,200 forms used a format that rated the training on a scale of 1 (the highest evaluation) to 6 (the lowest evaluation) in 9 categories. However, about 1,200 forms used other rating scales and other categories that are not comparable.

Furthermore, FAA has not conducted an overall evaluation of the training program. FAA's Air Traffic Services Training Order describes evaluation as

one of the phases of its systematic training development process. Such assessment is designed to chart the overall effectiveness and efficiency of the instruction. Decisions to continue or revise the instruction are to be based on the results of this evaluation. However, no such evaluation of the CIC training has been done. According to FAA training officials, they usually conduct such evaluations only if there is some indication of problems that would be visible in performance reviews, for example. Also, FAA officials said that they completed a special assessment at 15 facilities that included training and found that managers, supervisors, and controllers had positive comments about the course and study materials.[8]

Nevertheless, although they are not aware of any problems with the CIC training, FAA officials told us that they would develop a plan for an overall evaluation of the CIC training. They said that because of the importance of and concerns about the expanded CIC program, they will survey facility managers, CICs, and controllers who are not CICs but who receive direction from them, to determine if the training has been effective. They expect to obtain the results of this survey early in 2002.

Nationwide Refresher Training May Be Needed

Regardless of the effectiveness of the CIC training, some controllers who have received the training and have been certified are getting little experience actually performing CIC duties. Among the 12 facilities we visited, we identified several instances where controllers spent only brief periods of time as CIC. For example, at the time of our visit, some controllers in the Boston TRACON had spent less than 5 hours per month as CICs. In one area at the New York en route center about half the controllers spent 4 hours per month or less performing CIC duties. By comparison, FAA requires supervisors to spend at least 8 hours per month controlling air traffic in order to maintain proficiency in the hands-on aspects of air traffic management.

No such minimum time requirement exists for controllers serving as CICs. According to FAA officials, a minimum number of hours for controllers to spend as CIC each month is not practical because in some cases only a small number of hours are available for CICs. Furthermore, the officials believe that using CIC skills during busier or more difficult periods is most

[8]In providing oral comments on a draft of this report, FAA officials indicated they plan to revise the Air Traffic Services Training Order to clarify that the requirement for such an evaluation applies only on an as needed basis (e.g., if there is an indication of a problem).

critical, and many of the hours available to CICs are during the midnight shift, which generally do not provide the same conditions. Consequently, controllers meeting minimum hour requirements primarily on midnight shifts would not necessarily be developing and using all needed CIC skills. Our expert training panel also stated that requiring CICs to perform these duties a minimum number of hours each month is not realistic. The panel said that the quality of the time performing CIC duties, and a mechanism to provide additional training to ensure skills are retained, is more important.

Refresher training might be a more effective means of reinforcing and increasing knowledge and skills of CICs. Managers and controllers at some of the facilities we visited stated that they believed refresher training should be developed and provided. They said that this would be one mechanism to ensure that CICs retain their skills and knowledge base and receive new information that supervisors receive on a routine basis. At least one facility plans to institute refresher training on its own. FAA officials at the O'Hare tower said that they plan to develop and start a refresher training program lasting 4 to 8 hours in September 2001. Our expert panel believes that refresher training should be provided and made mandatory for all CICs.

In discussing this with FAA headquarters officials, they said that although no nationwide refresher training for CICs is in place, they are aware that there is a need to have such training to ensure that CICs remain fully capable of handling all the supervisory duties they have been assigned. They stated that refresher training should be provided and they are beginning the process to develop such training. However, they could not yet provide a timetable for when they expected that this training would be developed and required for all CICs.

Implementation of Quality Assurance Measures for the CIC Expansion Was Inconsistent

Five of the 12 facilities we visited did not have quality assurance measures in place for the CIC expansion even though, according to FAA, such measures should be used. Quality assurance measures are an important part of facilities' efforts to improve the safety of the air traffic system and, specifically, the means by which FAA committed itself to monitoring the effect of the expansion of CIC duties to ensure that it does not negatively affect safety. An FAA assessment of certain facilities' implementation of the CIC expansion recently found similar results, noting that implementation of measures such as quality assurance was inconsistent. Separate, biennial evaluations that FAA performs at each facility are a thorough review of all areas of facilities' performance and these now

include a special emphasis on the facilities' implementation of the effect of the CIC expansion. However, it will be fiscal year 2003 before FAA completes this effort at all of its facilities. In the interim, FAA does not require facilities to collect data or report on their use of CIC quality assurance measures. As a result, it will be fiscal year 2003 before FAA knows whether its facilities are adequately monitoring the effects of the CIC expansion.

FAA Developed Quality Assurance Measures for the CIC Expansion

In November 1998, the Department of Transportation's Inspector General recommended that FAA develop quality assurance procedures to monitor the effect of reductions in supervisors and the resulting expansion of CIC duties. FAA agreed and developed the CIC "success metric" as an empirical measuring system for facilities to use to evaluate the impact of the expansion of duties and supervisory reductions. The success metric consists of a series of questions about the effect of the CIC expansion as well as changes facilities have made to adjust to the expansion in six aspects of each facility's operations: safety, efficiency, control room distractions, resource utilization, training, and communications. For example, under the heading of safety, the metric asks about the effect the CIC expansion has had on a facility's efforts to reduce operational errors and deviations. Under the training heading, the success metric asks about the effect the expansion has had on the facility's delivery of the periodic refresher training that it requires its controllers to receive in various operational aspects of their duties.

FAA expects its facilities to use this metric in conjunction with other quality assurance tools, such as reviewing tapes of conversations between controllers and pilots or investigating operational errors to determine their cause(s) and how they might be prevented.[9] Facilities were free to choose how they would jointly use the success metric and other measures as long

[9]For all aspects of their operations, not just the use of CICs, FAA requires that each of its facilities use a quality assurance program to identify deficiencies (and ways to correct them) and recognize successes. FAA characterizes quality assurance as a dynamic process through which it continually—and proactively—improves the air traffic system. At a minimum, facilities' quality assurance programs must focus on four specific areas of their operations: (1) operational error and operational deviation prevention, (2) teamwork, (3) communications, and (4) customer service/feedback. In some cases, quality assurance programs are ongoing activities by which the facilities stay abreast of operational and performance issues, such as communicating with pilots. In other cases, quality assurance activities take place only when something happens that requires the facility's immediate, focused attention, such as a runway incursion or a pilot inquiry.

as they could, at any time, specifically address the impact of the expansion of CIC duties in terms of the information the success metric covers. However, FAA does not require that its facilities collect and report the quality assurance information covered in the CIC success metric to a central location.

Some Facilities Did Not Have Quality Assurance Measures for the CIC Expansion

Officials at 5 of the 12 facilities we visited told us that monitoring the impact of the expansion of CIC duties was not something that their ongoing quality assurance program addresses. For example, one tower/TRACON facility told us that its quality assurance office has little involvement with the CIC expansion, was not tracking the effect of the expansion, and that no one had instructed it to do so. Another tower/TRACON facility also said it had no quality assurance process in place to monitor changes as it implements the CIC expansion and that no part of its ongoing quality assurance program specifically or solely focuses on the use or performance of CICs. This facility's quality assurance manager told us its quality assurance program would address the use of CICs only on those occasions when a specific incident occurs, such as an operational error. At one of the en route centers we visited, an official questioned the usefulness of FAA's CIC quality assurance measures for monitoring the use of CICs in the en route center environment because they do not reflect the kinds of things supervisors need to consider in their daily duties, such as ensuring that the right sectors of airspace are open.

FAA Special Facility Assessments Also Found Inconsistent Implementation of CIC Quality Assurance

In the first set of special assessments that focus solely on facilities' implementation of the CIC expansion, which FAA recently completed at 15 facilities, it found similar deficiencies in certain facilities' quality assurance measures, noting that implementation and use of items like the success metric were inconsistent.[10] FAA conducts these special assessments upon request when a specific program or area of facilities' operations is of interest or concern to an FAA program office. In this instance, these CIC special facility assessments addressed areas such as controller and supervisory staffing and attrition, the facility's selection process and training for CICs, the use and performance of CICs, any ongoing facility assessment and tracking of the CIC expansion, and each

[10]In order to conserve resources, FAA selected facilities for the first of these assessments that are all collocated with or within commuting distance of its four regional evaluation offices. These offices are in Virginia (Washington/Dulles Airport); Fort Worth, Texas; Seattle, Washington; and Atlanta, Georgia.

facility's certification that it had reviewed the CIC success metric and was prepared to proceed with the CIC expansion. FAA expects to soon finalize a report summarizing its results (1) from revisiting 10 of the first 15 facilities it assessed to ensure that they have addressed any deficiencies the assessment teams identified and (2) 12 additional of these assessments it conducted at a second set of facilities.[11]

Facilities We Visited That Were Monitoring the Impact of the CIC Expansion Relied on Their Existing Quality Assurance Programs

Officials at the remaining seven facilities we visited told us that they are relying on their ongoing quality assurance programs to monitor the effect of increased use of CICs as they proceed with the expansion of CIC duties. They stated that, while they are not using the CIC success metric as a stand-alone tool, their ongoing quality assurance programs contain comparable quality assurance measures. For example, through operational error and operational deviation prevention efforts, these facilities' quality assurance programs include activities such as incorporating scenarios from recent operational errors into the facility's training program. Quality assurance programs can also include efforts focused on improving controllers' technical performance through methods such as computer audio and video recreations of air traffic control situations they have faced in the past.

FAA Uses Other Quality Assurance Activities to Identify the Effect of Using CICs in Instances When Errors or Other Incidents Occur

FAA headquarters officials told us that to date, since the expansion of CIC duties took effect in January 2001, there have not been any operational errors, deviations, or other incidents in which the final investigation found a controller acting as CIC caused or was a contributing factor to an error. They also noted that it is relatively rare that supervisors are found to have caused or contributed to errors. Investigations of operational errors (or other incidents) are quality assurance activities that happen only when FAA's facilities believe that an incident requiring further investigation might have occurred, such as an operational error. Individual facilities' quality assurance staff are usually responsible for such investigations; occasionally, in instances such as those that may be particularly controversial or sensitive, quality assurance staff from FAA's headquarters will also take part in the investigation.

[11]FAA originally planned to revisit all of the first 15 facilities it assessed and perform 15 additional assessments. However, because of the terrorist hijackings on September 11, 2001, FAA recalled all of its assessment teams and temporarily suspended activities such as these assessments. FAA subsequently decided that it had completed enough of the new and follow-up assessments to prepare its final report.

According to FAA officials, in any such investigation they pay particular attention to the role of the person providing supervision at the time of any incident—operational supervisor or CIC—and require that facilities determine in their investigations the identity, location, and actions of the person in charge, specifying whether it was a supervisor or CIC. In addition to citing the factor(s) that caused an error, these investigative reports will identify, when the situation warrants, other factors that contributed to the error, such as actions by a supervisor. When FAA concludes that a supervisor was a contributing factor to an error, the same range of corrective actions it prescribes when a controller is responsible for an error also applies to a supervisor (e.g., temporary decertification from control duties and remedial and/or skill enhancement training).

Potential Safety Concerns About Supervisory Reductions Highlight Importance of Quality Assurance Programs

FAA has said it will immediately stop reductions of supervisors at any facility where they find indications that the expanded use of CICs might be having an adverse effect on safety. According to FAA, quality assurance measures for the CIC expansion are important because FAA has said that it will use data from the quality assurance process to make decisions about continuing or modifying the CIC expansion.

Supervisors and managers at all of the facilities we visited expressed concerns that the expansion of CICs will have an adverse effect. For example, while FAA expects its supervisors to correct controllers' performance immediately (as needed), supervisors or managers with whom we met believe that CICs will not do so to the same degree as supervisors because it would involve correcting the performance of their peers. CICs, according to the supervisors and managers, will not make such corrections because their peers could soon be serving as CICs, or relatively junior controllers serving as CICs may lack credibility in the eyes of senior controllers. Supervisors and managers also expressed concern about CICs' human resource management—approving unexpected requests for annual leave or overtime—and the effect this could have on the supervisors' ability to appropriately supervise the shift when they return to supervise the controllers.

For the most part, the CICs with whom we met believe the increased use of CICs will not have the kinds of adverse effects the supervisors and managers suggested. While one CIC did say he might be hesitant to correct the performance of his peers, he added that the working relationships in that facility among controllers were very positive, making it unlikely that he would get significant resistance if he had to correct another controller's performance. Other CICs stated that they believe

CICs would correct the performance of their peers as much as supervisors do, with one adding that he regularly sees controllers correct one another. CICs at another facility expressed confidence in their ability to handle requests for annual leave because they are well-versed in the facility's operational requirements (e.g., the minimum number of controllers it needs at any given time).

Whether they were discussing potential adverse safety effects from the increased use of CICs or situations where CICs would likely perform well in their role, the supervisors, managers, and CICs cited a very limited number of instances that had actually occurred. Because we visited just 12 facilities, we cannot conclude how widespread or isolated these instances might be. Consequently, quality assurance measures might be the only way for FAA to systematically identify any safety-related effects—positive or negative—that result from the increased use of CICs.

Completion of Biennial Facility Evaluations Emphasizing CIC Quality Assurance Is Expected in Fiscal Year 2003

Beginning April 1, 2001, each full-facility evaluation has included an item especially focusing on the method by which each facility monitors changes as it implements the expanded CIC program. These evaluations basically amount to an on-site, comprehensive assessment of the facility's overall performance. They focus on (1) operational areas of the facility's performance, such as communications between controllers and pilots and operational error prevention and (2) operational support areas, such as on-the-job training and monthly performance skill checks for controllers. Typically, facilities receive a full evaluation one year and a follow-up evaluation in the subsequent year that focuses on items that were identified as problems during the previous year's full-facility evaluation.

At the request of program officials in FAA, the evaluation teams occasionally add "special emphasis items" through which they assess facilities' operations in areas of particular interest. FAA air traffic officials recently added a special emphasis item that focuses on the impact of the CIC expansion to be part of each facility's full or follow-up evaluation. Specifically, FAA expects each facility to implement a method (including any quality assurance tool) of monitoring changes as it implements the CIC expansion. FAA's evaluation teams have been asked to determine the methods the facilities use or, for those that have no method, their reasons for failing to establish one.

FAA has expanded the biennial full-facility evaluations' emphasis on quality assurance by broadening the scope of the evaluations to address more aspects of the facilities' implementation of the CIC expansion.

Specifically, each facility's full evaluation will now include a revised special emphasis item covering all of the areas addressed in FAA's recently completed special facility assessments (in addition to the existing special emphasis on CIC quality assurance).[12] Because FAA has just begun using this expanded special emphasis item, it expects that it will be fiscal year 2003 before it completes this effort at all of its facilities.

Cost Savings From Supervisory Reductions Will Be Lower Than FAA Estimated, While Productivity Gains Have Not Been Measured

FAA's cost savings from reducing supervisors and increasing its use of CICs will be $141.5 million—about $23.1 million less than it estimated. This change represents the net effect of two factors: (1) reducing FAA's estimated savings by the 10-percent premium it pays controllers for being CICs, which will be about $41.5 million through 2003 and (2) increasing its estimated savings by $18.4 million based on actual attrition to date, which has been happening faster than FAA first estimated. Despite the premise that expanding controllers' duties will make its workforce more productive, FAA has not measured their productivity to see if this premise has held true. FAA believes it needs more data than it currently collects to comprehensively measure controller productivity. FAA recently began deploying a system that will allow it to capture the additional data it believes it needs to evaluate the time controllers spend as CICs and performing non-air traffic control duties.

Cost Savings Will Be Less Than FAA Estimated

Currently, FAA can expect about $23.1 million less in savings than it first estimated after taking into account two factors—one which reduces its net savings and one which increases them (partially offsetting the reduction): (1) FAA's initial estimate did not take into account the 10-percent premium controllers earn for serving as CICs (which it began paying upon signing the agreement) and (2) supervisory attrition to date has been happening somewhat faster than FAA first estimated. While the CIC premium reduces FAA's estimated savings, using more current attrition data offsets some of the CIC premium costs because FAA is currently saving more from attrition than it estimated.

[12]As discussed earlier in this report, the 15 facility evaluations addressed areas such as controller and supervisory staffing and each facility's certification that it had reviewed the CIC success metric and was prepared to proceed with the CIC expansion; the existing special emphasis item originally covered only the methods the facilities use for monitoring changes as they implement the CIC expansion.

When FAA signed the 1998 collective bargaining agreement, it expected that some of the changes to which it had agreed, such as the expansion of CIC duties, would produce cost savings and productivity gains, but it had not estimated what those savings or gains would be. Subsequently, in September 2000, FAA estimated that the reduction in supervisors to a 10-to-1 ratio of controllers to supervisors would, over the 5-year life of the agreement, produce cost savings of about $165 million to offset some of the increased costs FAA will incur from various provisions of the agreement. At the same time, FAA stated that it expected to increase the productive use of controllers' on-duty time and, through the CIC expansion, improve controllers' decisionmaking abilities.[13]

Even though FAA had been using CICs for many years, it only began paying the controllers the 10-percent premium for this duty as a result of the 1998 agreement. Previously, FAA did not have historical payroll or time and attendance data on the number of hours its controllers served as CICs and FAA did not reduce its savings by an estimate of these costs. We estimate that the CIC premium will amount to over $41.5 million over the life of the 1998 agreement (through fiscal year 2003). Later this year, FAA plans to update its status report on the 1998 agreement and, because cost data should be available, it plans to include estimates of the CIC premium costs and show how these payments have reduced the amount it will save through supervisory attrition.

In contrast to how the CIC premium reduces its net savings, FAA currently expects that it will save $18.4 million more from supervisory reductions because attrition has occurred faster than it first expected. For example, FAA estimated it would lose by attrition about 100 supervisors each fiscal year. As of May 30, 2001, FAA had already lost by attrition 139 supervisors in fiscal year 2001. Table 2 shows (1) the amount FAA originally estimated it would save each year as a result of supervisory attrition, (2) FAA's most current data on savings based on actual supervisory attrition, (3) the actual or estimated CIC premium costs for each year, and (4) the resulting

[13]FAA, in conjunction with NATCA, established a team to identify the cost savings and productivity gains that would be associated with various provisions of the 1998 collective bargaining agreement. That team issued its first report—on the effects in fiscal year 1999—in September 2000. Because many provisions in the agreement required the development of implementation plans or would take effect over time, the team recommended that FAA annually issue status reports on the effect of the various provisions. FAA is doing so and, after experiencing some delays, now expects to issue its report on fiscal year 2000 in late 2001.

effect on its estimated savings from including both the current attrition data and the CIC premium costs.

Table 2: Effect on FAA's Projected Savings From Supervisory Reductions by Including Actual and Estimated CIC Premium Costs Plus Actual and Estimated Attrition Savings

Fiscal Year	1999	2000	2001	2002	2003	Total
FAA savings estimate	$5,200,000	$16,200,000	$30,400,000	$47,200,000	$65,600,000	**$164,600,000**
Change to savings based on actual supervisory attrition (fiscal years 1999-2001) and revised 2002 and 2003 estimates	$0[a]	($1,800,000)	$500,000[b]	$5,500,000 (est.)	$14,200,000 (est.)	**$18,400,000**
Change to savings by subtracting CIC premium costs	($5,912,067)	($6,704,849)	($8,134,472)[c]	($9,549,870)[c]	($11,211,548)[c]	**($41,512,806)**
Net savings						**$141,487,194**
Change in FAA net savings						**($23,112,806)**

[a]FAA issued its first report on the cost implications of the 1998 agreement in 2000 and, as a result, was able to use actual rather than estimated attrition data.

[b]As of May 30, 2001.

[c]We estimated the total CIC premium costs for 2001 using the amount FAA had paid to date as of the end of the third quarter of fiscal year 2001 (June 30, 2001). We estimated CIC premium costs for fiscal years 2002 and 2003 by using the average percentage by which these costs had increased each year (FYs 1999 to 2000 and 2000 to 2001).

Source: GAO's analysis of FAA's data.

The $164.6 million savings FAA expected from the CIC expansion derive entirely from supervisory attrition and the salary and benefits costs FAA will no longer pay when supervisors leave by retirement (or other means) and are not replaced. Because FAA made this estimate as part of its plan to move toward a controller-to-supervisor ratio of 10-to-1, the basis for the estimate was an assumption that FAA would, by the end of fiscal year 2003, reach its goal of a 10-to-1 ratio. However, according to one official, FAA also has said it would reach that goal only through attrition and, as a result, never guaranteed that it would be at a 10-to-1 ratio at any specific future point in time. As a result, the information we present in table 2 represents a snapshot of where FAA currently stands with respect to its net savings from supervisory attrition. The savings FAA ultimately achieves from the supervisory reductions may differ from its estimate and might be largely out of the agency's control because the savings depend on attrition, which will be determined by the decisions of hundreds of individual supervisors between now and the end of fiscal year 2003.

FAA Has Not Measured Productivity Gains From the Expansion of Controllers' Duties

FAA has not measured the productivity of its controller workforce to see if expanding the duties for which they are responsible has, as it expected, made them more productive. In its first report on the 1998 agreement, FAA did not quantify any possible productivity gains it might get from expanding the duties of CICs, although it did state that the expansion should produce efficiency gains by improving controllers' decisionmaking abilities. FAA officials cautioned that the CIC expansion is not the primary vehicle (among the articles of the 1998 agreement) through which they expect to make more productive use of controllers' on-duty time. Specifically, as permitted under the 1998 agreement, FAA agreed to expand the duties of controllers to include performing technical functions pertaining to the operations of the facilities when the controllers are not directing air traffic. These are duties for which the facilities' staff specialists are currently responsible, but because FAA is also reducing the number of staff specialists through attrition, FAA expects that having controllers perform some of these duties will increase the productive use of controllers' time.[14]

One Element of CIC Productivity Data Is Currently Available

FAA officials also expect that the CIC expansion will also make its controllers more productive because it expects that those controllers supervised by a CIC will, in most cases, be absorbing the operational workload (that is, air traffic control duties) of the CIC. According to FAA officials, there may be ways to measure controllers' productivity to determine whether other controllers (as the use of CICs increases) are absorbing the operational workload of CICs. For example, if the expansion is working as FAA expects, the amount of time each controller spends on any given position—which FAA's systems are capable of capturing—should begin increasing as the use of CICs increases. However, FAA has not done an analysis of the average time on position per controller nor is it including this analysis in its next status report on the 1998 agreement. According to an FAA official, the earliest it would consider doing so would be in fiscal year 2002, when it also should be able to systematically measure the use of controllers' time on the technical (non-air traffic control) duties.

[14]For example, controllers will begin performing some of the technical functions of facilities' staff support specialists, which include duties such as training, quality assurance, and military and international operations.

FAA's Systems Will Enable It To Do Comprehensive Productivity Analysis in Fiscal Year 2002

FAA officials believe that FAA needs more data than its systems currently capture to fully measure the productivity gains it might obtain as a result of changes to its controllers' duties in the 1998 agreement (including the CIC expansion).[15] Specifically, according to FAA, its ability to measure productivity changes resulting from an increase of the duties for its controllers other than those associated with CICs hinges on (1) its ability to measure the time controllers are spending on non-air traffic control duties and (2) establishing a baseline from which to measure changes in how controllers spend their time. FAA expects that by the end of 2001, it will have a reengineered system for its administrative processes in all of its facilities. This new system should allow it to collect data on the amount of time controllers spend on technical functions (such as quality assurance) as well as the amount of time each spends controlling air traffic. As a result, in fiscal year 2002 FAA should be in a position to start collecting the baseline data necessary to measure changes in controller productivity. Beginning in fiscal year 2003, FAA expects to be able to collect a second year's worth of data that would then allow it to measure changes in the use of controllers' time. As a result, it will be fiscal year 2003 before FAA can report whether, or to what extent, controllers are more productive because it does not currently have baseline data from which to measure changes in controllers' productivity.

Conclusions

FAA's decision to reduce supervisors and make increasing use of CICs carries both potential rewards and risks. To mitigate those risks, FAA took several specific steps to address the Inspector General's concerns and ensure that it could carry out the CIC expansion without compromising safety. While FAA reports that, to date, it has not experienced safety problems from the expansion, our work suggests FAA can still improve its implementation of the actions it has taken. The CIC training, for example, was comprehensive and well-received, but an evaluation of the training program would afford FAA the opportunity to ensure it effectively gave controllers the knowledge and competencies they need to be CICs.

[15]FAA is trying to increase the productive use of the time controllers are not spending on operational duties (that is, air traffic) during any given shift. Specifically, FAA's facilities schedule controllers so that they have an adequate number to deal with the busiest, most complex levels of air traffic they expect during the shift. Because the level of air traffic can vary considerably over the course of an 8-hour shift (requiring fewer to control traffic at certain times), on a less-busy day with no inclement weather, a controller might spend 4 to 5 of those 8 hours controlling traffic. After factoring out time for meals and other contractually mandated breaks, these portions of controllers' shifts when traffic is lighter are where FAA expects to more productively use the controllers' time.

Similarly, although it is reasonable for FAA to rely on each facility to carry out quality assurance for the expansion, both we and FAA found that implementation of the quality assurance measures fell short of FAA's expectations. While the cost savings from the expansion add support to FAA's decision to rely on its controllers to shoulder more of the workload, demonstrating the productivity benefits would make the case for the CIC expansion even more convincing. Because the CIC expansion has only recently occurred, FAA has opportunities now to make proactive, mid-course corrections to its CIC training program, quality assurance measures, and cost-benefit analyses of the expansion.

Recommendations for Executive Action

To better ensure that controllers develop and maintain proficiency in CIC duties and that the reductions in supervisors do not adversely affect safety, the Secretary of Transportation should direct the Federal Aviation Administrator to

- evaluate the effectiveness of the CIC training program to verify that it develops the knowledge and skills controllers need to perform watch supervision duties,
- provide periodic refresher training as needed in CIC duties for controllers,
- better communicate and enforce its requirement that all of its facilities have in place CIC quality assurance procedures to measure the effects of supervisory reductions and the increased use of CICs, and
- assess the productivity of its controller workforce in each of its upcoming annual status reports on the 1998 agreement.

Agency Comments and Our Evaluation

We provided FAA with a draft of this report for its review, and FAA officials provided oral comments on it. We also met with officials of FMA and NATCA to discuss our findings and obtain their comments.

FAA agreed with our findings and recommendations and is taking steps to address them. For example, FAA has begun developing refresher training and will soon require that all of its controllers certified as CICs receive this training annually. FAA also provided technical clarifications to our report, which we have incorporated as appropriate.

The FMA officials with whom we met disagreed with our findings, questioned the accuracy of the information FAA provided us, and stated that they believe our findings would be different if we had selected a different set of facilities. Specifically, on selection of controllers to be CICs, FMA disputed that selection was a requirement for the controllers

because of factors such as a facility's operational requirements or staffing levels. According to the FMA officials, selection to be a CIC has become an entitlement for the controllers—so much so that in some cases supervisors were pressured to certify some controllers as CICs even if they had doubts about the ability of some controllers to be a CIC.

Our objective regarding CIC selections was to report the number of controllers that FAA's facilities had selected (and plan to select in the future) and explain their reasons for choosing the number of controllers that they did. We did so and noted that overall, FAA now has fewer CICs than it did before it began the selection process for the expanded CIC program. We are not in a position to affirm or refute FMA's statement about pressure to certify larger numbers of controllers as CICs, but we do note that none of the managers at the 12 facilities we visited indicated that they had been subject to pressure to certify more controllers than they felt necessary.

On training, the FMA officials stated that the delivery of the CIC training was poor in certain facilities. They also said that supervisors and managers were put under pressure to quickly complete the required end-of-course certifications for the controllers (at the conclusion of the on-the-job training component of the CIC training).

Our expert panel and some of the supervisors with whom we met while visiting 12 FAA facilities shared concerns about the delivery of the CIC training program. For example, both the experts and some of the supervisors believed the time allotted for the training may have been too short. This and other reasons led us to recommend that FAA evaluate the effectiveness of the CIC training program—an effort that could, among other things, determine whether the concerns about the delivery of the training are pervasive enough to require changes to the program.

On CIC quality assurance measures, the FMA officials doubted the accuracy of the information FAA provided us regarding the lack of CICs found contributory to operational errors to date. The FMA officials said that they believe CICs have been involved in errors. They also stated that the tone of the report implies that supervisors are often a contributing factor to errors.

Our objective regarding CIC quality assurance was to determine whether FAA has adequate quality assurance procedures in place to measure whether the CIC expansion is having any safety-related effects. Part of this determination took place at the 12 facilities we visited and part involved FAA headquarters and its procedures for identifying when a CIC

is involved in certain events, such as errors, that are part of the focus of FAA's quality assurance efforts. We assured ourselves that FAA has procedures in place to identify when the supervisor on duty at the time of an operational error is a CIC and reviewed the data FAA had collected to date since it instituted these procedures. Because a review of the quality of each operational error investigation (e.g., to determine if CICs were always appropriately identified) was outside the scope of our review, we are not in a position to affirm or refute FMA's statement about CICs' involvement in errors. Regarding FMA's concern about the tone of our draft report, we have added language clarifying that supervisors are rarely found to be a contributing factor in operational errors.

Regarding the savings and productivity gains from the CIC expansion, the FMA officials expressed doubts about the accuracy of the data FAA provided us. They stated that because, in certain instances with which they are familiar, highly-paid controllers can earn more than the supervisors when they serve as CIC (earning the 10 percent CIC premium), they are not convinced there will be significant cost savings from the expansion.

FMA is correct to note that there can be certain individual cases in which, for example, a relatively senior controller serving as CIC will—with the benefit of the CIC premium—earn more than the supervisor. FAA is also aware that this can happen. However, we note that the net savings associated with the expansion that FAA provided us are in the aggregate, reflecting salaries of controllers and supervisors across the country. On balance, FAA's data appear to indicate that there are more cases in which a CIC temporarily serving in place of a supervisor saves money than there are cases in which it costs more.

With regard to the recommendations we are making, the FMA officials stated that we should also recommend that FAA halt the CIC expansion until it has ensured that every facility has CIC quality assurance measures in place. We agree that our findings as well as those from FAA's own facility evaluations raise concerns about facilities' efforts to monitor the effect of the CIC expansion. However, neither we nor FAA in its effort visited a sufficient number of facilities to suggest that our findings are representative of all of FAA's facilities and would warrant halting the CIC expansion. Doing so—that is, in a way that we could project our findings to the universe of FAA facilities—would require visiting over 170 facilities. As a result (and because FAA is itself in the process of visiting each of its facilities as part of the ongoing facility evaluations), we have retained our recommendation that FAA better communicate and enforce the requirement for facilities to have CIC quality assurance measures in place.

The NATCA official with whom we met agreed with our findings and conclusions and stated that our recommendations are all steps FAA should be taking. This official also stated that better implementation of quality assurance measures and productivity analysis of the controller workforce would help both FAA and NATCA because it would do more to give both parties credit for the benefits he believes they are seeing from the CIC expansion. He added that these are important steps that NATCA would support FAA taking to improve the expanded CIC program.

On the selection of controllers to be CICs, the NATCA official agreed with the FAA officials' characterization that selection was a requirement for the controllers because of the factors the FAA managers explained to us. He added that NATCA does not consider selection to be an entitlement for the controllers and that it has emphasized this to its membership. NATCA has also emphasized to its membership that CIC duties may be a condition of employment for the controllers if the needs of the facility in which they work dictate that all must be certified as CICs.

Regarding the CIC quality assurance measures, the NATCA official expressed concern that our draft report did not balance the safety concerns that supervisors and managers have about increased use of CICs with the perspectives of the CICs themselves. For example, he suggested some CICs might be more likely than supervisors to make on the spot corrections of other controllers' performance. We have added information to our report on the CICs' perspectives about the potential safety-related effects of the CIC expansion.

Scope and Methodology

To review FAA's preparation for and early implementation of the expansion of CIC duties, we met with officials from FAA, NATCA, and FMA who were responsible for or participated in the development of CIC selection procedures, training, and quality assurance systems. We reviewed FAA's responses to the OIG's recommendations on the CIC expansion and consulted with various aviation safety stakeholder organizations, such as the Air Transport Association and the Airline Pilots Association, to discuss the CIC expansion and gain a better understanding of the issues associated with it. In addition, we reviewed relevant background material from FAA, the OIG, and research and consulting firms that had done analyses for FAA on supervisory staffing levels and their effect on safety.

Because FAA allows its facilities to tailor their CIC selection processes, training, and quality assurance activities to local circumstances and conditions, we selected 12 FAA facilities to visit and review these issues in

depth. We selected them so that we had a cross-section of facilities that varied by type, location, size, operating conditions, and numbers (percentages) of controllers selected to be CICs. In total, we visited two stand-alone TRACONs, three towers, three en route centers, and four facilities that combined TRACONs and towers. Specifically, we visited:

TRACONS:	Boston, Massachusetts; Chicago, Illinois
Towers:	Chicago, Illinois (O'Hare); Portland, Oregon; North Las Vegas, Nevada
En Route Centers:	New York (Long Island); Atlanta, Georgia; Los Angeles, California
TRACON/Towers:	Providence, Rhode Island; Washington, D.C. (Dulles); Knoxville, Tennessee; Billings, Montana

At each facility, we met with the air traffic manager and other officials responsible for implementation and oversight of the CIC expansion's training and quality assurance efforts. We reviewed each facility's general watch supervision procedures and any available documentation from the CIC selection processes, training, and certification records. In addition, at each facility, we discussed the CIC expansion and the objectives of our review with operational supervisors as well as a local NATCA representative. At all but one facility we also met with individual CICs[16] and officials from the six FAA regional offices with oversight responsibility for them. FAA's nine regional offices play significant roles in staffing to FAA's facilities and determining the timing and pace at which they will allow attrition to occur among the ranks of operations supervisors (as FAA works on a region-by-region basis to reach a controller-to-supervisor ratio of 10-to-1).

In addition, to assess the CIC training program developed by FAA, we obtained copies of the training materials and obtained the services of four outside experts to review the materials: Dr. Marvin Smith of the Embry-Riddle Aeronautical Institute, Fort Lauderdale, Florida; Mr. Paul Arnholt of the Aviation Sciences Center, Community College of Beaver County,

[16]To ensure objectivity and candor, we asked to meet with CICs without their supervisors, FAA management, or NATCA officials present. At one facility, the NATCA representative would not allow the CICs to meet with us without him being present. We declined to meet with the CICs under these circumstances.

Beaver Falls, Pennsylvania; and Dr. Bruce Smith and Mr. Gary Bartelson, University of North Dakota School of Aerospace Sciences, Grand Forks, North Dakota. These experts all train students to become air traffic controllers; they reviewed the scope of the training program as well as the quality of the information contained in each of the various training modules. The experts did not observe the training and therefore offered no opinions on the overall effectiveness of the training in developing controllers to be effective CICs. Furthermore, we requested from FAA the student evaluations of all controllers who had taken the CIC program in an attempt to assess the results of the evaluations as a measure of the effectiveness of the training. However, FAA was unable to provide sufficient and consistent student evaluations for us to make any such assessment.

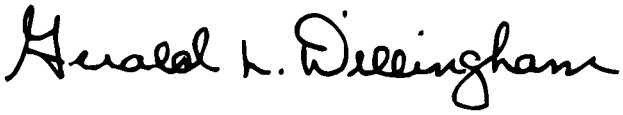
Throughout our review we met with and discussed issues associated with the CIC expansion with FAA Air Traffic Services headquarters officials responsible for (1) overall implementation of the expansion; (2) development, testing, validation, and delivery of the CIC training; and (3) quality assurance, program evaluation, and investigation of operational errors, deviations, and other incidents. In addition, we met with FAA officials responsible for developing and periodically updating the estimates of supervisory attrition and the cost-offsets associated with that attrition and reviewed the data and key assumptions underlying their analyses.

We performed our work from November 2000 through August 2001 in accordance with generally accepted government auditing standards.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 10 days after the date of this letter. At that time, we will send copies to the Ranking Minority Member of the Committee on Transportation and Infrastructure, other appropriate congressional committees, the Secretary of Transportation, and the Federal Aviation Administrator. We will also make copies available to others upon request.

Please call me at (202) 512-2834 if you or your staff have any questions about the information in this report. Key contributors to this report are listed in appendix III.

Sincerely yours,



Gerald L. Dillingham, Ph.D.
Director, Physical Infrastructure Issues

Appendix I: Article 18 of the Agreement Between the National Air Traffic Controllers Association and the Federal Aviation Administration

Controller-in-Charge (CIC)

Section 1. The CIC is intended to provide watch supervision for the continuous operation of a facility or area where a supervisor is not available. Assignments of employees to CIC duties are used when necessary to supplement the supervisory staff.

Section 2. When assigned CIC duties, an employee shall be given sufficient authority to fulfill the responsibilities of the assignment. General guidance and goals for the shift shall be conveyed in facility directives and/or during the shift/area position briefing.

Section 3. CIC premium pay shall be paid at the rate of ten (10) percent of the applicable hourly rate of basic pay times the number of hours and portions of hours during which the employee is assigned CIC duties. This premium pay is paid in addition to any other premium pay granted for overtime, night, or Sunday work and in addition to hazard pay differential.

Section 4. Prior to being designated as a CIC, an employee shall have been facility/area rated/certified for at least six (6) months and shall be operationally current. A Union representative shall be a member of the panel designated by the Employer to recommend CIC candidates. The panel shall forward its recommendations to the Employer or his/her designee for selection. The Employer retains the right to select Controllers-in-Charge.

Section 5. Employees who are not selected to be a CIC, upon request, shall be advised of the reasons for non-selection. When applicable, specific areas the employee needs to improve to be considered for the CIC position shall be identified.

Section 6. At facilities where CIC duties are performed, bargaining unit employees shall complete the national CIC training course prior to assignment of such duties.

Section 7. Each facility shall maintain a roster of bargaining unit employees qualified to perform CIC duties. When CIC duties are to be performed, assignments shall be made on an equitable basis.

Section 8. When other qualified bargaining unit employees are available, Union representatives shall not be required to perform CIC duties.

Appendix II: Table of Select Supervisor and CIC Duties

Watch-supervision duties that supervisors perform	Preexpansion CIC duty?[a]	Postexpansion CIC duty?
Determine whether shift is properly staffed, provide guidance and goals for the shift, including special projects, and control the break schedule	Yes	Yes
Communicate with internal and external personnel, including other facilities, service users, and airlines	Yes	Yes
Combine or de-combine air traffic control positions	Yes	Yes
Assign positions and CIC duties	Yes	Yes
Change take-off and landing configurations	Yes	Yes
Configure and monitor equipment, report equipment status	Yes	Yes
Assign, monitor, organize, supervise, and administer on-the-job training	Yes	Yes
Call a controller in for overtime	Yes	Yes
Approve annual/sick leave/holiday leave	Yes	Yes
Implement emergency procedures and compile information and complete documentation	Yes	Yes
Oversee training needs including supplemental and refresher training	Yes	Yes
Make initial judgments regarding possible operational errors and investigate errors (pull tapes, talk with controllers and pilots)	Yes	Yes
Prepare required initial reports of operational errors and deviations	Yes	Yes
Monitor movement of presidential aircraft	No	Yes
Make on-the-spot corrections while overseeing operations	No	Yes
Provide performance ratings and over-the-shoulder evaluations	No	No
Review recorded conversations between controllers and pilots	No	No
Take formal disciplinary action to ensure employees comply with agency regulations	No	No
Resolve complaints	Yes	Yes
Resolve grievances	No	No
Certify controller trainees	No	No
Act as Drug & Alcohol Site Coordinator	No	No

[a]According to FAA officials, these duties did not apply to the same extent at all FAA facilities but depend instead on a facility's particular practice. Generally, CICs did not perform these duties at en route centers or larger TRACONS and towers. In most cases, it would only be in unusual situations when there was no supervisor in the building and a CIC was required to perform all these duties.

Sources: OIG Audit Report, "*Staffing: Reductions in the Number of Supervisors Will Require Enhancements to FAA's Controller-in-Charge Program*" (#AV-1999-020); *Supervisor's Desk Guide* (from Operational Supervisor's Course); FAA Order 7210.3 (Facility Operation/Administration); FAA Order 7210.56 (Ch. 4 - Air Traffic Incidents and Ch. 5 – Air Traffic Operational Errors and Deviations, Investigations, and Reporting); *Terminal CIC Self-Study Course*, August 1996 (55024).

Appendix III: GAO Contacts and Staff Acknowledgments

GAO Contacts

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Acknowledgments

In addition to those named above, William R. Chatlos, Alexander G. Lawrence Jr., Bill MacBlane, Daniel Semick, and Frank M. Taliaferro made key contributions to this report.

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