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Subcommittee on Aviation
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Next Steps for the Air Traffic Organization

**Statement of
The Honorable Kenneth M. Mead
Inspector General
U.S. Department of Transportation**

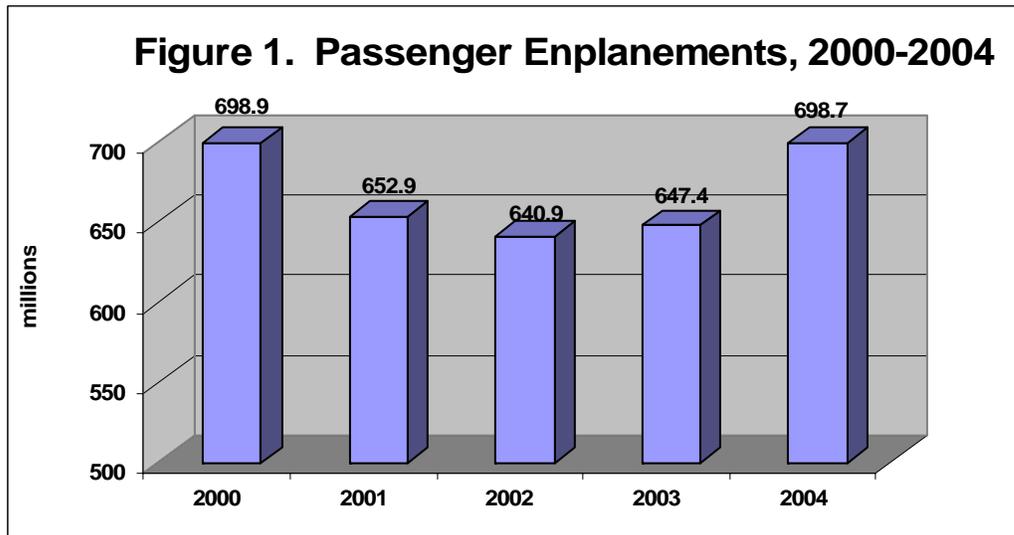


Mr. Chairman and Members of the Subcommittee,

We appreciate the opportunity to testify today regarding the next steps for the Air Traffic Organization (ATO). Two years ago, the Federal Aviation Administration (FAA) took the first steps to create the ATO by appointing a Chief Operating Officer. The expectations were that the new organization would be focused on accountability for performance and operate more like a business. Since that time, we have seen progress in establishing the foundations that will be needed for meeting those expectations in the future.

Since its inception, the ATO has worked to flatten its organizational structure and align responsibility for acquiring new systems with the organizations that provide the services. Those actions are initial steps but very critical ones. The ATO has also begun establishing a series of metrics for evaluating its progress and performance. However, a great deal of the ATO's efforts thus far have been focused on "dealing with the hand they were given"—growing operating costs, a high salary base, reduced capital funding, and a portfolio of systems that are substantially behind schedule and over budget. Nevertheless, providing air traffic services that are both safe and efficient to an ever-increasing number of passengers and aircraft operations and accomplishing that mission in a cost-effective way remain the next steps for the ATO. And this will be the focus of our testimony today.

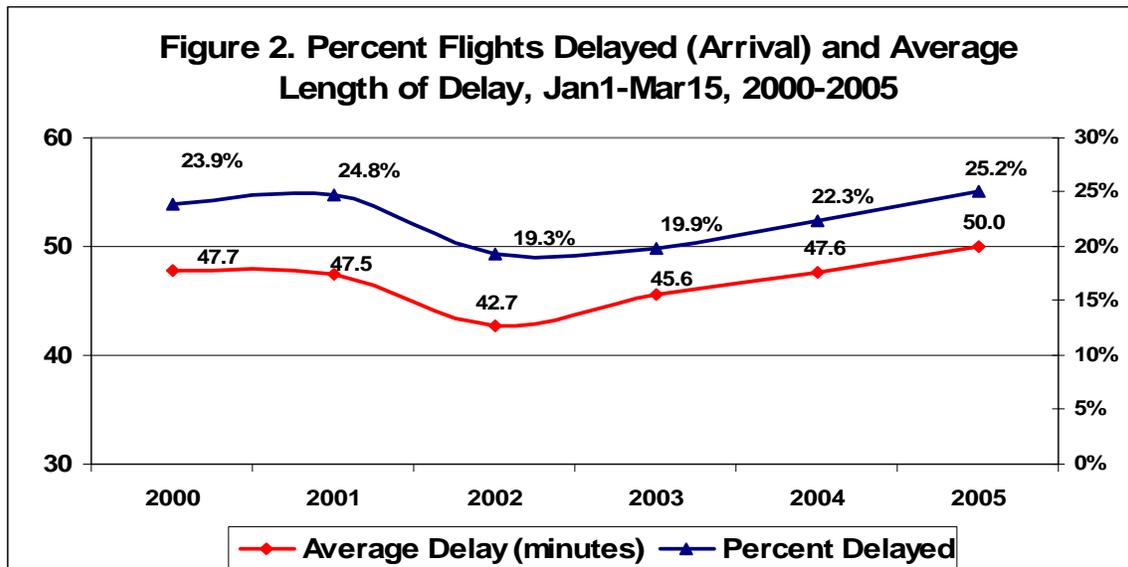
An important point, Mr. Chairman, is that the ATO is facing this challenge against a backdrop of ongoing and pervasive changes occurring within the industry. First, air traffic activity is on the rise. Passenger enplanements in 2004 were within 1 percent of total enplanements in 2000. By 2015, FAA estimates that 1 billion passengers will board planes domestically.



Air traffic operations are also on the rebound. In 2004, operations at en route centers were up 1.5 percent compared to 2000, although tower activity remained below 2000 levels largely due to a drop in general aviation operations.

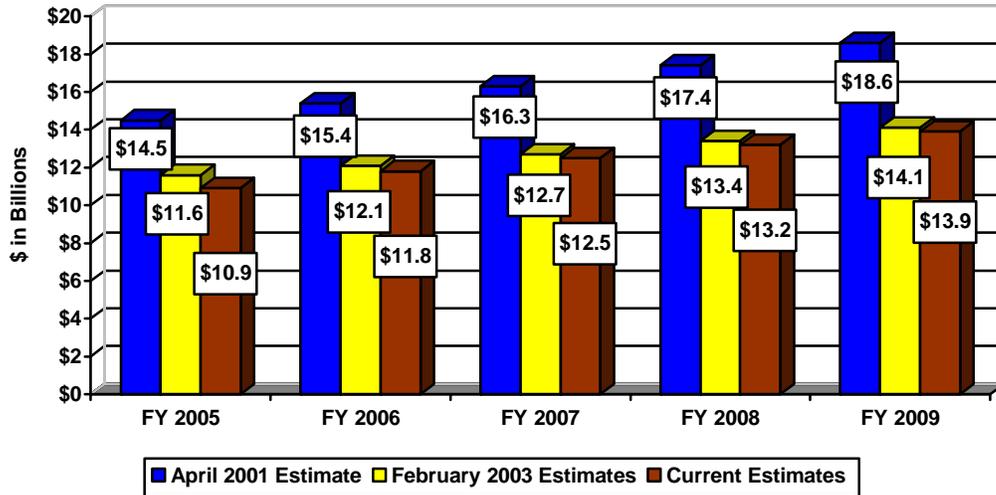
On the horizon, there is an emerging issue that could have tremendous repercussions on air traffic levels—micro-jets (relatively inexpensive aircraft that seat 4 to 6 people). FAA estimates that a 2 percent shift of today’s commercial passengers to micro-jets would result in triple the number of flights.

As air traffic has returned, however, so have delays, as we have previously testified. For the period January 1 through March 15, 2005, more than 25 percent of flights were delayed (at the 55 airports FAA tracks for delays), for an average delay of 50 minutes. In comparison, in 2000, 24 percent of flights were delayed during that same time period, with an average delay of 48 minutes.



Second, like the airlines, the ATO is facing significant financial challenges. While air traffic levels continue to show improvement from the sharp declines that began early in 2001, there still remains a substantial decline in projected Aviation Trust Fund revenues. In 2001, FAA estimated that Trust Fund revenues in 2005 would be about \$14.5 billion. That estimate has now been reduced to \$10.9 billion, a reduction of \$3.6 billion or nearly 25 percent. Those decreases can be attributed largely to reduced yields from the 7.5 percent ticket tax because of lower fares. In Fiscal Year (FY) 2006, FAA’s budget is expected to exceed estimated Trust Fund revenues by \$2.0 billion.

Figure 3. Estimated Trust Fund Revenues



The current budget level for the capital account is not sustainable. The reason for this is that the cost of current systems have experienced so much cost growth that there is little room for FAA to both pay for current systems and simultaneously take on new initiatives. This explains why the bulk of FAA’s modernization projects now focus on keeping things running (i.e., infrastructure sustainment) and on systems that have been delayed by years.

Given the mismatch between funding and requirements, an emerging issue for the Congress, the Department, and aviation stakeholders is how to finance the ATO and the FAA. We understand this issue will be the focus of a hearing before this Subcommittee sometime next month. Within this context, Mr. Chairman, we see eight matters that the ATO will need to address in its next steps.

- Reducing operational errors,
- Major Acquisitions,
- Reducing cost and development risks of ERAM, a new software-intensive system,
- Getting control of support service contracts and reducing associated costs,
- Addressing the pending wave of controller retirements,
- Negotiating a new collective bargaining agreement,
- Airspace redesign, and
- Developing long-term strategies for meeting future demand for air travel.

1. **Reducing Operational Errors:** The ATO reduced the number of operational errors (when controllers allow aircraft to come too close together in the air) from 1,185 during 2003 to 1,150 during 2004. Despite that progress, serious incidents still occur much too often—last year one high-severity operational error (where a collision was barely avoided) occurred every 9 days.

A significant concern regarding operational errors is that only 20 of the 524 air traffic control facilities (both FAA and contractor-operated) have an automated system that identifies when operational errors occur. Instead, the ATO depends on an unreliable system of self-reporting operational errors at towers and terminal radar approach controls (TRACONs). In FY 2003, 22 percent of the operational errors occurring at TRACONs and towers were identified as a result of reports from pilots, neighboring air traffic control facilities, or other outside sources, not by facility controllers or managers.

We are concerned that this system can allow operational errors to go unreported. For example, prior to our investigation at one location, the facility reported just two operational errors during the 6-month period from January 1 to June 24, 2004. However, during our investigation, we identified five operational errors that occurred in May and June alone that had not been previously reported. After instituting appropriate use of playback tools in June 2004, the facility reported 36 operational errors during the next 6 months ending December 2004. *The statistics show that the ATO needs procedures to ensure that substantially all operational errors are being reported.*

2. **Major Acquisitions:** The ATO needs to get control of cost growth and make decisions on billion dollar projects that have been delayed for years. We recently reviewed 16 of the ATO's major acquisitions—11 of these projects have experienced cumulative cost growth of about \$5.6 billion. Additionally, 10 of these 16 projects account for schedule delays ranging from 2 to 12 years and 2 projects have been deferred until at least 2008. There has been cost growth with major acquisitions since the establishment of the ATO, but the bulk of the cost growth represented by the \$5.6 billion occurred before the ATO's establishment. It is also a reflection of the ATO's efforts to re-baseline a number of projects, which identified costs that have been pent up for some time.

To its credit, the ATO is taking more incremental approaches to major acquisitions and rethinking several efforts, such as the Standard Terminal Automation Replacement System (STARS). Getting a handle on major acquisitions is critical to defining the ATO's cash flow needs for the capital account and establishing future funding requirements.

Nevertheless, key decisions need to be made. For example, FAA's revised estimates show that a "full STARS" solution (the replacement program for computers and controller workstations at terminals that began in 1996) would cost over \$2 billion. Faced with the additional cost growth of STARS, the ATO has been studying its approach to terminal modernization since 2003, and is committed to assessing alternatives. *A decision needs to be made on what technology is needed to complete terminal modernization based on cost, time, and capabilities.*

Of immediate concern is the state of aging displays at four large sites, such as Chicago and Denver. Displays at Denver, for example, are locking up randomly—this problem has occurred over 100 times in the last 3½ years and is now occurring a little over once a week.

3. **Reducing Cost and Development Risks of ERAM, a New Software-Intensive System:** The ATO needs to take proactive steps now to reduce risk with ERAM, a new multibillion dollar program. The purpose of ERAM is to replace HOST computers at en route centers. The ERAM contract is currently a cost-reimbursable type, which places most of the risk with the Government. The early stages of this effort are within schedule and budget, but the heavy lifting with respect to software development lies ahead.

Significant opportunities exist to make use of fixed price agreements for items not yet negotiated. The ATO should also streamline software development and assess the advantages of state-of-the-art network computer capabilities to centralize computer processing that allows for sufficient redundancy. This step can be taken independent of larger questions about facility consolidation. *The results of this assessment need to be provided to the Congress and the Secretary of Transportation by this time next year.*

4. **Getting Control of Support Service Contracts and Reducing Associated Costs:** A matter of concern is FAA's use of support service contracts, particularly three large Indefinite Delivery contracts valued at over \$2 billion that involve over 100 contractors. A number of indicators show that greater controls and oversight by FAA is needed. For example, there is a lack of centralized controls over these contracts to ensure that FAA gets the best price. We found cases where contract employees were doing the same job at the same location but for significantly different rates charged by different contractors.

We also have concerns over exactly how the contractors' work differs from work FAA employees do, but at substantially higher costs to the Government. For example, one of the contractor employees on one task order is a retired FAA support staff manager who earned \$109,000 just before retiring from the

FAA in 2003. This same person went to work for the contractor (within days after their retirement) as a senior financial analyst, performing the same type of duties but at an annual rate charged by the contractor of over \$206,000.¹ *The savings from greater controls over these contracts could be substantial.*

5. **Addressing the Pending Wave of Controller Attrition:** Over the next 10 years, the ATO estimates that approximately 73 percent of the organization's nearly 15,000 controllers will become eligible to retire. Because it currently takes an average of 2 to 5 years for new controllers to become certified, the ATO anticipates hiring slightly more controllers than will retire during that 10-year period (about 12,500) in order to accommodate the required training time. A significant challenge will be to hire and train those new controllers within a tightly constrained operating budget.

In December, the ATO issued the first in what will be a series of annual reports outlining the organization's plans for addressing that challenge. In our opinion, the plan is a good first step, but subsequent reports will need further details in two key areas. First, the plan does not address how much it will cost. Second, the plan does not address hiring and staffing needs by location. That level of detail is critical because there are over 300 FAA-operated air traffic control facilities.

The ATO recognizes this need, has committed to evaluate its facility staffing standards beginning this year, and intends to have the first group of facilities (en route centers) completed by March 2006. *Given the importance of this issue, we believe this evaluation needs to be completed before the ATO's next report to Congress, which is due at the beginning of the next Appropriations cycle.*

6. **Negotiating a New Controller Collective Bargaining Agreement:** Another critical issue for the ATO will be negotiating a new collective bargaining agreement with the controllers' union. The current agreement expires in September 2005. Although new controllers will generally have lower base salaries than the retiring controllers they replace, it is unlikely that significant reductions in operating cost growth can be achieved without substantial improvements in the organization's workforce productivity. *Initiatives such as new air traffic systems, technological improvements, and work rule changes will be important issues in the upcoming negotiations.*

¹ This rate is the annual loaded rate charged by the contractor and does not reflect the actual salary paid the employee.

7. **Airspace Redesign:** Airspace redesign efforts need to get on track to enhance the flow of air traffic by establishing cost and schedule controls and setting priorities. It is not always well understood how important airspace changes are in getting benefits in terms of capacity increases and delay reductions from new runways. Chicago O'Hare is an example where the benefits from new runways are contingent on airspace changes. *Getting a handle on airspace redesign efforts is important because we found that airspace redesign projects are not effectively coordinated among agency stakeholders, projects can be delayed 3 years or more, and it is unclear how much they would cost to implement.*

8. **Developing Long-Term Strategies For Meeting Future Demand For Air Travel:** The new Joint Planning and Development Office needs to focus on aligning budgets of diverse agencies with different missions, leveraging research, and determining how the new office can work to get new systems into the National Airspace System. While the 2025 timeframe is important, benchmarks for what can be done in 5- and 10-year intervals are needed. *Given the current funding situation, the other imperatives for the JPDO focus on determining what level of funding is actually required, how much other agencies will contribute, what specific capabilities will be pursued, and when they can be implemented.*

That concludes my testimony, Mr. Chairman. I would be glad to answer any questions you or other members of the Subcommittee may have.

NEXT STEPS FOR THE AIR TRAFFIC ORGANIZATION

Reducing Operational Errors

As air traffic operations increase, a significant focus of the ATO must be reducing operational errors (when air traffic controllers allow planes to come too close together in the air). Reducing operational errors has been a key performance goal for the organization. The ATO and controllers reduced the number of operational errors from 1,185 during FY 2003 to 1,150 during FY 2004. Despite that progress, serious incidents still occur too often. In FY 2004, one high-severity operational error (where a collision was barely avoided) occurred every 9 days.

A significant concern regarding operational errors is that only 20 of the 524 air traffic control facilities (both FAA and contractor-operated) have an automated system that identifies when operational errors occur. The ATO depends on an unreliable system of self-reporting operational errors at tower and TRACON facilities. In FY 2003, 22 percent of the operational errors occurring at TRACONs and towers were identified as a result of reports from pilots, neighboring air traffic control facilities, or other outside sources and were not identified by facility controllers or managers.

During an investigation at one air traffic facility, we identified multiple operational errors that were not reported. Prior to our investigation, the facility reported just two operational errors during the 6-month period from January 1 to June 24, 2004. However, during our investigation, we identified five operational errors that occurred during May and June alone that had not been previously reported. After instituting appropriate use of playback tools in June 2004, the facility reported 36 operational errors during the next 6 months ending December 2004.

While none of the 36 operational errors were classified as high severity, 28 were rated moderate severity (based on the proximity of the aircraft and their respective direction of flight).

The statistics indicate that the ATO cannot rely on a system that is based on self-reporting. The ATO needs a procedure that will provide greater assurance that substantially all operational errors are being reported. As a result of our audit, the ATO recently established an audit process at tower and TRACON facilities that will ensure more accurate and full reporting of operational errors.

Major Acquisitions

For FY 2006, the ATO is requesting \$2.4 billion for its capital account. The FY 2006 request is slightly less than last year (\$2.5 billion) but significantly less than FY 2004 (\$2.9 billion). It is also less than the investment level called for in Vision 100. At this Subcommittee's request, we recently reviewed 16 of the ATO's major acquisitions—11 of these projects have experienced cumulative cost growth of about \$5.6 billion, which is more than double the amount of FAA's FY 2006 capital request. Additionally, 10 of these 16 projects account for schedule delays ranging from 2 to 12 years, and 2 systems have been deferred until at least 2008. We note that many of FAA's major acquisitions focus on infrastructure sustainment rather than longer-term efforts.

The ATO has recently sought to be more realistic about the cost of some programs, and is taking a more phased approach to major efforts. There has been cost growth with major acquisitions since the establishment of the ATO but the bulk of the cost growth represented by the \$5.6 billion occurred before the establishment of the new organization. It is also a reflection of the ATO's efforts to re-baseline a number of projects, which identified costs that have been pent up for some time.

Nevertheless, key decisions need to be made. For example, FAA's revised estimates show that a "full STARS" solution (the replacement program for computers and controller workstations at terminals that began in 1996) would cost over \$2 billion. Faced with the additional cost growth of STARS, the ATO has been studying its approach to terminal modernization since 2003 and is committed to assessing alternatives. A decision needs to be made about what technology will be expected to complete terminal modernization based on cost, time, and capabilities.

Because of delays in developing STARS, FAA replaced aging computers at 141 terminal sites between 1998 and 2003. However, the Agency did not replace aging controller displays at most of these sites. Of immediate concern is the state of aging displays at four large sites, including Chicago and Denver. For example, controller displays at Denver are locking up randomly—FAA officials told us that this problem has occurred 100 times in the past 3½ years and now is occurring a little over once a week.

Under FAA's current plan, the Agency will not begin installing STARS and replacing the aging displays at the four large sites until sometime in FY 2008. In September 2003, we reported that the ATO could replace aging displays more quickly and save more than \$268 million by not waiting to install full STARS suites of new computers and displays.

Reducing Cost and Development Risks of New Systems

With an estimated cost of \$2.1 billion, the ERAM program (replacing Host computers at FAA's 20 en route centers) is one of the most expensive and complex acquisitions in the ATO's modernization portfolio. The organization is already spending more than \$240 million a year on the program, which will rise to more than \$300 million next year. Because of the size, complexity, and cost of the ERAM effort, any cost increase will have cash flow implications for the entire modernization account. The ATO is pursuing ERAM through a predominantly cost-reimbursable contract already valued at about \$1.2 billion, which places most of the risk with the Government. Progress is being made with ERAM, but the ATO can take proactive steps now.

- *First, contract management.* Our work on a wide range of major acquisitions over the years shows that FAA has been plagued by an inability to manage long-term complex automation projects with cost-reimbursable contracts, particularly when requirements are not well understood. This has led to cumulative multibillion dollar cost growth and multiyear schedule delays, as well as unmet expectations. Although the ERAM contract is already valued at about \$1.2 billion, the prices of a number of contract elements have not yet been negotiated. There are significant opportunities to use fixed price agreements with respect to maintenance and logistics support.
- *Second, software development.* In the past, FAA has allowed complex software development to grow without sufficient consideration given to cost implications. We note that to date the contractor reports modest software code growth of about 70,000 lines with ERAM. Moreover, the ATO has not yet defined, priced, or negotiated later software releases that provide advanced capabilities. These factors argue for focusing the scope of ERAM work on the first software release and deferring plans for later software releases.
- *Third, the ATO needs to "think outside the box" to identify ERAM savings.* For example, currently, the ATO plans to deploy an ERAM computer system with a redundant backup system to each of its 20 en route facilities to support the controller workstations at those facilities. However, as a result of technological advances in computer networking and telecommunications, the ATO may be able to support the controller workstations at all 20 en route facilities by deploying fewer ERAM computer systems without jeopardizing safety or redundancy. The ATO needs to assess this issue and report the results to the Congress and Secretary of Transportation by this time next year. This is a step that can be taken independent of larger questions about facility consolidation.

Getting Control of Support Service Contracts and Reducing Associated Costs

Over the past 3 years, we have seen an increased use of support services contracts acquired under Indefinite Delivery multiple-award contracts. Since 2001, FAA has awarded three of these contracts, involving over 100 contractors, with a value of over \$2 billion. We have several significant concerns regarding the increased use of these contracts.

- *First, there is a lack of clarity about what the contracts are actually used for.* Under these contracts, FAA acquires the services of many contractors under a large umbrella contract and then awards task orders to individual contractors. These umbrella contracts are broadly defined as used for information technology services, but individual task orders are awarded for services that do not appear to support information technology, including timekeeping and federal budget responsibilities.

For example, in a recent investigation concerning just one task order awarded to one support service contractor we found that when our investigators met with FAA officials, they were unable to tell us the full extent of this contractor's work with the Agency. So far, we have determined that the contractor is involved in at least 46 different task orders, under two multiple-award contracts, with a total value of over \$115 million.

- *Second, there is a lack of centralized controls over the contracts.* These contracts are issued out of multiple locations across the country—one out of FAA Headquarters in Washington, D.C.; one out of the Aeronautical Center at Oklahoma City, Oklahoma; and one out of the William J. Hughes Technical Center in Atlantic City, New Jersey. Task orders are normally awarded without competition under FAA's largest multiple-award contract, the Broad Information Technology and Telecommunications Services with a potential value of up to \$1.8 billion. Although the three contracts provide similar support services, they are billed at different rates. For example, under one contract, a Senior Systems Engineer is billed at \$110.17 per hour, while on another contract, a Senior Systems Engineer is billed at \$90.81 *even though they both perform the same type of work at the same location.*
- *Third, there are serious questions over how the contractors' work actually differs from work FAA employees do, but at much higher costs to the Government.* We have found instances in which some employees left FAA to accept senior positions with these contractors. These individuals then provided services similar to those they executed while at FAA, but at much higher costs to the Government. For example, one of the contractor employees on one task

order is a retired FAA support staff manager who earned \$109,000 just before retiring from the FAA in 2003. This same person went to work for the contractor (within days after their retirement) as a senior financial analyst, performing the same type of duties but at a rate charged by the contractor of over \$206,000.²

On the same task order, we found one employee who was classified as an “Information Engineer” and was billed out by the contractor at a rate of \$63 an hour. However, based on our interviews, we found that the employee was actually performing timekeeping duties at an FAA facility.

We intend to look into these matters in greater detail later this year.

Addressing the Pending Wave of Controller Attrition

Over the next 10 years, the ATO estimates that approximately 73 percent of the organization’s nearly 15,000 controllers will become eligible to retire. Because it currently takes an average of 2 to 5 years for new controllers to become certified, the ATO anticipates hiring slightly more controllers than will retire during that 10-year period (about 12,500) in order to accommodate the required training time. A significant challenge will be to hire and train those new controllers within a tightly constrained operating budget. In FY 2006, FAA requested \$24.9 million to hire and train a net increase (after attrition) of 595 new controllers.

At the direction of Congress, this past December, the ATO issued the first in what will be a series of annual reports outlining its plans for addressing controller staffing over the next 10 years. In our opinion, the plan is a good first step in that it lays out the magnitude of the issue and establishes broad measures for meeting the challenge. However, there are several key elements of the plan that need to be addressed in subsequent reports to Congress. For example, the ATO has not identified the total costs associated with the plan, nor the number of controllers that will be needed by location.

An important point, Mr. Chairman, is that new controllers will generally have lower base salaries than the retiring controllers they replace. Over time, the lower base salaries of new controllers could help reduce the ATO’s operating cost growth. According to FAA, the average base salary (excluding premium pay) of certified professional controllers today ranges from about \$73,000 to about \$134,000 at the busiest locations. However, with premium pay such as overtime and holiday pay, certified professional controllers’ annual salaries can be

² This rate is the annual loaded rate charged by the contractor and does not reflect the actual salary paid the employee.

substantially higher (generally from 17 percent to 21 percent but as much as 37 percent higher at busy locations).

However, if the ATO does not place new controllers where and when they are needed, the potential reductions will be offset by lower productivity from placing too many or too few controllers at individual facilities. That concept is important for the ATO's workforce planning because the current plan does not provide details on staffing by location. Planning at the facility level is critical because the ATO has over 300 air traffic control facilities—many with significant differences in the levels of air traffic they manage and the complexity of operations they handle. Some are essential locations (like Chicago O'Hare) that have the potential to significantly impact operations of the entire National Airspace System.

The ATO recognizes this need, has committed to evaluate its facility staffing standards beginning this year, and intends to have the first group of facilities (en route centers) completed by March 2006. Given the importance of this issue, we believe this evaluation needs to be completed before the ATO's next report to Congress which is due at the beginning of the next Appropriations cycle.

Negotiating a New Controller Collective Bargaining Agreement

Another critical issue for the ATO will be negotiating a new collective bargaining agreement with the National Air Traffic Controllers Association (the union representing the ATO's largest workforce). The current agreement expires in September 2005. An important part of those negotiations will be discussions concerning workforce productivity. Although new controllers will generally have lower base salaries than the controllers they replace, it is unlikely that significant reductions in operating cost growth can be achieved without substantial improvements in the organization's workforce productivity.

Initiatives such as new air traffic systems, technological improvements, work rule changes, efforts to redesign the National Airspace System, and consolidating locations all have the potential to significantly improve productivity. In light of the expected surge in controller attrition, it will be important for the ATO to have new productivity initiatives and new work rules in place and operating effectively as the organization begins hiring and training the next generation of air traffic controllers.

Airspace Redesign

It is not always well understood how important airspace changes are in getting benefits (in terms of capacity and delay reduction) from new runways. For example, very few of the benefits of the Chicago O'Hare Modernization Plan (the

addition of one new runway, the extension of two runways, and the relocation of three others) will be realized without significant airspace changes. On the other hand, the Choke Points initiative (following the summer of 2000) demonstrated that airspace changes can also have important impacts even without new runway construction.

We reviewed FAA's 42 approved airspace redesign projects in FY 2004 and found that FAA's process for controlling costs, mitigating risks, and coordinating airspace redesign efforts is fragmented and diffused. Specifically, the cost and schedule estimates for projects were not reliable—we could not, nor could FAA—determine the cost of implementing the approved 42 projects. In addition, redesign projects are often delayed 3 years or more because of environmental concerns, problems in developing new procedures, the inability to link operating and capital budgets, or changes in a project's scope.

We will issue a report shortly that outlines the steps the ATO needs to take to get airspace redesign efforts on track. They include, among other things, establishing cost and schedule controls for airspace projects, prioritizing projects and establishing criteria for assessing a project's system-wide impact, and evaluating how resources are used at the Headquarters and regional level. The ATO recognizes that significant changes are needed.

Developing Long Term Strategies To Meet Future Demand for Air Travel

Lastly, Mr. Chairman, let me conclude our testimony today with our observations on the new Joint Planning and Development Office (JPDO)—an important effort mandated by Congress. There are a numbers of reasons why this effort is particularly important, including a forecasted increase in the demand for air travel as well as factors (i.e., micro jets) that may drive increased operations. The safety implications of these changes will also need attention. The new office is expected to coordinate research efforts among diverse Federal agencies and to develop a vision for the next generation air traffic management system in the 2025 timeframe. FAA is requesting \$18 million for this office in FY 2006, an increase of \$13 million over last year's level of \$5 million. This is exclusive of research conducted at other Federal agencies.

It is important to set some realistic expectations for the JPDO. In that regard, we see several imperatives for the next year that focus on determining what level of funding is actually required, how much other agencies will contribute, what capabilities will be pursued, and when they can be implemented.

- *Aligning budgets and plans of diverse Federal agencies and leveraging existing research to transition new capabilities into the National Airspace System.* The key to JPDO success at this stage is not an infusion of funds but rather how well it leverages research dollars managed by the other agencies, including the National Aeronautics and Space Administration (NASA) and the Department of Defense. We note that NASA, exclusive of the other JPDO participants, is requesting over \$800 million for civil aeronautics research in FY 2006. Of particular importance to the JPDO is NASA's \$200 million planned investments for FY 2006 in "agile" air traffic management systems.

The issue of technology transfer—and how the JPDO will actually work—is important because our past work shows FAA has experienced mixed success in transitioning systems developed by other agencies. For example, FAA ultimately abandoned work on an automated controller tool pioneered by NASA because of complex software development and cost issues. It is not yet clear how the new office will shift from its initial planning efforts to the hard work of aligning budgets and plans, leveraging research, and getting new capabilities ready for implementation.

- *Determining strategies for what can be done in 5- and 10- year intervals.* We understand the need for a long-term vision, but the 2025 timeframe is difficult to relate to without 5- to 10-year benchmarks. The JPDO needs to provide details on what can be done in those intervals, what "core capabilities" will be pursued, and how they can be implemented. The JPDO is working on what can be done in shorter timeframes and what capabilities can indeed be "fast tracked." These decisions will, of course, require adjustments to the Agency's Flight Plan and Operational Evolution Plan. Also, determining what can be done in short intervals will be important in establishing funding requirements.
- *Examining how barriers to transforming the National Airspace System that have impacted past FAA programs can be overcome.* Equally important to technology development for the JPDO is a full understanding of complex policy questions that go hand-in-hand with new systems. This is particularly true for initiatives that require airspace users to purchase and install new avionics, such as data link communications. For example, the JPDO must tackle policy questions that focus on whether or not new systems will be mandated, what incentives will be put in place, and concerns about how to handle "mixed equipage" in the National Airspace System (where aircraft with markedly different capabilities operate in the same airspace).

ATTACHMENT A

Improving Management of Major Acquisitions and Controlling Capital Costs

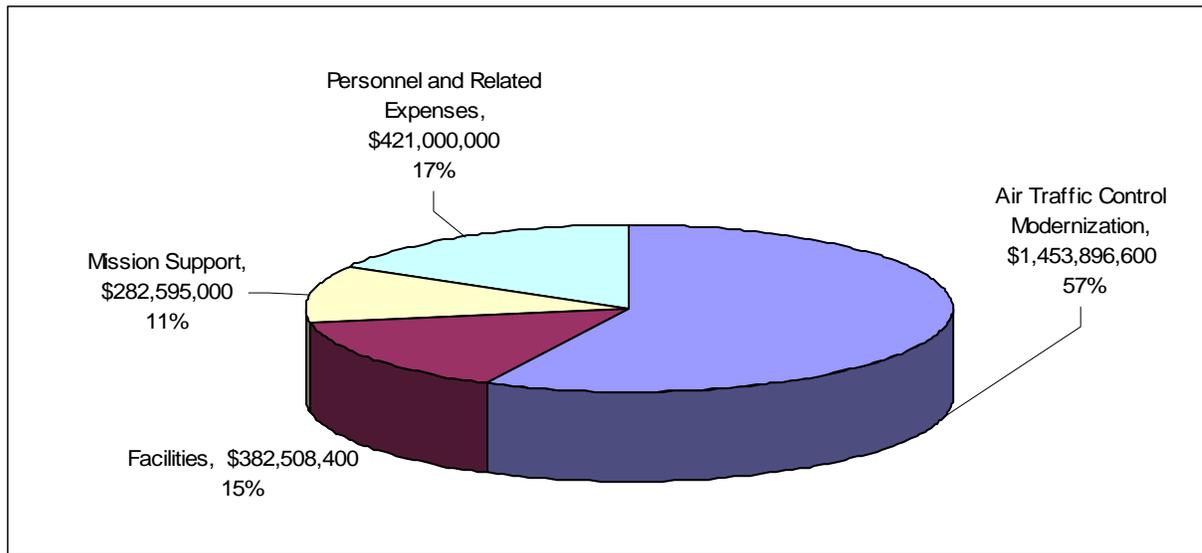
FAA's capital account is the principle vehicle for modernizing the National Airspace System, and the ATO represents the largest portion of this account. Historically, FAA's major acquisition projects have experienced considerable cost growth, schedule slips, and shortfalls in performance. While the ATO has made some progress, key decisions affecting billion dollar acquisitions remain to be made.

For FY 2006, FAA is requesting \$2.4 billion in the Facilities and Equipment (F&E) account for the Agency's major acquisition programs. FAA is requesting slightly less for modernization than it did last year and significantly less than the \$2.9 billion level received in FY 2004. FAA's FY 2006 request is \$500 million less than the investment level called for in Vision 100.

At this Subcommittee's request, we recently reviewed 16 of the ATO's major acquisitions. We found that 11 of these projects have experienced cumulative cost growth of about \$5.6 billion, which is more than double the amount of FAA's FY 2006 request for F&E programs. Additionally, 10 of these 16 projects account for schedule delays ranging from 2 to 12 years, and 2 have been deferred until at least 2008. We will be issuing a report on our results later this month.

We note that the ATO's modernization efforts are increasingly focusing on infrastructure sustainment. This includes major efforts to improve systems at facilities that manage air traffic at higher altitudes and in the vicinity of airports. As illustrated in Figure 4, of the \$2.5 billion funded in FY 2005, a little more than \$1.4 billion or 57 percent will be used for developing and acquiring FAA's air traffic modernization projects. The remaining funds are used for personnel-related expenses, mission support (support contracts), and FAA facilities.

Figure 4. FAA's FY 2005 Facilities and Equipment Budget



The ATO has deferred several long-term programs that often rely on user equipment, such as the Local Area Augmentation System (LAAS), the Next Generation Communications (NEXCOM) system, and the Controller-Pilot Data Link Communication (CPDLC) system. While it is true these projects had merit, they also faced unresolved issues of cost, schedule, and implementation.

The ATO has recognized the importance of having more accurate cost information and is rethinking its overall approach to modernization. The ATO is also seeking ways to reduce operating costs through the modernization account. This is important because the vast majority of past and current projects in the acquisition pipeline have not reduced operating costs. *Notwithstanding recent efforts to rebaseline some programs, key decisions need to be made.* For example:

- **STARS** is a program to replace computers, software, and controller workstations at TRACONS and towers. Faced with additional cost growth with STARS, the FAA is studying its terminal modernization approach—a long overdue step. In April 2004, after receiving a revised cost estimate of more than \$2 billion for 162 sites, FAA limited STARS deployment to 50 sites. In FY 2005, FAA plans to determine whether additional sites should be approved. Thus, a program that was originally estimated to cost less than \$1 billion could cost more than \$2 billion. If approved for all sites, deployment will not be complete until 2012—a 7 year delay compared to its original planned completion date.

Because of STARS schedule delays, FAA replaced aging computers at 141 terminal sites between 1998 and 2003. However, the Agency did not

replace aging controller displays at most of these sites. Of urgent concern is the state of aging displays at four large sites, including Chicago and Denver. For example, controller displays at Denver are locking up randomly—FAA officials told us that this problem has occurred 100 times in the past 3½ years and now is occurring a little over once a week. Under FAA’s current plan, the Agency will not begin installing STARS and replacing the aging displays at the four large sites until sometime in FY 2008. We recently reported that FAA could replace aging displays more quickly and save \$268 million compared to the cost if it waits for STARS.

- **WAAS** is a new satellite-based navigation system that is intended to impact all phases of flight and augments Global Positioning System (GPS) satellites. In May 2004, FAA rebaselined WAAS and raised the program’s cost estimate from \$2.9 billion to \$3.3 billion. FAA now intends to provide a capability called “LPV” in late 2008, which is less than the program’s original goal of Category 1 performance. The principle beneficiaries of WAAS will be general aviation and some regional carriers because large commercial air carriers already have sophisticated onboard systems.

We see the key risks to WAAS implementation being the development of flight procedures and how quickly airspace users will equip with new avionics. Additionally, FAA is adding new software to resolve safety-critical technical and performance issues. FAA also must effectively manage a contract with Lockheed Martin to procure and place into orbit new satellites to improve WAAS availability and coverage throughout the United States.

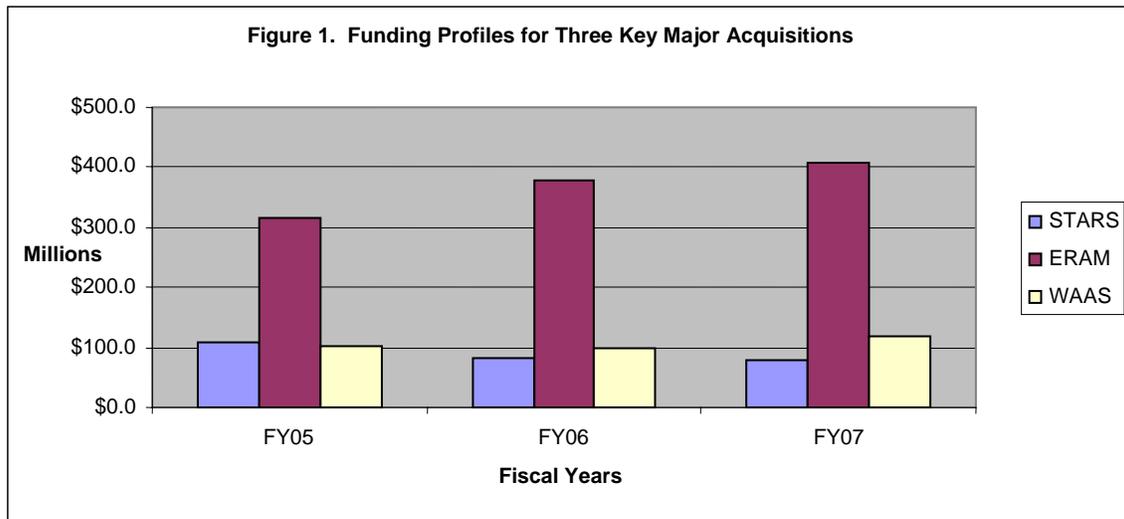
FAA still intends to pursue Category 1 capabilities and plans to make a formal decision in 2007. However, we believe a decision could be made much sooner. To provide Category 1 capability, FAA now depends on the Department of Defense’s (DOD) plans to enhance the GPS satellite constellation (i.e., a second civil signal for aviation use). Given shifting benefits, and uncertainty regarding DOD plans, we question whether or not FAA should commit funds for Category 1 development. A decision not to pursue Category 1 would significantly reduce the \$3.3 billion cost of WAAS.

The ATO can also take steps now with a multibillion dollar program that is still in its early stages. At an expected cost of \$2.1 billion, the ERAM program is one of the most expensive and complex acquisitions in FAA’s modernization portfolio. Because FAA expects the Host computer hardware and software—the brains and central nervous system of the National Airspace System—to be obsolete within the next 5 years, the Agency has placed a high priority on fielding ERAM at its

20 en route centers nationwide by 2010. The organization is already spending more than \$240 million a year, which will rise to more than \$300 million next year, on the program.

Additionally, as noted in Figure 5, FAA is planning to spend from \$500 million to \$600 million annually on STARS, WAAS, and ERAM over the next 3 years, which equals about a third of the available funds used to support air traffic control acquisitions during that same period. This leaves little room for additional cost growth with FAA’s acquisitions, and requires the Agency to make funding decisions that provide the greatest benefits.

Figure 5. Three Key Major Acquisitions Will Consume About One-Third of the ATO’s Available Modernization Funds



Because of the size, complexity, and cost of the ERAM effort, any cost increase will likely have cash flow implications for the entire modernization account. The ATO is pursuing ERAM through a predominantly cost-reimbursable contract already valued at about \$1.2 billion. Cost-reimbursable contracts place most of the risk with the Government.³ We note that FAA’s problem-plagued Advanced Automation Systems and, more recently, STARS development also used cost-reimbursable contract types. In both cases, requirements and cost growth became unmanageable.

³ FAA uses two primary types of acquisition contracts: cost-reimbursable and fixed price. A cost-reimbursable contract places most of the risk with the Government because the contractor is entitled to be reimbursed for all authorized costs, even if the contractor overruns estimates.

The ATO can take proactive steps now to keep this critical effort on track over the next several years:

- ***Contract Management:*** Our work on a wide range of major acquisitions over the years shows that FAA has been plagued by an inability to manage long-term complex automation projects with cost-reimbursable contracts, particularly when requirements are not well understood. This has led to significant cost growth and unmet expectations with major acquisitions. Although the ERAM contract is already valued at about \$1.2 billion, the prices of a number of contract elements have not yet been negotiated. These include, among other things, maintenance and logistic support. *The ATO needs to reduce cost risk with the multibillion dollar ERAM by ensuring that requirements are well-defined and maximizing the use of fixed priced agreements rather than cost-reimbursable ones.*
- ***Software Development:*** The ATO can reduce ERAM schedule and technical risk by focusing development on the first software release. The first release is well defined, focuses on Host replacement, and will provide some capabilities that do not exist today, such as increased surveillance coverage. We note that in addition to acquiring new hardware, Release #1 work involves developing, integrating, and testing 1.3 million lines of software code to replace the Host beginning in FY 2009. We note that to date the contractor reports modest software code growth of about 70,000 lines. Moreover, the ATO has yet to define, price, or negotiate later software releases to provide advanced capabilities.

These factors argue for focusing the scope of ERAM work on the first release and deferring plans for additional ERAM features. In the past, FAA has allowed complex software development to grow without sufficient consideration given to cost implications. This was particularly true with STARS when the planned scope of software development grew from about 800,000 lines of code to more than 1.2 million, with major ramifications for cost and schedule. The ATO needs to ensure that ERAM software development does not follow suit.

- ***Value Engineering:*** The ERAM program may also benefit from a value engineering analysis. The purpose of value engineering is to analyze a series of design alternatives and consider appropriate trade-offs among system capabilities, schedules, costs, and other factors and recommend the most cost-beneficial technical solutions to a given problem.⁴ Although

⁴ FAA policy directs the following factors to be included in value engineering analysis: reliability, testability, supportability, survivability, compatibility, and producibility.

ERAM is underway, FAA can still benefit from applying value-engineering principles to potentially identify savings. Currently, the ATO plans to deploy 20 computer systems to its 20 en route facilities, which is the Host configuration setup established in the 1960's. However, the ATO can take steps now, independent of larger questions about facility consolidation, by examining the benefits of centralizing computer systems and how savings could be achieved.

We will be issuing our report on ERAM later this month.

STATUS OF 16 KEY MODERNIZATION PROJECTS

Program	Estimated Program Costs (Dollars in Millions)		Percent Cost Growth	Implementation Schedule		Schedule Delay
	Original	Current		Original	Current	
WAAS	\$892.4	\$3,339.6	274%	1998-2001	2005-2013	12 years
STARS	\$940.2	\$2,760.4	194%	1998-2005	2002-2012	7 years
NEXCOM	\$406.0	\$986.4	143%	2002-2008	2002-TBD	Deferred
FTI	\$205.5	\$310.2	51%	2002-2008	2004-2008	2 years
OASIS	\$174.7	\$251.0	44%	1998-2001	2002-TBD	4 years
ADS-B	\$215.1	\$294.8	37%	2001-TBD	2001-TBD	N/A
ASR-11	\$743.3	\$1,003.0	35%	2000-2005	2003-2013	8 years
NIMS	\$273.7	\$362.3	32%	1997-2000	2001-2010	10 years
LAAS	\$530.1	\$696.1	31%	2002-TBD	2006-TBD	Deferred
ASDE-X	\$424.3	\$505.2	19%	2003-2007	2003-2009	2 years
ITWS	\$276.1	\$286.1	4%	2002-2003	2002-2009	6 years
ATCBI-6	\$281.8	\$282.3	N/A	2000-2004	2002-2009	5 years
FFP2	\$546.2	\$495.8	N/A	2003-2005	2003-2007	2 years
ERAM	\$2,154.6	\$2,141.9	N/A	2009-2010	2009-2010	N/A
ECG	\$315.1	\$315.1	N/A	2003-2005	2004-2005	N/A
ATOP	\$548.2	\$ 548.2	N/A	2004-2006	2004-2006	N/A
Total	\$8,927.3	\$14,578.4				2 to 12 years

Source: Project specific acquisition program baselines or FAA's Capital Investment Plan

N/A: Not applicable

TBD: To be determined

Definitions of Program Acronyms

Program	Definition of Program Acronym
1. WAAS	Wide Area Augmentation System
2. STARS	Standard Terminal Automation Replacement System
3. NEXCOM	Next Generation Air/Ground Communications
4. FTI	FAA Telecommunications Infrastructure
5. OASIS	Operational and Supportability Implementation System
6. ADS-B	Automatic Dependent Surveillance-Broadcast
7. ASR-11	Airport Surveillance Radar-11
8. NIMS	NAS Infrastructure Management System
9. LAAS	Local Area Augmentation System
10. ASDE-X	Airport Surface Detection Equipment-X
11. ITWS	Integrated Terminal Weather System
12. ATCBI-6	Air Traffic Control Beacon Interrogator-6
13. FFP2	Free Flight Phase 2
14. ERAM	En Route Automation Modernization
15. ECG	En Route Communications Gateway
16. ATOP	Advanced Technologies and Oceanic Procedures

ATTACHMENT B

Controlling Costs of Operating the Air Traffic Control System

This past year, the ATO has made some notable steps in beginning the process of controlling operating costs. A significant accomplishment was the completion and subsequent contract award of its A-76 competition for the Organization's Flight Services. According to FAA, the contract with Lockheed Martin is expected to save the ATO about \$1.7 billion over the next 10 years.

The ATO has also embarked on several programs that are designed to increase accountability for costs. For example, the ATO is in the process of developing financial budgetary planning and reporting by location. The new program will hold air traffic facility managers accountable for submitting and meeting annual budgets for their location. (Until the introduction of this program, most facility managers were neither assigned nor accountable for a facility budget.) Clearly, those efforts represent progress on the part of the ATO towards its goal of becoming a performance-based and cost-driven organization. However, much more effort is needed if the ATO is to operate more like a business, particularly in terms of controlling costs. We see several significant challenges in terms of operating costs that will need to be addressed in the ATO's next steps.

- ***Implementing an Effective Cost Accounting and Labor Distribution System.*** A critical tool for controlling costs is an accurate cost accounting system to identify where and when costs are incurred. Cost accounting is a basic tool that the private sector uses to improve operational effectiveness and control costs. The ATO (and FAA) have made deployment of an effective cost accounting system a priority and plan to have a fully operational system in place by September 2006.

However, there are several significant challenges that will need to be addressed. The ATO must revamp the system to account for its recent organizational changes, begin assigning actual labor costs and other unassigned service costs to facilities and activities (which is the first requirement to effective budgeting by location), and link performance measures to the cost accounting system. Those efforts are critical for achieving performance efficiencies and cost savings.

A reliable system to track labor costs is also a basic requirement for an effective cost accounting system. Labor distribution is the process of

associating labor cost directly with activities and services by requiring employees to record their time worked on specific activities. FAA is deploying a labor distribution reporting system for the ATO which, when fully deployed, will be used by about 35,000 employees and will include about \$3.8 billion in labor costs for air traffic controllers and maintenance technicians.

The labor distribution system also requires enhancements before it can capture complete information about the activities worked on by employees. For example, it does not identify the off-scope activities or collateral duties that air traffic controllers perform. It also does not require employees to enter actual start and stop times or record collateral duties by function. FAA and the ATO have made a commitment to implement the labor distribution system, correct these deficiencies by June 2005 and link this labor distribution system to the cost accounting system by December 2005.

- ***Addressing an Expected Surge in Controller Attrition.*** A significant cost driver now facing the ATO is addressing an expected surge in controller retirements. Over the next 10 years, the ATO estimates that approximately 73 percent of the organization's nearly 15,000 controllers will become eligible to retire. The ATO is anticipating a need to train and hire 12,500 new controllers over the same 10-year period in order to have enough recruits in the pipeline to meet anticipated needs. A substantial challenge for the organization will be to hire and train these new controllers within a severely constrained budgetary environment.

At the direction of Congress, in December the ATO issued a report outlining its plans for addressing controller staffing over the next 10 years. In our opinion, the plan is a good first step in that it lays out the magnitude of the issue and establishes broad measures for meeting the challenge. However, there are notable gaps in the plan that need to be addressed in subsequent reports to Congress. For example, the ATO has not identified the annual and total costs for hiring and training the number of new controllers it says it needs over the next 10 years or identified the offsetting savings it will realize from retiring controllers.

An important point worth noting is that new controllers will generally have lower base salaries than the retiring controllers they replace. Over time, this could help reduce the ATO's average base salary and, in turn, help reduce the organization's operating cost growth. However, if the ATO does not place new controllers where and when they are needed, the potential reductions in base salaries will be offset by lower productivity from placing too many or too few controllers at individual facilities.

The staffing plan also does not provide details on planned staffing by location. That level of detail is critical because the ATO has over 300 air traffic control facilities—many with significant differences in the levels of air traffic they manage and the complexity of operations they handle. Some facilities are key locations (like Chicago O’Hare) that have the potential to significantly impact operations of the entire National Airspace System. The ATO recognizes this need, has committed to evaluate its facility staffing standards beginning this year, and intends to have the first group of facilities (en route centers) completed by March 2006.

Facility-level details are also necessary because the staffing plan assumes a dramatically increased percentage of trainees within the controller workforce (from 15 percent of the total workforce to 35 percent). To effectively manage that kind of increase, facility managers will need to know how many new controllers will be hired for their location and when so managers can begin planning the logistics needed to handle the increase (i.e., determining the number of experienced controllers that will be needed to perform on-the-job training duties and determining the amount of overtime that will be required to maintain operations).

We will be issuing our report on FAA’s staffing plan later this month.

- ***Negotiating a New Collective Bargaining Agreement With the ATO’s Largest Union.*** Another critical issue for the ATO will be negotiating a new collective bargaining agreement with the National Air Traffic Controllers Association (the union representing the ATO’s largest workforce). The existing collective bargaining agreement expired in September 2003 but was extended by the union and the Agency for an additional 2 years. The extension is now due to expire in September 2005. An important part of those negotiations will be discussions concerning workforce productivity.

Although new controllers will generally have lower base salaries than the controllers they replace, it is unlikely that significant reductions in operating cost growth can be achieved without substantial improvements in the organization’s workforce productivity. Initiatives such as new air traffic systems, technological improvements, work rule changes, efforts to redesign the National Airspace System, and consolidating locations all have the potential to significantly improve productivity. In light of the expected surge in controller attrition, it will be important for the ATO to have new productivity initiatives and new work rules in place and operating effectively as the organization begins hiring and training the next generation of air traffic controllers.

ATTACHMENT C

Getting Airspace Redesign Efforts on Track To Enhance the Flow of Air Traffic

Revamping the Nation's airspace is critical to enhancing capacity and meeting the demand for air travel, which is rebounding to 2000 levels in terms of flights and delays. In fact, the most recent holiday season was projected to be the busiest in 5 years, exceeding 2000 holiday traffic levels by 1.5 percent—a period when air travel was at a peak.

Airspace changes are critical to get the most benefits from new runways. For example, the capacity increases and delay reductions envisioned through the Chicago O'Hare Modernization Plan (the addition of one new runway, extension of two runways, and relocation of three others) depends on significant airspace changes. For the first stage of the plan expected to be complete in 2007 (the new north runway only), a combination of airfield and airspace changes provides for more than a 50 percent reduction in the average minutes of projected delay per flight, from 19.6 to 9.6 minutes. FAA and Mitre analyses show the new north runway, without corresponding airspace changes, will have little impact on delays.

Even without new runways, airspace changes can reduce congestion and enhance the flow of air travel. FAA's Choke Point initiative—the Agency's effort to revamp airspace done in response to delays that reached intolerable levels in 2000—focused on eliminating bottlenecks east of the Mississippi. FAA reports that the Choke Point initiative reduced delays and resulted in an annual savings to airspace users of \$70 million. The Choke Point initiative was successful because it was placed on a fast track, had significant management oversight, and linked plans and resources—all of which are best practices that need to be transferred to all airspace projects.

We reviewed the 42 approved airspace redesign projects in FY 2004 and found that FAA's overall process for controlling costs, mitigating risks, and coordinating local, regional, and Headquarters efforts is not effective. The management and oversight of airspace projects is diffused and fragmented between FAA Headquarters and various local FAA facilities. Specifically, we found:

- Cost and schedule estimates for the vast majority of airspace redesign projects are not reliable. Cost estimates—for the program as well as individual projects—include only costs for planning, not for implementation. Therefore, we could not, nor could FAA, determine the cost of implementing the 42 approved projects in FY 2004.

- FAA's redesign projects are often delayed 3 years or more because of changes in a project's scope, environmental issues, and problems in developing new procedures for more precise arrival and departure routes. For example, of the 42 approved projects in FY 2004, 7 were affected by environmental concerns, 10 by problems in developing new procedures, and 21 by changes in a project's scope.
- Projects are not effectively coordinated among Agency organizations that manage resources (e.g., new equipment and radio frequencies) or linked to the Agency's budget process. This directly affects a project's implementation. We found that 19 of the 42 approved projects in FY 2004 had unresolved equipment issues.

FAA needs to get its airspace redesign efforts on track by determining what reasonably can be expected of the projects and when they can be completed. There are also opportunities for the ATO to make airspace redesign projects considerably more cost effective, including prioritizing projects, assessing a project's impact on the rest of the National Airspace System, and re-evaluating roles and resources at both the Headquarters and regional level. We will be issuing our report on FAA's airspace redesign efforts shortly.

ATTACHMENT D

Next Steps for the Joint Planning and Development Office

A critical effort to help meet the anticipated future demand for air travel is the JPDO. The establishment of this new office at FAA was mandated by the Congress to coordinate research and development efforts among diverse Federal Agencies (including the Departments of Defense, Homeland Security, and Commerce and the National Aeronautics and Space Administration) and is expected to develop a vision for the next generation air traffic management system in the 2025 timeframe. FAA is requesting \$18 million for the JPDO in FY 2006, an increase of \$13 million over last year's level of \$5 million.

This past December, the JPDO published its first plan for moving forward. It laid out goals, strategies, and research directions but did not provide details on what specific technologies would be pursued or how much it might ultimately cost to transition to the next generation air traffic management system.

It is important to set some expectations for the JPDO. This is important for both the Congress and various aviation stakeholders. In that regard, we see several core imperatives for the next year.

- ***Aligning budgets and plans of diverse Federal agencies to transition new capabilities into the National Airspace System.*** Leveraging research dollars is particularly important in today's resource constrained environment and given the fact that FAA conducts very little longer-term air traffic management research in its Research, Engineering, and Development (RE&D) account. FAA is requesting \$130 million for RE&D for FY 2006 but the majority of research will focus on safety-related concerns such as aging aircraft and fire safety. FAA has historically conducted significant development work in its F&E account, but most of the work focuses on systems already in the development pipeline. FAA is requesting over \$200 million for development work (called Engineering, Development, Test, and Evaluation) in the F&E account for FY 2006.

NASA is an important part of the JPDO effort because it now conducts a significant amount of civil aviation related research. NASA is requesting \$852 million for aeronautics research for FY 2006, which includes \$459 million for vehicle systems, \$200 million for airspace systems, and \$193 million for aviation safety and security. NASA expects to spend over \$700 million annually on aeronautics research from FY 2007 to FY 2010.

NASA's investments are exclusive of research conducted by the Department of Defense and other members of the JPDO.

The JPDO intends to rely on a senior policy committee chaired by the Secretary of Transportation; interagency integrated product teams; and an institute to align research budgets, coordinate efforts (both Federal and private), and ultimately transition new systems into the National Airspace System. It is not yet clear how the new office will shift from its initial planning efforts to the hard work of aligning budgets and plans, leveraging a wide range of research, and getting new capabilities ready for implementation into the National Airspace System.

Our past work shows FAA has experienced mixed success transitioning systems developed by other agencies into the National Airspace System. For example, FAA ultimately abandoned work on an automated controller tool developed by NASA (the Passive Final Approach and Space Tool) for sequencing and assigning runways to aircraft because of complex software development and cost issues. This underscores the need to set realistic expectations for the JPDO.

- ***Strategies are needed for what can be done in 5- and 10-year intervals.*** The primary objective of the office is to develop a vision for next generation air traffic management system in the 2025 timeframe. However, given expected growth in demand and the fact the much of the current modernization portfolio focuses on infrastructure sustainment, potential improvements set in 5- and 10-year intervals are also warranted. The new office has begun examining what can be done in shorter timeframes through demonstration projects.

In its December 2004 plan, the JPDO promised to provide Congress with a roadmap for how to move forward in various timeframes. FAA should provide, with a degree of specificity, what can be done in the near term and what “core technologies” will be pursued and how they can be implemented. *This will, of course, require adjustments to the Flight Plan as well as the Operational Evolution Plan. Determining what can be done in shorter intervals is also important to establish funding levels for the ATO.*

- ***Finally, the JPDO needs to examine barriers to transforming the National Airspace System that have impacted past FAA programs and how they can be overcome.*** Our work on many major acquisitions shows the importance of clearly defined transition paths, expected costs (for both FAA and airspace users), and benefits in terms of reduced delays and

reduced operating costs. This is particularly important for initiatives that call for airspace users to purchase and install new avionics. FAA canceled the controller-pilot data link communications program specifically because of uncertain benefits, concerns about user equipage, cost growth, and impact on FAA's operations budget. The inability to link data link schedules with other modernization efforts, such as the new multi-billion ERAM, was also a factor.

Other critical barriers to be overcome include how to ensure new systems are certified as safe for pilots to use and getting the critical expertise in place at the right time. Problems with the Wide and Local Area Augmentation Systems were directly traceable to these problems.

The JPDO must address policy questions, as well as technology development. For example, key policy questions focus on whether or not new systems will be mandated, what incentives will be put in place, and how to handle "mixed equipage" in the National Airspace System (where aircraft with markedly different capabilities operate in the same airspace).

ATTACHMENT E. RELATED OFFICE OF INSPECTOR GENERAL AUDITS 1998 - 2004

Operations

- FAA's Actions To Address Leave and Overtime Abuse at Five Locations – AV-2004-081, September 9, 2004
- Short- and Long-term Efforts to Mitigate Flight Delays and Congestion – CR-2004-066, June 17, 2004
- Opportunities To Improve FAA's Process for Placing and Training Air Traffic Controllers in Light of Pending Retirements – AV-2004-060, June 2, 2004
- Using CRU-X To Capture Official Time Spent on Representational Activities – AV-2004-033, February 13, 2004
- FAA's Management of Memorandums of Understanding with the National Air Traffic Controllers Association – AV-2003-059, September 12, 2003
- Safety, Cost and Operational Metrics of the Federal Aviation Administration's Visual Flight Rule Towers – AV-2003-057, September 4, 2003
- FAA's Oversight of Workers' Compensation Claims in Air Traffic Services – AV-2003-011, January 17, 2003
- FAA's National Airspace System Implementation Support Contract – AV-2003-002, November 15, 2002
- FAA's Air Traffic Services' Policy of Granting Time Off Work To Settle Grievances – CC-2002-048, December 14, 2001
- Subcontracting Issues of the Contract Tower Program – AV-2002-068, December 14, 2001
- Automated Flight Service Stations: Significant Benefits Could be Realized by Consolidating AFSS Sites in Conjunction with Deployment of OASIS – AV-2002-064, December 7, 2001
- Compensation Issues Concerning Air Traffic Managers, Supervisors, and Specialists – AV-2001-064, June 15, 2001
- Technical Support Services Contract: Better Management Oversight and Sound Business Practices Are Needed – AV-2000-127, September 28, 2000
- Contract Towers: Observations on FAA's Study of Expanding the Program – AV-2000-079, April 12, 2000
- Staffing: Supervisory Reductions Will Require Enhancements in FAA's Controller-in-Charge Policy – AV-1999-020, November 16, 1998
- Personnel Reform: Recent Actions Represent Progress but Further Effort Is Needed To Achieve Comprehensive Change – AV-1998-214, September 30, 1998

Acquisition and Modernization

- Report on Terminal Modernization: FAA Needs To Address Its Small, Medium, and Large Sites Based on Cost, Time, and Capability – AV-2005-016, November 23, 2004
- FAA's Advanced Technologies and Oceanic Procedures – AV-2004-037, March 31, 2004
- FAA Needs To Reevaluate STARS Costs and Consider Other Alternatives – AV-2003-058, September 10, 2003
- Status of FAA's Major Acquisitions – AV-2003-045, June 27, 2003
- Integrated Terminal Weather System: Important Decisions Must Be Made on the Deployment Strategy – AV-2003-009, December 20, 2002
- FAA's Progress in Developing and Deploying the Local Area Augmentation System – AV-2003-006, December 18, 2002
- Follow-up Memo to FAA on STARS Acquisition – CC-2002-087, June 3, 2002
- Letter Response to Senator Richard Shelby on FAA's Advanced Technologies and Oceanic Procedures (ATOP) – CC-2001-210, April 12, 2002
- Status Report on the Standard Terminal Automation Replacement System – AV-2001-067, July 3, 2001
- Efforts to Develop and Deploy the Standard Terminal Automation Replacement System – AV-2001-048, March 30, 2001

Aviation Safety

- Observations on FAA's Controller-Pilot Data Link Communications Program – AV-2004-101, September 30, 2004
- Report on FAA Controls Over the Reporting of Operational Errors – AV-2004-085, September 20, 2004
- Review of Air Carriers' Use of Aircraft Repair Stations – AV-2003-047, July 8, 2003
- Operational Errors and Runway Incursions – AV-2003-040, April 3, 2003
- Air Transportation Oversight System (ATOS) - AV-2002-088. April 8, 2002
- Oversight of FAA's Aircraft Maintenance, Continuing Analysis, and Surveillance Systems – AV-2002-066, December 12, 2001
- Further Delays in Implementing Occupational Safety and Health Standards for Flight Attendants Are Likely – AV-2001-102, September 26, 2001
- Despite Significant Management Focus, Further Actions Are Needed To Reduce Runway Incursions – AV-2001-066, June 26, 2001

These reports can be reviewed on the OIG website at <http://www.oig.dot.gov>.