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# ASSIGNING AIR TRAFFIC CONTROL COSTS TO USERS

Elements of FAA's  
Methodology Are  
Generally Consistent  
with Standards but  
Certain Assumptions  
and Methods Need  
Additional Support





Highlights of [GAO-08-76](#), a report to congressional committees

## Why GAO Did This Study

In January 2007 FAA reported the results of its study that assigned the fiscal year 2005 costs of its Air Traffic Organization (ATO) to users. FAA used this study to support the President's proposal to replace many current excise taxes with cost-based fees for commercial aviation users and higher fuel taxes for general aviation users. GAO assessed (1) the consistency of FAA's cost assignment methodology with established standards and guidance, (2) the support for selected cost assignment assumptions and methods, and (3) the impact of including budgeted capital costs in the cost baseline. GAO compared FAA's methodology to federal accounting standards and international guidance, reviewed available documents and analyses supporting FAA's assumptions and methods, and interviewed FAA officials and consultants.

## What GAO Recommends

GAO recommends that FAA provide additional analysis and documentation of the basis on which it assigns costs to users. GAO also recommends that FAA monitor any difference between original and actual cost assignments for facilities and equipment. In commenting on a draft of this report, the Department of Transportation neither agreed nor disagreed with its findings, conclusions, or recommendations while stating that FAA's fiscal year 2006 cost allocation will address several of the issues identified in our report.

To view the full product, including the scope and methodology, click on [GAO-08-76](#). For more information, contact Jeanette Franzel at (202) 512-9471 or [franzelj@gao.gov](mailto:franzelj@gao.gov).

# ASSIGNING AIR TRAFFIC CONTROL COSTS TO USERS

## Elements of FAA's Methodology Are Generally Consistent with Standards but Certain Assumptions and Methods Need Additional Support

### What GAO Found

With the federal government preparing for the next generation of air travel, the President, Congress, and users of the national airspace are considering alternative methods for funding air traffic control in the national airspace. To support a cost-based funding structure such as the current proposal from the President, FAA developed a methodology for assigning costs to users. Federal cost accounting standards and international guidance establish flexible principles for assigning costs and recognize that the selection of methods involves making choices that require balancing the cost of development and implementation with the benefit of precision in the resulting cost assignments. GAO found that the design of key elements of FAA's methodology was generally consistent with federal standards and international guidance. But GAO also identified matters related to the application of certain assumptions and cost assignment methods that need additional documentation and analysis.

Because building a methodology for assigning costs to users involves standards, alternative methodologies, and choices, documenting the decisions made and how they were made is important to allow users and others to assess whether the methodology and the structure of cost assignment is reasonable. FAA provided adequate support for its decision to assign costs based on whether the aircraft using air traffic control services are powered by turbine engines, such as jets, or piston engines, such as propeller-driven airplanes. However, FAA did not adequately document the basis on which it assigned costs to the aircraft groups or support its assumption that all types of aircraft with the same engine type affect costs in the same manner, leaving open the possibility that costs should be assigned to users differently. GAO also found that FAA's methodology does not take advantage of allocations already made in its cost accounting system, but instead aggregates the costs and then allocates them to aircraft groups. For some of these costs, such as employee benefit costs, a different method of allocation could have produced a more precise distribution between the groups.

A user fee designed to fund new facilities and equipment expenditures must provide funds equal to the annual budget for those expenditures. FAA's methodology includes adjusting current-year actual expenses to equal the budgeted amount for facilities and equipment costs. These adjustments are then assigned to users in the same proportion as are current acquisition, implementation, and depreciation expenses. But users of future facilities and equipment may be different from users of existing facilities and equipment. The manner in which the costs of facilities and equipment are assigned may, over time, result in assigning costs to users who are different from the ultimate users of future facilities and equipment once they become operational. Consequently, the implementation of this method warrants careful monitoring to avoid unintentional cross-subsidization among users.

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United States Government Accountability Office  
Washington, DC 20548

October 19, 2007

Congressional Committees

In January 2007, the Federal Aviation Administration (FAA) released the results of its study on the fiscal year 2005 costs of air traffic services provided by its Air Traffic Organization (ATO) to commercial, general aviation, and exempt users<sup>1</sup> of the National Airspace System (NAS).<sup>2</sup> FAA used this study to support the President's proposal to eliminate many of the current excise taxes and replace them with a combination of cost-based fees to commercial users and higher fuel taxes for general aviation users. With this proposed change, the President also sought to better align funding with the factors that drive ATO's costs. Many stakeholders in NAS funding have also questioned whether the current structure fairly and equitably distributes the burden of air traffic control costs between commercial and general aviation users and whether this structure should continue in its current form to fund the next generation of air traffic control.

To make informed judgments about a cost-based fee funding structure for FAA, Congress, the users, and other stakeholders need to understand how FAA's cost assignment assumptions and methods affect the distribution of costs and the potential funding burden among users. At your request, we reviewed FAA's methodology to determine how it assigns costs to users of air traffic services. We agreed to report to you matters that came to our attention during our review that we considered important for Congress to understand as it moves toward reauthorizing FAA and evaluates

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<sup>1</sup>Commercial users are entities that use aircraft in a business of transporting persons or property for compensation. General aviation users include entities that operate all U.S. registered civil aircraft other than (1) those operated under 14 C.F.R. Part 121 (scheduled commercial airlines), (2) military operations, and (3) those operated under 14 C.F.R. Part 135 (commuter and on-demand operations). In some cases users are classified differently for tax and regulatory purposes. For example, FAA's cost assignment methodology classifies fractional ownership operations as commercial users because such operations pay commercial excise taxes, but for regulatory purposes they are treated as general aviation because they fly under 14 C.F.R. Part 91. The exempt category includes military, public, and air ambulance users that are exempt from existing excise taxes.

<sup>2</sup>Federal Aviation Administration, *FY 2005 Cost Allocation Report* (Washington, D.C.: Jan. 31, 2007).

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alternative funding approaches. Specifically, this report assesses (1) the consistency of FAA's methodology with federal cost accounting standards and international guidance, (2) the support for selected assumptions and methods, and (3) the potential impact of using budgeted facilities and equipment costs in the cost base for developing user fees.

To meet these objectives we reviewed federal cost accounting standards, international policies, and guidance on setting fees for air traffic services,<sup>3</sup> and other reference sources to identify acceptable methods for assigning costs to services and products for the purpose of setting fees and prices. We reviewed FAA's 2007 report on fiscal year 2005 cost allocation and the draft report from FAA's consultant on the design and application of the cost assignment methodology using fiscal year 2004 data, which provided the base methodology used for the fiscal year 2005 cost allocation. We also reviewed supporting documents and selected analyses prepared by FAA and its consultants to support the methodology's underlying key assumptions and methods. To gain an understanding of how FAA classified and assigned costs to users, we analyzed a nonrepresentative selection of seven operations and capital projects<sup>4</sup> from FAA's report on the results of applying its Cost Assignment Methodology for Estimating Resource Allocation (CAMERA) to fiscal year 2005 cost data.

We also interviewed officials from FAA's Cost Accounting System (CAS) and CAMERA teams and FAA consultants to gain an understanding of the cost assignment process, including how FAA developed the CAMERA cost base. We also reviewed relevant reports of the Department of Transportation Office of Inspector General, the audit reports of FAA's external auditor, and reports of FAA consultants to identify issues that could have an impact on the assignment of costs to users.

Our review was not designed to determine whether CAS and CAMERA assumptions and methods for fiscal year 2005 were sufficient overall to support a cost-based user fee approach to finance FAA's ATO or to assess

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<sup>3</sup>The International Civil Aviation Organization (ICAO), an advisory organization affiliated with the United Nations, has issued policies and guidance on assigning costs and establishing charges for air navigation services.

<sup>4</sup>A project is a mechanism used to recognize, measure, and accumulate the costs of a particular set of activities, functions, organizations, products, services, or customers. Some of the projects were either operations, such as air traffic management, or capital projects, such as radar data display, or were a combination of related operations and capital projects.

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the reliability of FAA's fiscal year 2005 cost allocation results. With respect to the issues we identified during our review, we did not determine the dollar effect that these issues could have on the assignment of costs to user groups and aircraft operators. Also, it was beyond the scope of this review to assess alternatives to funding capital project budget authority with user fees, such as borrowing or special appropriations.

We conducted our work from October 2006 through October 2007 in accordance with generally accepted government auditing standards.

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## Results in Brief

FAA developed a methodology for assigning costs to users, CAMERA, to support a cost-based funding structure such as the President's proposal to eliminate many of the current excise taxes and replace them with cost-based user fees for commercial users and higher fuel taxes for general aviation users based on their use of air traffic control services. FAA's objectives in designing CAMERA included simplicity and transparency to achieve results that could be easily understood by stakeholders, while also adhering to established policies, standards, and guidance for assigning costs and developing user fees including federal cost accounting standards and applicable international guidance. Federal cost accounting standards and international guidance establish flexible principles for assigning costs, not a specific methodology that agency management must follow. The federal standards further recognize that agency management should select costing methods that best meet their needs, while considering the costs and benefits of reasonable alternatives. We found that the design of key elements of FAA's CAMERA methodology used cost assignment methods that are generally consistent with federal cost accounting standards and the principles set forth in international policies and related guidance. However, we identified matters related to the application of certain CAMERA assumptions and cost assignment methods that needed better support through additional documentation and analysis.

Cost accounting should associate an entity's incurred costs with its products, services, or activities. When associating costs with users of services as a basis for determining user fees, assigning costs to the appropriate users avoids unintentional cross-subsidization from users who pay more to users who pay less than the cost of services they receive. To associate the costs of its air traffic control services with the commercial, general aviation, and exempt operators that use those services, FAA

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initially identified two user groups based on engine type—turbine<sup>5</sup> or piston<sup>6</sup>—that are either the primary or secondary driver of the related costs. Using CAMERA, the costs from CAS were categorized by type of service to which they pertain and then were assigned to users based on key assumptions. We found that FAA adequately justified its decision to assign air traffic control costs based on whether the aircraft use turbine or piston engines, but it did not (1) adequately document the basis on which it assigned costs to these user groups or (2) support its assumption that all types of aircraft with the same engine type affect costs in the same manner. Documentation of key input from internal subject matter experts and the rationale linking this information and related analyses with the final cost assignments was not well established. Also, FAA did not conduct sufficient analysis (e.g., econometric analysis) to quantify the extent to which different users of one engine type (e.g., smaller jet aircraft versus commercial jets) impose costs differently on the air traffic control system, although FAA stated this was one of the issues discussed with its internal subject matter experts.

Further, the precision of FAA's approach to allocating overhead, indirect, and other miscellaneous costs might be improved by using allocations previously entered into CAS and, for certain of these costs, by using more appropriate allocation methods. CAMERA did not use the allocations of overhead and indirect costs from CAS and instead aggregated these costs and then allocated them to the turbine and piston user groups. In addition, FAA could have allocated some of these costs in a manner that resulted in a more precise distribution between the user groups, such as allocating employee benefit costs based on labor costs rather than the total of labor and nonlabor costs.

In order to provide funds sufficient to acquire new air traffic control assets authorized by its 2005 budget, FAA adjusted acquisition, implementation, and depreciation expenses recognized in accordance with generally accepted accounting principles (GAAP) upward to equal budget authority received for the Facilities and Equipment (F&E) account. The manner in which the adjusted costs are assigned to users may, over time, result in a difference between users who are assigned costs for F&E acquisitions and

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<sup>5</sup>Turbine aircraft include both turbojet and turboprop aircraft, which FAA refers to collectively as the “high-performance” group.

<sup>6</sup>Piston aircraft include all helicopters, whether turbine or piston, because of the similarities in their use of the air traffic control system.

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the ultimate users of those assets and unintentional cross-subsidization among users. These differences occur because of uncertainties in the actual nature, timing, and cost of future projects in comparison with cost estimates included in current cost assignments. Further, the long-term nature of these capital projects is such that some F&E purchases may be funded several years before the expenditures are made and the related improvements become operational. Accordingly, it can take many years before FAA knows the actual distribution of any single year's F&E budget across service types and to users. These issues are inherent with a system that pre-funds long-lived capital projects in general, and the next generation of air traffic control systems (NextGen) in particular, with revenues generated from current users.

To provide additional support for the reasonableness of its cost methodology, we are making recommendations that FAA perform additional analysis and document the basis for certain assumptions and methods underlying its cost assignment methodology and that it monitor cost assignments for budgeted F&E expenditures in relation to actual expenditures and users.

We requested comments on a draft of this report from the Secretary of Transportation. The Department of Transportation provided technical comments, which we incorporated in our report as appropriate, and a comment letter from the Assistant Secretary for Administration, which is attached as Appendix I. While the Department expressed general concurrence with our recommendations in its technical comments, it neither explicitly agreed nor disagreed with our findings, conclusions, and recommendations in its letter. The Assistant Secretary stated that FAA's fiscal year 2006 cost allocation will address several of the issues identified in our report, including improved documentation of subject matter expert input to the assumptions and better assignment of indirect labor costs. We believe that FAA must follow through with all of our recommendations to support its assertions that its cost study results are reasonable.

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## Background

FAA fulfills its mission of maintaining the NAS by providing services through four lines of business: Air Traffic Organization, Aviation Safety, Airports, and Commercial Space Transportation. The Air Traffic Organization (ATO) is the business line that provides air traffic control (ATC) services to users of the NAS through a network of towers, control centers, and flight service stations. ATC includes a variety of activities that guide and control the flow of aircraft through the NAS. ATO groups these activities into four types of services—oceanic en route (oceanic), domestic



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en route (en route), terminal, and flight services. The costs to operate and maintain this network and to make improvements to the ATC system are currently funded through excise taxes deposited into the Airport and Airway Trust Fund and contributions from the General Fund of the U.S. Treasury.<sup>7</sup>

FAA is subject to various laws that have an effect on agencies' development and use of cost information. These laws were enacted after the Comptroller General's 1985 report which provided the framework for the reforms needed to improve federal financial management and manage the cost of government.<sup>8</sup> The earliest of these laws—the Chief Financial Officers Act (CFO Act) of 1990<sup>9</sup>—applied to 24 federal departments and agencies, including the Department of Transportation, of which FAA is a part. Another of these laws is the Federal Financial Management Improvement Act of 1996<sup>10</sup> (FFMIA), which required, among other things, that agencies covered by the CFO Act have systems that comply substantially with federal accounting standards. One such standard is Statement of Federal Financial Accounting Standards (SFFAS) No. 4, Managerial Cost Accounting Standards and Concepts, which states that essential uses of cost information include controlling costs, measuring performance, setting fees, evaluating program costs and benefits, and making economic choice decisions. In plain language, the principal purpose of cost accounting is to assess how much it costs to do whatever is being measured, thus allowing agency management, Congress, and others to analyze that cost information when making decisions. When cost accounting is used as a basis for setting fees or recovering costs, the objective is to ensure that users who receive the related services or products are assigned costs appropriately to avoid unintentional cross-subsidization among users who would then pay more or pay less than the cost of the services they use.

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<sup>7</sup>For more information on air traffic control services and how FAA is funded, see GAO, *Aviation Finance: Observations on Potential FAA Funding Options*, [GAO-06-973](#) (Washington, D.C.: Sept. 29, 2006).

<sup>8</sup>GAO, *Managing the Cost of Government: Building an Effective Financial Management Structure*, [GAO/AFMD-85-35](#) and [GAO/AFMD-85-35A](#), (Washington, D.C.: February 1985).

<sup>9</sup>Pub. L. No. 101-576, 104 Stat. 2838 (Nov. 15, 1990).

<sup>10</sup>Pub. L. No. 104-208, § 803, Title VIII, 110 Stat. 3009, 3009-389 (Sept. 30, 1996).

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The Federal Aviation Reauthorization Act of 1996 requires that FAA develop a cost accounting system that accurately reflects the investment, operating and overhead costs, revenues, and other financial measurement and reporting aspects of its operations.<sup>11</sup> One of the stated purposes of the act was also to authorize FAA to recover the costs of services from those who benefit from, but do not contribute to, the national aviation system and the services provided by FAA. Specifically, FAA was required to collect overflight fees<sup>12</sup> and to ensure that the fees were directly related to FAA's costs of providing the services rendered.<sup>13</sup> In 1997, the National Civil Aviation Review Commission (the "Mineta Commission") recommended that FAA establish a cost accounting system to support the objective of FAA operating in a more performance-based, business-like manner. These legislative requirements and recommendations provided the impetus for FAA's decade-long development and deployment of its cost accounting system to all of its lines of business.

The International Civil Aviation Organization (ICAO), an advisory organization affiliated with the United Nations, aims to promote the establishment of international civil aviation standards and recommended practices and procedures. As such, ICAO has issued policies and guidance on assigning costs and the establishment of charges for air navigation services. The United States is a member of the governing Council of ICAO.

The previous FAA study of air traffic control service costs issued in 1997 allocated fixed costs (those that do not vary with the level of activity or output) and common costs (such as general and administrative overhead, which cannot be traced to a particular product or service) of air traffic control services to user types based on an economic pricing method that assigns more of these costs to users that have a greater willingness to pay them. This pricing method takes into consideration the demand for services and how the pricing of those services may impact demand.<sup>14</sup> However, in its January 2007 report on its study of 2005 costs, FAA

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<sup>11</sup>Pub. L. No. 104-264, 110 Stat. 3213 (Oct. 9, 1996).

<sup>12</sup>Overflight fees are those charged for air traffic control and related services provided to aircraft that neither take off from, nor land in, the United States other than military and civilian aircraft of the United States government or of a foreign government.

<sup>13</sup>This "directly related" standard was later amended by Congress in 2001 to say that the fees must be "reasonably related to the Administration's costs, as determined by the Administrator, of providing the service rendered."

<sup>14</sup>This pricing method is usually referred to as Ramsey Pricing.

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assigned costs to users without using this pricing method, an approach which is consistent with the statutory requirement for setting overflight fees and the federal government's policies on establishing user fees.<sup>15</sup>

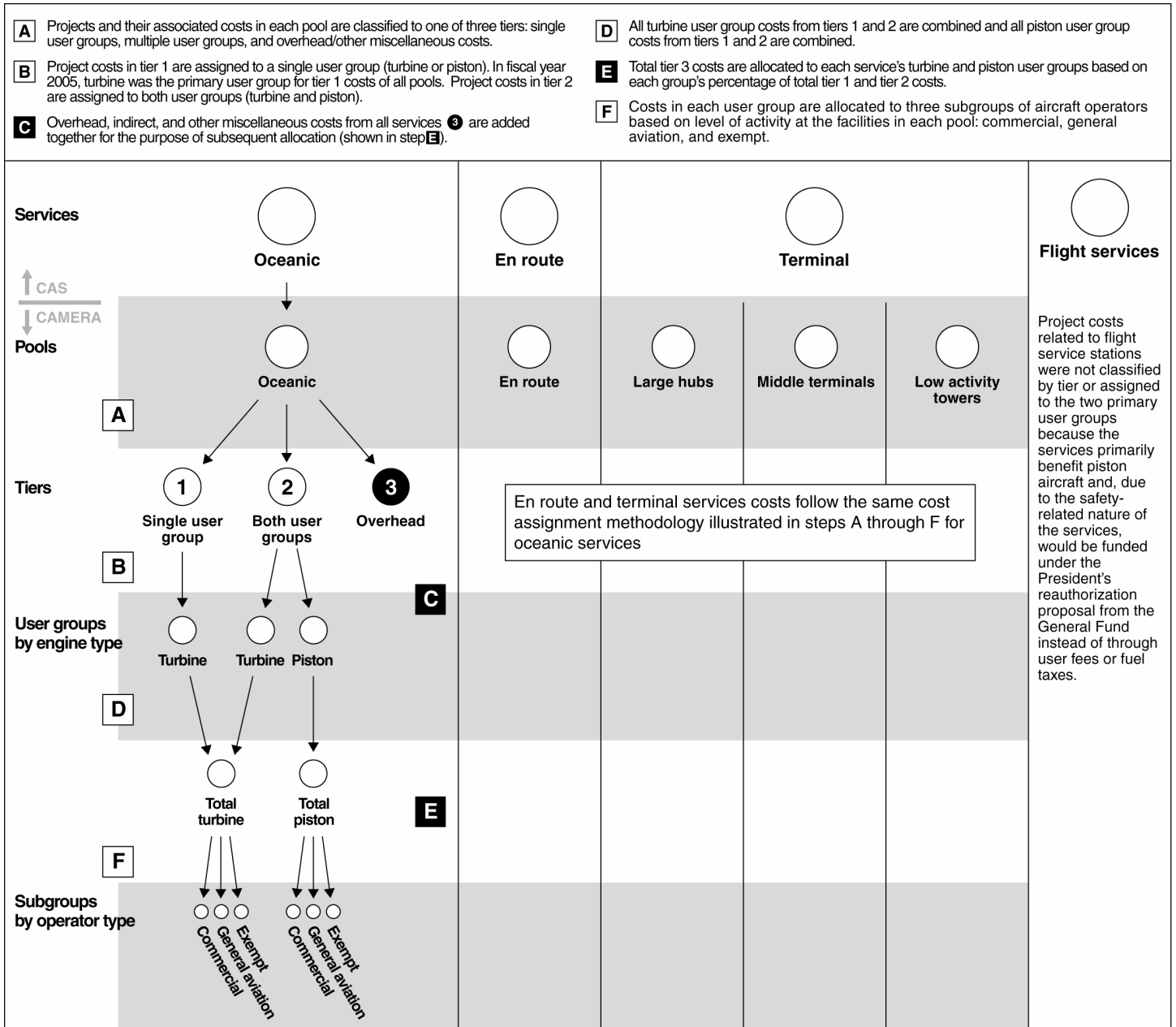
In designing its cost assignment methodology, simplicity and transparency were among FAA's objectives to facilitate stakeholder understanding and acceptance. The methodology, known as CAMERA (Cost Assignment Methodology for Estimating Resource Allocation), assigns air traffic control service costs to user groups by type of aircraft—turbine and piston—and to aircraft operators—commercial, general aviation, and exempt.

After developing six cost pools for air traffic control services, CAMERA assigns costs to Tiers 1, 2, and 3 depending on whether the cost can be directly assigned to a single user group (Tier 1), can be assigned to both user groups (Tier 2), or is overhead, indirect, or other miscellaneous cost allocated to both groups (Tier 3). The total of the three tiers for each user group is allocated to aircraft operators: commercial, general aviation, and exempt. Figure 1 illustrates the CAMERA process.

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<sup>15</sup>The Office of Management and Budget's (OMB) Circular A-25, *User Charges*, requires that user fees be sufficient to recover the full cost of providing goods, services, and resources when the government is acting in its sovereign capacity.

**Figure 1: Overview of the CAMERA Process as Applied to Fiscal Year 2005 CAS Data (Using the Oceanic Services Pool as an Example)**



Source: GAO analysis of FAA methodology.

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FAA's CAS is the source for the cost data used to develop a cost base for CAMERA. CAS captures cost data from FAA's financial accounting system as those costs are recognized as expenses incurred in accordance with generally accepted accounting principles (GAAP). CAS classifies costs by ATO's four types of air traffic services—oceanic, en route, terminals, and flight services—by assigning direct costs and allocating overhead and other indirect costs to services and facilities that provide those services.

CAMERA classifies the CAS data, as adjusted,<sup>16</sup> into six cost pools, namely, oceanic, en route, large hubs, middle terminals, low-activity towers,<sup>17</sup> and flight services. Once the CAMERA costs are classified into the six cost pools, the costs for distinct operations and capital projects within five of the pools (excluding flight services) are put into one of three tiers for assignment to users—turbine or piston.<sup>18</sup> The three tiers of costs are

1. costs exclusively assigned to a single user group, either because the project in question principally benefits a single user group or because the other user group does not drive material or measurable incremental costs (Tier 1);
2. costs assigned to both user groups because the projects benefit both user groups and use by the secondary user group drives measurable incremental costs (Tier 2); and
3. overhead costs, costs indirectly related to the delivery of services, and other miscellaneous costs that could not be directly assigned to the user groups, which were allocated based on each user

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<sup>16</sup>For fiscal year 2005 several adjustments were made to the CAS cost data to arrive at the CAMERA cost base. The most significant of these was the upward adjustment of the facilities and equipment acquisition, implementation, and depreciation costs to the Facilities and Equipment (F&E) account's fiscal year 2005 budget authority. A further explanation of this adjustment is presented in later sections of this report.

<sup>17</sup>Large hubs are defined by statute as those airports with at least 1 percent of U.S. scheduled enplanements. For fiscal year 2005, FAA defined low-activity towers as airports with towers (FAA or FAA contract tower) and fewer than 100,000 annual passenger boardings. Middle terminals consist of facilities with towers that do not fit the criteria for either large hubs or low-activity towers.

<sup>18</sup>Project costs related to flight service stations, which provide services primarily to piston aircraft and are safety related in their nature, were not classified by tier or assigned to the two primary user groups because under the President's reauthorization proposal these costs would be funded from the General Fund instead of through user fees or fuel taxes.

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group's proportional share of the total costs assigned to the first two tiers (Tier 3).

Once all costs are assigned by type of service, tier, and user group, total costs for turbine and piston user groups within each of the five service pools (excluding flight services) are further allocated to subgroups representing the types of aircraft operators—commercial, general aviation, and exempt—based on the proportion of each operator's share of total activity at facilities in the pool.<sup>19</sup> The allocations by type of aircraft operator within the turbine and piston user groups are then combined and serve as the basis on which the proposed user fees, fuel taxes, or general fund appropriations are determined.

Designing a costing methodology requires, within the parameters of applicable cost accounting principles, that management make judgments about how precise the resulting cost information needs to be and whether the benefits of achieving a higher level of precision justify the additional resources required to refine its cost methodology and related systems. These judgments will in turn influence management's choice of assumptions and cost assignment methods. Different sets of assumptions and methods applied to the same pool of costs can yield different results.

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<sup>19</sup>Activity was distance flown for oceanic and en route services and number of terminal operations (an operation is defined as a takeoff or landing) for terminal area services in each of three terminal pools. Operations at airports without an FAA tower or FAA contract tower were excluded from the total tower activity counts of turbine and piston user groups and subgroups of operators because FAA did not incur significant terminal costs for those activities. Therefore, costs were allocated based only on activity that resulted in FAA incurring costs to provide services to end users.

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## Elements of FAA's Cost Assignment Methodology Design Are Generally Consistent with Federal Cost Accounting Standards and International Guidance

FAA designed its CAMERA cost methodology so that the resulting cost assignments would be consistent with federal policies on the establishment of user fees, and, to the extent practicable, with international guidance for air navigation service providers on setting fees. Federal cost accounting standards<sup>20</sup> recognize that one of the purposes of cost information is to set fees, and both the federal standards and the ICAO guidance for implementing its policy on user fees<sup>21</sup> provide direction on allocating these costs. We found that, as designed, key elements of CAMERA used methods that are generally consistent with federal accounting standards and ICAO guidance. However, as discussed subsequently, we identified matters related to the application of certain assumptions and cost assignment methods underlying FAA's methodology that needed better support through additional documentation and analysis to demonstrate that the resulting cost assignments to users are reasonable.

Federal cost accounting standards establish a flexible principle for assigning costs, not a specific methodology that agency management must follow. The standards recognize that agency management should select costing methods that best meet their needs, taking into consideration the costs and benefits of reasonable alternatives, and once selected, follow those methods consistently. Further, the standards require that cost information developed for different purposes should be drawn from a common data source, such as consistently using information from an entity's financial management system to prepare all cost analyses.

To attribute costs to services or products, the federal standards list three categories of cost assignment methods in order of preference: (1) direct tracing of costs to, in this case, a specifically identifiable user wherever feasible and economically practicable, (2) assigning costs on a cause-and-effect basis, or (3) allocating costs on a reasonable and consistent basis. The standards provide that when seeking to assign costs of resources that are shared by, for example, activities, services, or customers, agency management may find it useful to classify these activities, services, or customers as either primary or secondary. If this method is used, management can then determine which costs are (1) necessary to support (in this case) the primary customer and are therefore unavoidable even without the secondary customer and (2) incurred for the secondary

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<sup>20</sup>Statement of Federal Financial Accounting Standards (SFFAS) No. 4, *Managerial Cost Accounting Standards and Concepts*.

<sup>21</sup>ICAO, *Manual on Air Navigation Services Economics*, Doc 9161.

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customer and, therefore, are incremental to the costs of the primary customer. The standards also state that management should maintain and use activity information, as appropriate, to allocate costs as necessary, such as accumulating and using data on miles flown as the basis for allocating certain costs of en route services that are not directly assignable to users.

As designed, elements of FAA's methodology are consistent with principles and methods set forth in federal cost accounting standards. FAA's common data source for CAMERA is costs by service type reported in CAS, which FAA also uses for operational analysis. FAA used the three categories of costing methods found in the federal standards to assign costs to users. To facilitate these cost assignments, FAA identified the turbine and piston user groups as either primary or secondary. FAA sought to determine the amount of each Tier 1 and Tier 2 project's costs that did not change with the level of services provided or other relevant activity, and assigned that amount entirely to a primary group of users. FAA used a two-step process for determining the Tier 2 incremental costs for both groups of users. First, FAA determined the amount of a project's total cost that was incremental and varied with the activity of all users. Second, FAA allocated these incremental costs to the primary and secondary user groups based on each group's proportional share of total activity, such as miles flown or number of terminal operations.

Although the international guidance does not specify particular methods for assigning costs, FAA's cost assignment methodology is generally consistent with the principles outlined in the ICAO guidance. ICAO members are not legally required to follow these principles and may apply the guidance differently depending on the circumstances.<sup>22</sup> Further, the ICAO guidance provides that it is essential that all costs be determined in accordance with GAAP and appropriate costing principles<sup>23</sup> so that costs can be analyzed and users are not assigned costs not properly attributable

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<sup>22</sup>We previously reported that FAA differs from the practices of foreign air navigation service providers (ANSP) we reviewed in that those foreign ANSPs do not assign en route and terminal costs specifically to turbine and piston user groups and subgroups of aircraft operators. See GAO, *Federal Aviation Administration: Cost Allocation Practices and Cost Recovery Proposal Compared with Selected International Practices*, [GAO-07-773R](#) (Washington, D.C.: June 8, 2007).

<sup>23</sup>Cost accounting principles primarily consist of a body of industry practices, economic and finance theory, and guidance issued by organizations such as the Institute of Management Accountants that have wide acceptance.



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to them. In designing CAMERA, FAA relied on federal cost accounting standards to address these criteria.

FAA's CAS provides information by facility and defines air traffic control services in a manner consistent with the ICAO guidance. Further, for en route services, FAA's cost assignment methodology allocates costs among user groups and aircraft operators using the type of activity metric the ICAO guidance suggests is likely to be the most appropriate, namely distance flown. For terminal services, ICAO's guidance states that the number of flights meets the basic requirement for allocating costs. FAA used a more detailed metric—operations—which includes both takeoffs and landings and which represents a reasonable basis on which to allocate ATO's terminal costs among user groups and aircraft operators.

ICAO guidance on pre-funding capital projects states this funding method should be used subject to appropriate safeguards and when other funding sources are not sufficient or available. The safeguards ICAO cites are focused on ensuring that the pre-funding charges link to users that will ultimately benefit from the projects, encouraging advance consultation with users, and that accounting for the pre-funding will be transparent. FAA's use of pre-funding capital projects, as discussed later in this report, is limited to the excess of current-year budget authority for (F&E) expenditures over the GAAP-based current-year expense related to F&E. Also, FAA's F&E budget is authorized and user fees proposed under the safeguard of public transparency and congressional oversight. Consistent with ICAO guidance, this limited pre-funding was incorporated into FAA's methodology because other permanent financing for budgeted capital projects is not currently available to FAA and was not provided in the President's proposal.<sup>24</sup>

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<sup>24</sup>The President's proposal would allow FAA to borrow an aggregate amount not to exceed \$5 billion beginning in fiscal year 2013, but requires repayment by the end of fiscal year 2017.

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## Further Documentation and Analysis Is Needed to Justify Key Assumptions and Methods

While elements of FAA's cost assignment methodology design comply with pertinent guidance, we identified matters related to the application of certain assumptions and cost assignment methods underlying the methodology that need further justification to demonstrate that the resulting cost assignments to users are reasonable.

Cost accounting is intended to associate an entity's costs with its products, services, or activities. The processes and procedures for making these cost associations must be documented according to federal cost accounting standards. Further, federal internal control standards require that significant events, which can include key decisions, be clearly documented. CAMERA uses certain key assumptions about factors that affect the costs of providing air traffic control services and how to assign those costs to particular users. We found that FAA justified its assumption that turbine and piston aircraft drive costs differently. However, FAA did not (1) adequately document the basis on which it assigned costs to turbine and piston user groups or (2) conduct sufficient analysis (e.g., econometric analysis) to support its assumption that all types of aircraft with the same type of engine (e.g., smaller jet aircraft versus larger commercial jets) affect costs in the same manner. Further, the precision of FAA's approach to allocating overhead, indirect, and other miscellaneous costs might be improved by using allocations previously entered into CAS and, for certain of these costs, by using more appropriate allocation methods.

Because FAA has not adequately supported certain assumptions and methods, it is not able to demonstrate conclusively whether the resulting cost assignments are reasonable.

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## FAA Justified Assigning Costs to Turbine and Piston User Groups, but the Basis of Cost Assignments Was Not Adequately Justified

FAA analyzed the activities related to the delivery of air traffic control services and found that different types of aircraft and aircraft operations have different effects on FAA's workload and the associated costs to provide its services. FAA determined that the principal indicator of the differences between aircraft and aircraft operations—in terms of the air traffic control workload they represent and as cost drivers—is whether the aircraft operate with turbine or piston engines. Turbine aircraft fly at higher cruising altitudes, higher speeds, and normally under instrument flight rules (IFR), which require they be "controlled" by air traffic controllers through en route airspace and for takeoffs and landings. Turbine aircraft are also more likely to fly in all weather conditions, which can affect the capacity of the NAS. Factors such as aircraft speed and weight also affect which airports turbine aircraft can use. Piston aircraft,

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as a group, fly more often under visual flight rules (VFR) than IFR and fly at lower cruising altitudes and lower speeds. Aircraft flying under VFR may not require air traffic control services if they do not fly to airports that have control towers.

Having appropriately identified types of aircraft and aircraft operations as cost drivers, FAA placed each project into one of three cost tiers depending on whether and to what extent the costs were related to the delivery of services to user groups. The costs of projects placed into the first two tiers were then assigned to the turbine and piston user groups, based primarily on the input of internal subject matter experts (SME) and, as discussed later, the costs of Tier 3 were allocated proportionally to user groups based on the total costs assigned through the Tier 1 and Tier 2 processes. According to FAA, these SMEs were selected from a cross-section of en route and terminal facilities and air traffic service units and were collectively knowledgeable in the delivery of air traffic control services; airspace usage; and FAA's financial, cost, and activity data systems. FAA officials told us that they obtained input from the SMEs on matters such as the specific activities necessary to deliver services; differences in the services provided to different user groups and the resources consumed to provide those services; and how factors such as traffic volume, mix of operators and aircraft type, weather, and congestion affect FAA's workload. Further, to help quantify the amount of incremental costs, FAA asked the SMEs how ATC services and costs would be affected if a group of users ceased operations altogether or if a user group permanently increased its operations by a certain percentage.

FAA also performed regression analyses to corroborate the input received from the SMEs on the percentage of a project's costs that varied with volume of activity. We noted that the results of some of the analyses were either different from the cost assignment decisions based upon SME input or were inconclusive. When such differences arose, FAA relied on the judgment of the SMEs rather than the results of the regression analyses. FAA officials said they chose to rely on SME input over the results of the regression analyses because their past experience had been that regressions would produce results that were indicative, but not conclusive, and that performing more complex regressions would make the cost assignments less transparent and more difficult for external

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stakeholders to understand.<sup>25</sup> FAA also explained that the aggregation of certain related but different projects and their costs was necessary to facilitate the SMEs' evaluation of these costs. This aggregation, however, may have contributed to some regression results implying different cost assignment decisions than the cost assignment decisions based on SME input and may also have contributed to other regression results being inconclusive.

Although the final decisions as to the percentage of total costs attributable to the user groups were documented, the key input from SMEs and the rationale linking this key information and related regression analyses with the final cost assignments were not well documented. FAA officials believe that the agency adequately analyzed the SME information in preparing its cost study and explained that the agency lacked sufficient documentation of SME input and the rationale linking that input to the final cost assignment decisions because the meetings with the SMEs were part of the early development of the methodology, which at that point was essentially a work-in-progress.

We acknowledge that the development of a cost assignment methodology is an iterative process and that the judgment of those individuals—including the SMEs—most knowledgeable of the business, its customers, and the factors that drive costs is essential to this process. However, the effects of the SME input and related regression analyses on the final cost assignments are critical for explaining decisions about the resulting cost assignments. Therefore, documentation of the input and rationale is needed to provide a basis for justifying current decisions as well as for evaluating any future changes to the assumptions that drive cost assignment decisions. Further, we acknowledge the challenges faced when trying to perform regression analyses to quantify the relationship between costs and the activity presumed to drive those costs. Improving the reliability of these regressions may involve further analysis of the cost drivers and improving the quality of the underlying data. Performing more detailed statistical analysis to support or corroborate its conclusions may assist FAA in effectively demonstrating to stakeholders that its cost assignment methodology is a reasonable basis on which to recover costs.

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<sup>25</sup> According to FAA, many of the regression analyses produced poor statistical fits (low R<sup>2</sup>) and, in most cases, using the results of the regressions would have required significant extrapolation from the observable data to the origin.

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## Methods for Allocating Overhead, Indirect, and Other Miscellaneous Costs Could Be Improved

CAMERA aggregated (pooled) certain facility; service; ATO; and allocated FAA headquarters, regional, and accrued expenses together (classified as Tier 3 costs) before allocating those costs to the turbine and piston user groups. The Tier 3 costs were allocated based on each group's proportional share, by service, of total costs directly assigned or allocated through the Tier 1 and Tier 2 processes.<sup>26</sup> CAMERA pooled these costs because FAA determined that (1) the costs were not directly related to the delivery of services and, therefore, did not vary with the volume of user activity, (2) the inherent nature of the costs did not allow for a direct assignment to either of the two user groups, or (3) the underlying transactions did not have sufficient data in CAS to directly assign the costs to a particular facility and service that would permit further analysis and allocation to the user groups in Tier 1 or Tier 2. However, we found that FAA's CAS had already associated some like costs to specific services and projects. The CAS assignments to services and projects could have been retained, avoiding CAMERA's aggregation and reallocation among all types of services, which affects the ultimate allocation of these costs to user groups.

We also found that certain costs could have been allocated in a manner that resulted in a more precise distribution between the user groups, for example

- certain telecommunication and flight inspection costs were allocated to all services, even though they related only to terminal services;
- indirect labor costs of equipment maintenance personnel were allocated to both turbine and piston user groups even though some of the related equipment and direct labor costs were assigned to a single user group in Tier 1; and
- annual leave, workers compensation, pension, and postretirement health costs were allocated to all user groups based on each group's share of direct labor and other nonlabor costs instead of basing the allocation only on the labor costs to which these benefit costs more closely relate.

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<sup>26</sup> CAMERA removes the overhead, indirect, and other miscellaneous costs associated with flight services from the Tier 3 pool before any of the remaining Tier 3 costs are allocated to user groups. Consequently, the overhead, indirect and other miscellaneous costs that FAA's CAS previously allocated to flight services remain entirely with that service.

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These cost allocation processes are examples of the CAMERA methodology's underlying objectives that it be simple and transparent. The 2006 draft report of the contractor who assisted FAA in developing the cost methodology states that the benefit of the cost allocation approach is the simplicity and transparency achieved by virtue of not having to rely on a highly complex system for allocating costs. FAA designed CAMERA to avoid the CAS process of allocating the same costs more than once. However, the report further notes that FAA's CAS was "designed to support the management of costs for highly detailed activities at individual locations, so a more complex allocation system is required"<sup>27</sup> than the contractor considered necessary for purposes of assigning costs to users.

CAS was designed to allocate costs to the facilities that provide services to users so that managers could use this cost information in making operational decisions. FAA also uses CAS information to prepare its external statement of net costs, which is audited by an independent public accounting firm. Despite FAA's reliance on CAS for these and other purposes and despite the fact that in fiscal year 2005 CAS associated about 34 percent of Tier 3 costs with specific services, CAMERA's method for allocating overhead, indirect, and other miscellaneous costs did not retain the preexisting allocations in CAS.<sup>28</sup> Consequently, aggregating these costs and then allocating them to the turbine and piston user groups resulted in shifting some costs between service types compared to the CAS allocations, which affects the ultimate allocation of these costs to user groups.

According to FAA officials, in fiscal year 2006 the agency addressed some of these issues related to how transactions had previously been recorded in CAS, notably requiring that technical support personnel charge their time to specific facilities where maintenance is performed and allocating a portion of ATO's annual leave expenses to the facilities based on direct labor charges. While these changes should help improve the precision of some cost assignments, until FAA has resolved the issues noted above concerning the allocation of telecommunication and flight inspection costs, indirect labor costs of maintenance personnel, and worker benefits, we believe that retaining the service and project allocations already

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<sup>27</sup>PwC, *Federal Aviation Administration Air Traffic Organization: FY2004 Cost Allocation For Reauthorization: Methodology and Application*, (McLean, Va.: June 27, 2006) (Discussion Draft).

<sup>28</sup>Except for that which is allocated to flight services.

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established by CAS may provide a more precise cost assignment to turbine and piston user groups. FAA officials told us that, although retaining the preexisting CAS allocations would not likely have a significant effect on the CAMERA allocations to user groups, FAA is considering increasing reliance on the CAS cost distributions for future user group cost studies. Further, FAA officials stated that CAS is continuing to evolve and CAMERA is designed to adapt to changes in data quality.

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**FAA Did Not Conduct Sufficient Analysis to Support Its Assumption That Different Aircraft with the Same Engine Type Drive Costs in the Same Manner**

CAMERA allocated the turbine and piston pools to commercial, general aviation, and exempt operators based on each operator's proportional share of total activity within each service. This allocation assumed that all types of aircraft operators with the same type of engine (e.g., smaller jet aircraft versus larger commercial jets) contributed to their respective group's costs in the same proportion as their share of distance flown (for en route services) and number of terminal operations (for terminal area services in each of three subgroups based on airport size). However, FAA did not conduct sufficient analysis (e.g., econometric analysis) to support this assumption.

CAMERA assigned Tier 1 and a portion of Tier 2 costs to the group that is the primary user of the air traffic control services that generate those costs. The turbine group was determined to be the primary user for Tier 1 costs of oceanic, en route, and all terminal services and Tier 2 costs of oceanic, en route, and terminal services at large hubs and middle terminals in FAA's analysis of 2005 data. Because general aviation jet aircraft are included in the turbine user group, FAA's methodology allocated a portion of these costs, such as those for navigational aids and other equipment, to the general aviation aircraft operators. Thus, the general aviation jet users receive the benefit of the air traffic control personnel and equipment, and allocating a portion of costs in this manner is acceptable when there is sufficient commonality between the activity and the driver of the related costs. However, FAA did not sufficiently justify its assumption that allocating costs on an average basis to all types of operators of one engine type would produce results similar to determining whether particular costs principally benefit a single group of operators. For example, FAA did not sufficiently support its assumption that individuals or companies that fly smaller jet aircraft drive terminal costs in the same way as commercial airlines that fly larger jets when they fly to the same airport. FAA stated that it considered aircraft characteristics (such as the speed at which small jets fly compared to large jets, and the percentage of flight hours flown under IFR plans) and discussed this issue with SMEs. However, FAA did not quantify the extent to which commercial, general aviation, and

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exempt users of either type of aircraft impose costs differently on the air traffic control system.

The contractor FAA retained to assist it in developing this methodology reported that, while variations in cost pools could have been developed, the simplicity and transparency of the turbine and piston pools provides an easily defined test that is also easy to administer. We agree that the benefits in terms of greater precision from a more detailed analysis need to outweigh the additional costs of that analysis. However, we believe that additional analysis of how different types of operators drive costs associated with each aircraft type would help identify how much precision is sacrificed to ensure simplicity and is needed to justify and support FAA's simpler approach.

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## Use of Facilities and Equipment Budget Authority in the Cost Base Needs to be Monitored

Because the total of ATO's fiscal year 2005 GAAP-based acquisition, implementation, and depreciation expenses taken from CAS were less than ATO's budget authority<sup>29</sup> for the F&E account, a user fee based on GAAP expenses would be insufficient to fund the budgeted costs for facilities and equipment. Therefore, to have the funds that would be needed to acquire budgeted air traffic control assets, FAA's CAMERA methodology adjusted ATO's GAAP-based expenses upward to equal total ATO budget authority for F&E. CAMERA then assigned those adjustments to the services and users of services in proportion to the historical, GAAP-based expenses. The manner in which these adjustments are assigned may, over time, result in costs being assigned to users who differ from the ultimate users of the new F&E when it becomes operational, leading to unintentional cross-subsidization among users. This can occur because of uncertainties related to the nature, timing, and cost of future F&E acquisitions and the volume and distribution of future flights that will use those assets. Also, because the budget includes multiyear spending authority, some F&E purchases may be funded several years before the expenditures are made and the related improvements become operational.

It can take many years before FAA knows the actual distribution of any single year's F&E budget across service types and to users. The long-term nature of these capital projects is such that FAA typically has 3 years to obligate F&E funds and another 5 years beyond that to expend these funds

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<sup>29</sup>Budget authority represents the current amount of funding available for obligations and outlays.



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from the Airport and Airway Trust Fund. Further, more than 40 percent of the fiscal year 2005 F&E budget was related to projects that support more than one type of service.<sup>30</sup> Consequently, FAA will not know for many years how the actual distributions of a particular year's F&E budget to each service compare to each service's adjusted expenses for that same year. FAA officials explained that CAMERA is designed to accommodate process changes to address the issues associated with recovering portions of the future costs of capital projects from current users. However, FAA had not yet designed a mechanism to monitor, identify, and adjust for those potential differences.

Furthermore, as new projects are included in the authorized budget for F&E, the differences that can arise due to the use of historical GAAP-based expenses to allocate costs become greater. For example, the difference between total ATO-related F&E budgets and actual expenses may increase as funding for the next generation (NextGen) of air traffic control increases. FAA expects NextGen to cost between \$15 billion and \$22 billion before 2025. However, the actual nature, timing, and cost of NextGen are not yet known, nor are the total volume and distribution of future flights by aircraft type. These uncertainties increase the risk that relying on the GAAP-based historical costs of a predominately ground-based system to allocate portions of the prospective, budgeted costs of a satellite-based NextGen system may result in a distribution of these prospective costs among user groups and types of aircraft operators that does not reflect the actual future use by these groups. Accordingly, in accordance with ICAO guidance, FAA needs to monitor these differences in future years and provide a basis for making appropriate adjustments.

In 2005, ATO's GAAP-based expenses were \$2,253.6 million while its F&E budget authority was \$2,428.2 million, representing a difference of \$174.6 million. In order to adjust GAAP-based expenses to total budget authority, FAA increased the amounts for each project within each service proportionally using the ratios of budget authority to expenses calculated for total nonterminal services and total terminal services. For example, the expenses of each en route project were increased by marking them up 2 percent, using the ratio of total nonterminal budget authority to total non-terminal expenses of 1.02. The resulting marked up GAAP-based project expenses within each service were then assigned to the turbine

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<sup>30</sup>FAA estimated the allocation of these project budgets to service types based on historical data such as direct labor dollars, head counts, and pieces of equipment by service.

and piston user groups. These markup adjustments could accumulate over several years. Table 1 shows the distribution of the ATO-related F&E budget, expenses, and the difference by service and in total. Table 1 also shows how this method increased the expenses associated with each service and the portion of the en route and flight services F&E budgets that would be assigned to users of oceanic services.

**Table 1: Fiscal Year 2005 ATO-Related Facilities and Equipment Budgets and Expenses (Actual and Adjusted), by Service Type and in Total**

(Dollars in millions)

	Nonterminal services					
	Oceanic	En route	Flight services	Total Nonterminal	Terminal	Total
Budget <sup>a</sup>	\$33.3	\$1,116.5	\$84.1	\$1,233.9	\$1,194.3	\$2,428.2
Expenses	76.8	1,069.1	63.7	\$1,209.6	1,044.0	2,253.6
Dollar difference	\$(43.5)	\$47.4	\$20.4	\$24.3	\$150.3	\$174.6
Ratio of budget to expense	0.43	1.04	1.32	1.02	1.14	1.08
Ratio used for markup	1.02	1.02	1.02	1.02	1.81 <sup>b</sup>	
Adjusted expenses	\$78.3	\$1,090.6	\$65.0	\$1,233.9	\$1,194.3	
Difference between budget and adjusted expenses	<b>\$(45.0)</b>	<b>\$25.9</b>	<b>\$19.1</b>	\$0	\$0	

Source: GAO analysis of FAA data.

Note: Amounts may not calculate because of rounding.

<sup>a</sup>Because the ATO-related F&E budget is not appropriated according to service type, FAA estimated how much of the budget will be expended in support of each type of service.

<sup>b</sup>FAA adjusted upward the F&E expenses separately for terminal and nonterminal services in fiscal year 2005 to avoid categorizing \$384.2 million in terminal-only project expenses as Tier 3 costs because these expenses did not have sufficient data in CAS to associate them with specific terminals. To restrict this \$384.2 million, it was subtracted from total terminal expenses of \$1,044.0 million (resulting in adjusted expenses of \$659.8 million) before calculating the ratio of total budget authority to total expenses. Therefore, the markup of terminal expenses distributed to other terminal projects was higher than if the \$384.2 million had not been subtracted. The ratio of budget to actual expenses increased from 1.14 to 1.81.

FAA explained that the cyclical nature of funding projects means that the relative distribution of the F&E budget among service types may change over time and that the distribution of historical costs (GAAP-based expenses) by service type represented a stable means of allocating the funding of long-lived assets. FAA reasoned that this approach can smooth out sharp year-to-year fluctuations in user fees that might otherwise occur if each service's F&E budget authority were used to adjust the service's expenses instead of using an overall markup based on total nonterminal and total terminal ratios of budget authority to expenses. FAA's reasoning

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has merit; however, we have concerns that using this method introduces risk that costs for F&E acquisitions may be assigned to users that differ from the users of those assets once they become operational.

Lastly, although we did not audit FAA's CAS data, it is important to note that FAA's external auditor has for the past 2 years reported an internal control weakness on the lack of timely processing and accounting for construction in progress. This weakness affects the GAAP-based expenses for assets and depreciation of certain capital projects and has required that FAA record significant year-end adjustments to its financial statements. Although FAA's auditors do not indicate in their report that this problem is limited to a particular line of business or category of facility or service, the impact of using depreciation figures that may not be accurate to allocate the F&E budget to user groups is not known.

Together these issues highlight the inherent and potential difficulties of pre-funding long-lived capital projects in general, and NextGen in particular, with revenues generated from current users. However, to avoid these challenges, FAA would have to seek other alternatives to fund its F&E budget, such as borrowing authority with a repayment period that closely matches the useful lives of acquired assets or special appropriations.

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## Conclusions

FAA's methodology for assigning costs to users is intended to link the costs that different user groups impose on the air traffic control system to fees that would be charged to users. Developing this type of methodology involves developing key assumptions and making decisions about the level of precision needed to achieve the objectives and the associated costs and benefits.

The design of FAA's methodology is generally consistent with the principles and methods set forth in federal cost accounting standards and international guidance. However, the lack of sufficient support for certain of the methodology's underlying assumptions and methods leaves open the possibility that the study should assign costs to commercial, general aviation, and exempt users differently. Notwithstanding the need to balance precision with simplicity and transparency, FAA, Congress, and users of air traffic control services would benefit from additional documentation and analysis for key assumptions impacting the assignment of costs to the different user groups and further evaluation of the reasonableness of FAA's method of allocating overhead, indirect, and other miscellaneous costs. This additional documentation and analysis for

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FAA's cost assignment methodology is critical to help justify the results in order to promote user acceptance. In addition, because FAA's methodology for allocating cost adjustments for FAA's budgeted facilities and equipment projects can allow unintentional cross-subsidization among users, careful monitoring of actual project costs and users compared to original cost allocations is needed to identify and adjust for any significant differences.

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## Recommendations for Executive Action

To provide additional support for the reasonableness of FAA's cost assignment methodology and to monitor F&E cost assignments to users, we recommend that the Secretary of Transportation direct the Administrator of FAA to

- adequately document the basis on which costs are assigned to user groups;
- evaluate the methods and basis upon which various overhead, indirect, and other miscellaneous costs are assigned to user groups and document the effect of any changes thereto;
- determine whether and quantify the extent to which commercial, general aviation, and exempt users who use either single type of aircraft—turbine or piston—impose costs differently on the air traffic control system; and
- establish a mechanism for monitoring, by user group, any cumulative difference between original cost allocations for budgeted facilities and equipment project costs and actual usage of those assets, and adjusting prospective cost assignments accordingly.

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## Agency Comments and Our Evaluation

We provided a draft of this report to the Secretary of Transportation for review and comment. The Department's comment letter is attached as Appendix I. While the Department expressed general concurrence with our recommendations in the technical comments it provided separately, it neither explicitly agreed nor disagreed with our findings, conclusions, and recommendations in its letter. The Assistant Secretary for Administration stated that the fiscal year 2006 allocation will address several of the issues identified in our report, including improved documentation of subject matter expert (SME) input to the assumptions and better assignment of indirect labor costs. However, these actions specified in the Department's letter appear to address only narrow elements of two of our four recommendations. The Department's letter is unclear about FAA's and the Department's position on the broader scope of our recommendations. For the Department to be able to support its assertions that CAMERA provides

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reasonable estimates of costs and is well supported, we believe that FAA must follow through with all of our recommendations.

The first three of our recommendations each relate to how well the results of FAA's methodology are supported and the extent to which the reasonableness of those results can be assessed. FAA's agreement to improve documentation of key source input from its internal SMEs, which provided the basis for FAA's cost assignments, is a good first step in completing the methodology documentation process. At the same time it represents only part of the input and methods FAA used to assign costs. As we reported, the effects of the SME input on costs assigned to the turbine and piston user groups as well as the related regression analyses of those costs are critical to the final cost assignments. Accordingly, documentation of the rationale linking the SME input to cost assignment decisions is also needed to justify those decisions.

The Department also stated that FAA concluded that more analysis of how turbine and piston users drive air traffic control costs had the potential for only marginal, if any, gain. While the value of more detailed analysis with respect to the accuracy of related cost assignments can be determined only upon completion of that analysis, there is intrinsic value in performing such analysis in terms of demonstrating to stakeholders that FAA's cost assignment methodology is a reasonable basis on which to recover costs. We believe more detailed analysis, at least regarding the most significant costs, would help achieve this primary goal. This is particularly important considering that, as we reported, the results of some regression analyses undertaken by FAA to support SME-based cost assignment decisions implied different cost assignments and others were inconclusive.

Concerning our recommendation that FAA evaluate the methods and basis upon which various overhead, indirect, and other miscellaneous costs are assigned to user groups, the Department commented that using the allocations of FAA's Cost Accounting System (CAS), an option suggested in our report, would not necessarily produce more precise cost allocations to users. However, as we reported, the method FAA used to allocate these costs to users resulted in shifting some costs between service types as compared to the allocations in CAS, which ultimately affects the allocation of these costs to user groups. CAS allocates costs to the facilities that provide services to users, and FAA managers rely on that information to make operational decisions. Accordingly, we believe that the CAS allocations may provide a more precise way of assigning these costs to users.

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The Department did not specifically comment on our recommendation to determine and quantify the extent to which commercial, general aviation, and exempt users of either engine type—turbine or piston—impose costs differently on the air traffic control system. FAA’s allocation method assumes, for example, that smaller jet aircraft drive terminal costs in the same way as commercial airlines that fly larger jets when they fly to the same airport. We believe that further analysis is needed to sufficiently justify FAA’s assumption that allocating costs to all types of operators of one engine type produces results similar to determining whether particular costs principally benefit a single group of operators and would help identify to what extent precision is sacrificed using FAA’s simpler method.

The Department also did not comment on our recommendation that a mechanism be established to monitor any cumulative difference between original cost allocations for budgeted facilities and equipment (F&E) project costs and actual usage of those assets. FAA’s method for allocating the costs of budgeted F&E to users may, over time, result in costs being assigned to users who differ from the ultimate users of the new F&E when it becomes operational. We believe that in an environment with a cost-based revenue structure that incorporates funding for the costs of budgeted F&E, monitoring cumulative differences would help identify unintentional cross-subsidization among users.

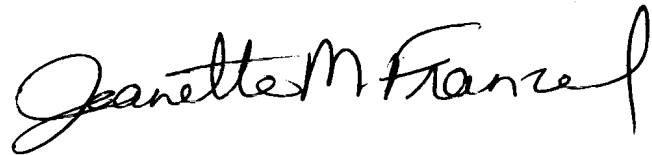
While the Department recognized our concerns with respect to adequacy of the support for the methodology’s underlying methods and assumptions, it stated that we did not offer quantitative evidence of fundamental flaws in FAA’s methodology. Our objective was to determine the extent to which FAA had supported its assumptions and methods, not to demonstrate through quantitative analysis that the resulting cost assignments to users are or are not reasonable. It is the responsibility of the agency to adequately support the assumptions and methods underlying its own methodology and the reasonableness of the results using quantitative analysis where appropriate. We found this support to be insufficient.

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We are sending electronic copies of this report to the Secretary of Transportation, the Administrator of FAA, and other interested parties. This report will be available at no cost on GAO’s Web site at <http://www.gao.gov>. If you or your staff have any questions on matters discussed in this report, please contact me at (202) 512-9471 or

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franzelj@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix II.

A handwritten signature in black ink that reads "Jeanette M. Franzel". The signature is written in a cursive style with a large, looping initial "J".

Jeanette Franzel  
Director, Financial Management and Assurance

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*List of Requesters*

The Honorable James L. Oberstar  
Chairman

The Honorable John L. Mica  
Ranking Member  
Committee on Transportation and Infrastructure  
House of Representatives

The Honorable Charles B. Rangel  
Chairman

The Honorable Jim McCrery  
Ranking Member  
Committee on Ways and Means  
House of Representatives

The Honorable Jerry F. Costello  
Chairman

The Honorable Thomas E. Petri  
Ranking Member  
Subcommittee on Aviation  
Committee on Transportation and Infrastructure  
House of Representatives



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# Appendix I: Comments from the Department of Transportation

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**U.S. Department of  
Transportation**  
Office of the Secretary  
of Transportation

Assistant Secretary  
for Administration

1200 New Jersey Avenue, SE  
Washington, DC 20590

October 12, 2007

Ms. Jeanette Franzel  
Director, Financial Management and Assurance  
U.S. Government Accountability Office  
441 G Street, NW  
Washington, DC 20458

Dear Ms. Franzel,

The Department is pleased that the Government Accountability Office (GAO) recognizes the extensive progress the Federal Aviation Administration (FAA) has achieved in building a logical, data-driven methodology for allocating Air Traffic Control (ATC) costs to users. In particular, DOT appreciates the draft report's verification that key design aspects of the cost allocation methodology are generally consistent with Federal standards and the principles set forth in international policies and guidance. Further, we welcome the draft report's recognition that FAA adequately justified its decision to assign air traffic control costs based on aircraft engine type. These successes result from extensive efforts by staff throughout the agency, applying their respective expertise, to help ensure FAA presents a fair and appropriate allocation of costs users impose on the ATC system.

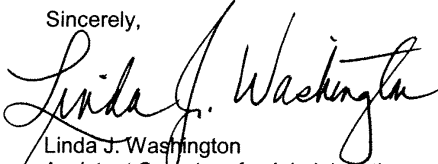
The objective of FAA's cost allocation effort is to assign both direct and indirect costs to users in a way that is equitable and transparent. FAA believes it has achieved this objective. The Cost Assignment Methodology for Estimating Resource Allocation (CAMERA), like any data-driven analytical tool functioning in a dynamic environment, requires continual testing and review; however, CAMERA provides reasonable estimates of costs users impose on the ATC system. These estimates are in line with previous cost allocation studies, while taking advantage of the unprecedented level of detailed cost and activity data now available. FAA recognizes that further refinement and fine-tuning are possible and has activities underway to continue those efforts, including some along the lines identified in the GAO draft report. CAMERA will continue to evolve based on continually improving data and stakeholder feedback, and the FY 2006 allocation will address several of the issues the GAO draft report identified relating to the FY 2005 allocation. In addition to improved documentation of subject matter expert (SME) input, these changes will include better assignments of indirect maintenance labor costs and indirect labor costs such as annual leave, which are possible due to improved fidelity in the FY 2006 cost accounting data.

FAA has already gone to great measure to ensure that CAMERA yields cost allocation results that are logical, data-driven, and well supported, while equitably meeting the needs of the Agency and ATC system users. As the GAO draft report points out, allocating costs in a large, complex environment such as FAA and its ATC system necessarily involves a degree of art and judgment along with the science. FAA made appropriate use of both. Recognizing the limits of regression analysis in a complex environment, FAA made extensive use of both resident expertise and recognized experts in the field, to ensure it achieved a reasonable outcome. For example, FAA studied aircraft operating characteristics, interviewed staff at a variety of air traffic control facilities, and completed an exhaustive analysis of activity data at the individual flight and facility level. Thanks to these and other efforts over more than two years, CAMERA has demonstrated the capability to provide a reasonable allocation of costs among ATC system end-users. Though more analysis is always possible—and will continue to occur as CAMERA evolves—FAA concluded it would result in further delay with the potential for only marginal, if any, gain at this point. In addition, getting the cost allocation information out to the user community will provide valuable feedback to FAA on this most important subject.

Regarding the allocation of overhead and indirect costs, FAA established indirect cost allocations that feed into CAMERA in a way that it—and third party experts—determined to be most appropriate for identifying costs to system end-users. While alternative allocations of these costs are available, such as in FAA's Cost Accounting System (CAS), FAA determined early in the design process that CAS, which was designed to provide managers with project and location-specific cost information, was not optimized for end-user cost allocation. As a result, while FAA recognizes that CAS offers a different approach for allocating indirect costs, it would not necessarily produce more precise end-user cost allocations.

FAA is continuing to judiciously pursue its fiduciary responsibilities with regard to end-user cost allocation. We view the GAO report as affirmation that FAA is on the right track, particularly as the concerns expressed in the report focus on issues of decision documentation and alternative methodologies, while offering no specific quantitative evidence of fundamental flaws in CAMERA. We appreciate the opportunity to offer comments on the draft report. Please contact Martin Gertel, Director of Audit Relations, on 202-366-5145 with any questions.

Sincerely,



Linda J. Washington  
Assistant Secretary for Administration

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# Appendix II: GAO Contact and Staff Acknowledgments

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## GAO Contact

Jeanette Franzel, (202) 512-9471 or franzelj@gao.gov

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## Acknowledgments

In addition to the contact named above, significant contributions to this report were made by Jack Warner (Assistant Director), H. Donald Campbell, Jay Cherlow, Gerald Dillingham, Fred Evans, Maxine Hattery, Ed Laughlin, Maureen Luna-Long, Maren McAvoy, Scott McNulty, and Meg Mills.

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