AIR TRAFFIC CONTROL

Better Guidance Needed for Deciding Where to Locate Facilities and Equipment

GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-257921

December 1, 1994

The Honorable Bob Carr
Chairman, Subcommittee on
Transportation and Related Agencies
Committee on Appropriations
House of Representatives

Dear Mr. Chairman:

The Federal Aviation Administration (FAA) is confronted each year with the same challenge as many other public and private entities. Namely, FAA wishes to procure more facilities and equipment than its budgetary resources will permit. As a result, the agency must make decisions about where to add new facilities and equipment to meet the growing needs of aviation system users and where to replace aging facilities and equipment. In recent years, facilities and equipment requests have grown faster than funding could permit because of budget constraints, making these decisions more difficult for FAA. In fiscal year 1991, 65 percent, or $612 million, of FAA's $949 million initial requests for facilities and equipment located at or near airports (terminal areas) was funded. By fiscal year 1994, 32 percent, or $361 million, of FAA's $1.1 billion in terminal facilities and equipment requests was funded.

Your Subcommittee was concerned that FAA could not explain why it had decided to select facilities and equipment projects at certain locations but not at others. As a result, you asked us to review how the agency made its decisions to locate air traffic control facilities and equipment in fiscal years 1992 through 1994 for three terminal area projects: (1) establishment of Instrument Landing Systems (ILS), which allow aircraft to approach and land at airports during adverse weather; (2) replacement of antiquated Terminal Air Traffic Control (Tower) Facilities; and (3) establishment of Digital Brite Radar Indicator Tower Equipment (D-BRITE), which assists tower controllers in identifying and sequencing traffic. Descriptions and funding histories for these projects are contained in appendix I.

The overall objective of our review was to determine how FAA targeted its scarce facilities and equipment resources for these three projects. As agreed with the Subcommittee, this report focuses on how the agency (1) prioritized locations, (2) considered the results of benefit-cost analyses in its decisions, and (3) documented all considerations that would

establish a location's priority. In addition, the Subcommittee asked us to identify possible improvements in the agency's decision-making process.

Results in Brief

For the three facilities and equipment projects we reviewed, FAA officials funded high-priority locations in accordance with agency guidance. This often resulted in a fairly equal distribution of facilities and equipment among FAA's nine regional offices based on the priority assigned by each regional office and the availability of the regional office's work force to implement the projects. However, we found that FAA generally did not rank locations numerically from a national perspective, use benefit-cost analysis as a tool for ranking eligible locations, and document the factors used to select certain locations over others. For example, for one of the projects we reviewed—the establishment of Instrument Landing Systems—agency officials told us that generally each regional office's top-priority location was submitted to the Congress for funding in fiscal years 1992 and 1993. FAA did not attempt to determine whether one regional office's number two or lower-priority location was of a higher national importance than another office's number one location.

FAA officials believe that their approach for locating facilities and equipment under the three projects ensured that scarce resources were targeted to high-priority needs. The officials said that it would be too costly to numerically rank each location on a national basis and subject each to a benefit-cost analysis, especially since other factors such as safety may outweigh economic considerations. Moreover, according to the officials, such analyses would create tension among regional offices about the methodologies used to justify individual locations. Furthermore, benefit-cost analyses may bias the selection process in favor of projects at large airports if qualitative criteria and judgment are excluded from the process. Finally, FAA officials said that current guidance contains no provision that each location be ranked nationally and subjected to a benefit-cost analysis and that decisions be documented for review by interested parties.

We believe that good business management of proposed capital investments requires a more analytically based decision process. We recognize that operational considerations may outweigh benefit-cost ratios, but such ratios provide a good starting point for ranking eligible locations. We believe that some level of benefit-cost analysis and national ranking of eligible locations—tailored to the size of the proposed investment—would help to identify the relative importance of each

location and demonstrate that FAA is taking a businesslike approach to its investments. Finally, we believe that documentation of FAA's decisions would explain to offices within the agency, aviation system users, and congressional decisionmakers why some locations were selected over others.

Improved guidance—focusing on the need for national prioritization of locations and documentation of the factors, including the use of benefit-cost analysis, that went into FAA's decisions—could help the agency better ensure the Congress and aviation system users that it is making the best use of available funds in allocating facilities and equipment to high-priority locations.

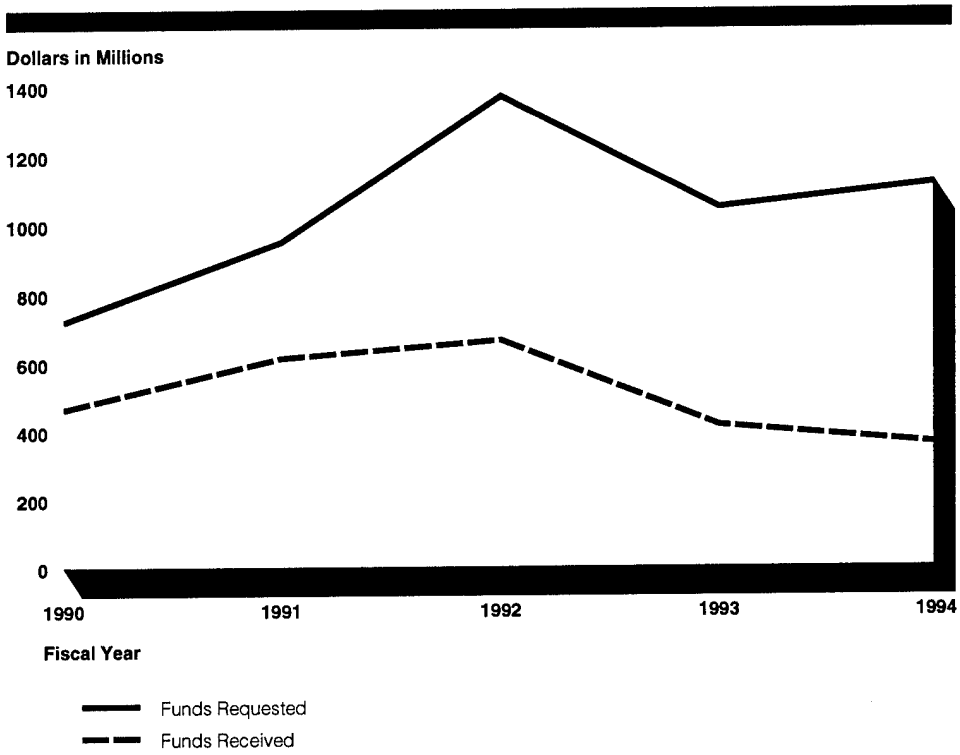
Background

FAA provides facilities and equipment at airport terminal areas to help aircraft begin and end their flights. FAA's acquisition policy provides the framework for initiating and managing national facilities and equipment projects. The projects are funded through the agency's facilities and equipment appropriation.

FAA's Airway Planning Standard Number One (APS-1) contains the policy and criteria the agency uses to establish the eligibility of terminal locations for facilities and equipment. This standard requires that traffic activity levels are the criteria to be used for "less expensive" equipment, whereas for "more expensive" equipment, locations must also meet minimum benefit-cost criteria. However, the standard does not define what is meant by less expensive or more expensive. Recognizing that it is not always economically possible to satisfy all requirements, the standard requires that equipment be allocated to locations where the greatest benefit will be derived from its cost or where there is the greatest operational need. The standard also requires that economics be the primary factor in considering improvements to existing facilities or services.

The Department of Transportation and the Office of Management and Budget (OMB) have not requested nor has the Congress provided all funds requested by FAA's nine regional offices in recent years. Total requests have outpaced budgetary resources for facilities and equipment in terminal areas, as illustrated in figure 1.

Figure 1: Total Facilities and Equipment Funds Requested and Actual Funds Received for Terminal Area Projects, Fiscal Years 1990 Through 1994



Source: FAA Budget Office.

FAA's annual budget Call for Estimates requires that regional offices assign a numerical ranking to all locations recommended to receive funding for facilities and equipment. After the regions submit their requests to FAA headquarters, program sponsors[1] for these projects, along with regional representatives, develop a priority list of locations for funding within the overall budget limitations for a given year. If the Office of the Secretary of Transportation or OMB makes changes to budget line items for these projects, program sponsors are expected to review and reprioritize locations for funding. The locations that are not funded must recompete for future-year budget funds. The Congress may also make changes to budget line items for these projects. For two of the three projects we reviewed, the Congress added funding for locations that were not requested by FAA. (See app. I.)

[1]FAA designates an organizational unit as the program sponsor for each facilities and equipment project. These sponsors are responsible for planning, prioritizing, and evaluating the projects.

FAA's Process for Locating Facilities and Equipment

For the three projects we reviewed, FAA's process for locating facilities and equipment ensured that candidate locations qualified for funding consideration and that high-priority locations were funded in accordance with agency guidance. This resulted in facilities and equipment being distributed in a fairly equal manner among FAA's nine regional offices on the basis of the priority assigned by each regional office and the availability of the regional office's work force to implement the projects. However, we found that FAA generally did not rank locations numerically from a national perspective, use benefit-cost analysis as a tool for ranking eligible locations, and document the factors used to select certain locations over others.

Instrument Landing Systems

Modern air commerce and transportation depend on consistently completing scheduled flights safely and on time. ILS is a critical component of an all-weather aviation system, because it provides the technology for allowing aircraft to approach and land at airports during adverse weather.

Each year, FAA's Budget Office initiates a Call for Estimates requesting that regional offices submit candidate locations for ILS equipment. Once locations are identified, FAA's planning standard requires that ILS locations meet two-phase criteria. FAA regional offices use the Phase 1 criterion to determine which locations will be submitted to headquarters for further consideration. Under Phase 1, a ratio is computed by dividing the actual number of instrument approaches at a runway by FAA's standard for the minimum number of such approaches that qualify locations to have an ILS. Runways with a ratio of at least 1.0 are eligible for funding. The traffic activity ratio is an efficiency measure; runways with higher ratios are presumed to accommodate more traffic with given resources. The Phase 2 criterion is a benefit-cost analysis that FAA headquarters prepares on all locations that met the Phase 1 criterion. But since the number of locations meeting the Phase 2 criterion is much larger than budget constraints will allow, some locations may not be funded, even if economically justified. A location that is not funded must recompete in the following year and be subject to the reevaluation process. Because of special safety considerations, some locations will receive ILS equipment regardless of the criteria.

For fiscal years 1992 through 1994, the program sponsor for the ILS project—the Flight Standards Service—told us that FAA regional offices developed the necessary justifications needed for each eligible ILS location submitted in response to the annual Call for Estimates. Regional offices

also assign a numerical ranking to all locations within their respective regions. Priorities are established at the regional level on the basis of an analysis of such factors as weather history and air traffic needs. The program sponsor then ensures that candidate locations at the national level meet the Phase 1 criterion. Once the program sponsor ensures that candidate locations qualify for funding, cost estimates are finalized. The number of ILS locations that make it into FAA's annual budget submission depends on the funding levels of the agency's facilities and equipment budget and the ILS program.

The program sponsor said that each regional office's number one priority location was generally selected for inclusion in the budget submissions for fiscal years 1992 and 1993. For fiscal year 1992, seven regions submitted requests and received funding for their first-priority location. In addition, one system was designated for the FAA Academy, and one region also received its second priority. For fiscal year 1993, seven regions submitted requests and received funding for their first priority, and two regions also received funding for their second priority. In addition to the locations FAA requested in its budget submission, the Congress added a total of 27 ILS locations in fiscal years 1992 and 1993, along with additional funding for those locations. (See app. I for more details.) The sponsor told us that in 1992 and 1993, locations were not ranked numerically from a national perspective. Furthermore, there was no documentation of what factors—including benefit-cost analysis—were considered in deciding which terminal locations received the new ILS.

For fiscal year 1994, the ILS program sponsor decided to institute a numerical ranking system in which each eligible ILS location that the regions submitted in response to the Call for Estimates would be prioritized. The sponsor and regional representatives met to decide how to rank 179 candidate ILS locations on a national basis. Priorities for the first 78 locations were established on the basis of an analysis of 12 factors, such as safety, weather, and potential to improve air traffic flow. However, the program sponsor could not show how each factor was used to develop this national priority list. The program sponsor then requested benefit-cost analyses for the top 16 locations that were to be submitted to OMB for funding in order to ensure that they met the minimum Phase 2 criterion. Priorities for the candidate locations numbered 79 to 179 were based on Phase 1 traffic activity ratios. As OMB and the Congress made reductions to this FAA budget line item, the program sponsor deleted lower-ranked locations. The sponsor told us that changing conditions, such as a problem with an environmental impact statement or a delay in an anticipated land

acquisition, could also force modification to the overall priorities. Seven regions received funding for between one and four new ILSs. The Congress did not direct additional ILS locations in fiscal year 1994.

Despite the agency's additional emphasis on ILS in fiscal year 1994, the program sponsor told us that documentation does not exist to show how the 12 factors were used to select certain locations over others. As a result, while fiscal year 1994 was an improvement over prior years, questions remain about the ranking of ILS locations. For example, the program sponsor could not explain how traffic activity ratios were factored into the ranking process. The sponsor could not show why one location with a Phase 1 traffic activity ratio of 3.71 was ranked 6th nationally, yet another location with a Phase 1 traffic activity ratio of 49.08 was ranked 81st nationally. Nor could the sponsor show why a location with a ratio of 1.67 was ranked 4th nationally, yet another with a ratio of 35.66 was ranked 39th nationally. A more documented process would enhance FAA's ability to quantitatively support its decisions to fund projects at certain locations but not at others.

Tower Replacement

This project replaces airport traffic control towers that are past their 20-year design life. Approximately six to eight towers are replaced each year. FAA's Air Traffic Plans and Requirements Service is the program sponsor for the Tower Replacement project.

The program sponsor said that FAA used a consistent methodology based on APS-1 and agency policy for selecting locations for replacement towers in fiscal years 1992 through 1994. Each year, regional offices screened and ranked eligible locations on the basis of an analysis of operational requirements, space requirements, facility condition, airport traffic activity, safety conditions, and future growth. Because of funding limitations, the program sponsor told the nine regional offices to submit only their top three locations in any given budget year. An important element in the regional decision as to which location or locations are submitted is the availability of the regional office's work force to implement the projects.

The program sponsor then reduced the 25 to 30 locations submitted by the regions to a top-priority group of 8 to 10, without any numerical ranking, after reviewing the regions' written justifications for tower replacement projects. The program sponsor could not show how each factor used by the regions—such as airport traffic activity or facility condition—was

considered and how each factor was weighed in developing this list of 8 to 10 top locations. The sponsor did not use benefit-cost analyses to develop the list. According to the sponsor, the original tower siting was based on a benefit-cost analysis, and tower replacement is based on a review of continuing need, so the sponsor did not believe further analysis was needed. Generally one priority location was recommended for funding in each FAA regional office, although in some cases a regional office had two candidate locations funded in one year.

Once the top locations had been identified, the program sponsor and regional representatives conducted an on-site inspection of these locations. If the on-site inspection revealed that the location was not in need of a replacement, it was removed as a replacement candidate. Moreover, the sponsor told us that changing conditions do arise that force modifications to the list of top locations, such as the identification of asbestos in a facility, a major shift of traffic activity, or natural disasters that weaken existing structures. Another factor that the sponsor told us affects FAA's decision-making process regarding tower replacement is congressional additions to FAA's budget request. In fiscal year 1992, the Congress added seven Tower Replacement locations to FAA's funding request. However, in fiscal years 1993 and 1994, the Congress added no additional locations for funding. (See app. I.) FAA recognizes the importance of congressional direction as a major determinant in naming towers for replacement and occasionally defers otherwise qualified locations to accommodate congressionally directed locations.

The process for determining which towers are to be replaced raises questions because the process is largely undocumented. As a result, it is difficult to determine why a particular location was recommended for funding and another location was not. For example, FAA provided the Congress with the following justification for a tower replacement project it sought funding for in fiscal year 1993:

"[The tower was] built in 1972. . . . The height of the control tower is not adequate to provide adequate depth perception for runways. . . . Controllers cannot visually determine if aircraft holding short of these runways are actually clear of the runways. This situation is more pronounced at night. . . . A new runway is currently under construction which will increase the airport capacity. The air conditioning and heating systems are inadequate and personnel must use a public access elevator to reach the tower cab."

Yet, a location where the tower likewise needed replacing was not submitted to the Congress for funding. According to the regional justification,

"[The tower] is an old Air Force Tower that was constructed in 1947 and transferred to the FAA in 1954. The tower cab is limited in size and not adequate to handle the current and projected staffing levels for a safe and efficient air traffic operation. The support facilities are limited in area and very poorly arranged for a functional office environment. Support systems, such as the cab heating and air conditioning system, the power supply system, and the basic utility system, have either outlived their normal useful lives or are in need of extensive refurbishing and maintenance."

Had FAA documented the factors it considered in arriving at its list of tower replacements to be funded and prioritized those locations, its ability to show why certain locations were selected over others would be enhanced.

D-BRITE

The D-BRITE system is an extension of an airport surveillance radar system. D-BRITE provides additional radar display positions at busy air traffic control towers and establishes positions at remote towers that do not currently have a radar display. The new equipment also reduces the need for verbal coordination and increases safety at both hub and remote towers. Additionally, the equipment assists the air traffic controller in identifying and sequencing aircraft traffic and provides traffic advisories to aircraft in visual flight rules conditions.

Regional offices screened and ranked eligible locations for the D-BRITE project on the basis of traffic activity levels and the operational needs of the towers associated with a surveillance radar. Locations with the highest traffic activity were given the highest regional priorities. The program sponsor—FAA's Air Traffic Plans and Requirements Service—grouped the regional priorities into a national delivery schedule. According to the sponsor, this schedule takes into consideration the regional offices' ranking of locations, funding levels, and the ability of the offices' work force to install systems. The individual currently acting as the program sponsor was not involved with D-BRITE funding decisions for fiscal years 1992 to 1994. However, this individual believed that, in those years, each regional office generally received funding for its top-priority locations. The program sponsor said that D-BRITE locations were not ranked numerically from a national perspective. The sponsor also said that the locations were not analyzed from a benefit-cost perspective because they were linked to the establishment of airport surveillance radars for which benefit-cost

analysis had already been considered. Moreover, the sponsor could not provide documentation to explain why some D-BRITE locations were recommended to receive equipment over others for any of the 3 years in question.

Opportunities to Improve FAA's Process for Locating Facilities and Equipment

While we found that FAA's process for selecting locations for facilities and equipment generally complied with the agency's current guidance, we believe that it could be improved if FAA ranked locations numerically from a national perspective, considered the results of benefit-cost analyses as a key factor when appropriate, and documented the rationale for its decisions.

National Ranking of Locations

Program sponsors told us that a numerical national ranking was not done for these projects for two major reasons. First, national directives, such as APS-1, the Call for Estimates, and FAA's acquisition policy, do not require program sponsors to rank locations numerically from a national perspective. The officials pointed out that current guidance only requires regional offices to assign a numerical priority to all locations recommended to receive equipment. Second, although a national ranking may result in the allocation of equipment unevenly across regions, some program sponsors said that no useful purpose would be served in trying to determine whether one regional office's number two or lower-priority location was of a higher national importance than another office's number one location. According to the program sponsors, the cost of conducting such an analysis would consume significant resources and would create tension among regional offices about methodologies used to justify individual locations.

We believe that because regional offices are required to rank candidate locations numerically for funding in their geographic area, FAA headquarters could do the same from a national perspective. This would provide FAA and the Congress with greater assurance that scarce resources are targeted to the highest-priority needs. Such a ranking would also expedite decision-making as program sponsors review, reprioritize, and defer lower-priority locations in response to changes made during each phase of the budget cycle. Moreover, such a ranking would quickly identify the importance of each location at any given point in time and demonstrate that FAA is taking a businesslike approach to investment decisions. While some FAA program sponsors said that no useful purpose is served in trying to determine whether one office's number two or

lower-priority location is of a higher national importance than another office's number one priority, we believe that such analyses are warranted, under today's budget constraints, to ensure that the highest-priority locations are selected as the first to receive equipment. According to FAA's guide for Economic Analysis and Investment and Regulatory Decisions, rational decision-making requires that those activities with greater returns be undertaken before those with smaller returns.

Benefit-Cost Analysis

FAA program sponsors told us that the results of benefit-cost analyses were not a primary consideration when prioritizing locations under the three projects. For the ILS project, sponsors used benefit-cost analysis to screen locations for compliance with minimum criteria, not to rank alternative locations. Sponsors believe that regional staff have the most up-to-date information on locations in need of equipment. Therefore, they believe that the process for ILS selection must look beyond benefit-cost analysis and emphasize other factors, such as safety, weather, and potential to improve air traffic flow. Otherwise, benefit-cost considerations bias the selection process in favor of projects at large airports if qualitative criteria and judgment are excluded from the process. For the Tower Replacement and the D-BRITE establishment projects, program sponsors told us that FAA guidance currently does not call for any location-specific benefit-cost analysis. This is because the original tower siting was based on a benefit-cost analysis, and tower replacement is based on a review of continuing need. Decisions on D-BRITE siting are dependent on the airport surveillance radar siting decision, which is itself based on benefit-cost analysis. Furthermore, the sponsors believe that such analysis would serve no useful purpose but would overwhelm FAA's resources. The sponsors contended that 25- to 30-year-old towers must be replaced in order to continue serving an established need and that no useful purpose is served if the cost of conducting a benefit-cost study for an eligible D-BRITE location exceeded the cost of the project.

We believe that good business management practices suggest that benefit-cost analysis can provide a useful, quantifiable means for weighing the value of alternative investments. We recognize that there are other considerations, such as a major shift in traffic activity or congressional direction. However, benefit-cost ratios provide a good starting point for ranking eligible locations. FAA's guidance also states that sound economic justification should be an important factor in the evaluation process. This guidance recognizes that benefit-cost analysis enables FAA to prioritize alternative investments so as to maximize the return on investment

dollars. We recognize that the cost of an elaborate benefit-cost analysis for less expensive projects such as D-BRITE may be prohibitive, but a less rigorous analysis could be appropriate. For example, a simplified methodology, to save analytical resources, may allow FAA to approximate benefits.

Documentation

The Call for Estimates and APS-1 provide detailed guidance for how regional offices should prepare location justifications and assign priorities to locations recommended for funding. However, the orders provide no guidance for how program sponsors should document their funding decisions. FAA officials told us, however, that they do keep track of locations that were funded or deferred during each phase of the budget cycle.

We believe that the process for selecting locations for funding would be improved if program sponsors maintained minutes of meetings where decisions are made and maintained an up-to-date system that tracked the status of and rationale for funding decisions. This system, if available to inspection by offices within FAA, the Congress, and aviation system users, would facilitate answers to queries from those groups about the relative ranking of locations. Moreover, documentation would greatly help program sponsors to explain to these groups the small differences that can determine whether a location is approved or not approved for funding. In addition, GAO's Standards for Internal Controls in the Federal Government stresses the need for agencies to clearly document significant events so that they are readily available for examination. The lack of documentation was a problem for the current ILS and D-BRITE program sponsors because various personnel changes—such as retirement, promotion, or resignation—had left their offices with no one available to answer questions about past decisions.

Conclusions

We recognize that FAA views safety as its major responsibility, allocates facilities and equipment to high-priority locations, and responds to dynamic changes in traffic activity. Moreover, we found no evidence that FAA's decisions for locating and replacing air traffic control equipment are not meeting the critical needs of the nation's aviation system. However, FAA's process for selecting locations for facilities and equipment was not consistent among the three projects reviewed, and documentation was not available to show what factors program sponsors considered in location-selection decisions.

Current FAA guidance does not require a numerical ranking of locations on a national basis, define what emphasis should be given to location-specific benefit-cost analyses and other factors, or specify what documentation is required when evaluating and selecting locations. If FAA improved its guidance, we believe that the agency would be in a better position to assure the Congress and aviation system users that the maximum value from investments in facilities and equipment is being received. Furthermore, the agency would help its internal decisionmakers when they review and reprioritize locations in response to changes made during each phase of the budget cycle.

Recommendations

We recommend that the Secretary of Transportation direct the Administrator, FAA, to revise current guidance—APS-1, the Call for Estimates, and the agency's acquisition policy—as necessary to ensure that program sponsors (1) use consistent approaches and (2) document what factors they used in location-selection decisions, including benefit-cost analyses when warranted by the project's cost. This would allow FAA to rank eligible locations from a national perspective and help ensure that scarce facilities and equipment resources are targeted to the highest-priority needs.

Agency Comments

We discussed a draft of this report with FAA's Assistant Administrator for Budget and Accounting and FAA program sponsors for the three projects. The officials expressed serious concerns about the tone and conclusions of the draft because it implied that FAA does not attempt to allocate facilities and equipment using a rational process. The officials said that given budget constraints, congressionally directed locations, and limited regional office work forces, FAA does a good job in allocating facilities and equipment to high-priority locations. In response to the officials' concerns, we have made it clear in this report that FAA's process for locating facilities and equipment ensured that candidate locations qualified for funding consideration and that high-priority locations were funded in accordance with current agency guidance. Nevertheless, FAA recognized that improvements can be made in documenting its decision-making process. FAA officials also said that location-specific benefit-cost analysis would serve no purpose other than to overwhelm the agency's resources. While we recognize that an elaborate benefit-cost analysis is not appropriate in all cases, we continue to believe that, where warranted by a project's cost, it helps ensure that equipment will be allocated to locations where the greatest benefit will be derived from the cost. FAA officials also made

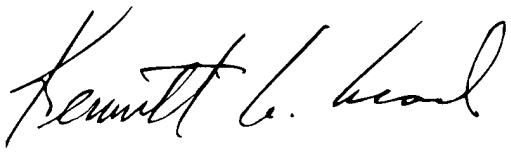
several other suggested changes to improve the accuracy and clarity of the report. We made these changes throughout the text where appropriate.

We performed our work from July 1993 through September 1994 in accordance with generally accepted government auditing standards. A detailed description of our objectives, scope, and methodology is contained in appendix II.

We are providing copies of this report to interested congressional committees; the Secretary of Transportation; the Administrator, FAA; and the Director, OMB. We will also make copies available to others upon request.

This work was performed under the direction of Allen Li, Associate Director, who may be reached at (202) 512-3600 if you or your staff have any questions. Major contributors to this report are listed in appendix III.

Sincerely yours,



Kenneth M. Mead
Director, Transportation Issues

Contents

Abbreviations

APS-1	Airway Planning Standard Number One
D-BRITE	Digital Brite Radar Indicator Tower Equipment
FAA	Federal Aviation Administration
GAO	General Accounting Office
ILS	Instrument Landing System
OMB	Office of Management and Budget

Description and Funding History for Three Terminal Modernization Projects

The following are general descriptions and funding histories for the three Federal Aviation Administration (FAA) terminal modernization projects that we reviewed.

Instrument Landing System (ILS) Establishment

These new landing systems provide precision approach guidance which allows aircraft to approach and land at airports during adverse weather. The ILS establishment project was terminated in 1982 when the Microwave Landing System was adopted as the precision landing system for the National Airspace System beyond the year 2000. However, FAA determined that there was an immediate need for precision approach systems at large and medium hub airports and their associated reliever airports as an interim solution prior to Microwave Landing System implementation. FAA recently terminated the Microwave Landing System project. A 3-year funding history for ILS establishment is shown in table I.1.

Table I.1: Funding History for ILS Establishment

Dollars in millions

	Regional Office requests		Regional Office requests funded		Congressional additions	
Fiscal year	Dollars	Systems	Dollars	Systems	Dollars	Systems
1994	$221.8	80	$36.2	15	$ 0.0	0
1993	$119.7	59	$10.4	9	$11.0	19
1992	$61.1	36	$13.7	9	$ 9.3	8

Terminal Air Traffic Control Facilities Replacement

This project replaces airport traffic control towers that are past their 20-year design life. FAA estimates that within the next 10 years nearly 150 towers will need to be replaced to enhance air safety and meet operational requirements. Approximately six to eight towers are replaced each year. Table I.2 provides a 3-year funding history for air traffic control tower replacement.

Table I.2: Funding History for Air Traffic Control Facilities Replacement

Dollars in millions

	Regional Office requests		Regional Office requests funded		Congressional additions	
Fiscal year	Dollars	Systems	Dollars	Systems	Dollars	Systems
1994	$218.3	31	$ 0.0	0	$ 0.0	0
1993	$160.0	35	$18.3	12	$ 0.0	0
1992	$130.0	37	$70.3	12	$16.7	7

Digital Brite Radar Indicator Tower Equipment (D-BRITE) Establishment

D-BRITE will provide additional display positions at busy air traffic control towers and establish positions at remote towers that do not currently have a radar display. The new equipment will reduce verbal coordination and increase safety at both the hub and remote towers. Additionally, the equipment is used to help the air traffic controller identify and sequence aircraft traffic and will provide traffic advisories to aircraft in visual flight rules conditions. A 3-year funding history for D-BRITE establishment is shown in table I.3.

Table I.3: Funding History for D-BRITE Establishment

Dollars in millions

	Regional Office requests		Regional Office requests funded		Congressional additions	
Fiscal year	**Dollars**	**Systems**	**Dollars**	**Systems**	**Dollars**	**Systems**
1994	NA	59	$3.6	17	NA	NA
1993	NA	NA	$7.7	NA	NA	NA
1992	NA	NA	$3.0	NA	NA	NA

NA = not available from FAA program sponsors.

Objectives, Scope, and Methodology

Our objective in this review was to determine how FAA decides where to locate and/or replace air traffic control facilities and equipment at or near airports when it cannot economically satisfy all operational requirements. To assess FAA's efforts in this area, we evaluated how FAA (1) prioritized locations to receive facilities and equipment, (2) considered benefit-cost analysis in its decisions, and (3) documented all considerations that would establish a location's priority for the receipt of facilities and equipment.

To attain our objectives, we interviewed FAA headquarters and field personnel responsible for making decisions on locating facilities and equipment for these projects. Through interviews and reviews of agency documentation, we collected information on a location's justification, benefit-cost ratio, and national ranking. We reviewed federal regulations and guidelines pertaining to system acquisition, compared FAA's actions to the guidance, and identified key issues that could affect how the agency determines where to locate terminal facilities and equipment.

We conducted our review between July 1993 and September 1994 at FAA headquarters in Washington, D.C., and FAA's New England Regional Office in Burlington, Massachusetts.

We performed this review in accordance with generally accepted government auditing standards. We discussed the results of our work with FAA officials and have incorporated their views in the report as appropriate.

Major Contributors to This Report

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