

**Before the Committee on Transportation and
Infrastructure
Subcommittee on Aviation
United States House of Representatives**

For Release on Delivery
Expected at
10:00 a.m. EST
Thursday
October 30, 2003
CC-2004-004

**Observations on Bringing
Fiscal Discipline and
Accountability to
FAA's Air Traffic Control
Modernization Program**

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



Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to testify on the Federal Aviation Administration's (FAA) efforts to modernize the Nation's air traffic control system. Our testimony today will focus on selected FAA major acquisitions, fundamental problems plaguing modernization projects, as well as actions needed to strengthen the overall management and execution of the air traffic control modernization program. FAA's modernization efforts are critical to enhance the margin of safety and improve the efficiency and capacity of the National Airspace System.

FAA has made progress with some acquisitions, such as Free Flight Phase 1, and successfully managed the Y2K problem. Progress with Free Flight Phase 1 builds on the successful implementation of the Display System Replacement, which provided new controller displays at FAA facilities that control high altitude traffic.

Also, we are encouraged by the FAA Administrator's commitment to improving Agency management and fiscal discipline as reflected in FAA's new strategic plan, *Flight Plan 2004-2008*. The plan calls for greater attention to controlling costs of major acquisitions and making better business decisions. In addition, we are encouraged that FAA now has a Chief Operating Officer—Mr. Russ Chew—in place. This position was vacant for almost three years. The Chief Operating Officer faces a number of challenges in controlling costs, getting reliable cost and schedule information on projects, and addressing organizational barriers that impede the effective management of major acquisitions.

In 1996, Congress exempted FAA from Federal procurement rules that the Agency said hindered its ability to modernize the air traffic control system. The expectation was that FAA would be able to deliver new projects much faster and within cost and schedule parameters. Seven years later, contracts have been

awarded faster, but the Agency has yet to satisfactorily address underlying and fundamental problems with major acquisitions.

Mr. Chairman, we see more positive signs in addressing fundamental problems with major acquisitions from the Administrator and her team than we have seen in many years. The key will be – as it has been in the past – follow-through.

Our work has identified the following problems with major acquisitions that require sustained management attention.

- **Committing to major acquisitions and entering into long-term cost-reimbursable contracts before user needs and Agency requirements are fully understood.** This lack of understanding inevitably results in significant cost increases and schedule slippages. Moreover, this places almost the entire risk on the Government.
- **Misleading and unreliable cost and schedule estimates.** Current estimates for many programs are misleading because they do not accurately portray the true cost, schedule, or performance parameters for the projects.
- **Beginning new, costly, and complex programs while still funding programs that are significantly over cost and behind schedule.** This stretches out program schedules, impacts other efforts, and has cash-flow implications for the entire modernization account. Until recently, this did not have a significant budget impact. Now, FAA finds itself in the position of funding new projects while at the same time funding ongoing projects that have been delayed for years, all with the same amount of money.
- **Lack of centralized control and lack of basic contract oversight.** Authority for managing FAA's major acquisitions is diffused among many entities and we have found serious shortcomings in basic contract oversight.

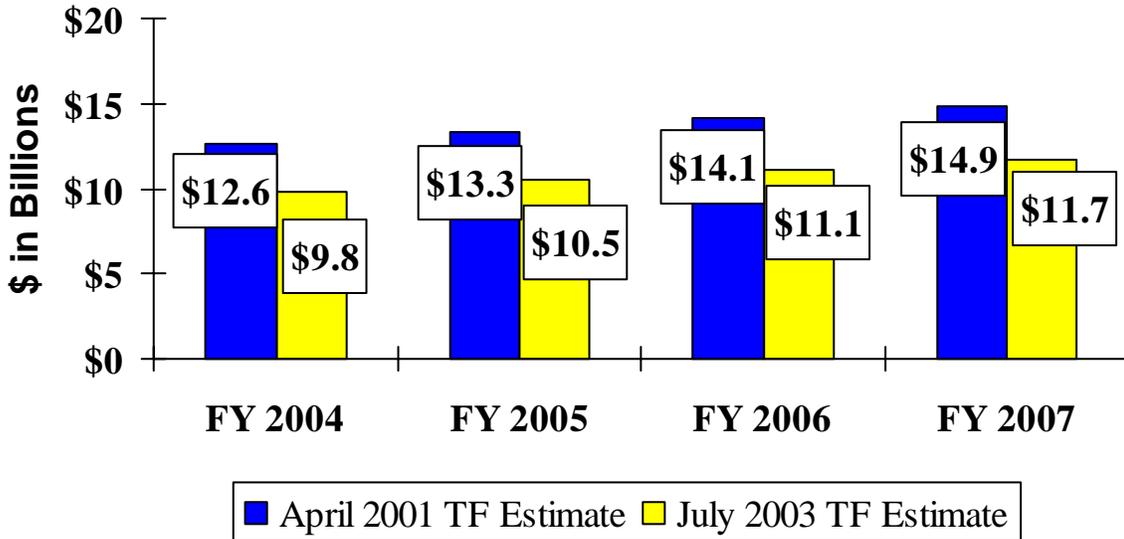
- **Lack of performance measures for assessing progress with major acquisitions, and not holding managers and contractors accountable for cost growth and schedule slips.** In the past, FAA has not used performance goals for assessing and tracking progress with major acquisitions or held managers accountable for cost growth and schedule slips.

Addressing these long-standing problems is imperative as illustrated by our recent work. We analyzed 20 major acquisitions and found that 14 of these projects have experienced cost growth of over \$4.3 billion (from \$6.8 billion to \$11.1 billion), which represents significantly more than FAA's fiscal year (FY) 2004 budget request of \$2.9 billion for modernization. Also, 13 of the 20 projects account for delays ranging from 1 to 7 years. (See page 12 of our statement.)

Problems with modernization efforts have serious consequences because they result in costly interim systems, a reduction in units procured, postponed benefits (in terms of safety and efficiency), or crowding out other modernization projects. Meanwhile, FAA is just starting two new complex projects that have a combined value of \$3 billion.

Continued cost growth, schedule slips, and shortfalls in performance are not sustainable given declines in Aviation Trust Fund revenues. Projected revenues for the Aviation Trust Fund for FY 2004 have dropped from an estimated \$12.6 billion in April 2001 to about \$9.8 billion in July 2003. Over the next four years (FY 2004-2007), the Trust Fund is expected to collect about \$12 billion less in taxes than anticipated in April 2001. (See Figure 1.) Further, funding levels in the reauthorization package being considered in both the House and Senate call for modernization funding to remain essentially flat (in the \$3 billion to \$3.1 billion range) over the next several years.

**Figure 1 - Airport and Airway Trust Fund:
Differences in Estimated Tax Revenue**



Continued cost growth of the magnitude seen in the past is unsustainable in today's budget-constrained environment.

Committing to Major Acquisitions and Long-Term Cost-Reimbursable Contracts before User Needs and Agency Requirements are Fully Understood.

Our work has consistently shown that FAA begins programs without a full understanding of what it will take in terms of development to meet Agency requirements and expectations for performance. This lack of understanding, coupled with use of cost-reimbursable contracts (where contractors have little incentive to control costs), has led to significant cost increases with major acquisitions. As a result, costs associated with additional development work and changing system requirements is absorbed fully by the government.

In addition to not fully knowing requirements and entering into cost-reimbursable contracts, FAA continues to underestimate the amount of development work needed for its projects. For example, problems we have seen with the Local Area Augmentation System (LAAS)—a new precision approach and landing system—show that FAA significantly underestimated the development effort required to meet stringent requirements for ensuring the system can safely operate as intended. FAA signed a development contract for LAAS earlier this year and the Agency believed that development work to meet FAA’s requirements was about 80 percent complete. Now, FAA believes that only 20 percent of development required to meet FAA requirements is done.

Likewise, FAA significantly underestimated the amount of software development that would be required for the Standard Terminal Automation Replacement System (STARS) to meet the Agency’s human factors requirements. This extra development added 3 years to the schedule, and \$500 million to the cost of the STARS program. Due to the delays in the STARS program, FAA deployed an interim system over the past 5 years, the Common Automated Radar Terminal System (Common ARTS), to 141 terminal facilities, or over 75 percent of the facilities where FAA intends to deploy STARS.

One significant exception to programs with cost-overruns is the Advanced Technologies and Oceanic Procedures (ATOP) program, which is an effort to modernize FAA facilities that manage air traffic over the Atlantic and Pacific Oceans. FAA relied on a fixed-price contract and has kept requirements stable. As a result, costs associated with resolving software development problems associated with ATOP have been borne by the contractor, not FAA.

FAA recognizes that a much better assessment of requirements, risk, and software maturity will help it acquire new systems more effectively, and thereby provide

more realistic expectations for when new systems can be delivered and what can be expected of them. In this regard, FAA is currently reevaluating what it can do on a number of programs. For example, the Agency tasked the MITRE Corporation for assistance in reviewing alternatives for STARS.

Misleading and Unreliable Cost and Schedule Estimates. Many of the projects we reviewed—both old and new—do not have reliable cost, schedule, or performance estimates (i.e. baselines). Without better information, FAA cannot effectively plan, manage programs, or meet expectations for improving the safety, security, and capacity of the National Airspace System. Current estimates for many programs are misleading because they do not accurately portray the true cost, schedule, or performance parameters for the projects. The following table provides information on 4 major acquisition programs that do not have reliable baselines.

Figure 2 - Four Major Modernization Programs that Need Updated Cost and Schedule Estimates

Program	Estimated Program Costs (Dollars in Millions)		Percent Cost Growth	Implementation Schedule		Schedule Delay
	Original	Current		Original	Current	
Wide Area Augmentation System	\$892.4	\$2,922.4*	227%	1998-2001	2003-TBD**	5 years
Standard Terminal Automation Replacement System	\$940.2	\$1,690.2	80%	1998-2005	2002-2012**	7 years
Local Area Augmentation System	\$530.1	\$696.1	31%	2002-TBD	2006-TBD**	4 years
Integrated Terminal Weather System	\$276.1	\$286.1	4%	2002-2003	2003-2008	5 years

* This includes the cost to acquire geostationary satellites.
 ** TBD=To Be Determined (costs and schedules are under review).

These estimates also do not include the costs to operate and sustain these new systems after they are fielded. We have testified previously that FAA needs to get control of its operations costs. Nevertheless, on some programs (for instance, STARS), program officials have proposed moving acquisition costs totaling \$147 million into the overburdened operations account in order to maintain an already unrealistic cost estimate of \$1.69 billion.

We have recommended that FAA rebaseline many of its modernization projects and the Agency is in the process of developing new cost, schedule, and performance parameters. This may require FAA to establish a new strategy that accelerates some projects and defers or cancels others.

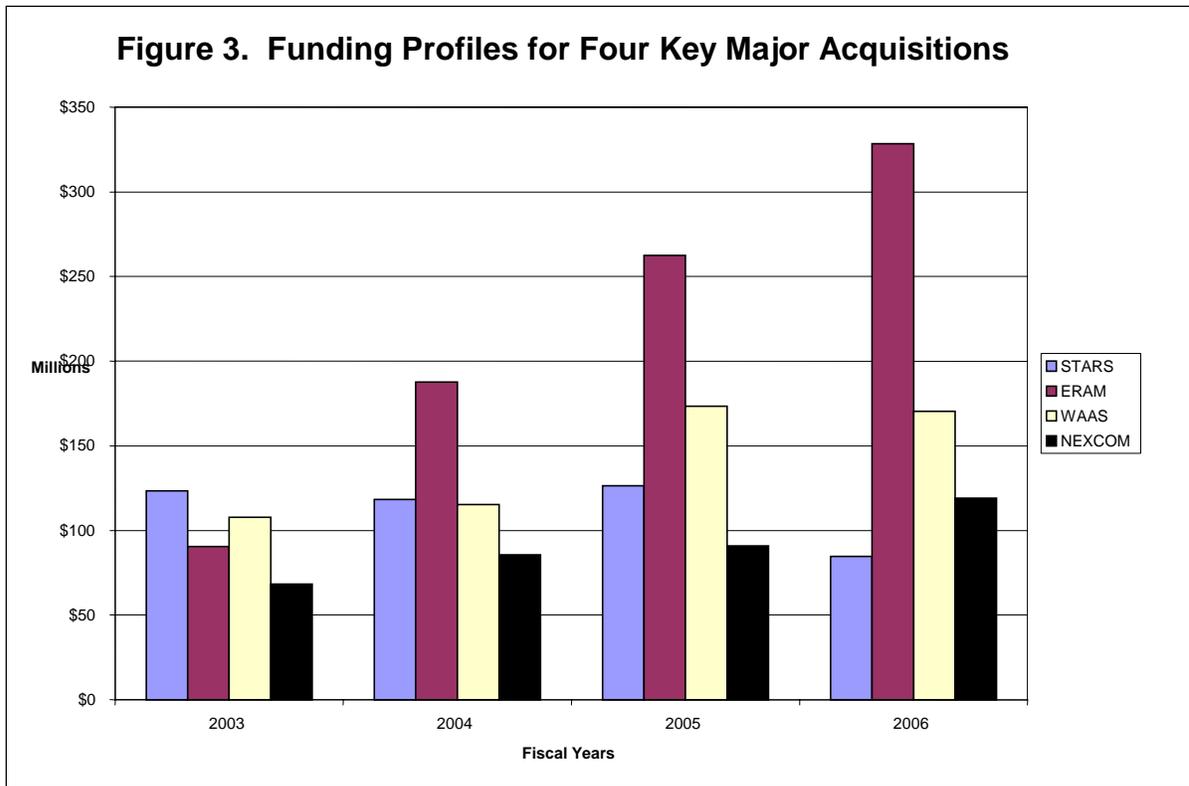
Beginning New, Costly, and Complex Programs While Still Funding and Managing Programs that Are Significantly Over Cost and Behind Schedule.

Since the inception of the modernization program in the 1980s, FAA has repeatedly embarked on new projects although ongoing efforts were not completed within cost and schedule parameters. This stretches out program schedules, impacts other efforts, and has cash-flow implications for the entire modernization portfolio. For example, in FY 2002 alone, FAA reprogrammed over \$40 million from other modernization efforts (data link communications, oceanic modernization, and instrument landing systems) to pay for cost increases associated with STARS. Greater attention to this issue is important given that funding for the modernization account overall is expected to remain essentially flat.

Although many programs are experiencing cost and schedule problems, FAA is beginning two new high-risk, billion-dollar projects. One effort is the En Route Automation Replacement Program (ERAM), which provides new hardware and software for facilities that manage high altitude traffic. Another project early in

the acquisition phase is the Next Generation Air-to-Ground Communications Program (NEXCOM), which will provide new radios and related systems to transition to digital communications. Each has potential for cost growth because of size and complexity. For example, ERAM, with an estimated cost of \$2.1 billion, involves developing and testing over 1 million lines of software code.

Successfully managing the new projects, while also managing the programs that have been delayed for several years, will require a level of cost control and improved management heretofore unseen by FAA since the modernization effort began in the early 1980s. Cost control for new programs such as ERAM and NEXCOM is essential while FAA moves forward with ongoing efforts, such as STARS and the Wide Area Augmentation System (WAAS). FAA expects to spend \$1.8 billion on these four projects alone between FYs 2004 and 2006. Any cost increases associated with these programs will have a cascading effect on other efforts and limit FAA's flexibility for beginning new projects. The following figure illustrates the funding profiles for ERAM and NEXCOM, as well as two other major projects that have been delayed for a number of years.



We know that FAA is trying to get a handle on this difficult situation. Doing so will inevitably involve rearranging priorities, modifying contract instruments, and modifying requirements.

Lack of Centralized Control and Lack of Basic Contract Oversight. Responsibility for major acquisitions is currently shared among several entities, including special program offices (Free Flight), lines of business (Terminal Business Unit), and integrated product teams (En Route). For example, the Associate Administrator for Research and Acquisitions does not have control over projects managed by the Terminal Business Unit, which controls over \$500 million annually. This includes important programs, such as STARS. The new Chief Operating Officer will have to resolve this lack of centralized control over major acquisitions.

Our work has also found that FAA has not followed sound business practices for administering contracts. For instance, we recently reported that the STARS program could not reconcile discrepancies between contractor billings and internal expenditure reports totaling \$41 million. Moreover, internal assessments of the STARS program office concluded that cost estimates had been unrealistically low or were not prepared, and contract management was not a priority.

We have consistently found a lack of basic contract administration at every stage of contract management from contract award to contract closeout. In our May 2002 report on the oversight of cost-reimbursable contracts, we found cost-reimbursable contracts totaling about \$2 billion that did not have required incurred cost audits by the Defense Contract Audit Agency (DCAA).

We have recommended on several occasions that FAA have DCAA conduct more audits on existing as well as closed contracts. Until recently, no action on this basic step of contract administration had been taken. This year, FAA has requested audits for 8 of 27 existing contracts over \$100 million. However, FAA has a ways to go since over \$8 billion in cost-reimbursable contracts are still not being audited by DCAA.

Developing—and Using—Performance Goals for Assessing Progress with Major Acquisitions and Holding Managers and Contractors Accountable. In the past, FAA has not used performance goals for assessing and tracking progress with major acquisitions or held managers accountable for cost growth and schedule slips. FAA’s new strategic plan of October 2003 represents a sharp departure from the past by establishing a performance target for making sure 80 percent of “critical” acquisition programs are on schedule and within 10 percent of budget. This is a step any business that pursues advanced technologies would

take. FAA should hold staff and contractors accountable for keeping projects within cost and schedule parameters.

Cost and Schedule Variances for Existing Programs

Program	Estimated Program Costs (Dollars in Millions)		Percent Cost Growth	Implementation Schedule		Schedule Delay
	Original	Current		Original	Current	
NAS Infrastructure Management System NIMS	\$100.8	\$350.9	248%	1997-2000	2001-2005	5 years
Wide Area Augmentation System WAAS	\$892.4	\$2,922.4*	227%	1998-2001	2003-TBD**	5 years
Airport Movement Area Safety System AMASS	\$59.8	\$146.0	144%	1994-1996	2001-2003	7 years
Next-Generation Air/Ground Communications System NEXCOM	\$406.0	\$986.4	143%	2002-2008	2002-2010	2 years
Standard Terminal Automation Replacement System STARS	\$940.2	\$1,690.2	80%	1998-2005	2002-2012**	7 years
Operational and Supportability Implementation System OASIS	\$174.7	\$251.0	44%	1998-2001	2002-2005	4 years
Aviation Safety Analysis System ASAS	\$207.6	\$296.1	43%	1982-Ongoing	1982-Ongoing	N/A***
Local Area Augmentation System LAAS	\$530.1	\$696.1	31%	2002-TBD	2006-TBD**	4 years
Automatic Dependent Surveillance - Broadcast ADS-B	\$215.1	\$268.4	25%	2001-TBD	2001-2012	N/A
Air Surveillance Radar - 11 ASR-11	\$743.3	\$916.2	23%	2000-2005	2003-2010	5 years
Weather and Radar Processor WARP	\$126.4	\$152.7	21%	1999-2000	2002-2003	3 years
Airport Surface Detection Equipment Model ASDE-X	\$424.3	\$505.2	19%	2003-2007	2003-2007	N/A

Cost and Schedule Variances for Existing Programs

Program	Estimated Program Costs (Dollars in Millions)		Percent Cost Growth	Implementation Schedule		Schedule Delay
	Original	Current		Original	Current	
Integrated Terminal Weather System ITWS	\$276.1	\$286.1	4%	2002-2003	2003-2008	5 years
Air Traffic Control Beacon Interrogator ATCBI-6	\$281.8	\$289.6	3%	2000-2004	2002-2007	3 years
FAA Telecommunications Infrastructure FTI	\$205.5	\$205.7	N/A	2002-2008	TBD	1 year
Free Flight Phase 1 FFP1	\$726.9	\$695.5	N/A	1998-2002	1998-2002	Completed
Free Flight Phase 2 FFP2	\$546.2	\$510.5	N/A	2003-2005	2003-2006	1 year
Total	\$6,857.2	\$11,169.0				1 to 7 years

* This includes the cost to acquire geostationary satellites.

** Costs and schedules are under review.

*** Not applicable

Mr. Chairman, this concludes my statement. I would be happy to answer any questions that you or other members of the Subcommittee may have.

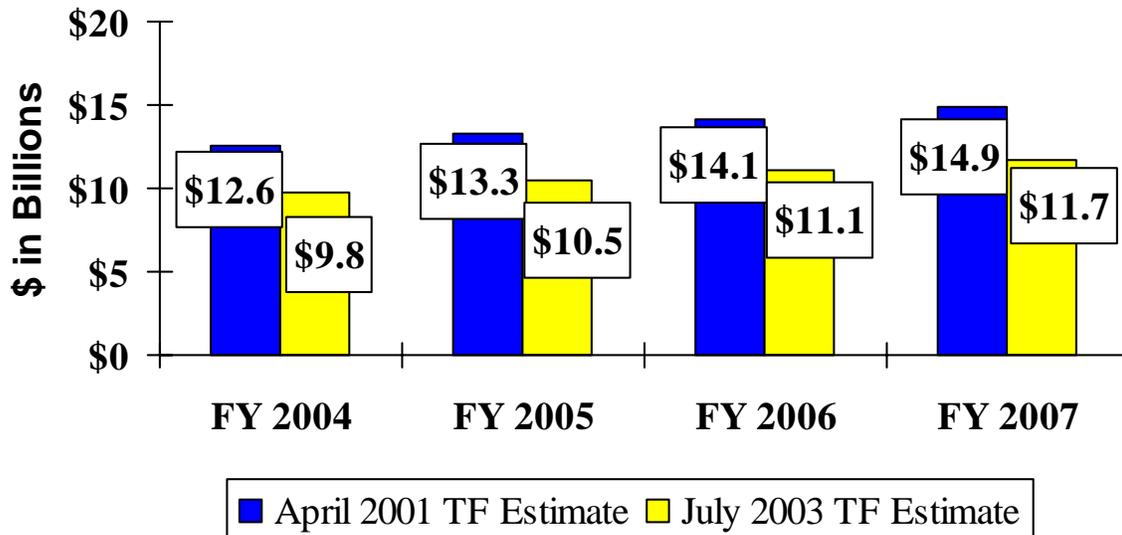
Introduction: FAA's Modernization Funding and Budget Constraints

FAA operates a vast network of radars, automated data processing, navigation, and communications equipment 24 hours a day, 365 days a year. FAA spends almost \$3 billion annually on efforts to modernize these systems and networks. Historically, FAA's modernization initiatives have experienced significant cost increases, schedule slips, and shortfalls in performance.

In 1996, Congress exempted FAA from Federal procurement rules that the Agency said hindered its ability to modernize the air traffic control system. Seven years later, we continue to see large cost overruns and schedule slips in FAA's major modernization programs. In June 2003, we reported that of 20 major acquisitions reviewed 14 of these projects have experienced cost growth of over \$4.3 billion (from \$6.8 billion to \$11.1 billion), which represents significantly more than FAA's FY 2004 \$2.9 billion request for modernization.

Continued growth of that magnitude is unsustainable given the multibillion-dollar declines in projected Aviation Trust Fund receipts and the projected levels of funding authorized in FAA's Facilities and Equipment account. Projected tax receipts to the Aviation Trust Fund for FY 2004 have dropped from approximately \$12.6 billion estimated in April 2001 to about \$10.2 billion estimated in February 2003. Over the next 4 years (FY 2004 through FY 2007), FAA's Aviation Trust Fund tax revenues are expected to be about \$12 billion less than projections made in April 2001. (See the following figure.)

Airport and Airway Trust Fund: Differences in Estimated Tax Revenue



The decline in tax revenue comes at a time when the Federal Government is in deficit spending and new financial commitments, such as homeland security and the war on terrorism, will further stretch the Government's resources. Also, FAA reauthorization proposals, which are currently being considered in Congress, call for only minimal increases in FAA's Facilities and Equipment account. As a result, FAA will have to operate within a budget framework that remains essentially flat over the next 4 years.

Cost, Schedule, and Performance Problems with Major Acquisitions Persist

FAA has made progress with a number of acquisitions, including Free Flight Phase 1 which provided new automated controller tools at selected locations and new communication systems that link FAA and airline operations centers. Progress with Free Flight builds on the successful deployment of the Display System Replacement, which provided new controller displays at FAA facilities that control high altitude traffic.

However, modernization programs continue to experience significant cost, schedule, and performance problems. For instance, just 4 of the 20 acquisitions we analyzed have experienced cost growth ranging as high as 227 percent and schedule slippage as long as 7 years. (See the following figure.) Any additional

cost growth in current projects will result in further lengthening implementation schedules, postponing benefits, or limiting FAA’s ability to start new projects.

Cost and Schedule Growth in Four Major Modernization Programs

Program	Estimated Program Costs (Dollars in Millions)		Percent Cost Growth	Implementation Schedule		Schedule Delay
	Original	Current		Original	Current	
Wide Area Augmentation System	\$892.4	\$2,922.4*	227%	1998-2001	2003-TBD**	5 years
Standard Terminal Automation Replacement System	\$940.2	\$1,690.2	80%	1998-2005	2002-2012**	7 years
Local Area Augmentation System	\$530.1	\$696.1	31%	2002-TBD	2006-TBD**	4 years
Integrated Terminal Weather System	\$276.1	\$286.1	4%	2002-2003	2003-2008	5 years

* This includes the cost to acquire geostationary satellites.
 ** TBD=To Be Determined (costs and schedules are under review).

Problems with modernization efforts have serious consequences because they result in costly interim systems, a reduction in units procured, postponed benefits (in terms of safety and efficiency), or crowding out other modernization projects. Many of the 20 projects we reviewed—both old and new—do not have reliable cost, schedule, or performance baselines, meaning that FAA cannot effectively plan, manage programs, or meet expectations for improving the safety, security, and capacity of the National Airspace System.

Our work shows that problems are traceable to a number of factors, including poorly defined cost estimates, changing requirements, complex and substantial software development, and difficulty in determining how new systems can be certified as safe for use. For example:

- *The Standard Terminal Automation Replacement System (STARS)* – In 1996, FAA selected STARS as the centerpiece of its terminal automation modernization strategy. We recently reported the STARS acquisition cost baseline has nearly doubled since 1996 from \$940 million to \$1.69 billion,

and the vast majority of systems have not yet been procured and deployed. Due to delays in the STARS program over the past 5 years, FAA deployed an interim system, Common ARTS, to 141 terminal facilities, or over 75 percent of the facilities where FAA intends to deploy STARS. Common ARTS is successfully operating at FAA's largest facilities, such as New York, Chicago, and Atlanta. At the 10 largest FAA facilities that use Common ARTS, air traffic controllers supported more than 14 million flight operations last year.

While FAA has made some progress with STARS, which was successfully deployed at Philadelphia last year, problems in adapting the software for specific sites is delaying the use of STARS at additional locations. Moreover, to complete the STARS deployment within the cost baseline of \$1.69 billion, the program office is counting on future cost "savings" of \$281 million that are not attainable. For instance, program officials are counting on generating more than half of these "savings" (\$147 million) by shifting costs from the Facilities and Equipment budget to the operations budget. We do not consider shifting these costs to the operations budget as cost "savings." Further, FAA will not have credible cost estimates for terminal modernization until independent cost assessments of STARS and Common ARTS, currently underway by FAA's investment analysis group and by MITRE Corporation, are complete.

FAA now faces a difficult decision on how to complete terminal automation modernization. We understand FAA and the STARS contractor are currently negotiating a fixed price contract to reduce the procurement cost of STARS. At this time, it is uncertain whether any resulting fixed price contract will include all work associated with completing software development and site-specific adaptation of STARS at all locations. Regardless of the outcome of the negotiations, whatever decision FAA makes for its modernization of terminal automation should be based on the results of the independent analyses

- *The Wide Area Augmentation System (WAAS)* - is a new satellite-based navigation system to enhance all phases of flight. The program has a long history of vexing technical problems and uncertainty regarding how much the system will cost, when it will be delivered, and what benefits can be obtained. Limited WAAS services (for en route services only) became available in July 2003, but additional work will be required to expand WAAS coverage (through additional ground stations). WAAS was

intended to provide Category I performance¹ to the majority of the Nation's airports but will provide something less than promised when the system is deployed. FAA needs to make a downward adjustment in the \$2.9 billion WAAS cost estimate to reflect the fact that the Agency will not pursue Category I performance.

- *The Integrated Terminal Weather System (ITWS)* - provides air traffic managers with a 20-minute forecast of weather conditions near airports and can help the National Airspace System recover from periods of bad weather. FAA initially planned to complete deployment of all 38 systems by 2003 at a cost of about \$286 million, but production costs have skyrocketed from \$360,000 to \$1 million per system. FAA cannot execute the program as intended and, absent additional funding, will defer adding several planned improvements and may procure fewer systems than intended. A decision about ITWS is expected later this year.
- *The Local Area Augmentation System (LAAS)* – is a new precision approach and landing system. This past year, we reported that expectations with respect to cost, schedule, and performance needed to be reset because the new landing system is not as mature as FAA anticipated. CAT I LAAS is planned for 2006 and the more demanding CAT II/III performance is now a research and development effort with an uncertain completion date. FAA signed a development contract for LAAS (CAT I) earlier this year and the Agency believed that development work to meet FAA requirements was about 80 percent complete. Now, FAA believes that only 20 percent of the development required to meet FAA's requirements is done. FAA needs to seriously rethink how it intends to move forward with LAAS and what level of investment is warranted.

Another project that warrants attention is the *Advanced Technologies and Oceanic Procedures (ATOP)* program, which will modernize equipment at facilities that manage air traffic principally over the Atlantic and Pacific Oceans. ATOP is important to enable FAA to safely reduce separation between aircraft to enhance capacity and provide for more fuel-efficient routing. Since 1995, FAA has spent over \$300 million to modernize its oceanic facilities, but past efforts met with little success due to, among other things, poor contractor performance.

Under a new initiative in June 2001, FAA awarded a \$217 million contract for ATOP to provide oceanic systems in Oakland (June 2004), New York (September 2005), and Anchorage, Alaska (March 2006). However, since the contract was

¹ Category I precision approach has a 200-foot ceiling/decision height and visibility of ½ mile.

awarded, the contractor has experienced delays primarily due to problems in completing software development and testing. These problems are due to the fact that FAA and the contractor planned to rely extensively on non-developmental software, but additional software development was needed to meet Agency requirements. The first phase of testing, known as factory acceptance testing, was completed 12 months behind schedule. However, FAA built additional time in the program schedule in the event that technical problems surfaced. Agency officials still believe that ATOP can be deployed and be operational at the first site in June 2004 as planned.

FAA is now preparing to perform operational and site acceptance testing. The results of these tests will determine whether or not the schedule for deploying ATOP to Oakland in June 2004, which is only 7 months away, can be met.

It is important to note that to date, schedule delays associated with software development problems have not resulted in cost growth because this is a fixed price contract. The contractor has absorbed all costs to date, not FAA. To continue to control costs with this acquisition, FAA needs to keep requirements stable.

There is little room for continued cost growth and schedule slips in FAA programs, and the Agency must get as much as it can for each acquisition dollar. This is critically important because there are billion-dollar projects just getting started.

Cost Control Is Essential for Billion-Dollar Projects Early in the Acquisition Phase

It is important for FAA to control costs for programs just getting started that are high-risk efforts because of their size, complexity, and level of developmental work required. Taken together, the En Route Automation Modernization and Next Generation Air-Ground Communications program have a combined cost of \$3 billion.

- *The En Route Automation Modernization Program (ERAM)* – is a set of projects aimed at modernizing hardware and software systems that control high altitude traffic. ERAM is estimated to cost \$2.1 billion, excluding smaller, associated efforts. This program is one of the largest and most software-intensive programs FAA has undertaken since the Advanced Automation System. In December 2002, FAA signed a cost-plus contract with Lockheed Martin to provide 26 ERAM systems. ERAM will replace the existing en route system, called HOST, and allow FAA to accommodate new Free Flight technologies. In Phase 1 of ERAM, FAA will replace the

HOST back-up system (known as the Direct Access Radar Channel, or “DARC”).

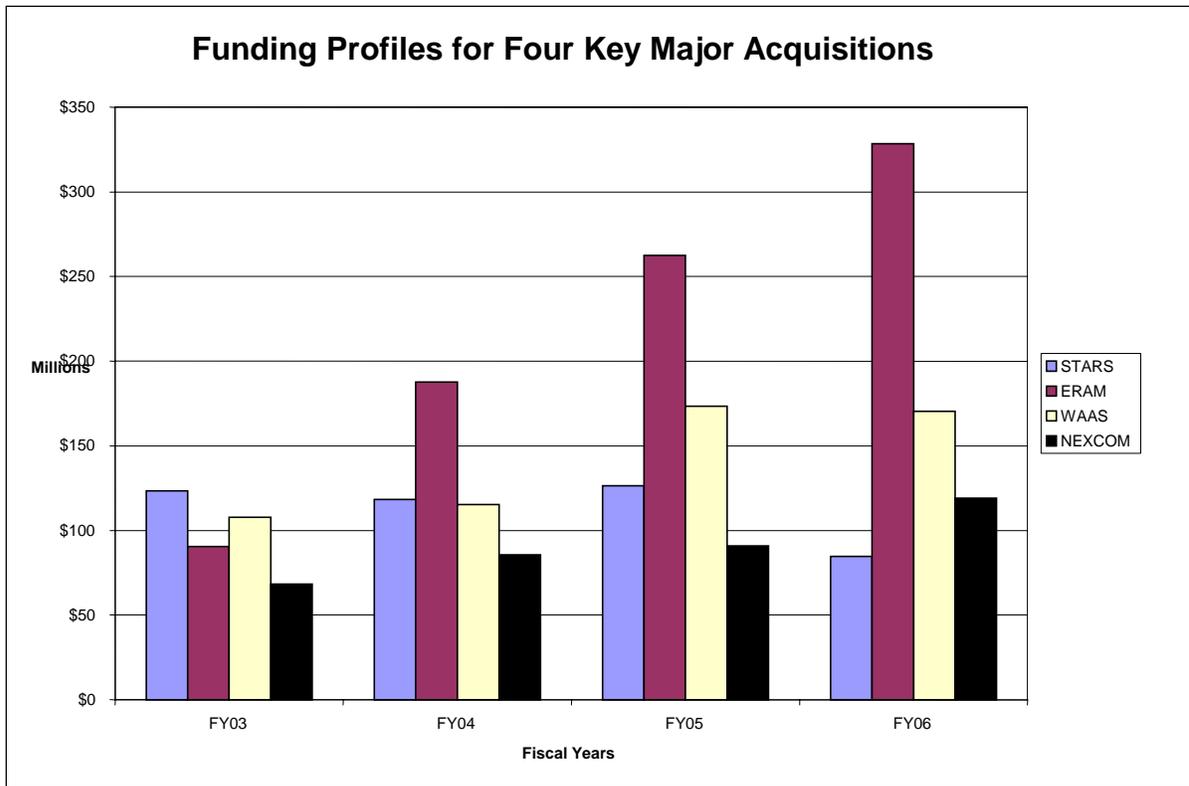
FAA faces significant risks in completing the ERAM program. For instance, schedules are very aggressive for such a software-intensive project, and FAA plans to replace DARC beginning in April 2005, just 18 months from now. At this stage, key risks that FAA has identified include (1) developing a multi-radar “surveillance tracker” (for monitoring aircraft and detecting potential conflicts), (2) integrating ERAM with other FAA efforts (planned upgrades to DSR and airspace redesign), and (3) developing and testing significant amounts of non-developmental and developmental software. We have just begun a review of the ERAM program.

- *The Next Generation Air-to-Ground Communications (NEXCOM)* - is intended to implement the use of new multi-mode radios and foster the transition to digital communications. Ultimately, FAA intends to be able to broadcast both voice and data over the same channel. The first stage is estimated to cost over \$900 million. The cost for later NEXCOM efforts is uncertain but substantial. NEXCOM has been controversial with the airlines because of timing issues and concerns about FAA’s preferred technology².

Much work remains for FAA to develop an executable path for moving forward with NEXCOM. FAA needs to address (1) the most cost effective way to meet the demand for new radio frequencies and when a lack of new frequencies will inhibit growth, (2) how quickly airspace users can transition to new radios (if required), and (3) how FAA will harmonize its plans with other countries. We have an audit underway of NEXCOM.

The following chart shows that cost control on ERAM and NEXCOM is essential because FAA must fund these new complex initiatives while moving forward with ongoing efforts, such as STARS and WAAS, which have been delayed for several years.

² FAA is pursuing “VDL-3” technology as part of the NEXCOM effort. This is a digital technology that is expected to allow for significantly better use of existing radio frequencies.



Source: FAA's Capital Investment Plan, Detailed Financial Baseline, January 23, 2003, and ERAM Final Investment Decision, June 12, 2003

On these four projects alone, FAA expects to spend \$1.8 billion between FYs 2004 and 2006. This is exclusive of efforts to move forward with other programs, such as a \$270 million additional upgrade to controller displays at facilities that control high altitude traffic, and efforts to improve runway safety. Successfully managing the execution of these complex efforts in this time period will require a level of cost control and effective management heretofore unseen by FAA since it began the modernization effort in the early 1980s.

FAA NEEDS TO TAKE ACTION TO IMPROVE ITS MANAGEMENT OF MAJOR ACQUISITIONS

FAA has important opportunities to control costs and act more like a business in developing new air traffic modernization systems. According to FAA's strategic plan, *Flight Plan 2004-2008*, the Agency must control program costs, refocus investment priorities on programs that perform, and make management decisions based on sound business principles. These are fundamental management principles that should apply to all acquisition efforts.

We are encouraged that FAA now has a Chief Operating Officer—Mr. Russ Chew—in place to implement a strategic plan for the air traffic control system and ensure that air traffic organization actions are consistent with long-term FAA strategies, increase productivity, and implement cost saving measures. This position was established in 2000 by the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (Public Law 106-181) but remained vacant for several years. Also, we understand that the Chief Operating Officer is developing a new organizational structure for Air Traffic Services, which will impact how FAA develops and acquires new systems. In conjunction with the changes being considered, a number of actions need to be taken.

- User needs and Agency requirements must be fully understood before committing to major acquisitions and entering into long-term cost-reimbursable contracts. Our work has consistently shown that FAA begins programs without a full understanding of what it will take in terms of development to meet Agency requirements and expectations for performance. This lack of understanding, coupled with use of cost-reimbursable contracts (where contractors have little incentive to control costs) has led to significant cost increases with major acquisitions. As a result, costs associated with additional development work and changing system requirements is absorbed fully by the government.

In addition to not fully knowing requirements and entering into cost-reimbursable contracts, FAA continues to underestimate the amount of development work needed for its projects. For example, problems we have seen with LAAS—a new precision approach and landing system—show that FAA significantly underestimated the development effort required to meet stringent requirements for ensuring the system can safely operate as intended. FAA signed a development contract for LAAS earlier this year and, at the time, the Agency believed that development work to meet FAA's requirements was about 80 percent complete. Now, FAA believes that only 20 percent of development required to meet FAA's requirements is done.

Likewise, FAA significantly underestimated the amount of software development that would be required for STARS to meet the Agency's human factors requirements. This extra development added 3 years to the schedule, and \$500 million to the cost of the STARS program.

- Updating the cost, schedule, and performance estimates for many major acquisitions, including STARS, WAAS, ITWS and LAAS at a minimum. Many of the projects we reviewed—both old and new—do not have reliable cost, schedule, or performance estimates (i.e. baselines). Without

better information, FAA cannot effectively plan, manage programs, or meet expectations for improving the safety, security, and capacity of the National Airspace System. Current baselines for many programs are misleading because they do not accurately portray the true cost, schedule, or performance parameters for the projects.

Additionally, these estimates do not include the costs to operate and sustain these new systems after they are fielded. We have testified previously that FAA needs to get control of its operations costs. Nevertheless, on some programs (for instance, STARS), program officials have proposed moving acquisition costs totaling \$147 million into the overburdened operations account in order to maintain an already unrealistic cost estimate of \$1.69 billion.

We have recommended that FAA update its cost and schedule estimates for many of its modernization projects, and the Agency is in the process of developing new cost, schedule, and performance parameters for a number of projects. This may require FAA to establish a new strategy that accelerates some projects and defers, or cancels, others.

- Centralizing control and strengthening contract oversight. Responsibility for major acquisitions is currently shared among several entities, including special program offices (Free Flight), lines of business (Terminal Business Unit), and integrated product teams (En route). For example, the Associate Administrator for Research and Acquisitions does not have control over projects managed by the Terminal Business Unit, which controls over \$500 million annually. This includes important programs, such as STARS.

To protect the Government interests, FAA must adhere to the basic principles of contract oversight and administration. Failure to do so can result in major problems for important programs. For instance, internal assessments of the STARS program office concluded that cost estimates had been unrealistically low or were not prepared; contract management was not a priority; and that critical oversight positions were not filled, such as the business and financial manager as well as contracting officer's technical representative. We also recently reported that the STARS program could not reconcile discrepancies between contractor billings and internal expenditure reports totaling \$41 million.

We have also consistently found a lack of basic contract administration at every stage of contract management from contract award to contract closeout. In our May 2002 report on the oversight of cost-reimbursable

contracts, we found cost-reimbursable contracts totaling about \$2 billion did not have required incurred cost audits by DCAA.

We have recommended on several occasions that FAA have DCAA conduct more audits on existing as well as closed contracts. Until recently, no action on this basic step of contract administration had been taken. This year, FAA has requested audits for 8 of 27 existing contracts over \$100 million. However, FAA has a ways to go since over \$8 billion in cost-reimbursable contracts are still not being audited by DCAA.

- Developing and using performance goals for assessing progress and holding managers accountable. In the past, FAA has not used performance goals for assessing and tracking progress with major acquisitions or held managers accountable for cost growth and schedule slips. FAA's new strategic plan of October 2003 represents a sharp departure from the past by establishing a performance target for making sure 80 percent of "critical" acquisition programs are on schedule and within 10 percent of budget. This is a step any business that pursues advanced technologies would take. FAA should hold staff and contractors accountable for keeping projects within cost and schedule parameters.
- Improving cost estimating and placing greater emphasis on life-cycle management and impact on the Operations account. Most of our comments today have focused on the cost of developing and acquiring new systems (or what is funded through the modernization account)—not the life-cycle cost to sustain new systems once they are fielded. The modernization account only funds the sustainment of new systems for 2 years. Subsequent costs are funded from FAA's Operations account, which our recent work shows is also overburdened. Although FAA's Acquisition Management System places considerable emphasis on life-cycle costs, FAA's own internal assessment shows that insufficient attention has been placed on this matter.

Paying attention to life-cycle costs is important because while FAA may be able to afford to develop new systems, it may not be able to afford to operate them. For example, FAA decided to defer plans to move forward with Controller-Pilot Data Link Communications (Data Link) because of, among other things, it would have added \$54 million to the Operations account between FYs 2005 and 2008 for just 8 locations.