Memorandum

U.S. Department of Transportation
Office of the Secretary of Transportation
Office of Inspector General

Subject: INFORMATION: Status on the Federal Aviation Administration's Major Acquisitions

Date: February 22, 2002

From: Inspector General

Reply to Attn of: JA-10:x60500

To: The Secretary
Deputy Secretary
Chief of Staff
Assistant Secretary for Budget and Programs/CFO
Federal Aviation Administrator

As part of our oversight role, we are providing you with a status report on the Federal Aviation Administration's (FAA) major acquisitions. The Congress provides FAA with over $2.5 billion annually for an array of major acquisitions to enhance the safety, security, and capacity of the National Airspace System. Most of these projects are funded through the agency's Facilities and Equipment account.

We routinely monitor these 20 major FAA projects, which include developing new precise satellite navigation systems, replacing air traffic controller displays at facilities that serve large hub airports, and acquiring new technologies to prevent accidents on crowded runways. The details on the cost, schedule, and key issues associated with the 20 projects are included as an attachment to this memorandum.

In summary, our work shows that FAA has made progress with a number of acquisitions, including Free Flight Phase 1, which has introduced new automated controller tools as well as new information exchange systems that link FAA and airline operations centers.[1] Progress with Free Flight Phase 1 builds on the successful deployment of the Display System Replacement, which provided new controller displays and related equipment at FAA facilities that manage high altitude traffic. FAA has also moved with dispatch since September 11 to improve

[1] See Free Flight Phase 1 Technologies: Progress to Date and Future Challenges (AV-2002-067, December 14, 2001).

air and ground communication links with the Department of Defense. However, cost and schedule problems persist with major acquisitions, and several programs require careful watching.

- The *Wide Area Augmentation System (WAAS)* has a long history of cost increases, schedule slippages, and vexing technical problems. The current cost estimate of $2.9 billion[2] is under review. FAA now expects to have WAAS operational in 2003, but this new satellite navigation system will provide less precision approach capability than initially promised. FAA must decide whether to stop WAAS development in 2003 or continue to refine the technology to meet more demanding precision approach capability known as a "Category I precision approach."[3] The cost, milestones, and benefits for achieving Category I performance are uncertain but substantial. FAA expects to make a decision this spring on how to proceed with WAAS.

- FAA's *Standard Terminal Automation Replacement System* (STARS) is already 4 years late and is now estimated to cost $600 million over the original estimate of about $1 billion. STARS will provide air traffic controllers in the terminal environment with color displays, processors, and computer software at 166 FAA facilities. Delays with STARS caused FAA to take stopgap measures for some facilities. FAA spent $85 million to purchase and install Common ARTS systems at large facilities to replace aging equipment. FAA has spent about $660 million on the STARS program but has only two Early Display Configuration systems in operation, which provide new controller displays, but rely on older software. The Early Display Configuration should not be confused with Full Service STARS (Full STARS), which includes both new equipment and a complete replacement of older software.

  The cost and schedule to complete Full STARS remain at risk for primarily two reasons. First, testing of STARS continues to identify critical problems (trouble reports). Currently, there are 523 open trouble reports, and the number of trouble reports deemed "critical" has remained relatively constant at about 175 between September 2001 and January 2002. The schedule calls for 5 additional months of testing, which could result in additional trouble reports. This puts the on-time installation for the first site in November 2002 (Philadelphia) at risk because all critical trouble reports must first be corrected. Second, STARS is dependent on the new ASR-11 digital radar, which has experienced cost increases and schedule slips of its own. FAA has delayed a

[2] The $2.9 billion estimate for WAAS represents Facilities and Equipment costs, with total lifecycle costs for WAAS estimated in 1999 to be $3.68 billion, but these estimates are under review.

[3] Category I precision approaches provide for an approach to a height above touchdown of not less than 200 feet and visibility of ½ mile.

decision to authorize full production for the ASR-11 radar from December 2001 to November 2002 because of delays in resolving technical problems. Unless FAA modifies its deployment strategy or purchases equipment to make existing analog radars compatible with STARS, this will result in some STARS sites being deployed before the new digital radar is in place. This complicates an already large, complex deployment that is scheduled to be complete by 2008.

- FAA and industry are pursuing *Automatic Dependent Surveillance–Broadcast,*[4] commonly referred to as "ADS-B," through the Safe Flight 21 initiative ($215 million). The Safe Flight 21 initiative is a limited deployment with the bulk of development work being done in the Ohio River Valley and Alaska. ADS-B is a key Free Flight technology that can help pilots land in bad weather and, when coupled with cockpit moving map displays, can help prevent accidents on runways. Considerable controversy has focused on the data link and required radio frequency that will be used to transmit ADS-B information to aircraft and controllers. FAA expects to make a decision on these matters in March or April of this year. Reaching closure on these issues is important because it will solidify technical standards and facilitate the development and implementation of a new generation of cockpit avionics.

- The *Operational and Supportability Implementation System* (OASIS) is currently scheduled to be deployed at 61 Automated Flight Service Stations by 2005. OASIS provides weather and flight planning information to general aviation pilots. In October 2001, we recommended that FAA develop a strategy, in conjunction with OASIS deployment, to consolidate the 61 existing Automated Flight Service Stations into a smaller number of sites.[5] We estimate that FAA could realize cost savings of nearly *$500 million* over the 7-year OASIS lease by making a consolidation decision now while OASIS is in the early stages of deployment. This could be achieved without a decrease in services to the aviation community. FAA has not yet decided whether or not it will consolidate these facilities.

In light of the September 11 terrorist attacks against the United States and the softening economy, FAA is reevaluating its plans for modernizing the National Airspace System. Therefore, our analysis of the 20 acquisitions represents a snapshot; adjustments in budgets and milestones are likely to occur over the next

[4] Automatic Dependent Surveillance-Broadcast uses the Global Positioning System. Aircraft equipped with ADS-B avionics transmit position information, along with aircraft identification, altitude, velocity, and possible intent data to ground systems and other properly equipped aircraft.

[5] See Automated Flight Service Stations: Significant Benefits Could Be Realized by Consolidating AFSS Sites in Conjunction with Deployment of OASIS (AV-2002-064, December 7, 2001).

year as greater priority is placed on security and sustainment of existing systems. For example, in response to September 11, FAA must now sustain long range radars for tracking aircraft (with or without transponders), something for which the agency did not plan or budget. Also, FAA is examining its satellite navigation efforts (wide area and local area augmentation systems) in light of the recent report on vulnerabilities with satellite-based systems for all modes of transportation.[6] In addition, milestones are being extended for data link communications for controllers and pilots (funded through Free Flight Phase 2) to coincide with revised airline plans for equipping their fleets with new avionics. We will continue to monitor these acquisitions, update our analyses, and keep your office informed.

We are also providing this information to the Chairs and Ranking Members of Committees of jurisdiction in both the House and Senate. If we may be of further assistance in this or any other matter, please contact me at (202) 366-1959, or my Deputy, Todd J. Zinser, at (202) 366-6767.

Attachment

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[6] Vulnerability Assessment of the Transportation Infrastructure Relying on the Global Positioning System (Volpe National Transportation Systems Center, August 20, 2001).

Attachment

STATUS OF SELECTED FAA ACQUISITIONS
(as of February 2002)

Project Name and Description	Original Program Cost Estimate	Current Program Cost Estimate	Original Deployment Schedule	Current Deployment Schedule	Status
Wide Area Augmentation System (WAAS): Provides the augmentation needed to make GPS fully usable for en route, terminal, nonprecision, and Category I precision approaches.	$892.4 Million	$2.9 Billion (Costs are under review)	Start: 1998 Finish: 2001	Start: 2003 Finish: To be determined	Since 1997, WAAS program costs have increased by over $700 million, exclusive of the cost to acquire geostationary satellites to broadcast the WAAS signal, and the system has been delayed by several years. A key cost and schedule driver focuses on resolving WAAS integrity concerns. *Airspace users must equip with new avionics to obtain benefits.*
Standard Terminal Automation Replacement System (STARS): Replaces controller and maintenance workstations with color displays, processors, and computer software at over 166 terminal air traffic control facilities. STARS requires digital radar data input.	$940.2 Million	$1.6 Billion	Start: 1998 Finish: 2005	Start: 2002 Finish: 2008	The complete deployment is now estimated to be nearly 4 years late. Deployment by 2008 under current cost and schedule estimates remains at risk due to the aggressive test schedule needed to deploy the system, delays to the ASR-11 digital surveillance radar, and the large number of STARS sites (166) to be fielded.
Airport Surveillance Radar (ASR-11): Replaces aging analog radar at small terminal facilities with digital radar. Can be used by Common ARTS and STARS. This is a joint effort with DOD.	$752.9 Million	$891.8 Million	Start: 2000 Finish: 2005	Start: 2002 Finish: 2008	Program costs have increased by $139 million and further schedule delays in ASR-11 are likely to impact the deployment of STARS. Fixes for technical problems, such as false targets and misleading weather information, are currently undergoing testing. Deployment schedule is at risk due to developmental issues.

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Airport Movement Area Safety System (AMASS): Provides software enhancement for the Airport Surface Detection Equipment (ASDE-3) radar designed to monitor airport surface traffic and alert air traffic controllers to potential collisions on the runways.	$59.8 Million	$151.7 Million	Start: 1994 Finish: 1996	Start: 2001 Finish: 2003	Currently, AMASS is 7 years behind schedule and $92 million over cost projections made in 1993. While FAA has been developing AMASS since 1991, the system is commissioned at only 8 of 34 airports. Based on a DOT/OIG recommendation, FAA has issued a revised schedule with the last system commissioning in the 4th quarter 2003.
Weather and Radar Processor (WARP): Provides en route meteorologists and air traffic controllers with more accurate graphic weather products to help identify weather conditions that may adversely impact air traffic control and aircraft operations.	$126.4 Million	$155.4 Million	Start: 1999 Finish: 2000	Start: 2002 Finish: 2002	The first operational WARP system for controller displays has been delayed by 3 years. A number of complex technical and human factors issues remain unresolved. Additional cost and schedule changes are likely.
Air Traffic Control Beacon Interrogator (ATCBI): Replaces older generation equipment with a new surveillance radar that will improve the accuracy and availability of position information on individual aircraft to air traffic controllers.	$281.8 Million	$283.4 Million	Start: 2000 Finish: 2004	Start: 2001 Finish: 2006	Internal FAA reprogramming actions have reduced available funding. This in turn will affect the installation and commissioning schedules for production systems.

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Operational and Supportability Implementation System (OASIS): Replaces the current Model One Full Capacity (M1FC) system at the 61 Automated Flight Service Stations (AFSS) and will provide an integrated system that will increase operational capabilities such as Flight Data Processing and Weather Graphics.	$294.8 Million	$349.5 Million	Start: 1998 Finish: 2001	Start: 2002 Finish: 2005	FAA has deployed an "initial daily use" version of the system at Seattle. We estimate that FAA could realize cost savings of nearly $500 million over the 7-year OASIS lease by consolidating flight service stations now while OASIS is in the early stages of deployment.
Local Area Augmentation System (LAAS): Provides the augmentation needed at 160 airports to make GPS fully usable for Categories I, II, and III precision approaches at selected airports.	$530.1 Million	$720 Million (Costs are under review)	Start: 2002 Finish: To be determined	Start: 2004 Finish: To be determined	LAAS is being developed through joint Government/Industry Partnerships. FAA and industry plan to have the LAAS systems operational for Category I services by the end of 2004. The schedule for LAAS is aggressive because considerable work remains to complete requirements, and to make the transition from a developmental to a production effort. *Airspace users must equip aircraft with new avionics to obtain benefits.*

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Airport Surface Detection Equipment-X (ASDE-X): Provides surveillance equipment to prevent runway incursions at a large number of airports. Implementation of these systems will improve situational awareness of the airport movement area.	$332.6 Million	$423.3 Million	Start: 2003 Finish: 2007	Start: 2003 Finish: 2007	Acquisition Program Baseline was approved September 5, 2001, for 26 operational and 4 support systems.
Free Flight Phase 1 (FFP1): Provides new information-exchange (Collaborative Decision-Making and Surface Movement Advisor) systems and automated controller tools (Center TRACON Automation System and User Request Evaluation Tool). *This is a limited deployment.*	$837.7 Million	$837.7 Million	Start: 1998 Finish: 2002 (For limited deployment)	Start: 1998 Finish: 2002 (For limited deployment)	FFP1 reflects FAA's "build a little, test a little, and deploy a little" approach. Progress is being made in implementing new information systems and automated controller tools. However, work on one automated tool has been stopped due to technical concerns. Program costs reflect costs for limited deployment at select locations and sustaining them through fiscal year 2007. *The cost to implement FFP1 technologies nationwide is uncertain but substantial.*

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Free Flight Phase 2 (FFP2): Geographically expands the deployment of the User Request Evaluation Tool and Traffic Management Advisor-Single Center to additional locations, introduces Controller-Pilot Data Link Communications, and accelerates research in several areas.	$845.9 Million	$845.9 Million	Start: 2003 Finish: 2005	Start: 2003 Finish: 2005	Program costs exclude the cost of Controller-Pilot Data Link Communications, which FAA continues to refine. FAA expects to postpone the implementation of data link by 2 years to reflect recent changes in airlines' plans for purchasing new avionics.
NAS Infrastructure Management System (NIMS): Provides a centralized management system to improve the services provided by the National Airspace System (NAS), as well as to operate and maintain the facilities, systems, and equipment that comprise the NAS infrastructure, such as communications equipment, radars, and navigation aids.	$100.8 Million	$172.9 Million	Start: 1997 Finish: 2000	Start: 2000 Finish: 2005	The goal to deploy new infrastructure management capabilities in 2000 was not met. The acquisition, modification, and implementation of commercial off-the-shelf software remains problematic for this effort.

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Integrated Terminal Weather System (ITWS): Acquires and integrates weather data from multiple sensors, and provides traffic management units with a graphic display of weather information that needs no meteorological interpretation.	$276.1 Million	$282.1 Million	Start: 2002 Finish: 2003	Start: 2002 Finish: 2004	ITWS is an important acquisition because it provides controllers and traffic managers with 20-minute forecasts of weather conditions to improve the safety and efficiency of terminal airspace operations. The first production system is scheduled to be operational at Atlanta in December 2002. There are strong indications that costs will increase as FAA moves from prototype to production systems.
Aviation Safety Analysis System (ASAS): Is a safety technology development program comprised of a multitude of safety and security subsystems that provide mission-critical information and tools that enable the aviation safety, standards, security, medical, and rulemaking workforces to perform their diverse assignments.	$131.2 Million	$278.8 Million	Start: 1989 Finish: (Ongoing deployment)	Start: 1989 Finish: (Ongoing deployment)	ASAS is an ongoing program of development and deployment of automation tools. It will provide FAA with modern mechanized methods to better analyze inspection and investigation results.

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Project Name and Description	Current Program Cost Estimate	Anticipated Deployment Schedule	Status
Automatic Dependent Surveillance-Broadcast: (ADS-B): Relies on GPS to broadcast the position of an aircraft. Pilots of ADS-B equipped aircraft will be able to track other equipped aircraft using special multi-function cockpit displays. The same data can be transmitted to controllers.	$215 Million for limited deployment as part of Safe Flight 21	Through 2006 For Safe Flight 21	Under Safe Flight 21, FAA is working with cargo airlines in the Ohio Valley and equipping aircraft in Alaska. ADS-B has potential for reducing runway incursions and helping pilots land in bad weather. FAA envisions limited implementation of certain ADS-B applications over the next 5 to 7 years, within the continental United States, with costs to be determined. *Airspace users must equip aircraft with new avionics to obtain benefits.*
National Airspace Redesign: Revamps the Nation's airspace to improve efficiency, reduce delays, and take advantage of new technologies, procedures, and infrastructure improvements.	$241 Million (Preliminary cost estimate)	2002 (Short-term segment)	Short-term initiatives include the top 7 aviation system *choke points in the Great Lakes, New England, and Eastern regions of the United States.* There are 21 action items relative to these choke points, 18 of which have been completed. FAA is in the process of refining plans for the intermediate and long-term efforts. Current estimate of $241 million may not reflect all costs associated with this effort.
Advanced Technologies and Oceanic Procedures (ATOP): Modernizes FAA facilities that are responsible for managing large segments of airspace over the Atlantic and Pacific Oceans. FAA plans call for an integrated system for flight data processing, detecting conflicts between aircraft, data link and surveillance capabilities.	$548.2 Million	Start: 2003 Finish: 2005	In 1995, FAA awarded a multi-year contract for an oceanic system. In 1998 due to funding limitations and poor contractor performance, the contract scope was reduced to deliver only the oceanic data link portion of the system. In June 2001 FAA awarded a $217 million contract to Lockheed Martin to provide oceanic systems in Anchorage, New York, and Oakland. The contractor plans to deliver the first operational system to Oakland in April 2003. While the ATOP contract was awarded only 8 months ago, FAA already faces challenges overseeing complex software development and meeting new security requirements for foreign nationals working on the NAS.

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Next-Generation Air/Ground Communications (NEXCOM): Upgrades FAA's communications to provide capability to accommodate additional sectors and services; reduce logistical cost; replace UHF and VHF radios; provide data link communications capability; reduce RF interference; and provide security mechanisms.	Program baseline to be determined	Program baseline to be determined	NEXCOM will involve replacing over 46,000 radios used for air-to-ground communications for air traffic control with new multi-mode radios. A Government/Industry group has made recommendations to FAA for implementing NEXCOM. FAA awarded a contract for $580 million to purchase multi-mode digital radios, *but this only represents the first step of the NEXCOM effort.* FAA plans to install the new digital radios for controlling high altitude traffic. FAA then plans to transition to digital voice beginning in 2005.
En Route Automation Modernization (ERAM): Replaces National Airspace System software currently resident in the Host computer system.	To be determined	To be determined	ERAM is a critical effort to modernize the NAS by replacing the existing en route air traffic control automation system and infrastructure. The Host mainframe computer was replaced to address Year 2000 computer issues and maintenance concerns, but the software was not replaced. Host software and mainframes must be replaced to improve the overall maintainability of the NAS and to successfully implement new Free Flight technologies. Costs are uncertain, but informal estimates indicate costs will range from $1 billion to $1.5 billion. Contractor protest and lack of a clearly defined acquisition strategy are delaying contract award.
FAA Telecommunication Infrastructure (FTI): Replaces ground-to-ground owned and leased communications networks, because existing networks are approaching the end of their contract or the end of their service life.	$1.9 Billion (July 1999 Acquisition Program Baseline)	Contract award expected in June 2002	The current cost estimate of $1.9 billion may not be reflective of all the costs associated with this effort. Based on our August 2001 report, FAA revised the requirements for FTI and issued a new Screening Information Request (SIR) which included security requirements. FAA now intends to award the contract in June 2002.