



**Federal Aviation
Administration**

National Airspace System Capital Investment Plan

for Fiscal Years 2009–2013



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Federal Aviation Administration National Airspace System Capital Investment Plan for Fiscal Years 2009–2013

1 Introduction

1.1 The Capital Investment Plan

The Federal Aviation Administration (FAA) Capital Investment Plan (CIP) is a 5-year plan that describes the National Airspace System (NAS) modernization projects planned for the next 5 years within anticipated levels of funding. The CIP fulfills our obligations under the Consolidated Appropriations Act, 2008. Division K of that act contains language that requires that we:

“... transmit to the Congress a comprehensive capital investment plan for the Federal Aviation Administration which includes funding for each budget line item for fiscal years 2009 through 2013, with total funding for each year of the plan constrained to the funding targets for those years as estimated and approved by the Office of Management and Budget.”

The planned project accomplishments shown in the CIP are consistent with the President’s FY 2009 budget request and OMB’s future year estimates. Funding estimates for budget line items are based on several factors. For the large capital investment projects, the estimated funding is the amount needed for annual contract and project support costs. For infrastructure improvements, the estimated funding is either the cost for specific locations or the annual amounts needed to upgrade existing facilities and equipment based on facility condition surveys. As we move forward with the Next Generation Air Transportation System (NextGen), we are allocating a larger percentage of our planned funding toward implementing the new technology needed to modernize the NAS.

1.2 Strategic Planning and the CIP

FAA’s Flight Plan 2008-2012 is our strategic plan. It contains the goals established by FAA management. These goals guide us in improving National Airspace System (NAS) performance and adjusting operations to meet the demands placed on the NAS by future growth. Our strategic goals are supplemented by objectives and supporting initiatives that define the necessary plans and programs to meet them. These objectives and initiatives must have measurable performance targets to assess our progress. We must continually measure our actual performance against the established targets to ensure our initiatives are successful and quickly make adjustments, when they are not producing the expected results.

1.2.1 FAA Strategic Plan

The current FAA strategic plan identifies four specific goal areas:

- **Increased Safety** – Achieve the lowest possible accident rate and constantly improve safety;
- **Greater Capacity** – Work with local governments and airspace users to provide increased capacity in the United States airspace system that reduces congestion and meets projected demand in an environmentally sound manner;
- **International Leadership** – Increase the safety and capacity of the global civil aerospace system in an environmentally sound manner; and
- **Organizational Excellence** – Ensure the success of the FAA’s mission through stronger leadership, a better-trained and safer workforce, enhanced cost-control measures, and improved decision-making based on reliable data.

Consistent with the President’s Management Agenda, we have linked each CIP project to a Flight Plan goal, objective, and performance target in Appendix A. Although projects may support more than one goal, the link in Appendix A is limited to a single goal to maintain focus on the broader and most important strategies for ensuring safety and improving system performance and capacity. We list several projects under each performance measure for several reasons. Many projects are interdependent, and one project may not be successful in meeting a performance target without completing other supporting projects. Also, in the complex system used for air traffic control, system improvements must address several different operating conditions to reach the overall performance target, and often it takes multiple projects to address all of the variables, which individually contribute to overall system inefficiencies. The complete list of planned initiatives for each performance target helps focus attention on coordinating these efforts to maximize the value of each individual project.

The detailed project information in Appendix B provides more insight into the strategic purpose of projects by including a “Relationship to Flight Plan Goal” section that gives more specific information about how each project helps meet the Flight Plan goal.

1.2.2 The Strategic Management Process

To supplement the broad goals of the FAA Flight Plan, the Air Traffic Organization (ATO) uses the Strategic Management Process (SMP) to identify more detailed actions to improve performance. The SMP objectives, shown in the white ellipses in Figure 1, support five pathways. These pathways identify specific objectives for delivering air traffic services more effectively and efficiently in both the near term and in the future. Each objective will have specific metrics so that we can define and measure planned improvement in system performance and user benefits.

The five SMP pathways are:

- Achieve Operational Excellence;
- Enhance Financial Discipline;
- Increase Capacity Where Needed;
- Ensure Viable Future; and
- Promote Organizational Learning and Growth.

FY08 ATO Strategy Map

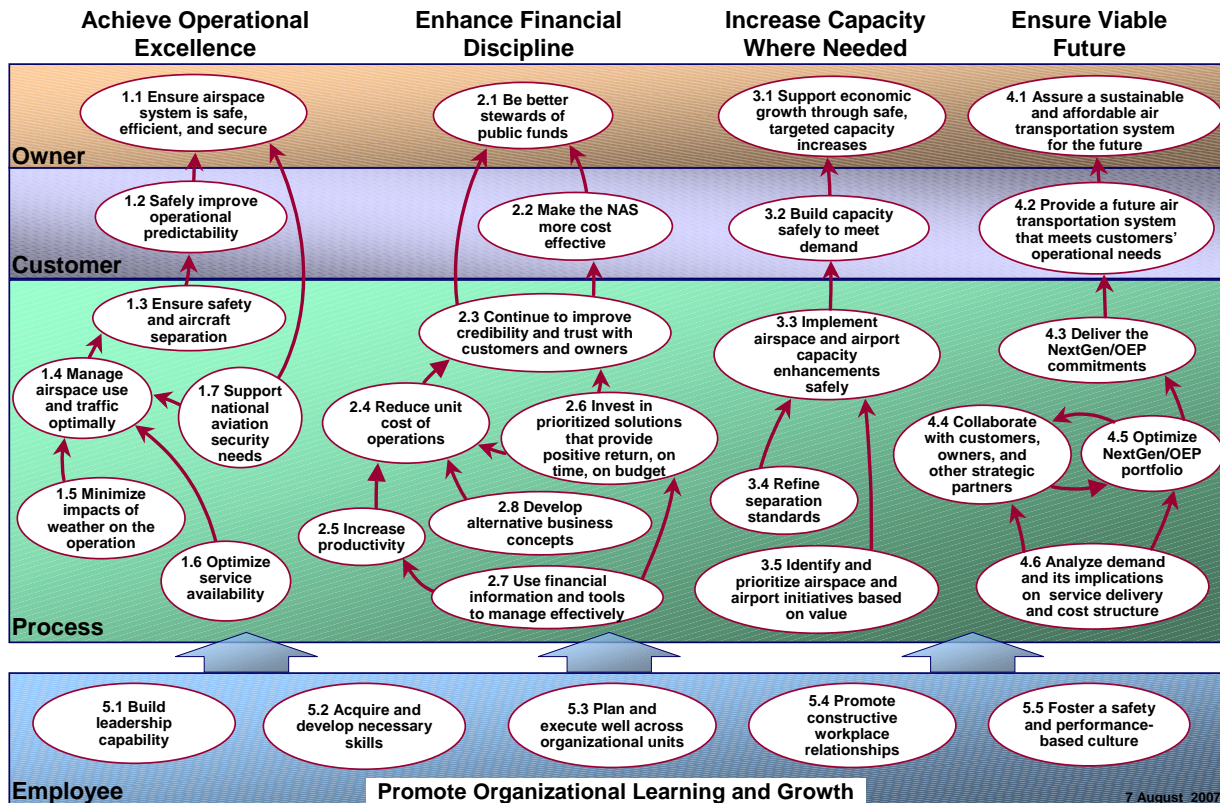


Figure 1 Strategic Management Process Pathways

The first pathway, Achieve Operational Excellence, focuses on maintaining safe and reliable service to all our customers, who want an airspace system that moves aircraft safely, handles the volume of traffic with minimal delays, and is protected from security threats. This pathway requires a large percentage of capital investment resources. The current system must continue to meet the high performance standards set for managing air traffic while we modernize and transform air traffic control to meet the goals of the NextGen.

The second pathway, Enhance Financial Discipline, continues the transition to managing FAA more like a business. It depends on accurately measuring costs, setting benchmarks for efficient performance and improved productivity, and investing to reduce operating costs. Controlling

costs is a necessary step in making sure resources are available to meet the challenges of future growth.

The third pathway, Increase Capacity Where Needed, outlines the necessary steps for the ATO to manage the growing demand for air travel. Since several large airports are nearing practical capacity, there is significant pressure to maximize use of existing capacity and support extension of air traffic services to accommodate new runways when they are built.

The fourth pathway, Ensure Viable Future, aims at ensuring that the air transportation system will continue to meet the evolving needs of customers in an affordable way. It extends planning beyond the capabilities of today's systems. As NextGen programs are implemented, we must concurrently explore new procedures and operational improvements to accommodate the projected increase in air travel. The roadmaps appearing in later sections present a detailed transition plan for transforming the air traffic system seamlessly from its present architecture to its future form without inhibiting present operations.

The fifth pathway, Promote Organizational Learning and Growth, focuses on supporting the FAA workforce in adopting best practices to improve management efficiency and customer satisfaction. Good organizations constantly search out and implement these best business practices, so they can continually improve performance.

The ATO Service Units design and implement their respective business plans based on the SMP pathways and objectives. The Service Units align specific projects with the pathways objectives and their associated metrics. They measure their progress against the metrics on a monthly schedule. Progress toward meeting the goals and objectives is reported to ATO leadership monthly.

1.3 Next Generation Air Transportation System (NextGen)

Increasing aviation capacity by implementing NextGen plays a roll in supporting economic growth. U. S. economic growth is supported by our nation's air transportation industry. A recent study by the ATO Operations Planning Service Unit, *The Economic Impact of Civil Aviation on the U.S. Economy*, published in July 2007 estimates that aviation accounted for over \$1 trillion in economic activity in 2005, which represents 5.5 percent of the Gross Domestic Product. It created an estimated 10 million aviation-related jobs and flew nearly 30 billion revenue ton-miles of air cargo. A reliable world-wide aviation network is essential for today's economy. Domestic and international commerce rely on the access and passenger and freight capacity it provides to cities around the world to sustain economic growth.

1.3.1 Need for NextGen

The projected growth in aviation (see Section 1.4) requires new systems and procedures to accommodate the increased demand for capacity. We must also develop the necessary skills to transition to NextGen, which will transform the existing system into one with advanced capabilities.

1.3.2 Transition to NextGen

The President's FY 2009 budget for NextGen contains a portfolio of investments backed by the commitments of the FAA and Joint Planning and Development Office (JPDO) partner agencies and is based on input from a broad range of stakeholders. The FY 2009 budget sets out a plan to:

- Achieve near-term deployment of mature technologies
- Develop moderately mature concepts for operational viability, and
- Perform research to more fully define long-term capabilities

The fiscal year 2009 budget will be used to deploy foundational technologies and infrastructure such as: Automatic Dependent Surveillance - Broadcast (ADS-B), Data Communications (DataComm), NextGen Network Enabled Weather (NNEW), NAS Voice Switch (NVS) and System Wide Information Management (SWIM). Funds will also be used to more fully develop requirements for the broad range of future NextGen capabilities.

We must invest now to ensure these new capabilities are in place ahead of the forecasted increase of air traffic operations, and we must continue investing well into the future to reach the full potential of these initiatives. Section 3 discusses the NextGen solution sets and budget line items that define a new concept of operations and provide insight into additional steps that take advantage of NextGen's potential to expand capacity.

In the initial years, the line items and funding associated with these NextGen solution sets (e.g. trajectory-based operations, high density arrivals and departures, etc) are groups of activities, which are different from other FAA capital investments. These activities include research and development, planning for capital investments, demonstrations, procedure development, and certification. As the NextGen investments within these capabilities become more developed, they will take the form of traditional capital investments, subject to investment control procedures. Therefore, the out-year funding amounts for the NextGen capabilities are inherently less precise and should be regarded as estimates, subject to refinement, as the work on these capabilities proceeds.

We have begun the transition to NextGen. As the chart below shows (Figure 2), the investment in NextGen increases over the five years of the CIP. We believe we are planning a responsible transformation of the existing air traffic control system to a newer system with far greater capabilities, while maintaining the current system at peak operational performance. As we complete many of the existing CIP programs during this period, increased amounts of funding will be available for development and implementation of NextGen.

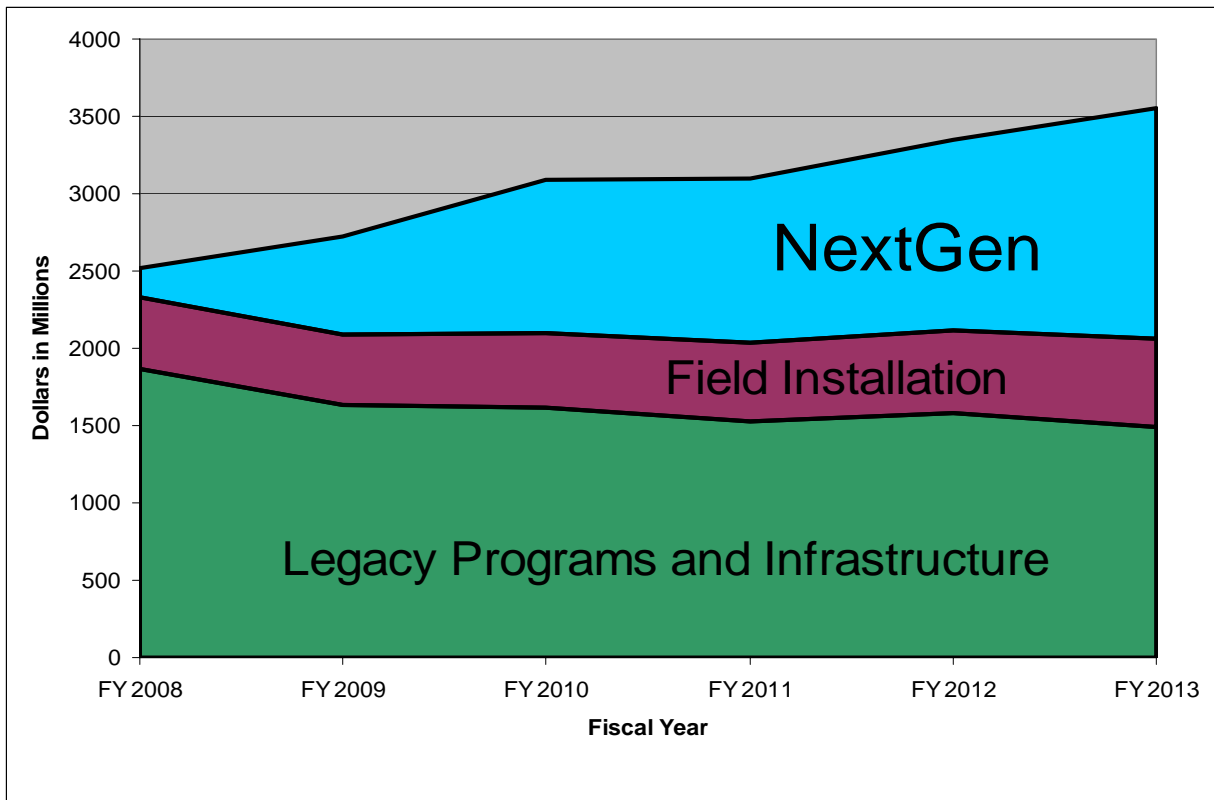


Figure 2 NextGen Portfolio Relative to the Total Capital Request

1.3.4 Operational Evolution Partnership (OEP)

The OEP is the key vehicle for coordination and integration of efforts to introduce NextGen capabilities into the NAS. The coalition of the FAA, the JPDO, and the aviation and aerospace user communities have worked together to define the specific operational capabilities for NextGen and establish a timeline for implementing mid-term capabilities to support our transition to NextGen. Several solution sets have been developed and needed research and system demonstrations have been identified.

In the past, the OEP mainly focused on initiatives to relieve congestion at major airports. The OEP now has a broad scope including strategic research, development, and prototyping, along with specific policy and certification activities for NextGen. The OEP brings together the right FAA and JPDO personnel to assess the benefits of potential initiatives, including program functionality and cost-effectiveness. The OEP will manage integration, ensuring that all new capabilities are aligned and perform as intended. In its role as management integrator, the OEP

will establish a strategic timeline that shows exactly what steps are needed, how long each step will take to complete, and who will be responsible for each step.

FAA's OEP Web site is:

http://www.faa.gov/about/office_org/headquarters_offices/ato/publications/oep/

1.4 Important Factors Affecting Planning for the Future

1.4.1 Nature of Capital Investment

Planning for capital investment relies on a long-range forecast. Capital investments normally require extensive planning horizons and often take more than a year to implement before any operational improvements or gains in efficiencies can be realized. This is a normal schedule for large technically sophisticated projects. Thus, project managers must be planning for the operating environment forecast for 4 to 5 years in the future rather than only meeting present needs. To support this planning, the FAA prepares a detailed forecast of future aviation activity every year.

Since most systems, once implemented, will remain in service for up to 20 years, the long-range forecast is a critical tool for assessing near and far term demand. The following section reviews the latest long-term forecast, giving insight into why we are pursuing NextGen solutions to provide the system of the future.

1.4.2 Air Travel Demand

The demand for air travel is closely related to changes in the economy. As Figure 3 shows the growth in revenue passenger miles (RPM) over the last 25 years correlates highly with the growth in Gross Domestic Product (GDP). The chart clearly shows an overall upward trend in growth with some minor deviations in the pattern often caused by abnormal events, such as the terrorist attacks of September 11, 2001. This chart also shows a long-term economic growth trend, which is likely to continue due to population growth and introduction of new technology. If growth continues, it is reasonable to assume that increased demand for air travel will continue. That growth in demand will lead to more aircraft operations, which translates into increased workload for FAA. It also translates into more pressure on the 35 OEP airports to handle additional operations. Significant increases in operations at these airports will increase delays, unless we implement the advanced NextGen capabilities to provide the improved services needed to handle this growth.

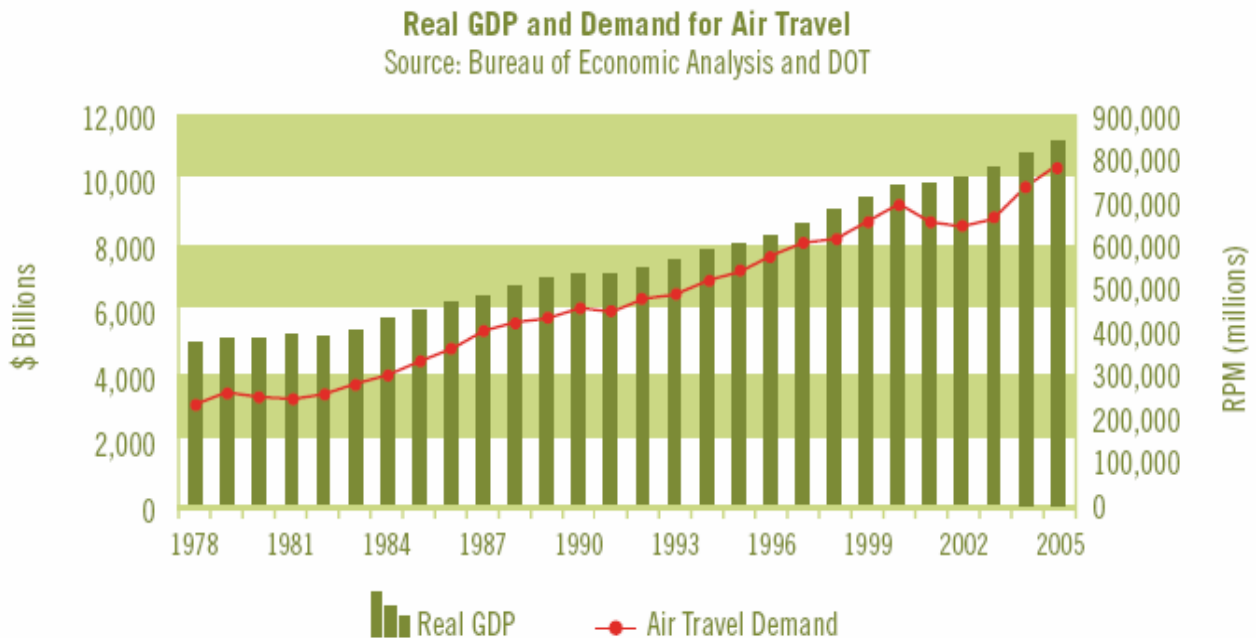


Figure 3 Air Travel Demand Growth Compared to Growth in GDP

The long-range forecast prepared by the FAA Office of Aviation Policy, Planning and Environment shows FAA average annual workload growing about 2.5 percent to accommodate commercial operations into airports through 2030; the forecast also shows that average annual workload for en route centers grows about 3 percent through 2030. The following sections discuss the forecast growth in these two areas and some of the potential changes that may affect that growth in workload. Using forecasts of economic activity from several sources, the FAA prepares a 12-year aviation activity forecast and a long-range aviation forecast to help identify the level of services that the agency must provide in the future.

1.4.3 Growth in En Route Operations

The most significant change in air travel is the increase in use of regional jets. Legacy air carriers have shifted larger aircraft to long haul and international markets. They then offer more frequent service on shorter routes with smaller jets, but that adds to FAA workload growth. That trend has reached the point where regional jets represent 34 percent of the traffic at the 35 busiest airports. Many of these aircraft carry fewer than 100 passengers, and the ratio of operations to passengers carried will continue to grow as they expand their business. Also, a new category of service by very light jets (VLJs) may add to the number of en route and terminal operations.

We understand that much of the new service VLJs offer will be between smaller airports, so they are not expected to affect the large hubs. Regardless of whether they serve small or large airports, their operating characteristics and the market segment they serve makes it likely that they will fly in controlled en route airspace, and this will increase FAA’s workload. Over the

next 10 years, growth in this segment would create significant pressure on the existing air traffic control system, and that growth would make it more difficult to accommodate the requests for efficient routes and altitudes that reduce operating costs for all commercial operators. The FAA long-term forecast estimates that the workload at FAA en route centers will increase by 82 percent between 2005 and 2025, as Figure 4 shows.

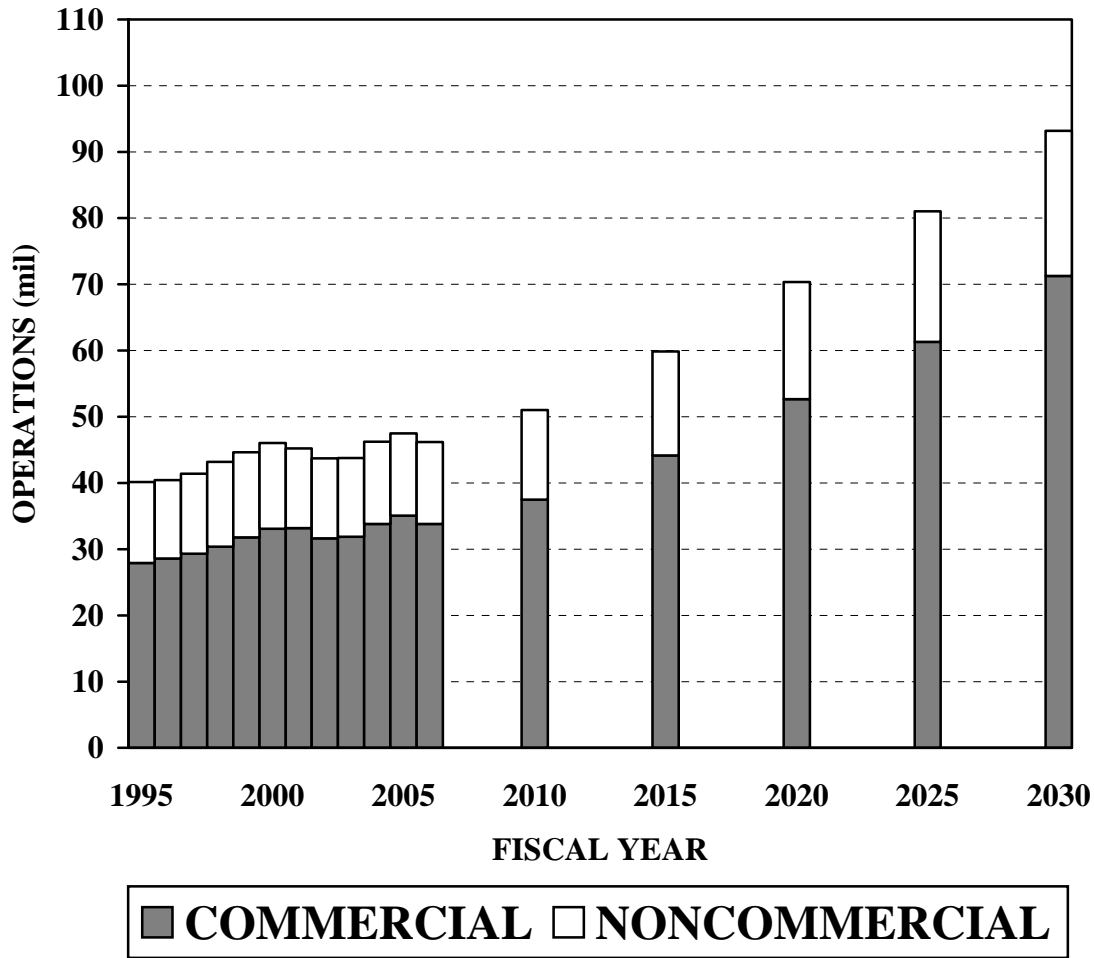


Figure 4 Projected Growth in Number of Aircraft Handled by En Route Centers

1.4.4 Growth in Terminal Operations

Growth in the number of aircraft handled by air traffic control facilities at the major airports has varied during 2007. Some airports serving international flights have seen the largest growth as the legacy carriers have increased international flights in an effort to improve their revenue. System-wide, there have also been more delays due to unfavorable weather near the largest hub airports and increased scheduling at the already constrained major airports. Continued refinement of strategic initiatives to adjust for weather conditions and other operational

enhancements will help increase same block time scheduling, but continued growth will require a transformation of air traffic operations to manage the traffic in and out of these airports.

The long-term forecast projects slightly less than 60 percent growth in instrument operations at towers and Terminal Radar Approach Control (TRACON) facilities between 2005 and 2025, as Figure 5 shows. Congestion and delays will increase if FAA does not complete modernization in time to make more efficient use of airspace capacity.

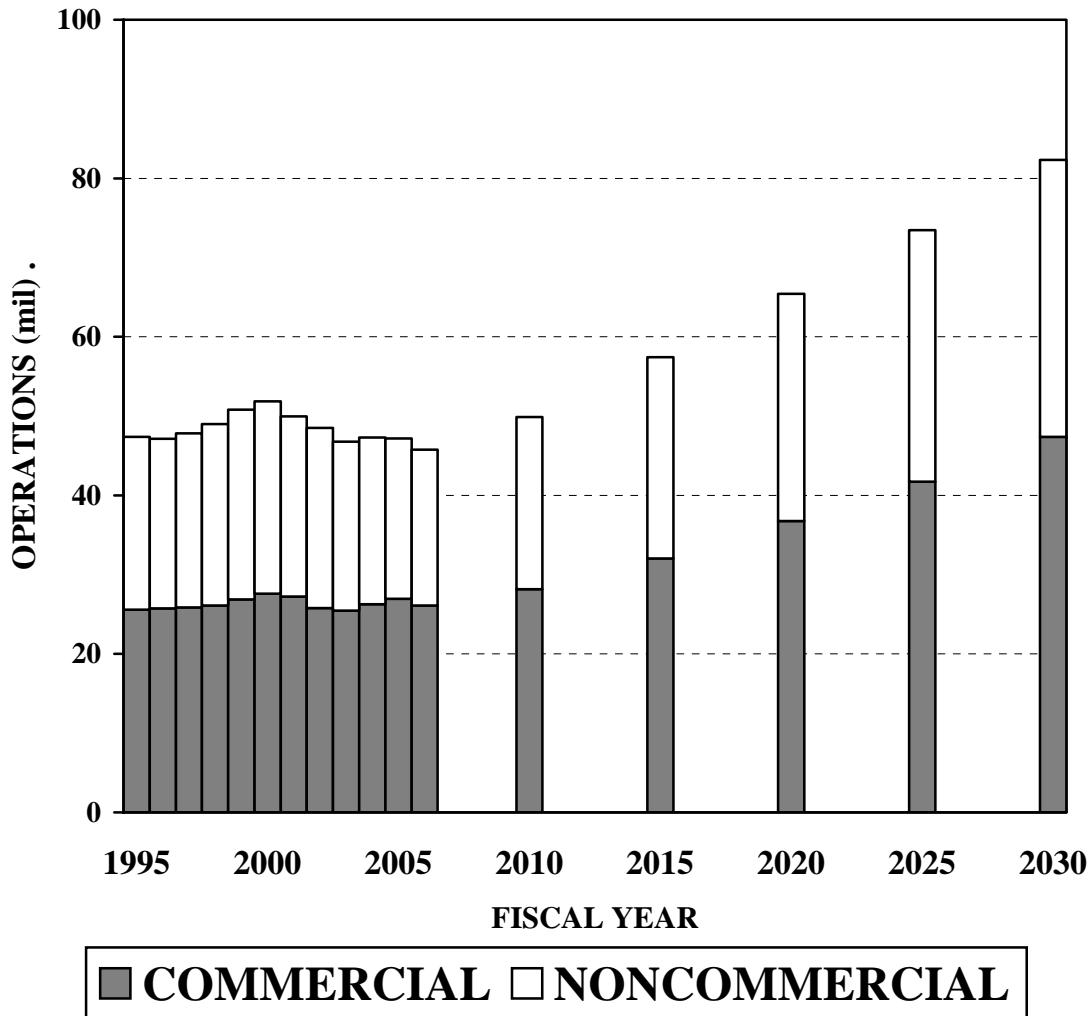


Figure 5 Projected Growth in Instrument Operations at Towers and TRACONs

Accommodating future increases in growth at the busiest airports will be more challenging because several large airports- such as: Newark, LaGuardia, Philadelphia, and Chicago O’Hare - are nearing their respective capacity limits. Since the top 35 airports handle 73 percent of aviation passengers, minor improvements in their capacity will be inadequate to handle the predicted growth in operations.

The FAA continues to actively help large airports increase their capacity. Thirteen new runways have become operational since 2000. The OEP identifies 12 more airfield projects in the planning stages. To encourage building new capacity the FAA's Airport Improvement Program supplements local financing for new airport projects with federal grants.

The FAA also invests its internal capital funding when local airport authorities build new runways. Often, airspace around the airports is reconfigured to accommodate a new runway, and that requires installing new navigational aids and precision landing systems to guide pilots in the approach patterns for the airport. Before precision approach guidance systems become operational, the FAA must develop procedures, install approach lights, and position visibility sensors along the runway so it can be used in the lowest visibility approved for that system. Some airports need new surface surveillance systems to alert pilots to potential runway incursions and to help pilots negotiate complex airport taxiway and runway configurations. Capital investment is also required to expand air traffic control facilities and add additional controller positions to handle the increased complexity of terminal airspace after a new runway is opened. The FAA must allocate capital investment dollars to support these infrastructure investments in the near term, while increasing NextGen investments to achieve the future capacity expansion to handle future increased levels of operations.

2 Safety and Security

Most CIP projects support ATO air traffic control functions, but there are several non-ATO projects in the CIP that support the FAA's safety and security missions. Monitoring and enforcing safety standards are mainly the responsibility of FAA lines of business outside of the ATO. FAA safety projects include upgrading and improving the hardware, software, and communications equipment that support databases of safety information and aircraft design standards. The primary project that has improved safety databases is called the Aviation Safety Analysis System (ASAS), which plays a major role in improving safety and helping safety inspectors allocate their inspection hours to address the most serious problems. The ASAS databases are a readily available source of regulatory data and past FAA actions that safety personnel can access to assist them in carrying out inspections and certifications.

Although most CIP projects support the Increased Capacity goal and are allocated to that goal in Appendix A, they often have some safety benefit as well. These include weather systems that enable controllers to both warn pilots of severe weather problems and select more efficient routes of travel and upgrades for inspection aircraft that check the accuracy of navigational aids and precision-landing systems to allow all weather operations.

Responsibility for airport security programs has shifted to the Department of Homeland Security, but the FAA must maintain and improve internal security. The air traffic control system is part of the nation's critical infrastructure, and we must protect it from damage and disruption. We must ensure both the physical security of structures and equipment and the integrity of information systems and data transfer among them. We must also maintain emergency radio networks to retain operational control when normal systems are unusable.

2.1 Aviation Safety Projects

The following projects are examples of the most important safety capital investments.

2.1.1 Safety Databases

The ASAS and its three follow-on projects—the System Approach for Safety Oversight, the Aviation System Knowledge Management Environment, and Regulation and Certification Infrastructure System Safety—buy hardware, software, and information-sharing technology to support aviation safety databases. These databases contain records of safety infractions by pilots and air carriers; safety regulations governing how to operate, manufacture, and repair aircraft; and directives and compliance records for commercial operators. Having this information readily available ensures that the FAA safety inspectors are aware of the past safety compliance of the people and organizations they are reviewing. It also increases the effectiveness of these inspectors and ensures that they have the latest information about FAA regulations and Advisory Circulars readily available when they conduct inspections.

2.1.2 Runway Incursion Reduction Program

The Runway Incursion Reduction Program (RIRP) will continue research, development, and operational evaluation of technologies to increase runway safety. Consistent with National Transportation Safety Board recommendations and initiatives identified in the FAA Flight Plan and the Runway Safety Blueprint, research emphasis will remain on technologies that provide direct safety warnings to pilots and aircrews as well as those that can be applied cost effectively at small to medium airports. Initiatives include operational evaluation of Runway Intersection Lights, Low Cost Ground Surveillance, and Final Approach Runway Occupancy Signal awareness tools. The program will also develop upgraded capabilities for the Runway Status Lights. As appropriate, solutions will be prototyped and tested in an operational setting to validate their technical performance and operational effectiveness.

2.1.3 Airport Surface Surveillance

A more detailed discussion of the Airport Surface Detection Equipment (ASDE), which helps to prevent runway incursions, appears in section 4.1.3. The ASDE Model 3 (ASDE-3) is a radar-based system that displays the location of aircraft on or near the runway and ground vehicles that could pose a hazard to aircraft. This enables controllers to issue warnings to prevent a runway or taxiway incident. ASDE Model X (ASDE-X) uses a variety of technologies to better display the location of aircraft and ground vehicles near the runways and taxiways.

2.1.4 Weather Systems

Although we discuss these systems in section 4.1.5, we also mention them here because many weather sensors improve the safety of flight. The Terminal Doppler Weather Radar (TDWR), Weather Systems Processor (WSP), and the Low Level Wind Shear Alerting System (LLWAS) provide warnings of dangerous wind shear conditions. This helps pilots avoid flying into

hazardous weather as they approach and land at an airport. The TDWR operates at the larger airports; the WSP is at medium-sized airports; and the LLWAS is used both at airports without radar coverage and to supplement radar information at airports with weather radar using ground-based wind sensors. Visibility sensors measure the distance pilots can see on a runway so they know whether visibility is above or below the minimums needed for a safe landing. Information from the weather sensing and reporting systems is often integrated to produce weather forecasts so controllers can make more informed decisions in routing flights around severe weather and avoiding turbulence and thunderstorm risks.

2.1.5 Traffic Alert and Collision Avoidance System (TCAS)

TCAS provides pilots with warnings and resolution advisories to avoid colliding with another aircraft. This project will support efforts to develop improved software for these systems.

2.1.6 Aeronautical Information Management (AIM)

The program will improve aeronautical information services by adopting modern information technology and improvements in business processes and aeronautical information policies.

Target capabilities in AIM include:

- Centralize and standardize Notices-to-Airmen (NOTAMs);
- Migrate to fully digital NOTAM, weather and flight plan services;
- Streamline and automate processes for generating status changes such as airspace reservations/activations and NOTAMs;
- Centralize and standardize definition and scheduling of military airspace;
- Improve quality and value of pilot briefing and flight planning services by integrating digital weather and digital NOTAMs into briefing and analysis services; and
- Integrate Aeronautical Information services into SWIM and other NextGen capabilities.

2.2 Security

Several projects protect FAA facilities and equipment and prevent injury to employees and damage to and disruption of air traffic control systems.

2.2.1 Facility Security Risk Management

The FAA established the Facility Risk Management Program to respond to Presidential Decision Directive 63, which requires Federal agencies to develop programs to protect critical infrastructure. That directive has been superseded by Homeland Security Presidential Directive (HSPD) 7, which addresses identifying, prioritizing, and protecting critical infrastructure. The program takes an integrated approach to security by improving access control, surveillance, and intrusion detection. The program also includes perimeter hardening and adding blast resistant film to windows at NAS critical facilities. Security upgrades will continue at 180 smaller facilities between 2009 and 2013.

2.2.2 Information Security

The FAA must protect the NAS from both external and internal cyber threats. The number of incidents has been reasonably small, but the critical nature of FAA's infrastructure requires elaborate security precautions to prevent intrusions. As part of our existing information technology security program, we are working to strengthen the firewalls that prevent intrusion and to upgrade anti-virus software and other safeguards.

The FAA Cyber Security program is a partnership between the FAA Chief Information Officer and FAA lines of business and staff offices that focuses on protecting our information technology (IT) infrastructure. The program includes computer security incident response; IT and Information Systems Security (ISS) awareness and training; IT research and development; policy, standards, and requirements development; program evaluations; and system certification and compliance. This comprehensive Cyber Security effort offers information system security awareness training for the agency's key ISS personnel, protection of FAA's information systems, and appropriate responses to computer security incidents.

2.2.3 Emergency Communications

In case of natural disasters or human-caused service disruptions, the FAA must maintain communications among its facilities. The NAS Recovery Communications (RCOM) project provides an emergency communications network using high frequency and very high frequency radios and satellite communications. RCOM also provides secure communications equipment for voice and facsimile messages and mobile communications devices for short-range communications. We are continually upgrading and testing these systems so that they will work when they are needed.

2.2.4 Automated Detection and Processing Terminal (ADAPT)

The FAA will use ADAPT to validate the identity and legitimacy of aircraft operating within or entering the NAS. ADAPT is a highly integrated set of database systems provided by FAA, Department of Commerce, Department of Homeland Security, and the Transportation Security Administration.

3 Next Generation Air Transportation System

Over the last 20 years, the FAA has significantly modernized the existing air traffic control system. By both improving equipment and adding a robust strategic planning capability at the Air Traffic Control System Command Center, the agency has markedly improved its ability to handle the flow of air traffic. However, we anticipate reaching the limits of improving the current system in the near future. With continued aviation growth on the horizon, the FAA must implement new ways of managing the predicted air traffic volume. The Next Generation Air Transportation System (NextGen) replaces and expands the current system's capabilities. This section discusses the key elements contained in the NextGen solution sets and budget line items

that identify the operational improvements that we must implement to create a system to handle future demand.

3.1 Demonstrations and Infrastructure Development

This project supports major field demonstrations of key NextGen capabilities. These demonstrations include stakeholder participation to ensure user evaluation of new concepts in an operational environment. The purpose is to validate the benefits of NextGen and encourage stakeholder adoption of the capabilities. There are four NextGen demonstrations.

International Air Traffic Interoperability: This effort, which includes the Atlantic Interoperability Initiative to Reduce Emissions (AIIRE), will obtain data from commercial aircraft along oceanic routes to demonstrate and accelerate Airline and Air Navigation Service Providers (ANSP) efficiency and improvements using existing systems and technologies. The flight trials development stage will include system architecture, design, hardware and software development (where applicable), procedures development, simulations, component and subsystem testing and certification, and system checkout. This international interoperability air traffic demonstration and development initiative will also assist the international communities and the FAA in validating 4D Trajectory Based Operations (TBO) and Performance-based Air Traffic Management (PATM) alternatives.

High Density Airport (HDA) Capacity and Efficiency Improvement Project: Trajectory Based Management (TBM) will be accomplished using fully defined 3D paths to ensure aircraft sequencing and spacing (path stretching using dog-legs or offsets). The 3D paths permit more orderly and predictable traffic patterns and use path clearances rather than the conventional speed, altitude, and heading clearances to manage aircraft spacing. This technique has the potential to reduce controller workload and allow the airplane to precisely follow a continuous path using the accuracy of Required Navigation Performance (RNP) operations.

Unmanned Aircraft Systems (UAS) 4D Trajectory Based Demonstration: The first objective will utilize the advanced capabilities of the UAS community to serve as a testbed for exploring future 4D trajectory based concepts. The second objective is to examine potential concepts for the wide-spread integration of UAS into the future NextGen environment.

Virtual Tower (Staffed and Autonomous): The Virtual Tower (VT) program will demonstrate and validate the potential of emerging alternative approaches to performing local and ground air traffic control from facilities other than the current Airport Traffic Control Tower (ATCT).

3.2 System Development

This project focuses on four areas of research and development – safety, capacity, human factors, and environment. The safety research includes expanding information sharing and data analysis to identify and mitigate risks before they lead to accidents. The capacity research develops requirements for new air traffic management systems to support NextGen; measures NextGen concepts to determine if they achieve the capacity targets for 2025; and develops flexible airspace categories to increase throughput. The human factors research investigates higher efficiency levels in air traffic control and identifies the new role for controllers as more

responsibility shifts to the flight crew. The environmental research provides new procedures, technologies, and fuels to reduce emissions, fuel burn, and noise; and includes demonstrations, methods to adapt the current infrastructure, and estimates of costs and benefits.

Controller Efficiency: This subproject examines human factors related to increasing controller efficiency to meet rising demand. A key performance target of NextGen is to satisfy growth in demand up to three times current levels. Automation and technology must work in concert with the humans in the system to meet the targeted efficiency levels. Human factors aspects, e.g. cognitive load, or verbal communications in existing air traffic control systems are a limiting factor for traffic loads. Projected traffic loads will exceed the capability of our current mode of air traffic control when traffic levels exceed 130 percent of 2004 levels (baseline).

Air/Ground Integration: This subproject examines human factors when systems on aircraft and at ground locations are integrated and the roles of humans shift. Achieving the capacity targets of NextGen and achieving allocation of tasks to flight crews/aircraft such as self-separation between aircraft requires significant changes in the roles and responsibilities of pilots and controllers, and their interaction with automation. Integration of air and ground capabilities poses significant challenges for the air traffic service provider and the flight crew. A core human factors issue is to ensure that safety is maintained. Information on intent as well as positive information on delegation of authority must be clear and unambiguous; and new types of human error modes are required to manage safety risk in the changing environment.

Advanced Noise and Emission Reduction: This subproject examines the impact of operational changes that might result from the introduction of new airframes and engines and how to reduce the environmental impact of aircraft. Achieving the NextGen target of three times current levels of capacity could cause aircraft noise and emissions to increase threefold. The potential for environmental damage could restrict capacity growth and prevent full realization of NextGen. The problem is to reduce the environmental impact of aviation in absolute terms through new operational procedures, technologies, and fuels to allow the desired increase in capacity.

Emissions Validation Modeling: There must be a thorough understanding of the economic and operational impacts of the system alternatives for reducing noise and emissions with respect to the system alternatives for increasing capacity. As the system solutions to increase capacity develop, there must be validation that proposed solutions to reduce noise and emission are sufficient to prevent environmental restrictions that might limit the required capacity increases.

New ATM Requirement: This subproject identifies, defines and validates system requirements established by the NextGen mid-term concept elements. Achieving NextGen will require a full-scale transformation of the air traffic control system, because our current system simply is not scalable to handle the required changes. The new system must demonstrate higher capacity levels at faster speeds than today. A system transformation of this magnitude requires air traffic control to change from tracking aircraft to managing trajectories.

NextGen Operations Concept Validation: This subproject defines, and validates detailed concepts to be achieved by NextGen operational capabilities. As proposed system alternatives for NextGen develop, there must be an understanding of the economic and operational impact of

the solutions. This requires a thorough understanding of how the aerospace system operates, the impact of change on system performance and risk, and how the system impacts the nation. There must be methods, metrics, and models that demonstrate whether or not the proposed solution contributes to increased capacity, reduced transit time, or increased on time arrivals; and if so, how much the solution contributes.

System Safety Management Transformation: Safety is the top priority of FAA. Transforming the system will require a thorough understanding of the operational impact (with respect to safety) of system alternatives. While pursuing three times current levels of capacity, FAA will continue to pursue reduced fatality rates. This will require: data analysis capabilities to predict, identify, and mitigate safety risks before they become accidents; safety guidelines to help stakeholders develop their own safety management systems; and modeling to help measure progress toward achieving FAA goals.

Wake Turbulence Recategorization: Achieving the NextGen targets requires improved airspace access for a changing fleet mix and updated separation standards that increase capacity to allow efficient use of congested airspace while at the same time maintaining safe operations. Current wake separation standards are set-up to protect the smallest aircraft in one category from the largest aircraft in the next category. Establishing categories which are adapted to the aircraft's operational profile, .e.g. partially loaded or flying continuous descent profile, could increase flexibility and throughput.

3.3 Initiate Trajectory Based Operations

This project primarily supports improvements in en route operations, but it does affect efficiency in all other phases of flight. It requires a shift from a clearance-based Air Traffic Control (ATC) system to a trajectory-based one. The rationale for a trajectory-based system is that aircraft will receive approval to fly with assurance that their flight path (trajectory) is free of near- and mid-term conflicts. Aircraft will be able to fly the most efficient flight path with specified times to pass pre-identified waypoints, and air traffic control intervention will not be necessary, except when atmospheric or off-nominal conditions do not allow the aircraft to fly the planned route at the planned times.

3.3.1 Background

Currently, controllers are responsible for separation of aircraft; and they assess the airspace in their sector to assign altitudes and routes of flight. With increasing diversity and volume of aircraft using the en route airspace, controllers find it more difficult to accommodate optimal routes and altitudes. The combination of different airspeeds and turbulence behind large aircraft requires larger separations. Also, as more aircraft fly in any one sector, the amount and the relative simplicity of voice communication limits controllers' ability to maintain flight efficiency and minimum separation distances. This, in effect, reduces the capacity of a given amount of airspace.

3.3.2 Operational Capability Description

A key aspect of trajectory-based operations (TBO) is integrating trajectory planning with strategic planning to minimize the tactical decision making for overall airspace management. The flexible management of aggregate trajectories enabled by TBO allows maximum access for all air traffic with more efficiency for those aircraft with advanced capabilities that support the air traffic management concept enabled by TBO.

3.3.3 Development of Capital Investments that Support Trajectory Based Operations

FAA is planning several new technologies that support TBO. Later releases of software enhancements to ERAM will allow assessment of whether requested trajectories are available and will reserve that airspace for flight well in advance. Just before flight time, weather information can be integrated into the approval process for trajectories, so the assigned trajectory can be changed if the original trajectory is unavailable due to severe weather. The enhanced surveillance with ADS-B and communication, which results from the DataComm program, will minimize the voice communication between pilots and controllers and enable them to have more complex interactions than voice alone cannot support. Strategic planning will also be more precise, due to improved weather forecasting and more timely sharing of weather information made possible by the NextGen Weather Processor.

3.4 Reduce Weather Impact

Weather can impact aviation in a number of ways. Over 70 percent of aviation delays are weather related. However, the most dangerous impact is from thunderstorms. These powerful storms can damage aircraft with lightning strikes and severe turbulence, and deteriorate performance if there is ice accumulation on the wings. Due to the risk related to encounters with severe weather, pilots plan routes that let them avoid flying close to thunderstorms. Fog and low clouds can obscure visibility for aircraft approaching airport runways. Only the most well equipped aircraft can land when visibility is severely restricted. Airports will often be closed when visibilities are below established minimums. Rain and snow can also result in airport closures because heavy precipitation can seriously reduce visibility or braking effectiveness on the runway. Winds also affect flight schedules. Stronger than expected head winds can increase en route flight times and create such issues as overlapping arrivals because arrivals from the west are earlier than expected and arrivals from the east are later than expected. Access to accurate weather information is essential for planning a flight and avoiding problems while in flight. To adequately reduce weather impact, the FAA must continue to effectively integrate weather information into operational systems and decision-making.

3.4.1 Background

Weather information used in aviation today is not in the formats or resolution needed to provide the degree of predictability necessary for flight planning and ATM. Current systems need improvements, but it is especially important to upgrade weather systems to cope with the increases in air traffic predicted for the future. Unpredicted changes in the weather cause significant disruptions in the NAS, and the current system is unable to respond well to changes

stemming from unpredicted weather. The goal is to make weather information more user friendly by creating better access and more frequently updated information so decisions can be made faster and better. Integrated weather information, along with probabilistic forecasts, will minimize the effects of weather on NextGen operations. Accurate preflight planning has as much potential to reduce delays as trying to mitigate impacts after the aircraft is airborne.

3.4.2 Operational Capability Description

The FAA can improve NAS performance by reducing the operational impact of weather. Integrating consistent and accurate weather into ATM, flight operations centers, and flight decks will improve safety and reduce delays. Improvements are needed in weather sensors, forecast technology, and techniques for providing universal user access to weather information. Decision support systems need to directly incorporate weather data so expected weather is matched to specific route planning. This will maximize use of airspace and minimize delays.

3.4.3 Development of Capital Investments that Reduce Weather Impact

There will be investments in both sensing and dissemination systems. The FAA will continue to upgrade the group of weather sensors described generically as automated weather observing systems to better detect ceilings, precipitation type and freezing rain. We will upgrade the weather channel of terminal radars and carry out service life extension programs (SLEP) on other existing systems such as the Terminal Doppler Weather Radar and the Weather and Radar Processor (WARP). We will decide in the future whether to replace WARP with the NextGen Net-enabled Weather (NNEW) system.

A key component of the NNEW is the NextGen 4D Weather Cube. It is a distributed “virtual” database that will receive weather data directly from sensors and other weather sources and either automatically or by request send data to FAA facilities. The 4D weather cube allows observations and forecasts to be more widely and consistently distributed to a broad set of users via network enabled operations.

There will also be investments in supporting systems. We can use the ADS-B transmitters to send weather data to the cockpit. The consolidated automation systems will incorporate weather data into their decision software.

3.5 Increase Arrivals/Departures at High Density Airports

The 35 OEP airports serve about 73 percent of airline passengers. Many of these airports are operating near capacity during peak hours of travel demand. Although building new runways can accommodate increased operations at these airports, expansion of airside capacity is not an option if developable land is unavailable and environmental issues restrict new construction. Thus, the FAA must develop better technology to maximize use of available capacity. This solution set addresses opportunities to increase runway throughput.

3.5.1 Background

Making full use of available runway capacity is challenging. First, aircraft have different landing speeds and that affects the amount of required separation between aircraft. Second, large wide-body aircraft generate significant wake turbulence, which is a hazard to smaller narrow-body aircraft. As a result, it is rare to achieve the theoretical maximum runway acceptance rate. Automation programs, improved approach procedures, and trajectory-based operations could potentially increase the number of aircraft handled on each runway.

Another inefficiency in terminal control at large airports is the need to vector aircraft into a line to approach the runway end. Since aircraft can enter terminal airspace from any one of several directions, controllers typically require that they fly an indirect route to the airport to position them in the line for the runway. This increases efficient use of the runway, but it also increases flight time and fuel burn. If trajectory-based management is able to bring aircraft more directly to the line at a precise time, it could save airline direct operating costs.

3.5.2 Operational Capability Description

High-density corridors will provide more efficient transition to and from trajectory-based en route airspace. The corridors will seamlessly integrate surface operations through transition altitudes to and from en route airspace. Arriving aircraft will receive specific 4D trajectory profiles via data communications as early as possible. As routes converge, automation will establish airborne spacing and merging procedures that reduce spacing and save flight time. Required Navigation Performance/Area Navigation (RNP/RNAV) routes will be prevalent, allowing for closer route spacing than is available today. Also, aircraft approaching closely spaced parallel runways may conduct parallel runway procedures, thereby removing another restriction on runway capacity.

Time savings will also be provided on the airport surface. Onboard displays of the data communications provided taxi route, coupled with display of surface traffic and other hazards, will enable aircraft to safely taxi at or near normal speeds in low visibility conditions. This has the added benefit of reducing runway incursions and other taxi errors. Cockpit and ground automation will allow aircraft to plan for crossing active runways without tower intervention. Near real time updates for airport surface maps will be provided via data communications.

3.5.3 Development of Capital Investments that Support Increased Arrivals/Departures at High Density Airports

Improving runway utilization will depend on enhanced automation. The ERAM and modernized terminal automation will be upgraded to merge en route and terminal routes. Matching terminal routes and en route flight paths end-to-end will reduce flight time and maximize use of runway capacity. Improving surface operations will rely on enhanced surveillance of the airport surface combined with automation in the Surface Management System. Transferring information to the cockpit will require implementing the new Data Communications System. Increasing RNP/RNAV approaches may require installing more DME locations.

3.6 Improved Collaborative Air Traffic Management (CATM)

Significant service improvements are possible by collaborating with aircraft operators regarding how to deal with severe weather conditions and with air traffic and airport congestion, both in terminal areas and en route. By sharing information and letting customers identify their priorities, better decisions can be made regarding how to handle re-routes and potential delays. Adjustments are shared equitably among all the aircraft using the affected airspace, but users can decide which of their own flights to hold back and which flights need to move to prevent further downstream delays. The quality of the decisions depends heavily on the quality of the information being used. Sharing all available information in near real-time requires a sophisticated network such as SWIM. It also depends on the accuracy of software that forecasts future conditions and the available capacity of affected airports.

3.6.1 Background

The FAA has been collaborating with users for several years. Existing software predicts the demand at specific airports and the available capacity. When demand exceeds capacity, there are several ways to control demand to reduce delays that would occur if traffic flows were not adjusted. Either aircraft can be held on the ground at their departure airport until there is balance between demand and capacity, or aircraft at the congested airport can be held so runways can accommodate more approaching aircraft. Either of these decisions has gradations between full holds and normal operations, so judgments have to be made regarding how stringent a holding order has to be. An additional complication is the impact of weather. If capacity is restricted because of weather, a forecast of when the weather pattern will change becomes a key factor in deciding whether to hold aircraft. An inaccurate forecast can result in more delays than necessary or it can increase delays because aircraft cannot land at an airport that was forecasted to be clear of the weather, but it is still affected.

Weather also is important in the en route domain. Airlines try to avoid moderate to heavy turbulence and thunderstorms to avoid damage to the aircraft and injuries to passengers and crew. Choosing a different route to avoid severe weather normally involves a time and distance penalty. To strategically manage weather and en route congestion, the FAA is implementing the Airspace Flow Program to match demand with the expected capacity of the target airspace. The FAA coordinates with air carriers to choose the most efficient alternative routes for those aircraft that can't be assigned to the flow-constrained area. It also judges when diversion is no longer necessary and future flights can fly their planned routes.

3.6.2 Operational Capability Description

When the FAA fully implements NextGen, all airspace users will be able to collaborate on Air Traffic Management (ATM) decisions. The system will accommodate everything from large airline operations centers to the single pilot with a personal computer. Authorized users will have access to information relevant to their level of operations, and that information will be more timely and comprehensive when NextGen improvements are implemented.

Collaborative Air Traffic Management is the means for balancing operator objectives and constraints with overall NAS performance objectives. To ensure that locally developed solutions do not conflict with overall goals or other implemented strategies, decision makers follow NAS-wide objectives and pre-developed “play books” to ensure that delays are minimized throughout the system rather than at a few selected airports. In NextGen systems, flight planning will be iterative and interactive, and automation systems will store trajectory and other information. As the departure time draws closer, operators will be notified of any changes necessitated by weather or other factors so adjustments can be made to the trajectory. For sophisticated NextGen users, a preferred trajectory and alternate trajectories may be filed in advance so selection of an alternative, when needed, will be automatic depending on the forecast weather.

3.6.3 Development of Capital Investments that Support Improved Collaborative Air Traffic Management

Investment will continue in modernizing the ATM System and upgrading the software that calculates capacity and demand for major airports. The automation upgrades for ERAM and terminal automation systems will enhance the information feeds to the ATM platforms. SWIM will allow data sharing among all the airspace users. Upgrades to the weather dissemination systems will improve the timeliness and forecast accuracies used to strategically manage air traffic. This, plus improvements in defining and managing aeronautical information, will provide the basis for the NextGen Automation Platforms to have access to complete and consolidated information, which improves the efficiency of comparing, displaying and managing traffic conditions.

3.7 Increase Flexibility in the Terminal Environment

This solution set gives airports that support both high-density and lower density operations the flexibility to serve all types of aircraft that want to land at the airport. It seeks to provide a core NextGen functionality to both high- and medium-level airports. This is important since medium level airports are expected to have faster growth rates than high-density airports, which often operate near capacity several hours of the day. At airports where traffic demand is lower, operations requiring lesser aircraft capabilities can be offered; this allows access to a wider range of users while retaining some of the throughput and efficiencies of the high-density airports.

3.7.1 Background

Since we expect higher growth rates at the medium-density airports, we need to focus on ensuring that their capacity grows to meet that demand.

3.7.2 Operational Capability Description

Aircraft equipped for airborne spacing and merging procedures at large airports will be handled during periods of peak operations. The smaller, more flexible air traffic control facilities will be able to more easily accommodate aircraft transiting their airspace or landing at a satellite airport with fewer requirements than those needed for super density operations. These airports can

allow satellite navigation based approaches, limited use of continuous descent approaches, and other efficient procedures for aircraft with less equipment than larger aircraft.

3.7.3 Development of Capital Investments that Support Increased Flexibility in the Terminal Environment

Investment to support this type of operation includes the Wide Area Augmentation System and Local Area Augmentation System to allow approaches during limited visibility. The Tower Data Link System can be used to provide departure and simple, coded taxi route clearances. Aircraft that are properly equipped can also use RNP/RNAV approach procedures. The Traffic Information System (TIS-B), which broadcasts over ADS-B transmitters, can provide expanded traffic advisory services. Reduced separations can be safely used when technology-based wake turbulence separation decision support tools have been implemented.

3.8 Increase Safety, Security, and Environmental Performance

Safety is the FAA's primary goal. As we continue to develop new techniques and technologies for air traffic control, we will ensure that they are as safe or safer than current systems. Increasingly, we are seeking to discover safety issues before work begins on new initiatives, and improve design safety for new systems and procedures. Security also deserves special attention. The air traffic control system is part of the critical infrastructure of the United States and needs to be protected from terrorist threats as well as natural disasters. Many of the facilities were designed in the middle of the last century and need to be upgraded to more current standards.

We must also address environmental concerns for every project. Anticipated increases in air transportation demand will place significant environmental pressures on various segments of the NAS. The primary environmental constraints on the capacity and flexibility of NextGen will likely be community noise, local air quality, global climate impacts, water quality, and energy production and consumption. Our NextGen environmental challenge is to manage aviation's environmental concerns in a manner that reduces or limits the impact of these challenges to allow aviation growth.

3.8.1 Background

The FAA is examining the optimal configuration for its air traffic facilities. The outcome is very likely to involve new construction. Designing security and environmental improvements into new facilities is much more economic than adding them to existing facilities.

The FAA has adopted the Safety Management System, which the International Civil Aviation Organization (ICAO) recommended. We must analyze programs during their earliest stages and throughout their life cycle to uncover safety risks or hazards. This action allows the designers to incorporate safety into a program before we have spent significant sums building it, and it ensures that planned improvements do not result in any new risks.

3.8.2 Operational Capability Description

The potential for significant growth and increased complexity in the air transportation system requires a fundamental change in the way we manage safety. Future safety programs will evolve from reactive data analysis to integrated historic and prognostic evaluation and management of safety risks so that we can prevent future accidents and incidents. This means that we must require program offices to analyze safety issues as they develop new capabilities and procedures and incorporate safety risk management when they are implemented.

3.8.3 Development of Capital Investments that Support Increased Safety, Security and Environmental Performance

For the FAA, the Security Integrated Tool Set (SITS) embeds security requirements for flights and airspace into daily operations so that it becomes an efficient, normal part of the task. Monitoring aircraft and airspace for security is equally important as other operational considerations regarding weather, congested airspace, and Special Use Airspace. This requires incorporating security characteristics into the operational toolset and developing a supporting security infrastructure. Including security into NextGen improvements should improve controller efficiency.

3.9 Networked Facilities

The Networked facilities solution set includes all initiatives that are focused primarily on improvements in NAS resource management. This effort includes allocating staff and facilities optimally, using more cost-effective and flexible systems for information sharing and facility backup, and improvements in managing and training employees. It involves all activities related to the establishing and removing facilities, and changing the size and number of control facilities as well as thinning or eliminating other facilities such as navigation aids.

3.9.1 Background

Handling increased traffic in the future while managing costs and improving services is a key goal of this solution set. The current system has built in limitations in flexibility, cost of service delivery, and continuity of operations. Redesigning facilities can overcome some of these limitations. In addition, some smaller airports have limited service and future growth may qualify them for more service. We must explore how to provide expanded services at a lower cost.

3.9.2 Operational Capability Descriptions

Flexible ground-ground and air-ground communications networks do not require that air traffic facilities be in close proximity to air traffic being managed. Facilities can be sited in locations that enhance infrastructure security, allow service continuity and optimize workforce deployment. New information systems planned for NextGen improve monitoring of infrastructure health and system performance to maintain service availability. Transforming FAA's delivery of ground, air-ground, and other services will enable the flexibility needed to

respond to demand in an affordable and timely manner. Flexible infrastructure can scale service delivery up and down as needs change.

3.9.3 Development of Capital Investments that Support Transform Facilities

Initial investments will focus on analyzing how service will be delivered under the NextGen system and design of the facilities that can provide those services. It will include examining the requirements for creating virtual towers and determining how best to create facilities that more optimally allocate and balance current workload while taking advantage of new and expanded capabilities.

3.10 Airport Development

One of the most effective ways to increase capacity and decrease delays is to build more runways. The FAA has promoted new construction wherever possible, but expanding airports in major urban areas is difficult. It is impressive that since 2000, 13 new runways have opened at the 35 major airports referred to as the OEP airports. These new runways will support 1.6 million additional operations. There are 10 additional airfield projects underway at the OEP airports, which will add even more capacity in future years. Local airport authorities build new runways, and FAA airport grants partially finance many projects; however, additional FAA investment is necessary to make full use of the increased capacity.

3.10.1 Background

The 35 OEP airports serve 73 percent of airline passengers. These airports are most likely to have significant delays due to the heavy demand for air travel and the limitations on capacity expansion. The FAA encourages building new runways and other capacity projects, whenever possible. A new runway can support a large number of new operations during visual flight conditions, but that runway needs supporting equipment to increase the airport's capacity to handle additional flights during limited visibility conditions. If NextGen is going to succeed, the FAA must be prepared to invest in equipment that will allow new runways to increase capacity in adverse weather, when delays are most likely to occur.

3.10.2 Operational Capability Description

There are 10 projects underway at eight OEP airports – Philadelphia, Los Angeles, Washington Dulles, Chicago, Charlotte, Atlanta, and Dallas-Ft. Worth. Six are new runways, and the others are runway extensions or taxiway improvements that allow the airport to handle more operations. There are 11 more projects in the planning stages, and it is likely that there will be a continuing effort through 2025 to construct new capacity to accommodate growing demand.

3.10.3 Development of Capital Investments that Support Airport Development

There are several infrastructure investments required to support new airport and new runway construction. To achieve the maximum benefit, a new runway at an OEP airport must have precision approach guidance. Current policy is that the Instrument Landing System (ILS) will be

required at OEP airports. Installation of an ILS also requires runway visual range and approach lights. Communication lines and automation systems must be installed or modified to accommodate the new equipment.

3.11 Aircraft and Operator Requirements

Many of the NextGen investments will not result in the expected benefits if aircraft and commercial operators do not equip their aircraft with next-generation equipment. The Automatic Dependent Surveillance–Broadcast ground stations will rely on transmissions from aircraft that send information on their location and operating parameters. DataComm will require that aircraft have the appropriate communications equipment to support data link. Efforts will continue to ensure that aircraft equip at a rate compatible with development of new capabilities.

3.11.1 Background

Demonstration projects have shown that there are potential efficiencies in managing air traffic if FAA and users share the responsibility for separation of aircraft. For this to happen, mechanisms must exist to share information, and aircraft must install equipment that will be compatible with the FAA ground installations.

3.11.2 Operational Capability Description

NextGen operational improvements depend on introducing new technology. This requires investment by both FAA and aircraft operators. Improved surveillance will depend on aircraft equipping to transmit accurate position information to the ADS-B ground stations. Improved communication requires an update for aircraft radios, which incorporates the ability to receive and display data link transmissions. Taking advantage of terminal approach procedures that allow lesser separation requires more precise navigation equipment.

3.11.3 Development of Capital Investments that Support Aircraft and Operator Requirements

The capital investment to support this solution set will be the responsibility of aircraft owners and operators. FAA has been working to make the appropriate investments to bring their systems on line in the predicted timeframe, so users are confident their investment will bring them benefits.

4 Roadmaps Showing Current CIP Projects and Transition to NextGen

4.1 Roadmaps to the Future System

The detailed roadmaps appearing in the following sections are an integral part of the NAS Enterprise Architecture. The roadmaps show progression from the present system to NextGen. The roadmaps extend planning beyond the 5-year financial horizon covered in the CIP, to ensure an orderly transition to NextGen. Modernization will occur in incremental steps, and we must

clearly show the planned pathway to reach NextGen. Current CIP projects that are foundational technologies for NextGen are funded over the next 5 years to begin the transition.

We update the Roadmaps frequently to reflect the results of studies, demonstration projects, and economic analysis related to projects. The CIP text does not explain every detail in the roadmaps, because final decisions on some elements will depend on study results and associated demonstration projects. For more detailed information, view the Enterprise Architecture and Roadmaps at <http://www.nas-architecture.faa.gov>.

Figure 6 defines the symbols used in the roadmaps. The diamonds indicate decisions regarding whether or not to proceed with a planned improvement. Since the introduction gives only a general overview of the planned changes, the reader should view the NAS architecture Web site for a more complete description of all decisions involved in upgrading NAS capabilities.

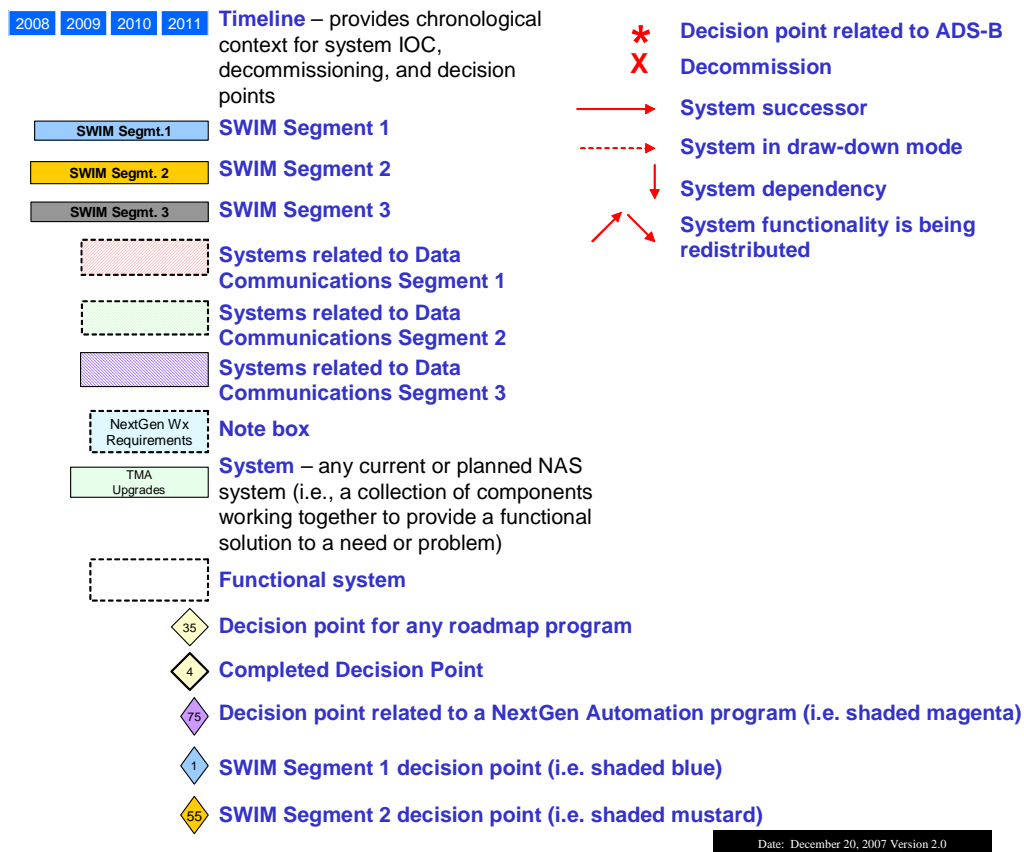


Figure 6 Roadmap Legend

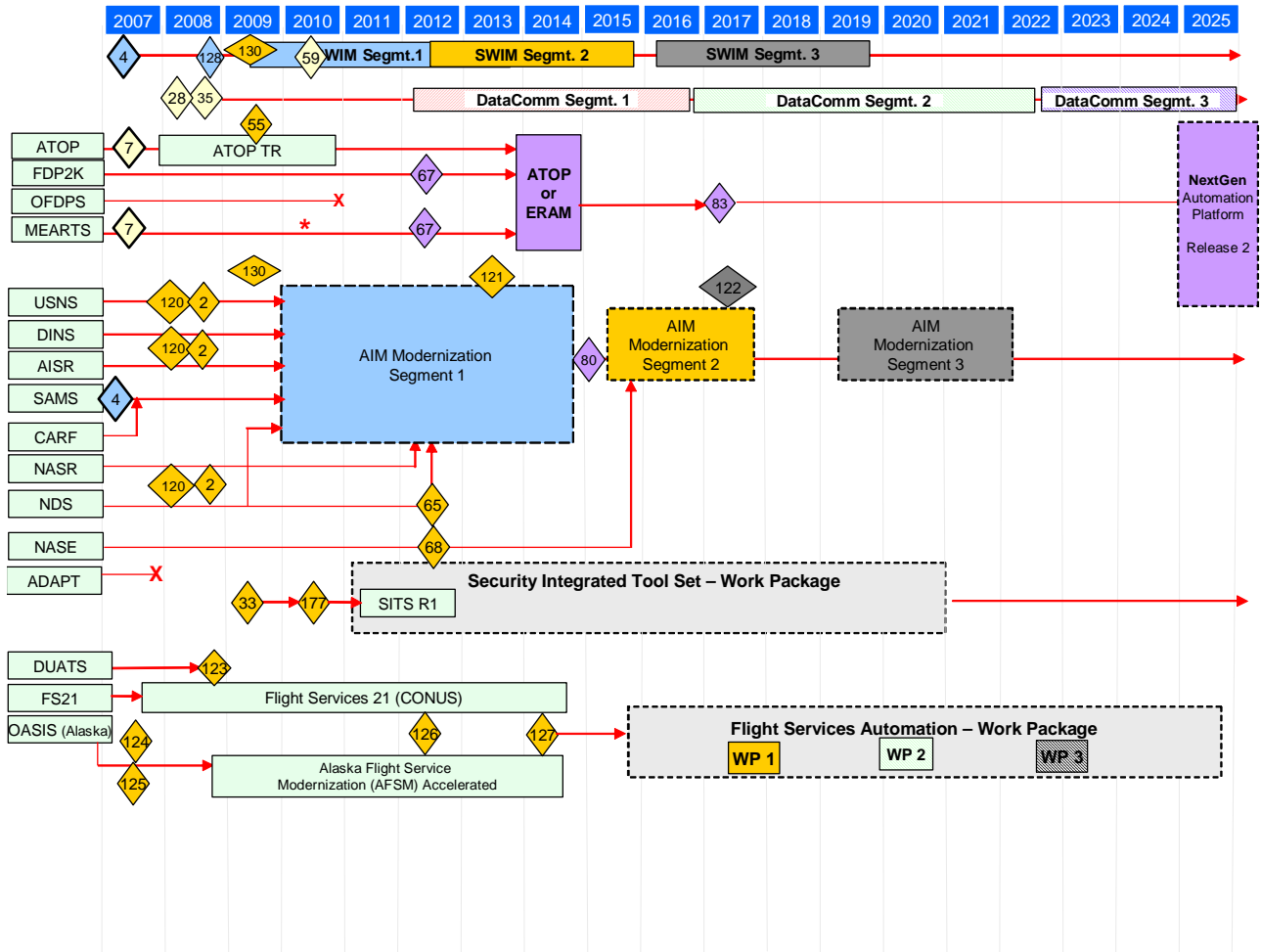
4.1.1 Automation

Automation is a core element of the air traffic control system. For controllers to keep over 50,000 flights safely separated every day they require a real-time depiction of aircraft location and information about operating characteristics such as speed and altitude. Automation gives controllers continuously updated displays of aircraft position, identification, speed, altitude and whether the aircraft is level, climbing or descending. Automation systems can also continue to show an aircraft's track when there is a temporary loss of surveillance information. It does this by calculating an aircraft's ground speed and then using that information to project its future position.

Other important features of automation:

- It generates visual displays of information on routes, restricted areas, and several other fixed features of the controller's sector.
- It uses software that further enhances safety by providing automated alerts to controllers of potential aircraft conflicts and warnings that aircraft may be approaching a terrain hazard.
- It supports many functions that are essential to controlling air traffic, such as showing the data from weather sensors, giving the status of runway lights and navigational aids, and providing flight plan information on aircraft being monitored.

The automation roadmaps in Figures 7 and 8 depict current systems and progression to more capable NextGen systems over an extended planning period. One of the important changes that will occur during the roadmap timeframe is that we will be consolidating functions in larger shared systems. These systems will be able to offer more sophisticated services, such as early approval of direct routes, and they will allow better allocation of workload among facilities. New systems will have quicker access to more data and will have the processing power to determine whether the best routes are available or if pilots must use alternate routes to avoid severe weather.



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Figure 8 Automation Roadmap (2 of 2)

Figure 9 shows projected CIP expenditures on automation roadmap projects.

BLI Number	Program Name	FY 2009 Budget	FY 2010	FY 2011	FY 2012	FY 2013
Automation Functional Area		\$664.1	\$950.9	\$914.8	\$897.8	\$1,034.0
1A02	Traffic Management Advisor (TMA)	\$3.7	\$0.0	\$0.0	\$0.0	\$0.0
1A08	Next Generation Air Transportation System (NextGen) - Demonstrations and Infrastructure Development	\$28.0	\$30.0	\$30.0	\$30.0	\$30.0
1A09	Next Generation Air Transportation System (NextGen) - System Development	\$41.4	\$102.9	\$104.0	\$105.3	\$108.3
1A10	Next Generation Air Transportation System (NextGen) - Trajectory Based Operations	\$39.5	\$90.1	\$90.8	\$87.0	\$67.8
1A12	Next Generation Air Transportation System (NextGen) - Arrivals/Departures at High Density Airports	\$18.2	\$74.2	\$85.3	\$110.0	\$316.1
1A13	Next Generation Air Transportation System (NextGen) - Collaborative Air Traffic Management (CATM)	\$27.7	\$111.4	\$103.9	\$84.3	\$87.8
1A14	Next Generation Air Transportation System (NextGen) - Flexible Terminal Environment	\$37.1	\$102.0	\$106.9	\$45.8	\$30.8
2A01	En Route Automation Modernization (ERAM)	\$203.1	\$170.9	\$131.5	\$183.2	\$171.1
2A02	En Route Communications Gateway (ECG)	\$7.4	\$12.6	\$16.3	\$19.8	\$18.5
2A06	Air Traffic Management (ATM)	\$90.2	\$31.6	\$15.2	\$8.5	\$13.4
2A11	Oceanic Automation System	\$20.7	\$12.7	\$20.8	\$10.0	\$7.1
2A15	System-Wide Information Management (SWIM)	\$41.0	\$54.3	\$38.2	\$22.5	\$8.0
2A17X	Automated Detection & Processing Terminal (ADAPT)	\$0.0	\$6.0	\$0.0	\$0.0	\$0.0
2B03	Standard Terminal Automation Replacement System (STARS) (TAMR Phase 1)	\$28.2	\$47.0	\$47.0	\$47.8	\$57.0
2B04	Terminal Automation Modernization/ Replacement Program (TAMR Phase 3)	\$3.0	\$50.0	\$50.0	\$80.0	\$90.0
2B05	Terminal Automation Program	\$4.3	\$2.4	\$2.4	\$2.5	\$2.5
2B19	Integrated Display System (IDS)	\$7.0	\$3.0	\$4.0	\$0.0	\$0.0
2B22X	Terminal Automation Modernization/ Replacement Program (TAMR Phase 2)	\$0.0	\$1.7	\$1.1	\$2.4	\$3.0
2D08	Instrument Flight Procedures Automation (IFPA)	\$10.9	\$7.9	\$0.5	\$0.0	\$0.0
4A10	Aeronautical Information Management (AIM)	\$11.6	\$10.0	\$10.0	\$8.0	\$8.0

Figure 9 Expenditures in the Automation Functional Area¹

One can more easily understand these automation roadmaps when they are segmented into nine major elements. At the top of Figure 7 are the three systems that appear in several other functional roadmaps (System Wide Information Management (SWIM), Data Communications (DataComm) and Automatic Dependent Surveillance-Broadcast system (ADS-B)). These systems are central to collecting and sharing information used throughout the NAS. They transmit and receive critical information to support air traffic control in both the en route and terminal environments.

The far left column of Figure 7 shows the first seven components of the en route automation system (HADDS, URET, Host, DSR, TMA, ECG, and ERIDS, all are defined below). The roadmap shows their eventual incorporation into the En Route Automation Modernization (ERAM) program. The next three systems (STARS/S Lite, ARTS 1E/IIIE, and ARTS IIIIE, also defined below) are different terminal automation models that will be sustained as separate systems until they are eventually consolidated into the NextGen Automation Platform (NAP). The four following systems (DOTS+, SMA, ETMS, and DSP) are part of the automation used for Traffic Flow Management (TFM). TFM is used to strategically manage air traffic, and it will be upgraded as a separate system throughout the period shown in the roadmaps. The bottom seven blocks are information and display systems that feed data to terminal control facilities. We will consolidate their functions in the Terminal Flight Data Platform.

¹ Out-year funding amounts are estimates that assume enactment of the Administration's reauthorization proposal to reform FAA's financing system by adopting cost-based user fees and fuel taxes for the costs of air traffic services.

The far left column of Figure 8 shows four systems (ATOP, FDP2K, OFDPS, and MEARTS), which are used to control aircraft flying over the oceans. A decision is pending on whether oceanic automation will remain stand-alone or be incorporated into ERAM upgrades. The next eight systems (USNS, DINS, AISR, SAMS, CARF, NASR, NDS, and NASE) provide status information on airports, airspace, and navigation facilities. A modernized and consolidated Aeronautical Information Management (AIM) system will replace these individual systems. The ADAPT is a security system that validates the identity and legitimacy of aircraft within or entering the NAS; it will be incorporated into the more capable Security Integrated Tool Set (SITS) beginning in 2010. The final three systems (DUATS, FS21, and OASIS) provide flight services to pilots.

The SWIM program is developing the network architecture that will allow distribution of information relevant to air traffic control to those who need it when they need it. Sharing real-time information on weather and traffic conditions will allow FAA collaboration with users to minimize delays and improve operational efficiency. The DataComm program is developing data link equipment to allow critical data to be shared more efficiently with cockpit crews and to reduce the amount of voice communication. The ADS-B program will transform the way air traffic control facilities receive information on aircraft position, speed, altitude, mode of flight, and identification. An aircraft, using its on-board navigation and flight management system, will broadcast information from these systems to ground receivers.

The FAA is currently installing ERAM hardware and software in en route air traffic control facilities. We are integrating existing en route components into the overall ERAM program. The components include:

- Host Air Traffic Management Data Distribution System (HADDSS),
- User Request Evaluation Tool (URET), which allows controllers to select direct routes for aircraft,
- Host Computer,
- Display Replacement System (DSR),
- En route Communications Gateway (ECG), and
- Traffic Management Advisor (TMA).

ERAM replaces both the hardware used for en route automation and translates the software into a modern programming language. The existing software language is obsolete, and modern computers cannot use it. ERAM will expand the capacity of en route centers to handle aircraft, and it will be capable of providing four-dimensional (4D) trajectory management. By adding the fourth dimension, which sets the time aircraft need to arrive at specific waypoints for air traffic control purposes, fewer deviations from direct routes will be necessary, and more aircraft will be able to use their most efficient flight paths. ERAM will remain in service until at least 2022, then, it will be replaced by NAP. During its lifespan, ERAM will be continually upgraded by technical refresh (TR) of hardware components and new software releases to further extend its capabilities. These releases appear on the roadmap with an R and the associated release number.

The En Route Information Display System (ERIDS) distributes important information electronically to controllers to improve productivity and efficiency. The information includes

Notices to Airmen, Pilot Reports, aeronautical charts and airport information, instrument approach and departure procedures, letters of agreement, and local procedures.

The existing terminal automation systems – Automated Radar Terminal System (ARTS) and the Standard Terminal Automation Replacement System (STARS) – will receive technical refresh and upgrades under the Terminal Automation Modernization Replacement (TAMR) program and remain in service until Release 2 of the NAP replaces them. Terminal automation systems assist controllers in handling traffic departing and arriving at airports. These systems will be modified to use the technology introduced by SWIM, Data Comm, and SBS programs. Modernizing terminal automation systems in conjunction with introducing new procedures will allow more direct routes to runway ends, reduce aircraft separation standards, and decrease delays at busy airports.

Traffic Flow Management Systems (TFMS) improve efficiency by collecting information on the use of busy routes and airports. This information is displayed at the Air Traffic Control System Command Center and all affected facilities so they can make decisions on route selection and synchronize traffic approaching airports. This reduces the amount of maneuvering near airports and reduces delays. The FAA has significant investments in TFM and is continually upgrading its capabilities: Dynamic Ocean Track System (DOTS) used for oceanic flights adjusts over water routes to take advantage of favorable winds; the Surface Management Advisor (SMA) reduces taxi time; and the Departure Spacing Program (DSP) assists controllers in sequencing takeoffs. These capabilities will all be incorporated in the TFMS upgrades. The roadmap shows that TFMS will remain a separate system through 2025.

Tower and TRACON controllers must constantly update themselves on conditions around the airport and planned routes of travel for arriving aircraft. They use several separate systems to provide this information. The roadmap shows:

- ARMT – Airport Resource Management Tool,
- FDIO – Flight Data Input Output,
- AEFS – Advanced Electronic Flight Strip System (contains information on the planned route of flight for each aircraft using their airspace),
- ACE-IDS – Automated Surface Observing System Controller Equipment Information Display System, and
- SAIDS – Systems Atlanta Information Display System.

The FAA will integrate the functional capabilities of all these information systems into the Terminal Flight Data Platform to enable controllers to minimize the number of displays they need to monitor.

The FAA has upgraded the suite of systems used for oceanic control, and the Advanced Technologies and Oceanic Procedures (ATOP) system is operational at the three centers that control oceanic air traffic. At those centers, it replaces the Offshore Data Processing System (OFDPS). We will either incorporate the functions of the Flight Data Processor upgraded in 2000 (FDP2K) and the Microprocessor En Route Automated Radar Tracking System (MEARTS) installed at Anchorage into an upgraded ATOP system by 2013 or we will transfer

these functions to ERAM once we decide which alternative is more efficient. Automation of oceanic air traffic control, accompanied by improved position reporting and communications to air traffic facilities, allows reduced separation between aircraft and significant fuel savings because aircraft flying internationally can use more optimal routes.

There are several systems that are used to inform pilots and controllers of temporary changes to airspace use, availability of navigational aids or airport status (such as a closed runway). Both pilots and controllers regularly review this information, which the following systems provide:

- USNS – United States NOTAM (Notice to Airmen) System,
- DINS – Defense Internet NOTAM Service,
- AISR – Aeronautical Information System Replacement,
- SAMS – Special Airspace Management System,
- CARF – Central Altitude Reservation Facility,
- NASR – National Airspace System Resources,
- NDS – NOTAM Distribution System, and
- NASE – NAS Adaptation Services Environment.

NOTAMs are notices of temporary changes such as temporary flight restrictions and runway closures for construction. SAMS and CARF inform controllers when airspace ordinarily reserved for military use is available for civilian use. The other systems contain more detailed information about FAA air traffic control equipment or less frequently changed information such as charts and airspace regulations. The AIM program will establish a standard format and a user-friendly interface for finding the information needed for a specific route of flight.

The bottom three systems on the left side of Figure 8 provide flight services. The FAA has contracted for flight services in the lower 48 states, and the contractor is responsible for upgrading equipment, such as flight service specialist workstations. The Direct User Access Terminals (DUATS) currently allow pilots to file flight plans and obtain weather information for their planned routes from flight service stations, and we plan to decide during 2008 whether to continue this service. Flight Service Automation Systems (FS-21 and OASIS (Operational and Supportability Implementation System)) are used by flight service specialists to record flight plans and provide weather briefings to pilots. The Alaska Flight Service Modernization (AFSM) project will replace the existing automation system used there because it is a leased system and the lease expires in 2010. We will also request funding to upgrade the buildings and supporting equipment for Alaska's flight service stations.

4.1.2 Communications

Radio, ground telecommunications lines, and satellite links connect pilots with controllers and provide communications within and among facilities. Voice switches in air traffic facilities enable controllers to select the channels they need to communicate with one another and with pilots. Controllers are able to use radios located either in their facilities or at remote locations to communicate verbally with pilots. The remote radios extend the range of pilot-controller communication beyond the geographic limits of direct radio transmission and transmit voice communications from their location to the air traffic facility through telecommunication lines.

Backup systems provide communications when the primary systems fail. Figure 10 is the roadmap for the modernization of these systems.

A limited band of frequencies has been reserved for air traffic communications. As the volume of air traffic increases, the fixed number of available frequencies within that band limits our flexibility to add control sectors. There are several solutions to expanding the number of communication channels. FAA is working proactively with international standards committees and industry to identify the most suitable technology for handling future growth and the expanding levels of information exchange needed to maintain efficient operations.

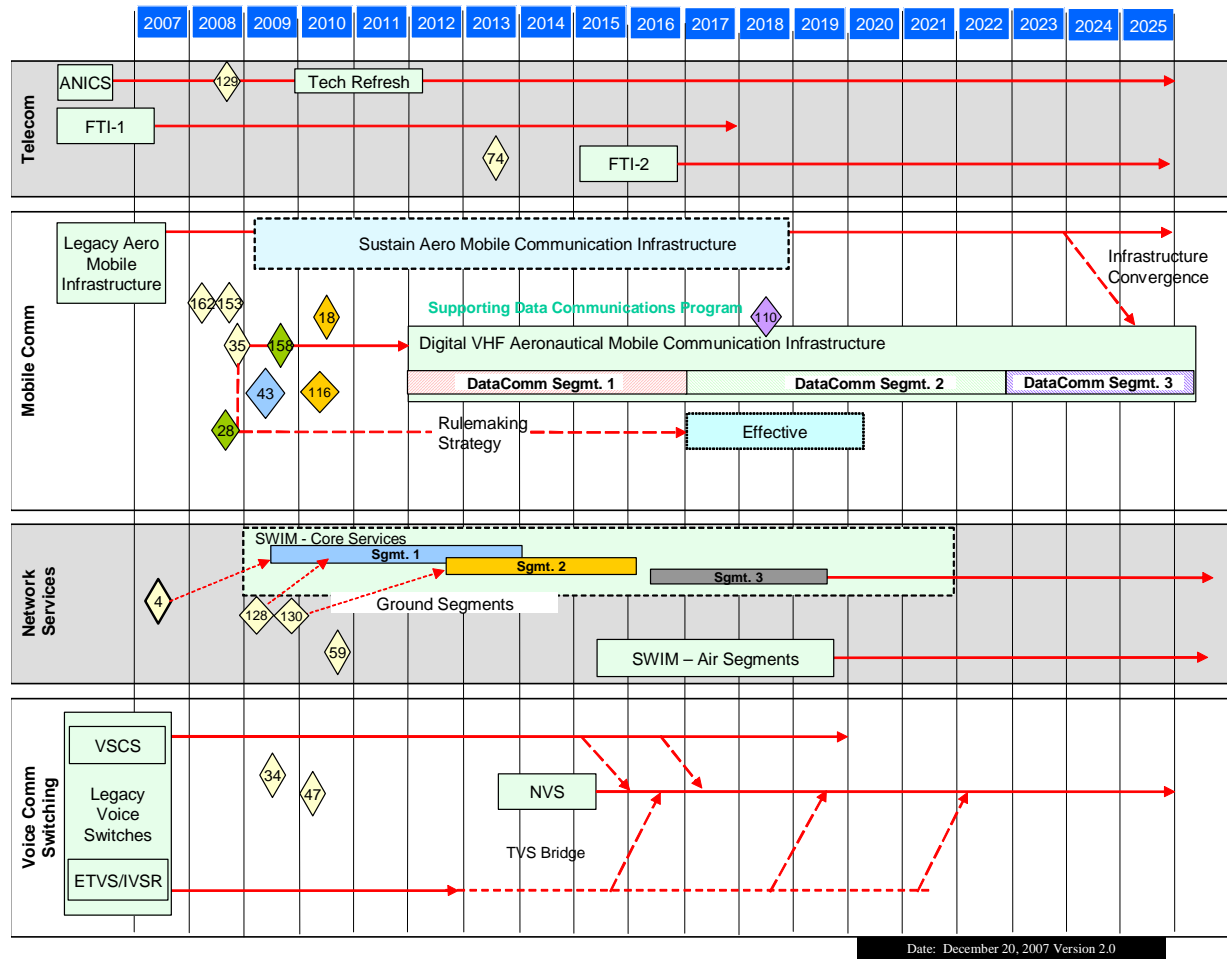


Figure 10 Communications Roadmap

Figure 11 shows the projected CIP spending for replacing communications systems and improving and modernizing communications channels.

BLI Number	Program Name	FY 2009 Budget	FY 2010	FY 2011	FY 2012	FY 2013
Communication Functional Area		\$150.2	\$207.5	\$201.7	\$199.8	\$189.7
1A07	Data Communication in support of Next Generation Air Transportation System	\$28.8	\$28.6	\$36.7	\$38.1	\$25.0
2A07	Air/Ground Communications Infrastructure	\$7.5	\$4.8	\$4.9	\$5.3	\$4.5
2A10	Voice Switching Control System (VSCS)	\$23.3	\$17.0	\$15.9	\$0.0	\$0.0
2A14	Next Generation VHF Air/Ground Communications System (NEXCOM)	\$46.4	\$79.9	\$70.6	\$92.4	\$97.2
2B08	Terminal Voice Switch Replacement (TVSR)	\$8.4	\$10.3	\$0.0	\$0.0	\$0.0
2B15	National Airspace System Voice Switch (NVS)	\$10.0	\$40.0	\$50.0	\$50.0	\$50.0
2B17	Voice Recorder Replacement Program (VRRP)	\$10.8	\$11.9	\$9.6	\$0.0	\$0.0
2E07	Alaskan NAS Interfacility Communications System (ANICS)	\$5.0	\$3.0	\$2.0	\$2.0	\$1.0
3A04	National Airspace System (NAS) Recovery Communications (RCOM)	\$10.0	\$12.0	\$12.0	\$12.0	\$12.0

Figure 11 Expenditures in the Communications Functional Area²

Figure 10 shows the planned modernization of communications systems that FAA uses. The first box, Telecom, at the top of the page, shows two backbone systems that carry FAA messages. The Alaska National Airspace System Interfacility Communications System (ANICS) consists of ground stations that send and receive data from communications satellites to connect the operational facilities in Alaska. Because there are far fewer ground telecommunications connections in Alaska, this system is needed to ensure that important air traffic information is reliably transmitted between smaller and larger facilities. Previously used commercial satellite service did not meet FAA standards for reliability and availability. ANICS will continue to operate for the entire period shown in the roadmap with technical refresh and renovation as required due to the extreme weather conditions in Alaska. The FAA Telecommunications Infrastructure (FTI) program leases communication infrastructure to connect its facilities in the lower 48 states. The single contract awarded in 2002 consolidates services to reduce costs, upgrade security, and increase accountability for internal users of telecommunications services.

The second box, Mobile Comm, shows the radio systems that are used to communicate with pilots. The FAA uses frequencies in the Very High Frequency (VHF) band to communicate with civil aircraft, and it uses frequencies in the Ultra High Frequency (UHF) band to communicate with military aircraft. The FAA is currently replacing the VHF radios with the Next Generation Air/Ground Communications (NEXCOM) multimode digital radios, and it is also replacing UHF radios. Starting in 2009, the FAA will be developing digital communications with data link capability (DataComm) for pilot-controller communications.

The third box, Network Services, contains the System Wide Information Management (SWIM) program, which will establish information management and data sharing for the NextGen. SWIM will develop policies and standards to support data management, along with the core services to enter data into NAS systems, retrieve it, secure its integrity, and control its access and use. SWIM is being developed incrementally. Segment 1, the initial phase of SWIM includes capabilities that were selected based upon the needs of various users (both government and private sector), the maturity of design standards for concepts of use, and the ability of existing

² Out-year funding amounts are estimates that assume enactment of the Administration's reauthorization proposal to reform FAA's financing system by adopting cost-based user fees and fuel taxes for the costs of air traffic services.

programs to integrate these SWIM capabilities into their program plans. Future segments will be based on positive test results for initial steps and are planned to include the additional capabilities that move the FAA toward the data sharing required for NextGen programs.

SWIM will reduce the number and types of interfaces between information systems, reduce unnecessary redundancy of information systems, improve predictability and operational decision-making, and reduce cost of service. The improved coordination that SWIM will provide will enable transition from tactical conflict management of air traffic to strategic trajectory-based operations.

The fourth block, Voice Comm Switching, shows the voice switching systems used in FAA facilities. The Voice Switching and Control System (VSCS) is used at en route centers to connect controllers with the appropriate telecommunications line to speak to pilots, controllers in other facilities, and controllers within their own facility. The voice messages to the facility are carried on telecommunications lines that feed into the VSCS, and the controllers can select the channel they need to speak to the appropriate person. The Interim Voice Switch Replacement (IVSR) contract fills the same function in airport towers and Terminal Radar Approach Control (TRACON) facilities.

The FAA is upgrading the VSCS with a technical refresh to replace components that have a high failure rate. We are replacing terminal voice switches at the rate of about 10 per year, and about 380 switches out of 420 have been replaced to date. The terminal voice switch program also installs a new voice switch when an airport traffic control tower is constructed at a new location.

The FAA has begun developing requirements for the NAS Voice Switch (NVS), a single scalable design that would replace both center and terminal voice switches. It would have a modular configuration, so it could be sized for the facility where it was installed. The value of using a single type of voice switch is that it reduces the number of training courses for maintenance technicians and the inventory of spare parts needed to maintain it. It also enables operation of planned NextGen facilities. Installation of the NVS is currently scheduled to begin in 2013 and, by 2023, all the voice switches will be NVS.

4.1.3 Surveillance

To provide separation services to aircraft, air traffic controllers must have an accurate display of all aircraft under their control. Controller displays use radar and transponder information to show location of aircraft and to portray flight data. En route facilities use the Air Route Surveillance Radar (ARSR), and terminal facilities use several models of the Airport Surveillance Radar (ASR) as primary radars. The ARSR and ASR radars are primary because they do not require a cooperative transmission from an aircraft to detect and track its location. The controller displays in both en route and terminal facilities use primary radar only as a back up to the returns from secondary radars called the Air Traffic Control Beacon Interrogators (ATCBI) and Mode Select (Mode S). Secondary radar sends a signal to aircraft equipped with a transponder. The transponder sends a reply, which gives the aircraft call sign, altitude, and speed and allows the beacon interrogator to determine its position. Using ATCBI or Mode S enhances

the controller's ability to separate traffic because the transponder reply provides flight and altitude information that can also be shown beside the aircraft's symbol.

We use two systems on the airport surface. The ASDE-3 is a radar system that provides a display of aircraft and ground vehicles in the airport operating areas (runways and taxiways). This helps controllers manage aircraft on the ground and warn them of potential runway incursions. The ASDE-X uses several technologies to improve detection of aircraft and provide a clear display of the positions of aircraft and vehicles on taxiways and runways.

Figure 12 is the roadmap for surveillance systems.

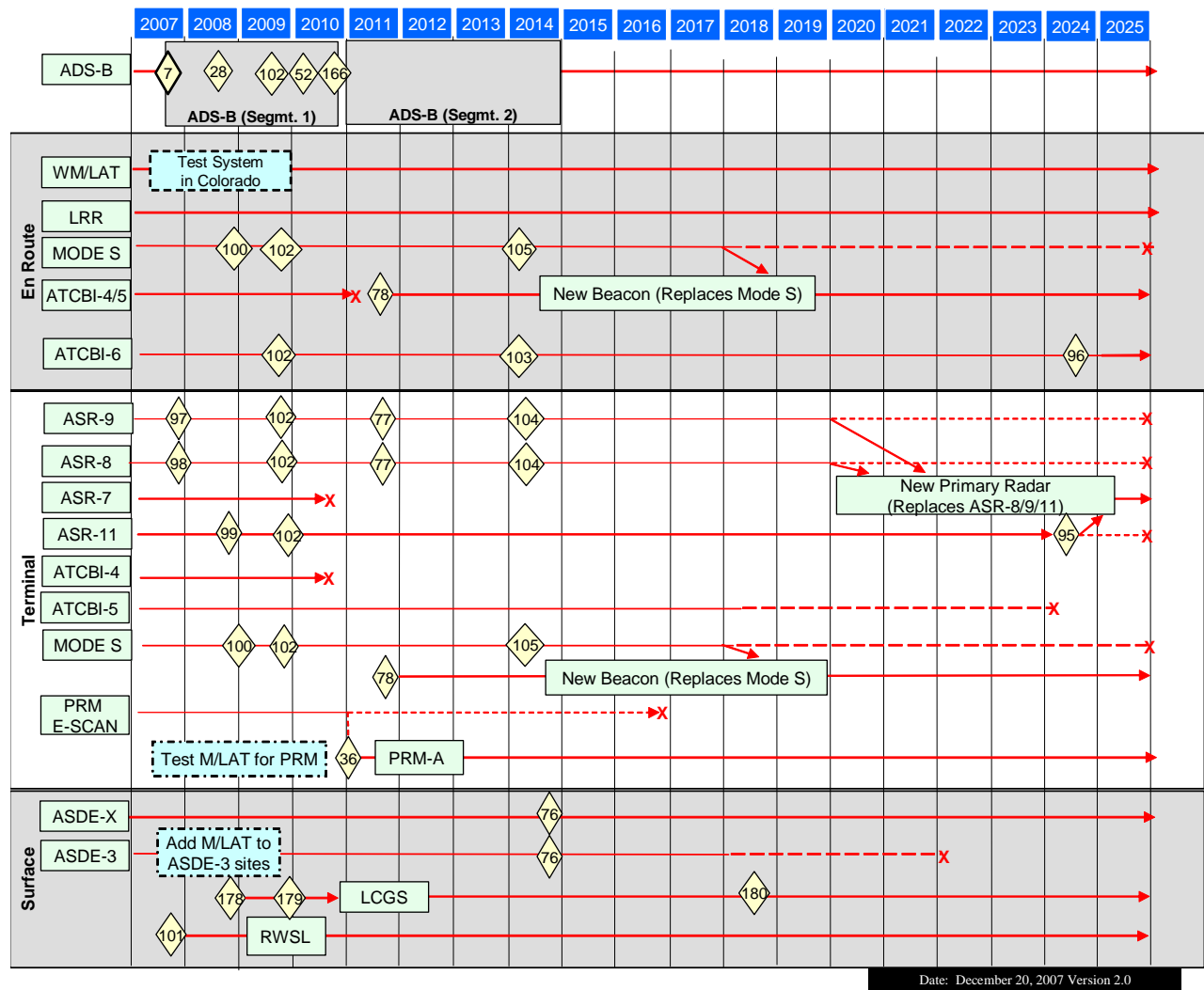


Figure 12 Surveillance Roadmap

Figure 13 shows the CIP costs associated with upgrading the surveillance units.

BLI Number	Program Name	FY 2009 Budget	FY 2010	FY 2011	FY 2012	FY 2013
Surveillance Functional Area		\$409.9	\$252.4	\$206.6	\$331.8	\$308.2
2A08	ATC Beacon Interrogator (ATCBI) - Replacement	\$13.0	\$5.2	\$0.0	\$0.0	\$0.0
2A09	Air Traffic Control En Route Radar Facilities Improvements	\$5.3	\$5.3	\$5.6	\$5.8	\$5.9
2A16	Automatic Dependant Surveillance-Broadcast (ADS-B) NAS-Wide	\$300.0	\$200.4	\$175.2	\$284.2	\$270.7
2B01	Airport Surface Detection Equipment - Model X (ASDE-X)	\$32.7	\$11.1	\$0.0	\$8.4	\$11.0
2B10	Airport Surveillance Radar (ASR-9)	\$8.8	\$2.2	\$0.0	\$0.0	\$0.0
2B11	Terminal Digital Radar (ASR-11)	\$17.1	\$12.6	\$4.4	\$4.4	\$4.4
2B13	Precision Runway Monitors	\$1.0	\$0.0	\$0.0	\$0.0	\$0.0
2B14	Runway Status Lights (RWSL)	\$27.0	\$11.8	\$18.2	\$24.2	\$11.8
2B20	ASR-8 Service Life Extension Program	\$3.0	\$0.0	\$0.0	\$0.0	\$0.0
2C03	Weather Camera Program	\$2.0	\$3.8	\$3.2	\$4.8	\$4.4

Figure 13 Expenditures in the Surveillance Functional Area³

The Automatic Dependent Surveillance-Broadcast (ADS-B) line at the top of the roadmap indicates a planned shift toward a different technology for providing surveillance data to controllers. The nationwide implementation of ADS-B will enable a once-per-second transmission of location and other flight information from the aircraft to replace or supplement the transponder response or passive reflected energy from radars. The advantage of ADS-B is that it has a faster update rate (1 second versus 5 seconds for a radar), and the accuracy remains constant regardless of the distance from the aircraft to the receiving site, unlike radar technology where accuracy declines with distance.

The major systems shown in the block for en route are the Long Range Radar (LRR – a generic term for the various ARSR models), the Air Traffic Control Beacon Interrogator (ATCBI), and the Mode S. The LRR has a range exceeding 200 miles, and it provides back up aircraft location information to the en route centers. It is a “skin-paint” radar that sends out electrical pulses and determines aircraft location by combining information on the angle of elevation of the beam and the time it takes the reflected energy to return to the radar antenna. The ATCBI or Mode S transmits a beacon signal to aircraft, which triggers a transponder in the aircraft.

We will maintain the LRR throughout the roadmap timeframe because of national and homeland security concerns. The FAA and the Department of Defense will jointly fund the maintenance required to keep the existing systems operational. We are replacing the ATCBI 4s, slated for a 2011 decommissioning, with the ATCBI-6s. The ATCBI 5 and Mode S may start being phased out in 2017, and a decision will be made in 2011 whether a New Beacon system is needed to support NextGen or whether the ADS-B is robust enough to support terminal surveillance displays.

The Wide Area Multilateration (WM/LAT) system is experimental and is being tested in Colorado. It uses triangulation to determine the location of an aircraft that cannot be detected by radar. In mountainous terrain the line-of-sight transmission from a radar can be blocked by an intervening mountain between the radar and the aircraft. The WM/LAT system overcomes this

³ Out-year funding amounts are estimates that assume enactment of the Administration’s reauthorization proposal to reform FAA’s financing system by adopting cost-based user fees and fuel taxes for the costs of air traffic services.

problem, and it is being locally financed and may be implemented in other mountain regions if it proves to be successful.

There are four models of terminal radars currently in use. The Airport Surveillance Radar Model 11 (ASR-11) is the newest, and it is replacing some of the older radars that were not replaced by the ASR-9 program. As shown in the roadmap, FAA will replace all the existing ASR-7s by 2011. The ASR-8 and the ASR-9 will have Service Life Extension Programs (SLEP) to update and modernize their components, and a decision will be made in 2011 whether to continue to update these systems or to design a replacement. Current planning calls for keeping these skin paint radars operational to address safety and weather requirements.

The Precision Radar Monitor (PRM) is installed at six airports, and can be used to allow simultaneous approaches to closely spaced parallel runways. It is a rapid update radar that provides the precision that controllers need to ensure two aircraft approaching side by side maintain safe clearance from each other. The sixth system will become operational at Detroit in 2009. The 2009 funding will be used to determine if PRM systems can be modified to use multilateration to provide precision separation information to controllers.

Controllers use two systems to maintain aircraft separation on the airport surface. Some airports have ASDE-3, which uses radar and a display in the tower to depict the location of aircraft on or approaching the taxiways and runways. These displays show aircraft location when buildings, weather or darkness obscure the view of the airport surface. The ASDE-X uses several technologies to perform the same function. We plan to upgrade 21 of the existing ASDE-3 radars with the multilateration technology to enhance their effectiveness, and ASDE-X will replace 4 existing ASDE-3 radars. We plan to also install ASDE-X at 10 new locations. We are accelerating installations so that all systems will be installed by 2010 and the final system will become operational in 2011.

The surface surveillance section of the roadmap shows that FAA is testing a new system, the Low Cost Ground Surveillance (LCGS) system, and it may be deployed in 2010. After testing competing designs for the LCGS, we will decide during 2009 which of the competing technologies has the best performance and whether to deploy the technology as a production system. LCGS would be used at small to medium-sized airports, and it would cost less than the ASDE-X or ASDE-3 with multilateration. Deploying LCGS would increase the number of airports that use sophisticated detection system to show the location of aircraft and other vehicles near the runways and taxiways on tower displays, which would enhance our efforts to reduce runway incursions.

A third system to warn pilots about potential runway incursions is the Runway Status Lights (RWSL). These systems use lights embedded in the runway to inform a pilot when it is unsafe to cross a runway; they then change color when it is safe to proceed. These lights have been tested at Dallas/Ft. Worth. The FAA has requested funding in FY 2009 to implement these systems at additional airports as part of the agency's goal to reduce runway incursions.

4.1.4 Navigation

There are two major types of navigational aids: those used for en route navigation and those used for precision approach and landing guidance. Radio navigation aids form the established routes normally used for flying across the U.S. Pilots use these en route navigation aids to follow their planned routes accurately under all visibility conditions. Precision landing guidance systems, and the associated equipment on the ground provide radio signals and approach lights that pilots use to safely land in limited visibility.

The ground-based system commonly used for en route navigation is the Very High Frequency Omnidirectional Range with Distance Measuring Equipment (VOR and DME). There are over 1,000 VORs spread across the United States. These navigational aids allow pilots to determine an accurate position and also help define the airways, which are routes based on the straight lines from VOR to VOR. Airways have the added value of providing predictability for air traffic control. Using airways can simplify route planning and reduce the length of the clearances to fly from departure to destination. The precision landing aids, called Instrument Landing Systems (ILS), guide pilots to runway ends in very limited visibility. There are over 1,000 ILSs installed in the United States. They are essential to airlines for maintaining schedule reliability during poor weather.

Figure 14 shows the roadmap for navigation aids.

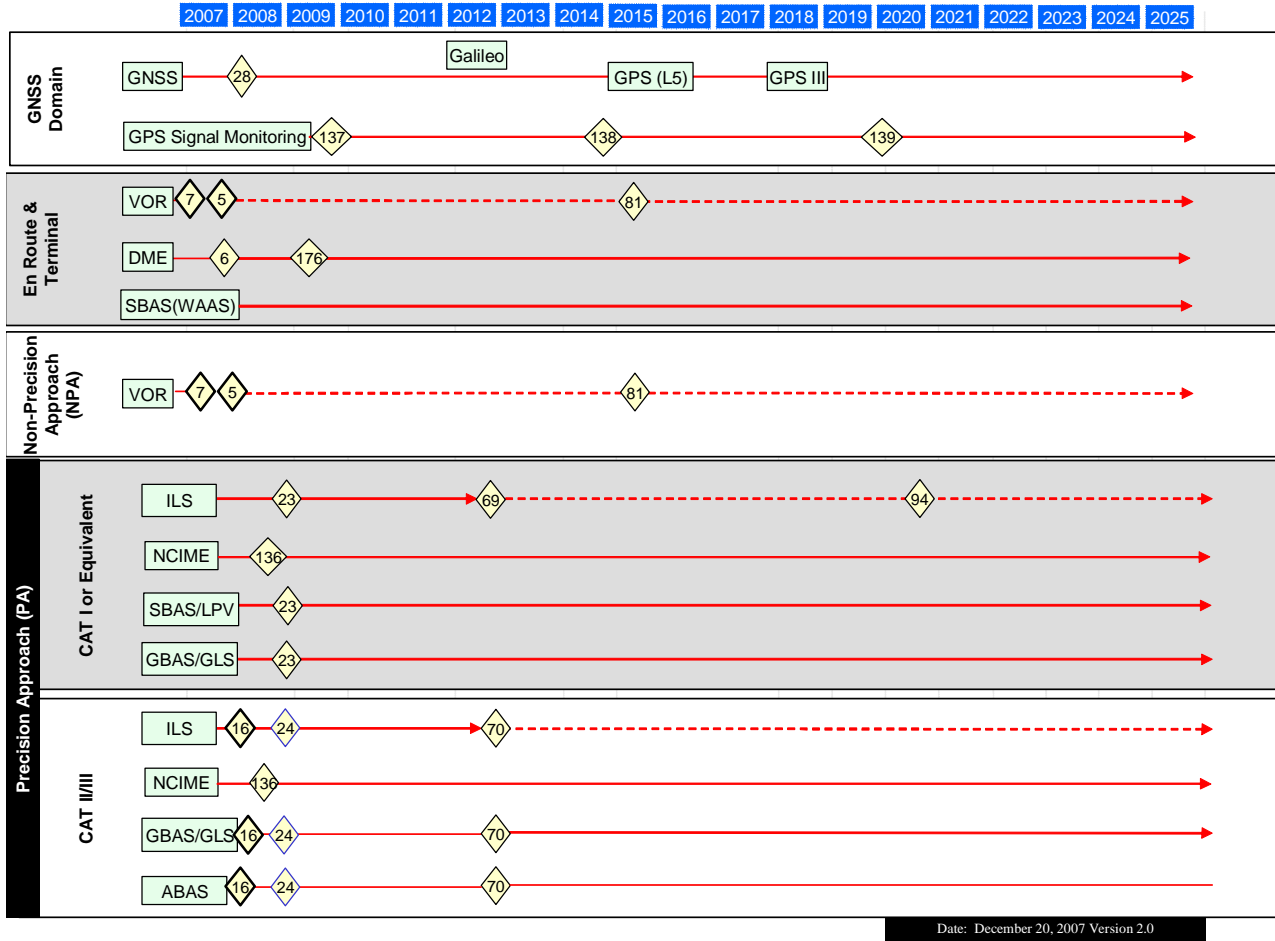


Figure 14 Navigation Roadmap

Figure 15 shows the future capital investments for navigation systems included in the CIP.

BLI Number	Program Name	FY 2009 Budget	FY 2010	FY 2011	FY 2012	FY 2013
Navigation Functional Area		\$162.4	\$166.9	\$146.1	\$141.9	\$139.8
2D01	VHF Omnidirectional Radio Range (VOR) with Distance Measuring Equipment	\$7.5	\$5.0	\$5.0	\$5.0	\$2.5
2D02	Instrument Landing Systems (ILS) - Establish	\$7.5	\$21.8	\$7.8	\$5.0	\$7.0
2D03	Wide Area Augmentation System (WAAS) for GPS	\$99.0	\$100.9	\$101.1	\$100.5	\$100.3
2D04	Runway Visual Range (RVR)	\$5.0	\$5.0	\$5.0	\$5.0	\$4.0
2D05	Approach Lighting System Improvement Program (ALSIP)	\$10.0	\$10.0	\$5.0	\$5.0	\$3.0
2D06	Distance Measuring Equipment (DME)	\$6.0	\$8.0	\$6.0	\$5.0	\$5.0
2D07	Visual Nav aids - Establish/Expand	\$1.7	\$3.2	\$3.2	\$3.4	\$5.0
2D09	Navigation and Landing Aids - Service Life Extension Program (SLEP)	\$1.0	\$6.0	\$6.0	\$6.0	\$8.0
2D10	VASI Replacement - Replace with Precision Approach Path Indicator	\$4.0	\$7.0	\$7.0	\$7.0	\$5.0
2D11	GPS Civil Requirements	\$20.7	\$0.0	\$0.0	\$0.0	\$0.0

Figure 15 Expenditures in the Navigation Functional Area⁴

The major component of the Global Navigation Satellite Services (GNSS) domain is the satellite constellation called the Global Positioning System (GPS) operated by the Department of Defense. There are 24 active satellites in orbit, and an aircraft’s position can be determined by interpreting the data transmitted by all the satellites in view (4 or more is ideal). Two GPS upgrades are expected in future years. The next generation of satellites will have a second frequency for civilian use. A properly equipped aircraft receiver that receives both signals can calculate corrections to account for atmospheric distortion. The GPS III family of satellites will be upgraded with more transmitting power.

The GNSS also includes non-U.S. satellites. A European system called Galileo is being developed, and satellites launched in this program would increase the navigation information available to determine aircraft position. Launch of these additional satellites is expected to begin in about 2014.

GPS III civil-side requirements development (identified as GPS Civil Requirements in the FY09 Budget) will be another enhancement to the GPS constellation. This program will finance the development of techniques to determine whether any of the GPS satellites are operating outside acceptable tolerances. If the civil frequencies being added to GPS satellites are out of tolerance, a message will be up-linked to the GPS satellites so navigation receivers are notified which satellites are not usable for their position calculation.

The en route and terminal domains rely primarily on the system of VORs, Distance Measuring Equipment (DME), and Space Based Augmentation System (SBAS) for navigation. The approximately 1,000 operational VORs are the predominant system for en route. The DME is used for both en route and terminal navigation. The VOR gives the direction to the station, and the DME gives the distance. In the terminal area, one or more DMEs can be used for Required Navigation Performance/Area Navigation (RNP/RNAV) approaches to an airport. These approaches improve an aircraft’s precision in following the designated approach path, which increases the number of airplanes that can land at an airport within any given time period. The

⁴ Out-year funding amounts are estimates that assume enactment of the Administration’s reauthorization proposal to reform FAA’s financing system by adopting cost-based user fees and fuel taxes for the costs of air traffic services.

SBAS, which is the WAAS (Wide Area Augmentation System), is another alternative for en route navigation. The WAAS provides corrections and satellite reliability information to GPS receivers properly equipped, and the augmented signal can be translated into a precise geographic position. As the transition to SBAS navigation occurs, FAA will decide during 2008 whether half the VORs can be decommissioned and during 2015 whether virtually all VORs could be decommissioned.

Non-precision approaches provide guidance to pilots preparing to land on a runway when there is limited visibility, but, as the term implies, these approaches are not accurate enough to allow descent to the minimum altitudes possible with a precision approach. Many of the non-precision approaches are supported by VORs. If a decision is made to decommission VORs, another navigation aid will have to be used for these approaches. SBAS provides more accurate guidance than the VORs. The FAA is developing procedures to use the SBAS guidance to replace the VOR approaches.

There are three categories of precision approach. Category I is the most common. The Category I approach guides the pilot to the runway end, but it requires that the pilot be able to see the runway when the aircraft is no less than 200 feet above the field elevation, and the horizontal visibility is more than a half mile. The Category II and III approaches have lower minimums (i.e., less vertical and horizontal visibility is required). Currently only the ILS is accurate enough for precision approaches. Category II and III ILS have the redundancy and reliability that justify lower minimums. Alternatives for precision approach guidance are the SBAS/LPV (Localizer Performance with Vertical guidance) and Ground Based Augmentation Systems/ Global Navigation Satellite System (GNSS) Landing System (GBAS/GLS). When these alternatives become operational, a number of ILSs can be decommissioned, but a number will remain operational to provide back-up capability at the OEP airports.

Another alternative for precision approaches is the Aircraft Based Augmentation System (ABAS), which will be feasible when the GPS constellation is upgraded with a second civil frequency. The ABAS does not rely on ground based augmentation systems. It uses the GPS receiver carried in the aircraft to monitor signals from several satellites to ensure the satellite information is accurate enough to be used for a precision approach.

4.1.5 Weather Systems

Weather information is essential to aviation. Pilots need to know the effect winds aloft will have on their speed and whether there will be sufficient visibility for them to land at their destination airport. Pilots also use weather information to determine if they need to fly a different route to avoid severe weather, like thunderstorms and turbulence that can damage aircraft and potentially injure passengers. The FAA has a significant role in collecting and distributing weather data. The FAA distributes weather hazard information from its own systems and from the National Weather Service to air traffic control facilities, pilots, airline operations centers, and other aviation-related facilities. Because of its impact on an aircraft's speed, weather data is essential for computing the 4D trajectories used in the NextGen systems.

There are two major categories of weather information systems. The first is the weather sensors that measure several atmospheric parameters, including temperature, wind speed and direction, relative humidity and cloud heights. Sensors provide real-time information to air traffic facilities and to centralized weather forecasting systems. The second category is weather processing and display systems, which integrate data from the sensors, forecast weather patterns, and create weather graphics for air traffic displays. An advanced feature enables some systems to project the future movement of weather affecting operations. The first weather roadmap (Figure 16) shows the current and planned status of weather sensors.

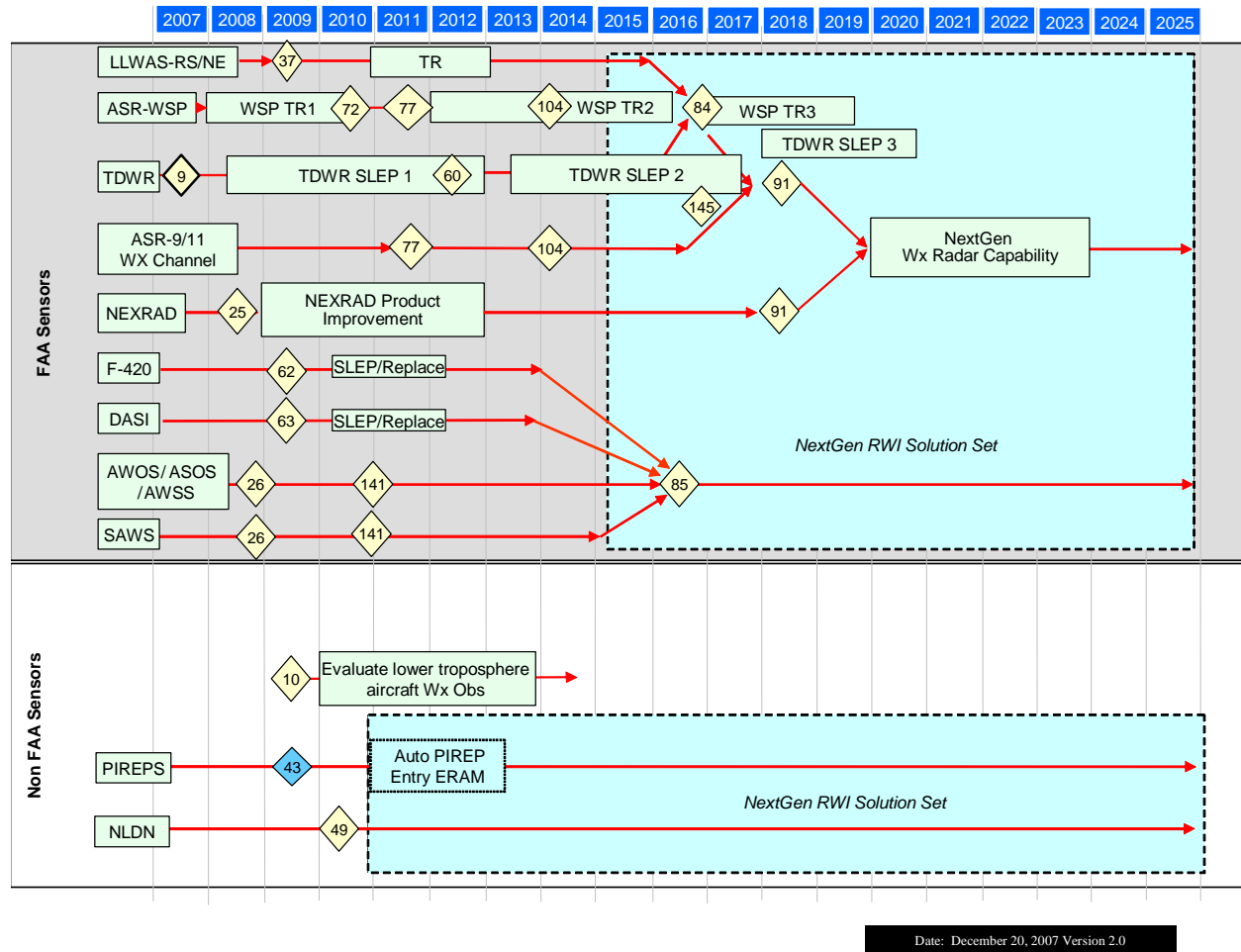


Figure 16 Weather Sensor Roadmap (1 of 2)

FAA sensors shown in the roadmap include the Low Level Wind Shear Alert System (LLWAS); the Airport Surveillance Radar - Weather System Processor (ASR-WSP); and the Terminal Doppler Weather Radar (TDWR), which all detect wind conditions near the surface of the airport to warn pilots of gust fronts and wind shear. The ASR-9/11 Weather (Wx) Channel and the Next Generation Weather Radar (NEXRAD) detect precipitation, wind and thunderstorms that affect aircraft in flight. The F-420 and the Digital Altimeter Setting Indicator (DASI) are located in FAA facilities and display the current wind and barometric pressure for controllers. The

Automated Weather Observing Systems (AWOS/ASOS/SAWS) measure weather parameters on the surface to report conditions to air traffic facilities and pilots and also assist in weather forecasting.

Of the three different sensors that can detect wind shear, the most sophisticated is the TDWR. There are 47 of these radars, and most are located within 10 miles of a runway end. Using Doppler technology, the radars can detect the rapid changes in wind speed and direction that indicate wind shear hazards for an aircraft approaching a runway. For medium-sized airports that don't qualify for a TDWR, a lower cost alternative is the Weather System Processor (WSP), which interprets data from the terminal surveillance radar to identify wind shear. To supplement these radar systems, LLWAS wind sensors located at 6 to 10 points around the runways measure surface wind direction and velocity. The LLWAS wind sensors and the associated computer systems determine whether significant changes in the wind at different locations near the airport present a wind shear hazard to aircraft. LLWASs serve locations that do not have a TDWR or WSP as well as locations where they supplement the radars with point-specific wind measurements to verify the presence and location of wind shears. The roadmap shows that we will perform a service life extension on the TDWR and technical refresh on the LLWAS and ASR-WSP and decide in the 2018 timeframe whether to replace all of them with a NextGen weather radar system.

Replacing the ASR-9/11 weather channel will be necessary only if the ASR-9/11 do not remain in operation. The FAA plans to decide by 2018 whether to incorporate these functions into the NextGen terminal weather radar. The NEXRAD was developed under a joint DOC National Weather Service, Department of Defense (DoD), and FAA program. These systems are Doppler weather radars that collect atmospheric weather conditions over a broad area and are essential for forecasting future weather. In the short term we are installing upgrades such as Dual Polarization (Dual Pol) and software improvements. Working with our partner agencies we will also decide by 2018 whether to incorporate NEXRAD into the NextGen terminal weather system.

The Automated Surface Observing Systems (ASOS) and other variants - such as the Automated Weather Observing System (AWOS) and the Stand Alone Weather Sensing (SAWS) system - have up to 14 sensors that measure weather data. These systems feed data directly to air traffic control facilities and support automated broadcast of weather information to pilots. They also provide regular updates for the forecast models that predict future weather problems. The Digital Altimeter Setting Indicator (DASI) displays current altimeter settings in the tower. The F-420 is a wind sensor that measures the wind near the runway, so that pilots know which direction to land on a runway. These sensors will require updating, and we plan to work with our partner agencies and decide how their functions are incorporated into the NextGen Reduce Weather Impact solution set.

Pilot reports (PIREPS) of weather conditions can be transmitted by voice or automated systems to FAA facilities. We are studying whether these reports can be transmitted directly to air traffic automation systems in the future. The National Lightning Detection Network (NLDN) reports on the location of lightning strikes. The existing system or a modernized system will continue operating through 2025.

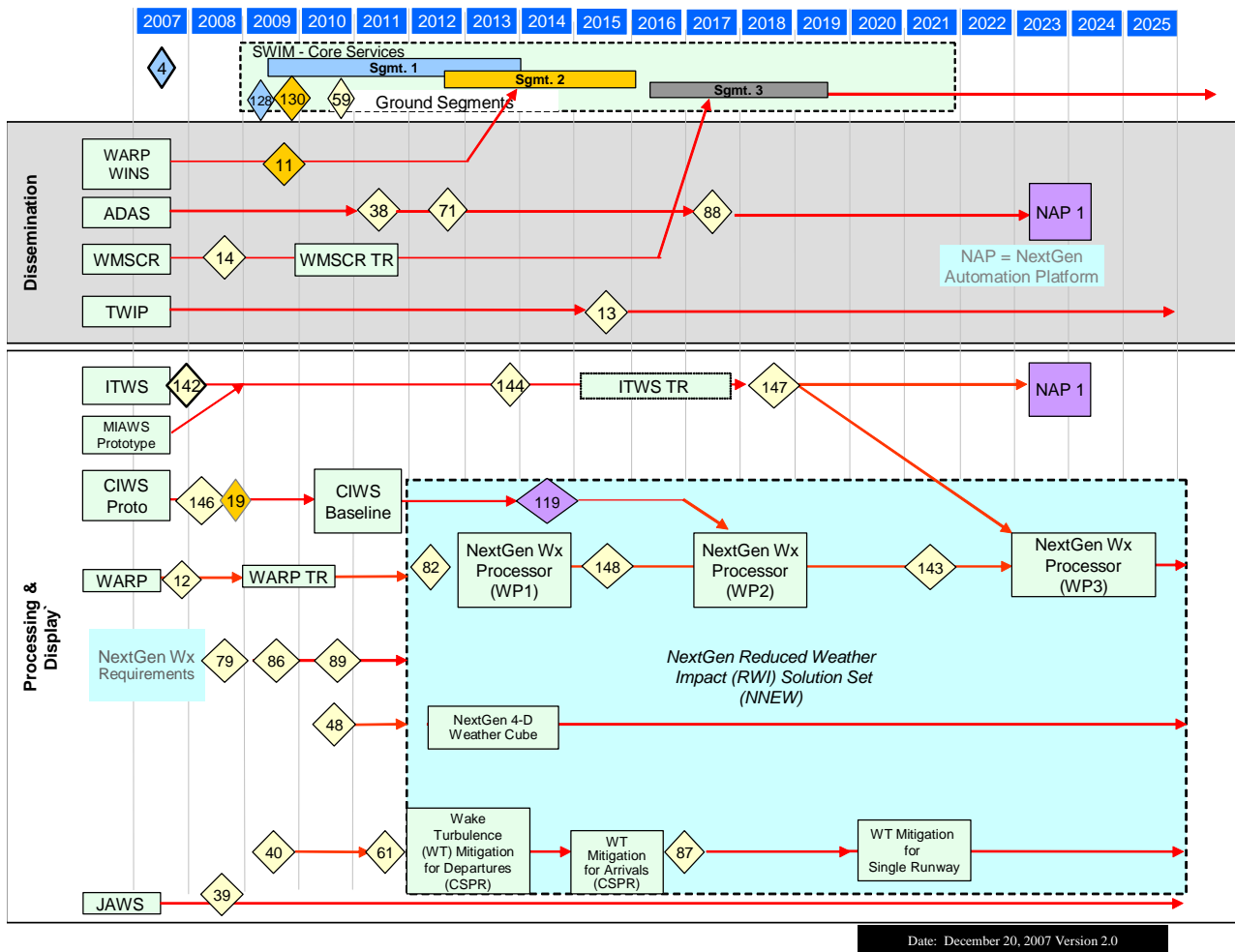


Figure 17 Weather Dissemination, Processing, and Display Roadmap (2 of 2)

Figure 18 shows the planned expenditures included in the CIP for weather sensors and weather dissemination and processing systems.

BLI Number	Program Name	FY 2009 Budget	FY 2010	FY 2011	FY 2012	FY 2013
Weather Functional Area		\$63.1	\$119.7	\$125.0	\$123.8	\$131.8
1A06	NextGen Network Enabled Weather (NNEW)	\$20.0	\$25.0	\$25.0	\$25.0	\$25.0
1A12	Next Generation Air Transportation System (NextGen)-Reduced Weather	\$14.4	\$62.0	\$62.0	\$64.1	\$100.7
2A03	Next Generation Weather Radar (NEXRAD)	\$3.0	\$3.0	\$3.0	\$3.0	\$0.0
2A12	Corridor Integrated Weather System (CIWS)	\$5.9	\$8.4	\$17.4	\$22.7	\$4.0
2B02	Terminal Doppler Weather Radar (TDWR) - Provide	\$6.1	\$9.9	\$8.6	\$7.7	\$2.1
2B16	Weather System Processor (WSP)	\$0.7	\$0.3	\$0.0	\$0.0	\$0.0
2B21	Integrated Terminal Weather Systems (ITWS)	\$4.5	\$4.4	\$2.3	\$0.0	\$0.0
2C01	Automated Surface Observing System (ASOS)	\$8.5	\$6.7	\$6.7	\$1.3	\$0.0

Figure 18 Expenditures in the Weather Functional Area⁵

The FAA plans to consolidate weather processing, display and dissemination systems into the NextGen systems that capture and process weather data and then integrate that data into the decision software for advanced automation capabilities.

The Weather and Radar Processor (WARP) used in en route control facilities receives information from Next Generation Weather Radars (NEXRAD), from automated weather sensors located at airports, and from other sources such as weather satellites. It compiles the information for interpretation by the Center Weather Service Unit forecasting stations. WARP also feeds data to controllers' displays. The Automated Weather Observation Data Acquisition System (ADAS) is a radio link that transmits AWOS/ASOS/SAWS data to air traffic facilities. The Weather Information Network Server (WINS) stores NEXRAD data, which will be distributed by SWIM once it is operational. The Weather Message Switching Center Replacement (WMSCR), operated by the FAA, is a network with terminal nodes in Salt Lake City and Atlanta that collects and distributes weather information. The Terminal Weather Information for Pilots (TWIP) system transfers weather information to FAA facilities and the airline's communication provider for use in analyzing weather conditions. Current planning shows that the first four systems shown on the roadmap will become part of the SWIM network to distribute weather data during Segment 2. The TWIP may stay a separate system, but the FAA will decide during 2015 whether to integrate the system into the SWIM Air Segment.

The Integrated Terminal Weather System (ITWS) consolidates weather information from automated sensors and surrounding radars to provide real-time weather information for terminal control facilities. The system also projects movement of severe weather systems up to 20 minutes into the future. Tower and Terminal Radar Approach Control (TRACON) controllers use the information to make more precise estimates of when runways should be closed and subsequently reopened. They also use the information to plan for a switch in terminal arrival patterns to avoid excessive maneuvering to accommodate a runway change as aircraft approach an airport. The ITWS has been installed at 22 airports, and it will receive technical refresh in the near term. The ITWS weather inputs and processing power will become part of the NextGen Automation Platform by 2022.

⁵ Out-year funding amounts are estimates that assume enactment of the Administration's reauthorization proposal to reform FAA's financing system by adopting cost-based user fees and fuel taxes for the costs of air traffic services.

The Medium Intensity Airport Weather System (MIAWS) prototype uses weather information from the airport surveillance radars to fulfill some of the same functions as the ITWS at smaller airports where it is not economical to install an ITWS. Its functions will be integrated with the ITWS program.

The Corridor Integrated Weather System (CIWS) gathers weather information occurring along the busiest air traffic corridors to help controllers select the most efficient routes when they must divert traffic to avoid severe weather conditions. The CIWS prototype tested a predictive capability to refine the decisions on when normal routes will be available. This system will become part of the NextGen Weather Processor and support the Traffic Flow Management automation software.

The NextGen Weather Processor will incorporate the functionality of the existing Weather and Radar Processing (WARP) system. Work Package 2 (WP 2) will enhance the display of weather information by using new algorithms to portray icing conditions, turbulence, and other hazards. The ITWS functions will be incorporated as part of WP 3. Further upgrades of weather-predicting algorithms will also be added in WP 3 to include Wind Shear/Microburst and Wake Vortex Detection and prediction advisories.

The NextGen 4D Weather Cube is a distributed “virtual” database that will receive weather data directly from sensors and other sources, and either automatically, or by request, send data to FAA facilities so that observations and forecasts can be more widely and consistently distributed to a broad set of users via network enabled operations. The 4D Weather Cube will be part of the NextGen Networked Enabled Weather program and supports the Reduce Weather Impact solution set.

The Wake Turbulence program is developing technology-based solutions to safely reduce the present aircraft separation applied to mitigate wake vortex impacts. Currently controllers must maintain a set distance between aircraft to ensure a low likelihood that the following aircraft could encounter wake turbulence. The technology solutions focus on using knowledge of how wakes move laterally with crosswinds. The first product, Wake Turbulence for Departures (WTMD), is a controller decision support tool for use with departure operations on closely spaced parallel runways (CSPR). When there is a persistent crosswind, the WTMD will indicate that it is safe to allow a departure after a heavy aircraft departs on an adjacent CSPR. As shown in Figure 17 (Weather Dissemination, Processing and Display Roadmap) the next expected product will be a crosswind decision support tool that will be used for approaches to CSPR. In future years, the FAA will develop equipment that addresses a potential reduction in separation standards for single and multiple runway operations during both approaches and departures.

The Juneau Airport Weather System (JAWS) uses wind sensors to detect and transmit turbulence and dangerous wind alerts to air traffic facilities near the Juneau airport. The approach and departure routes for Juneau follow a narrow channel between two mountain ranges. Detecting and transmitting information on the wind conditions along these routes help ensure safe operations for aircraft arriving and departing this airport.

4.1.6 Facilities

The ATO has thousands of manned and unmanned operational facilities, which we must regularly upgrade and modernize. The largest facilities are the 20 en route centers, which house hundreds of employees and the equipment needed to control aircraft flying in the en route airspace. The other operational facilities with significant staffing are the over 500 tower and 178 TRACON facilities that control traffic departing and arriving at airports.

There are also more than 16,000 unmanned facilities—many in very remote locations—supporting communications, navigation, and surveillance equipment and weather sensors. Much of this equipment is housed in shelters and buildings that have exceeded their service lives and need renovation. Many have deteriorating steel towers and foundations. Some newer unmanned buildings and structures frequently need renovation because they are in remote and/or hostile locations near the ocean or on mountain tops. Replacing roofing, power, heating/cooling, and structural and security components of these structures is essential to the successful operation of the NAS.

The William J. Hughes Technical Center (WJHTC) in Atlantic City, New Jersey, and the Mike Monroney Aeronautical Center (MMAC) and FAA Depot in Oklahoma City have many buildings. Each year these complexes receive funds to both sustain and replace infrastructure and to improve and modernize buildings to support training, logistics, research, and management functions. The MMAC operates under a lease from the Oklahoma City Trust, and funds are requested to pay the annual lease costs. The WJHTC supports research programs and testing of new equipment that will be installed in the NAS. In 2009 funding is requested to upgrade electrical and water supply systems and improve roadways. In addition funding is provided to reconfigure the research laboratories to accommodate acceptance testing for new equipment and to test modifications to existing equipment. The MMAC receives infrastructure funding for building renovation, a hanger fire suppression system, sewer upgrades, and an updated telecommunications infrastructure.

The FAA operates 3 Center Radar Approach (CERAP) facilities located at San Juan, Puerto Rico; Guam; and Honolulu, Hawaii that operate as both a center and a Terminal Radar Approach Control (TRACON) facility. They control a limited amount of airspace surrounding their islands and also guide aircraft to airport runways. The San Juan facility needs renovations and an analysis is underway regarding how to proceed.

There are two large budget line items for tower and TRACON investments. The first is the Terminal Air Traffic Control Facilities – Replace program, which includes funding for both airport traffic control towers (ATCT) and TRACON facilities. This line item funds replacement of existing towers and construction of towers for new airports. In most years there are between 10 and 20 projects to replace towers that are too small to handle the traffic growth that has occurred since they were built or have inadequate sight lines due to construction of new runways or new hangers. These types of projects will continue, and over the next 2 years FAA will conduct studies to determine whether efficiencies are possible by controlling airport surface movements from a remote facility rather than using a tower on the airport. The second line item is the Terminal Air Traffic Control Facilities – Modernize program which replaces specific

exterior or interior components of existing towers such as: elevators; heating ventilation and cooling equipment; roofs; or other infrastructure that FAA must upgrade to keep towers functioning.

The FAA invests about \$50 million a year to upgrade and improve Air Route Traffic Control Center (ARTCC) facilities. Projects include expanding the size of the facility, replacing heating and cooling systems, and upgrading electrical power distribution systems.

In 2009, funding is requested to modernize flight service stations (FSS) and automated flight service stations (AFSS) in Alaska including updating the automation system.

Over the next 2 years, the FAA will be evaluating the design and potential location of NextGen facilities, including the amount of airspace they would have to control to reap the benefits of the NextGen architecture. There are several issues associated with changing the number and location of en route centers. We cannot upgrade many of the current centers to meet new security guidelines. Some control rooms have limited expansion space. Another consideration will be the scope of changes needed in ARTCC communications systems. The potential benefits include the ability to control larger expanses of airspace over more than one time zone and improve productivity. If the studies show that benefits will exceed costs, the FAA may begin building these new facilities starting in 2014. Studies will also look at the possibility of incorporating some terminal services into the NextGen control facilities. By efficient use of airspace, these new facilities may be able to minimize delays and safely increase throughput at the busiest airports.

Figure 19 shows the planned expenditures for facilities projects that contribute to modernizing the air traffic control system.

BLI Number	Program Name	FY 2009 Budget	FY 2010	FY 2011	FY 2012	FY 2013
Facilities Functional Area		\$465.5	\$528.4	\$628.6	\$774.3	\$836.6
1A04	William J. Hughes Technical Center Facilities	\$12.0	\$12.0	\$12.0	\$12.0	\$12.0
1A05	William J. Hughes Technical Center Infrastructure Sustainment	\$5.4	\$5.5	\$5.6	\$5.7	\$5.9
1A16	Next Generation Air Transportation System (NextGen) - Networked Facilities	\$17.0	\$38.6	\$115.2	\$281.2	\$374.0
2A04	Air Traffic Control System Command Center (ATCSCC) Relocation	\$28.6	\$10.3	\$2.1	\$2.1	\$0.0
2A05	ARTCC Building Improvements/Plant Improvements	\$56.5	\$56.5	\$57.0	\$62.0	\$62.4
2A13	San Juan Radar Approach Control (CERAP)	\$6.0	\$0.0	\$0.0	\$0.0	\$0.0
2B06	Terminal Air Traffic Control Facilities - Replace	\$134.3	\$150.0	\$160.0	\$165.0	\$165.0
2B07	ATCT/Terminal Radar Approach Control (TRACON) Facilities - Improve	\$37.9	\$42.6	\$48.0	\$53.3	\$52.7
2B12	DOD/FAA Facilities Transfer	\$1.4	\$1.4	\$1.4	\$1.5	\$1.5
2B18	Houston Area Air Traffic System (HAATS)	\$3.6	\$2.0	\$0.0	\$0.0	\$0.0
2C02	Flight Service Station (FSS) Modernization	\$14.6	\$20.3	\$22.3	\$16.5	\$8.5
2E01	Fuel Storage Tank Replacement and Monitoring	\$6.1	\$6.2	\$6.3	\$6.4	\$6.6
2E02	Unstaffed Infrastructure Sustainment (formerly FAA Buildings and Equipment)	\$15.3	\$14.5	\$15.0	\$15.7	\$16.3
2E03	Air Navigational Aids and ATC Facilities (Local Projects)	\$1.5	\$2.5	\$2.6	\$2.6	\$2.7
2E05	Airport Cable Loop Systems - Sustained Support	\$7.0	\$5.0	\$5.0	\$5.0	\$5.0
2E07	Facility Disposition	\$5.0	\$5.0	\$5.0	\$5.0	\$5.0
2E08	Electrical Power Systems - Sustain/Support	\$51.0	\$70.0	\$70.0	\$70.0	\$70.0
3A01	Hazardous Materials Management	\$18.0	\$20.0	\$20.0	\$20.0	\$20.0
3A05	Facility Security Risk Management	\$15.0	\$40.0	\$54.4	\$23.0	\$1.0
3B01	Aeronautical Center Infrastructure Modernization	\$13.5	\$9.8	\$10.1	\$10.3	\$10.5
4A04	Mike Monroney Aeronautical Center Leases	\$15.8	\$16.2	\$16.6	\$17.0	\$17.5

Figure 19 Expenditures in the Facilities Functional Area⁶

4.1.7 Support Contracts and Automated Management Tools and Processes

The FAA has several support contracts and automated management tools that help our employees plan and manage modernization of existing systems; develop detailed transition plans to install new equipment; and oversee installing that equipment. The System Engineering and Technical Assistance contract and the Center for Advanced Aviation System Development contract help us plan overall modernization and simulate the impact on air traffic of implementing new concepts and new equipment. The Technical Services Support program provides field engineers who oversee site preparation and installation of new equipment. These engineers and technicians help the FAA keep installation on schedule for the many projects with equipment deliveries. The National Implementation Support Contract helps plan our transition to new equipment. Since air traffic control functions must continue while we install new equipment, we must prepare detailed plans before we begin installation to minimize any disruption. The Computer Assisted Engineering Graphics and Web-based Configuration Management programs give engineers the tools to effectively plan, manage, and document NAS improvements.

Another category of support contracts covers leasing, modifying, or modernizing buildings to house engineering and training. The FAA also leases or purchases computer automation to support these engineering functions. Examples include the lease for the Mike Monroney Aeronautical Center and licensing fees for software used for the WJHTC. In addition, there are

⁶ Out-year funding amounts are estimates that assume enactment of the Administration's reauthorization proposal to reform FAA's financing system by adopting cost-based user fees and fuel taxes for the costs of air traffic services.

support contracts to provide spectrum engineering to allocate radio frequencies for new installations and to prevent outside interference with existing frequencies. We also have support contracts for environmental projects to remove asbestos, improve fire/life safety, prevent fuel tanks from leaking and clean up environmental pollution.

BLI Number	Program Name	FY 2009 Budget	FY 2010	FY 2011	FY 2012	FY 2013
Mission Support Functional Area		\$347.9	\$373.7	\$357.3	\$334.2	\$344.9
1A01	Advanced Technology Development and Prototyping (ATDP)	\$41.4	\$36.9	\$37.2	\$35.2	\$32.4
1A03	NAS Improvement of System Support Laboratory	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0
1A15	Next Generation Air Transportation System (NextGen) - Safety, Security, and Environment	\$8.0	\$27.0	\$33.0	\$0.0	\$0.0
2B09	NAS Facilities OSHA and Environmental Standards Compliance	\$26.0	\$26.0	\$26.0	\$26.0	\$26.0
2E04	Aircraft Related Equipment Program	\$7.8	\$10.0	\$9.0	\$13.0	\$9.0
2E09	Aircraft Fleet Modernization	\$3.0	\$15.0	\$0.0	\$0.0	\$0.0
2E10	Aircraft Fleet Modernization - International Aircraft	\$24.9	\$0.0	\$0.0	\$0.0	\$0.0
2E11X	Independent Operational Test/Evaluation - Outyear request	\$0.0	\$3.5	\$5.0	\$5.2	\$5.3
3A03	Logistics Support Systems and Facilities (LSSF)	\$9.3	\$9.3	\$0.0	\$0.0	\$0.0
3A06	Information Security	\$12.0	\$12.0	\$12.0	\$12.0	\$12.0
3A09	Logical Access Control	\$0.0	\$15.1	\$10.2	\$9.0	\$10.0
3B02	National Airspace System (NAS) Training Facilities	\$1.4	\$0.0	\$0.0	\$0.0	\$0.0
3B03	Distance Learning	\$1.5	\$1.5	\$1.0	\$1.0	\$1.0
3B04	National Airspace System (NAS) Training - Simulator	\$12.0	\$4.3	\$0.0	\$0.0	\$0.0
4A01	System Engineering and Development Support	\$32.0	\$32.7	\$32.3	\$32.9	\$33.5
4A02	Program Support Leases	\$43.5	\$47.6	\$49.1	\$50.5	\$52.1
4A03	Logistics Support Services (LSS)	\$7.9	\$8.0	\$8.5	\$8.5	\$8.5
4A05	Transition Engineering Support	\$10.7	\$15.0	\$15.0	\$15.0	\$15.0
4A06	Frequency and Spectrum Engineering	\$3.5	\$2.5	\$2.0	\$0.0	\$0.0
4A07	Technical Support Services Contract (TSSC)	\$22.0	\$22.0	\$22.0	\$22.0	\$30.0
4A08	Resource Tracking Program (RTP)	\$4.0	\$4.0	\$4.0	\$4.0	\$4.0
4A09	Center for Advanced Aviation System Development (CAASD)	\$76.0	\$80.3	\$90.0	\$98.9	\$105.1

Figure 20 Expenditures in the Mission Support Functional Area⁷

Figure 20 shows the planned expenditures for the specific mission support projects that will help us modernize the air traffic control system.

⁷ Out-year funding amounts are estimates that assume enactment of the Administration's reauthorization proposal to reform FAA's financing system by adopting cost-based user fees and fuel taxes for the costs of air traffic services.

5 Conclusion

Economic growth continued in 2007, but decreased to less than 1% during the final quarter. This slowing of economic growth does not appear to have a significant impact on aviation growth. The number of passengers and the 2007 increase in air traffic operations indicate that long-term travel demand continues to increase. The most significant growth has been in international travel, but demand for domestic travel also appears to be growing.

Many carriers have shifted their emphasis to longer routes, which increases the number of revenue passenger miles with fewer operations. Offsetting this decrease in operations is the use of regional jets for routes formerly flown by larger aircraft. These aircraft hold fewer passengers, but they can provide more frequent service. A significant concern for the future is whether higher fuel prices will affect profitability. We believe that there will be some adjustments in the industry in the near term, but growth in the number of passengers and aircraft operations will continue.

Growth will put the most pressure on the capacity at large airports, and both new runways and more sophisticated management of air traffic activity will be needed. We will need new and better equipment and procedures to accommodate the anticipated growth. We have already begun preparing for the future by starting NextGen projects that transition our existing system to the system of the future. These projects must begin now to be ready for the increase in demand predicted by the Joint Planning and Development Office. We must have the tools to allocate airspace more efficiently for the expected volume of flights and to reduce congestion and delays caused by severe weather. Timely and accurate information must be shared with users to optimize the airspace use and allow efficient operations for our customers.

One of the great challenges in preparing for the future is deciding how to balance spending between building significant system improvements and maintaining reliability and availability of the current system while reducing costs. We need additional capacity, but we must also reduce operating costs. In the short term, reducing costs depends on a consistent program of modernizing existing facilities and equipment.

As the roadmaps show, we are developing a long-term, coordinated effort to build a system that can handle future air travel demand and prevent increases in delays. We have begun work on some of the initiatives, but several important steps follow. Continuing to enhance the collaborative air traffic management technology program will improve interaction between commercial carriers and the FAA and help reduce delays. The SWIM program will help us share information so decisions will be more informed with real-time information on system status. Introducing Automatic Dependent Surveillance and data link communication will improve efficiency and reduce workload. Improving automation and weather display systems will increase the data available and allow us to share it more effectively to support decision making for more efficient use of airspace. It will take these initial efforts and a continuing commitment to modernization to achieve the goal of building a system that can handle future growth.

6 Appendices to the CIP

The CIP contains four appendices:

Appendix A

- Lists FAA strategic goals, objectives and performance targets
- Associates CIP projects with strategic objectives and performance targets

Appendix B

- Provides CIP project descriptions and the relationship of projects to strategic goals
- Provides the Strategic Management Plan (SMP) pathway and objective supported by projects
- Lists FY 2009–2013 — performance output goals
- Shows system implementation schedules

Appendix C

- Provides estimated expenditures 2009–2013 by Budget Line Item (BLI)

Appendix D

- Defines acronyms and abbreviations

Federal Aviation Administration

National Airspace System

Capital Investment Plan

Appendix A

Fiscal Years 2009 – 2013

APPENDIX A

GOAL MATRIX

The Capital Investment Plan (CIP) projects have been aligned to the goals, objectives, and performance targets in the Federal Aviation Administration (FAA) Flight Plan 2008-2012 and the Department of Transportation's (DOT) strategic plan. Many FAA projects will contribute to more than one goal, objective, or performance target. The project linkages in Appendix A are aligned to the goal, objective, and performance target where its contribution is most significant. Only CIP projects with Fiscal Year (FY) 2009-2013 funding are included in this Appendix.

Budget Line Item (BLI) numbers with an X (i.e., 1A09X) are used to designate programs/projects that are not in the FY 2009 President's Budget. These Programs/projects are new starts or future programs not currently in the President's budget and will report future year planned activities based on projected funding.

For clarification, the following definitions generally describe the elements of the FAA Flight Plan 2008-2012 and can be used to relate the objectives and performance targets to the CIP projects.

STRATEGIC GOAL

A general statement of the broad agency purpose in carrying out its mission, such as: "To achieve the lowest possible accident rate and constantly improve safety."

OBJECTIVE

A statement of a specific emphasis area that will contribute to the overall goal, such as: "Reduce the commercial airline fatal accident rate."

PERFORMANCE TARGET

A quantifiable measure of the improvement in a goal area that sets a target for specific improvements in outcomes that affect FAA customers, such as: "Maintain the three-year rolling average fatal accident rate below 0.010 per 100,000 departures".

1. STRATEGIC GOAL: INCREASED SAFETY

FAA Strategic Goal: To achieve the lowest possible accident rate and constantly improve safety.

- **FAA Objective 1:** Reduce commercial air carrier fatalities.
 - **FAA Performance Target 1:** Cut the rate of fatalities per 100 million persons on board in half by 2025.

FY 2009 BLI	CIP #	CIP Name
1A01K	A28.01-01	Traffic Alert & Collision Avoidance System (TCAS)
1A14C		Local Area Augmentation System (LAAS) – ATDP
2B02	W03.03-01	Terminal Doppler Weather Radar – Service Life Extension Program (SLEP)
2D05	N04.03-00	Visual Nav aids – ALSIP Continuation
2D07	N04.01-00	Visual Nav aids – Visual Nav aids for New Qualifiers
2E04A	M12.00-00	Aircraft Related Equipment Program
2E04B	M12.01-01	Aircraft Related Equipment Program – Boeing Simulator Replacement
2E04X	M12.01-03	Airbus Simulator Purchase – Advanced Fly-By-Wire Simulator – Technical Refresh
2E09	M11.02-00	Flight Standards Inspector Aircraft Replacement
2E10	M11.03-00	International Flight Inspection Aircraft – Bombardier Challenger Purchase
3A02	A17.01-01	Regulation and Certification Infrastructure System Safety (RCISS) – Segment 1
3A02	A17.01-02	Regulation and Certification Infrastructure System Safety (RCISS) – Segment 2
3A07	A25.01-00	System Approach for Safety Oversight (SASO)
3A07X	A25.02-01	System Approach for Safety Oversight (SASO) – Phase 2
3A08	A26.01-00	Aviation Safety Knowledge Management Environment (ASKME)
4A10	A08.03-01	Aeronautical Information Management (AIM) Modernization

- **FAA Objective 2:** Reduce the number of fatal accidents in general aviation.
 - **FAA Performance Target 1:** By FY 2009, reduce the number of general aviation and nonscheduled Part 135 fatal accidents from the 1996-1998 average of 385 per year to no more than 319 accidents per year.

FY 2009 BLI	CIP #	CIP Name
2D03A	N12.01-00	Wide Area Augmentation System (WAAS) – LPV Segment
2D03B	N12.01-06	Wide Area Augmentation System (WAAS) – Survey and Procedures

1. Strategic Goal: Increased Safety

- **FAA Performance Target 2:** By FY 2009, reduce accidents in Alaska for general aviation and all Part 135 operations from the 2000-2002 average of 130 accidents per year to no more than 99 accidents per year.

FY 2009 BLI	CIP #	CIP Name
1A01I	W10.01-00	Juneau Airport Wind System (JAWS), Alaska Weather Research
2C02	F05.04-01	Alaska Flight Services Modernization
2C03	M08.31-01	Weather Camera Program – Segment 1
2E06	C17.02-01	Alaskan NAS Interfacility Communications System (ANICS) Satellite Network – ANICS Modernization – Phase I

- **FAA Objective 3:** Reduce the risk of runway incursions.

- **FAA Performance Target 1:** By FY 2010, limit Category A and B (most serious) runway incursions to a rate of no more than 0.450 per million operations, and maintain or improve through FY 2012.

FY 2009 BLI	CIP #	CIP Name
1A01A	S09.02-00	Runway Incursion Reduction Program (RIRP) – ATDP
2B01	S09.01-00	Airport Surface Detection Equipment – Model X (ASDE-X)
2B01X	S09.01-01	ASDE-X –Tech Refresh & Disposition
2B14	S11.01-02	Runway Status Lights (RWSL) – Segment 1

- **FAA Objective 4:** Ensure the safety of commercial space launches.

- **FAA Performance Target 1:** No fatalities, serious injuries, or significant property damage to the uninvolved public during licensed or permitted space launch and reentry activities.

FY 2009 BLI	CIP #	CIP Name
None	None	Currently no Capital projects are required to support this Target

- **FAA Objective 5:** Enhance the safety of FAA's air traffic systems.

- **FAA Performance Target 1:** Limit Category A and B (most serious) operational errors to a rate of no more than 1.95 per million activities by FY 2012.

FY 2009 BLI	CIP #	CIP Name
1A01E	M08.28-02	Airspace and Aeronautical Information Management Lab – ATDP

- **FAA Objective 6:** Implement a Safety Management System (SMS) for the FAA.

- **FAA Performance Target 1:** By FY 2010, implement Safety Management System (SMS) in the Air Traffic Organization, Office of Aviation Safety, and Office of Airports. By FY 2012, implement SMS policy in all appropriate FAA organizations.

FY 2009 BLI	CIP #	CIP Name
None	None	Currently no Capital projects are required to support this Target

**** END OF INCREASE SAFETY STRATEGIC GOAL ****

2. STRATEGIC GOAL: GREATER CAPACITY

FAA Strategic Goal: Work with local governments and airspace users to provide increased capacity in the United States airspace system that reduces congestion and meets projected demand in an environmentally sound manner.

- **FAA Objective 1:** Increase capacity to meet projected demand and reduce congestion.
 - **FAA Performance Target 1:** Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

FY 2009 BLI	CIP #	CIP Name
1A01B	M08.28-00	System Capacity, Planning, and Improvements – ATDP
1A01C	M08.29-00	Operations Concept Validation and Infrastructure Evolution – ATDP
1A01D	M08.27-01	NAS Wide Weather Requirements & Strategic Planning
1A01F	M08.28-04	Airspace Management Program (AMP) – ATDP
1A01X	M08.36-01	Wake Turbulence Research
1A02	A24.03-00	Traffic Management Advisor (TMA) – Single Center (SC)
1A06	W11.01-01	NextGen – NextGen Network Enabled Weather (NNEW)
1A07	C27.01-01	NextGen Data Communications
1A08	M49.01-01	NextGen – Demonstrations and Infrastructure Development
1A09	M49.01-02	NextGen – Systems Development
1A10	M48.01-03	NextGen – Trajectory Based Operations
1A11	M48.01-07	NextGen – Reduce Weather Impact
1A12	M48.01-04	NextGen – Arrivals/Departures at High Density Airports
1A13	M48.01-08	NextGen – Collaborative Air Traffic Management
1A14A	M48.01-09	NextGen – Flexible Terminal Environment
1A14B		Wake Turbulence Mitigation for Departures (WTMD)
1A15	M48.01-10	NextGen – Safety, Security, and Environment
1A16	M48.01-05	NextGen – Networked Facilities
2A01	A01.10-01	En Route Automation Modernization (ERAM)
2A01X	A01.10-03	En Route Automation Modernization (ERAM) – Technical Refresh
2A12	W07.02-00	Corridor Integrated Weather System (CIWS)
2B13	S08.00-00	Precision Runway Monitor (PRM)
2B21	W07.01-00	ITWS – Development/Procurement/Pre-Planned Product Improvement (P3I)
2B21	W07.01-01	ITWS – Segments 2 and 3
2D02	N03.01-00	Instrument Landing Systems (ILS)
2D06	N09.00-00	Sustain Distance Measuring Equipment (DME)
2D11	N12.03-01	GPS Civil Requirements

2. Strategic Goal: Greater Capacity

- **FAA Performance Target 2:** Commission nine new runway/taxiway projects, increasing the annual service volume of the 35 OEP airports by at least 1 percent annually, measured as a five-year moving average, through FY 2012.

FY 2009 BLI	CIP #	CIP Name
2B18	F02.11-01	Large TRACONs – Houston Area Air Traffic System (HAATS)

- **FAA Performance Target 3:** Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

FY 2009 BLI	CIP #	CIP Name
2A02	A01.12-02	En Route Communication Gateway – Technology Refresh
2A03	W02.02-00	NEXRAD Open Systems Upgrades
2A05	F06.01-00	ARTCC Plant Modernization/Expansion – ARTCC Modernization
2A07	C04.01-01	Radio Control Equipment (RCE) – Sustainment
2A07	C06.01-00	Communications Facilities Enhancement – Expansion
2A07	C06.03-00	Communications Facilities Enhancement – Air/Ground Communications RFI Elimination
2A08	S02.03-00	ATC Beacon Interrogator (ATCBI) Replacement
2A08	S02.03-02	Beacon Only Sites – Facility Establishments
2A09	S04.02-03	LRR Improvements – Infrastructure Upgrades/Sustain
2A10	C01.02-03	Voice Switching and Control System (VSCS) – Tech Refresh – Phase 2
2A13	F08.01-01	San Juan Facility Remediation
2A14A	C21.01-01	Next-Generation VHF A/G Communication System (NEXCOM) – Segment 1a
2A14A	C21.02-01	Next-Generation VHF A/G Communication System (NEXCOM) – Segment 2
2A14B	C06.04-00	Communications Facilities Enhancement – UHF Replacement
2B03	A04.01-01	Standard Terminal Automation Replacement System – Technical Refresh (TAMR Phase 1)
2B03	A04.01-02	Standard Terminal Automation Replacement System – Terminal Enhancements
2B04	A04.07-01	Terminal Automation Modernization – Replacement (TAMR) – Phase 3
2B05A	A01.11-01	Flight Data Input/Output (FDIO) Replacement
2B05B	A03.04-01	Terminal Sustainment
2B06A	F01.02-00	ATCT/TRACON Replacement
2B07	F01.01-00	ATCT/TRACON Modernization
2B08	C05.02-00	Voice Switches – Terminal Voice Switch Replacement (TVSR) II
2B10	S03.01-05	ASR-9 / Mode S SLEP, Phase 1B – Transmitter Modification
2B10	S03.01-06	ASR-9 / Mode S SLEP, Phase 2
2B11A	S03.02-01	ASR-11 – ASR-7/ASR-8 Replacement, DOD Takeover, New Establishments

FY 2009 BLI	CIP #	CIP Name
2B11B	S03.02-04	ASR-11 – Tech Refresh
2B12	F04.01-00	DOD/FAA ATC Facility Transfer/Modernization – Original Program
2B15	C05.03-01	NAS Voice Switch
2B16	W09.01-00	ASR-WSP – Technology Refresh/Product Improvement
2B17	C23.01-00	Voice Recorder Replacement Program – Next Generation Recorders (VRRP)
2B19	A03.05-01	Integrated Display System (IDS) – Technical Refresh and Sustainment
2B20	S03.05-01	ASR-8 SLEP
2B22X	A04.05-02	Terminal Automation Modernization – Replacement (TAMR) – Phase 2 Tech Refresh
2C01	W01.02-02	Automated Surface Weather Observation Network (ASWON) – ASOS – Pre-Planned Product Improvements (P3I)
2D01	N06.00-00	Very High Frequency Omni-Directional Range (VOR) Collocated with Tactical Air Navigation (VORTAC)
2D04	N08.02-00	Runway Visual Range (RVR) – Replacement/Establishment
2D09	N04.04-00	Visual Nav aids – Sustain, Replace, Relocate
2E02	F12.00-00	FAA Buildings & Equipment Sustain Support – Unstaffed Infrastructure Sustainment
2E03	M08.04-00	Air Navigation Aids Facilities – Local Projects
2E05	F10.00-00	Airport Cable Loop Systems – Sustained Support
2E08	F11.00-00	Power Systems Sustained Support
4A06	M43.01-00	NAS Interference Detection, Locating and Mitigation (NAS IDLM)

- **FAA Performance Target 4:** Achieve an average daily airport capacity for the seven major metropolitan areas of 39,484 arrivals and departures per day by FY 2009, and maintain through FY 2012.

FY 2009 BLI	CIP #	CIP Name
None	None	Currently no Capital projects are required to support this Target

2. Strategic Goal: Greater Capacity

- **FAA Objective 2:** Increase reliability and on-time performance of scheduled carriers.
 - **FAA Performance Target 1:** Achieve a NAS on-time arrival rate of 88.76 percent at the 35 OEP airports by FY 2011 and maintain through FY 2012.

FY 2009 BLI	CIP #	CIP Name
2A06	A05.01-06	TFM Infrastructure – Infrastructure Modernization
2A06	A05.01-10	Collaborative Air Traffic Management Technologies (CATMT) – Work Package 1
2A06	A05.01-11	Collaborative Air Traffic Management Technologies (CATMT) – Work Package 2
2A06	A05.05-01	Route Availability Planning Tool (RAPT)
2A11	A10.03-00	Advanced Technologies and Oceanic Procedures (ATOP)
2A16	S10.04-01	Automatic Dependent Surveillance - Broadcast (ADS-B) – National Implementation – Segment 1 and 2
2D10	N04.02-00	Visual Nav aids – Replace Visual Approach Slope Indicator (VASI) with Precision Approach Path Indicator (PAPI)
4A09	M03.02-00	CIP Systems Engineering & Technical Assistance – MITRE

- **FAA Objective 3:** Address environmental issues associated with capacity enhancements.
 - **FAA Performance Target 1:** Reduce the number of people exposed to significant noise by 4 percent per year through FY 2012, as measured by a three-year moving average, from the three-year average for calendar years 2000-2002

FY 2009 BLI	CIP #	CIP Name
None	None	Currently no Capital projects are required to support this Target

- **FAA Performance Target 2:** Improve aviation fuel efficiency by another 1 percent over the FY 2007 level (for a total of 6 percent) through FY 2008, and 1 percent each subsequent year through FY 2012 to 10 percent, as measured by a three-year moving average of the fuel burned per revenue mile flown, from the three-year average for calendar years 2000-2002

FY 2009 BLI	CIP #	CIP Name
None	None	Currently no Capital projects are required to support this Target

****END OF GREATER CAPACITY STRATEGIC GOAL****

3. STRATEGIC GOAL: INTERNATIONAL LEADERSHIP

FAA Strategic Goal: Increase the safety and capacity of the global civil aerospace system in an environmentally sound manner.

- **FAA Objective 1:** Promote improved safety and regulatory oversight in cooperation with bilateral, regional, and multilateral aviation partners.
 - **FAA Performance Target 1:** Work with the Chinese aviation authorities and industry to adopt 27 proven Commercial Aviation Safety Team (CAST) safety enhancements by FY 2011. This supports China’s efforts to reduce commercial fatal accidents to a rate of 0.030 fatal accidents per 100,000 departures by FY 2012.
 - **FAA Performance Target 2:** Conclude at least eight (new or expanded) bilateral safety agreements that will facilitate an increase in the ability to exchange aviation products and services by FY 2012.
 - **FAA Performance Target 3:** Secure a yearly increase in international aviation development funding to strengthen the global aviation infrastructure. Increase the FY 2007 external funding baseline target of \$12 million in \$3 million annual increments for a FY 2012 target of \$27 million.

FY 2009 BLI	CIP #	CIP Name
None	None	Currently no Capital projects are required to support these Targets

- **FAA Objective 2:** Promote seamless operations around the globe in cooperation with bilateral, regional, and multilateral aviation partners.
 - **FAA Performance Target 1:** By FY 2012, expand the use of Next Generation Air Transportation System (NextGen) performance-based systems to five priority countries.

FY 2009 BLI	CIP #	CIP Name
None	None	Currently no Capital projects are required to support this Target

****END OF INTERNATIONAL LEADERSHIP STRATEGIC GOAL****

4. STRATEGIC GOAL: ENVIRONMENTAL STEWARDSHIP

DOT Outcome: Reduce pollution and other adverse effects of transportation and transportation facilities.

- **DOT Strategy:** Adopt transportation policies and promote technologies that reduce or eliminate environmental degradation.

FY 2009 BLI	CIP #	CIP Name
2E01	F13.01-00	Fuel Storage Tanks
3A01	F13.02-00	Environmental Cleanup / HAZMAT

****END OF ENVIRONMENTAL STRATEGIC GOAL****

5. STRATEGIC GOAL: HOMELAND AND NATIONAL SECURITY

DOT Outcome: Balance homeland and national security transportation requirements with the mobility needs of the Nation for personal travel and commerce.

- **DOT Strategy:** Support and implement U.S. security strategies and plans related to transportation.

FY 2009 BLI	CIP #	CIP Name
2A17X	A29.01-01	Automated Detection & Processing Terminal (ADAPT)
3A04	C18.00-00	Command & Control Communications (C3)
3A05A	F24.00-00	Facility Security Risk Management (FSRM)
3A05X	F24.01-01	Facility Security Risk Management (FSRM) – Phase 2
3A06	M31.00-00	NAS Information Security – Information Systems Security
3A09X	M31.02-01	Logical Access & Authorization Control Svc (LAACS)

****END OF SECURITY STRATEGIC GOAL****

6. STRATEGIC GOAL: ORGANIZATIONAL EXCELLENCE

FAA Strategic Goal: Ensure the success of the FAA's mission through stronger leadership, a better trained and safer workforce, enhanced cost-control measures, and improved decision-making based on reliable data.

- **FAA Objective 1:** Make the organization more effective with stronger leadership, increased commitment of individual workers to fulfill organization-wide goals, and a better prepared, better trained, safer, diverse workforce.

- **FAA Performance Target 1:** Increase the score of the Employee Attitude Survey measure for the areas of management effectiveness and accountability by at least 5 percent, over the FY 2003 baseline of 35 percent by FY 2010 and maintain through 2012.
- **FAA Performance Target 2:** By FY 2010, 70 percent of FAA external hires will be filled within OPM's 45-day standard for government-wide hiring.

FY 2009 BLI	CIP #	CIP Name
None	None	Currently no Capital projects are required to support these Targets

- **FAA Performance Target 3:** Reduce the total workplace injury and illness case rate to no more than 2.44 per 100 employees by the end of FY 2011, and maintain through FY 2012.

FY 2009 BLI	CIP #	CIP Name
2B09	F13.03-00	NAS Facilities OSHA & Environmental and Occupational Safety and Health Compliance and Fire/Life Safety for Airport Traffic Control Towers

6.Strategic Goal: Organizational Excellence

- **FAA Performance Target 4:** Reduce grievance processing time by 30 percent (to an average of 102 days) by FY 2010 over the FY 2006 baseline of 146 days, and maintain the reduction through FY 2012.

FY 2009 BLI	CIP #	CIP Name
None	None	Currently no Capital projects are required to support this Target

- **FAA Performance Target 5:** Maintain the air traffic control workforce at or above the projected annual totals in the Air Traffic Controller Workforce Plan.

FY 2009 BLI	CIP #	CIP Name
3B02	M20.00-00	NAS Training – Equipment Modernization
3B04	M20.01-02	NAS Training Simulation – Tower Cab

- **FAA Objective 2:** Improve financial management while delivering quality customer service.

- **FAA Performance Target 1:** Increase cost reimbursable contract closeouts by 1 percent per year, from 86 percent in FY 2008 to 90 percent in FY 2012.

FY 2009 BLI	CIP #	CIP Name
None	None	Currently no Capital projects are required to support this Target

- **FAA Performance Target 2:** Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

FY 2009 BLI	CIP #	CIP Name
1A03/ 1A04	F14.00-00	System Support Laboratory Sustained Support
1A05	F16.00-00	William J. Hughes Technical Center Building and Plan Support
2A04	F28.01-01	ATCSCC – Relocation
2A15	A31.01-01	System-Wide Information Management (SWIM)
2B06X	M51.01-01	Terminal PCS Moves
2D08	A14.02-01	Instrument Flight Procedures Automation (IFPA)
2E07	F26.01-01	Decommissioning
3A03	M21.04-01	Logistics Center Support System (LCSS)
3B01	F18.00-00	Aeronautical Center Infrastructure Modernization
3B03	M10.00-00	Distance Learning
4A01A	M03.01-00	CIP Systems Engineering & Technical Assistance – SETA and Other Contractors

6.Strategic Goal: Organizational Excellence

FY 2009 BLI	CIP #	CIP Name
4A01B	M08.01-00	Provide ANF/ATC Support (Quick Response)
4A01C	M03.01-01	Web CM
4A02	M08.06-00	Program Support Leases
4A03	M05.00-00	NAS Regional/Center Logistics Support Services
4A04	F19.00-00	Mike Monroney Aeronautical Center – Leases
4A05A	M22.00-00	NAS Implementation Support Contract (NISC)
4A05B	M22.01-01	NAS Implementation Support Contract (NISC) – Configuration Management
4A07	M02.00-00	Technical Support Services (TSS)

- **FAA Performance Target 3:** Obtain an unqualified opinion on the agency’s financial statements (Clean Audit with no material weaknesses) each fiscal year.

FY 2009 BLI	CIP #	CIP Name
None	None	Currently no Capital projects are required to support this Target

- **FAA Objective 3:** Make decisions based on reliable data to improve our overall performance and customer satisfaction.

- **FAA Performance Target 1:** By FY 2008, 90 percent of major system acquisition investments are within 10 percent of annual budget and maintain through FY 2012.

FY 2009 BLI	CIP #	CIP Name
1A01G	M46.01-01	Strategy and Evaluation – ATDP
1A01H	M47.01-01	Dynamic Capital Planning

- **FAA Performance Target 2:** By FY 2008, 90 percent of major system acquisition investments are on schedule and maintain through FY 2012.

FY 2009 BLI	CIP #	CIP Name
4A08	M08.14-00	Resource Tracking Program (RTP)

- **FAA Performance Target 3:** Increase agency scores on the American Customer Satisfaction Index, which surveys commercial pilots.

FY 2009 BLI	CIP #	CIP Name
None	None	Currently no Capital projects are required to support this Target

- **FAA Performance Target 4:** Achieve zero cyber security events that disable or significantly degrade FAA services.

FY 2009 BLI	CIP #	CIP Name
None	None	Currently no Capital projects are required to support this Target

6.Strategic Goal: Organizational Excellence

- **FAA Objective 4:** Enhance our ability to respond to crises rapidly and effectively, including security-related threats and natural disasters.
 - **FAA Performance Target 1:** By October 1, 2008, develop performance targets that measure improvement in three outcome areas: readiness; providing a framework for effective decision-making; and effective response.

FY 2009 BLI	CIP #	CIP Name
None	None	Currently no Capital projects are required to support this Objective

****END OF ORGANIZATIONAL EXCELLENCE STRATEGIC GOAL****

Federal Aviation Administration

National Airspace System

Capital Investment Plan

Appendix B

Fiscal Years 2009 – 2013

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APPENDIX B

DETAILED PROGRAM PLAN DATA

LINKING FAA CIP PROJECTS TO GOALS

The Capital Investment Plan (CIP) projects support the goals, objectives, and performance targets in the Federal Aviation Administration (FAA) Flight Plan 2008-2012 and the Department of Transportation's (DOT) strategic plan. Projects are linked to a single objective and the data provided in Appendix B describes how these projects contribute to the performance target under those objectives. For each project output goals are described for the 5 years of this CIP, and, if the CIP project is delivering air traffic control systems into the National Airspace System (NAS), a graphical representation of the implementation schedule is shown. The CIP projects managed by the Air Traffic Organization (ATO) also show the alignment to Strategic Management Process (SMP) Pathway and Objective.

FORMAT

Appendix B is organized by budget line item (BLI) consistent with the fiscal year (FY) 2009 President's submission to Congress. Several CIP projects may be included in one BLI. In those cases when all of the CIP projects pertain to one specific purpose, they are grouped. However, when the CIP projects have different purposes, they are described with separate CIP entries.

Programs/projects in Appendix B contain a Program Description and Relationship to Performance Target description. FY 2009 Performance Output Goals and FY 2010-2013 Performance Output Goals for all Capital funded CIP projects are reported as outlined below.

BLI numbers with an X (i.e., 1A09X) are used to designate programs/projects that are not in the FY 2009 President's Budget (ATO and Safety and Operations Capital) but are planned for future years. Accordingly, their inputs are reflected as follows:

- Programs/projects representing new starts or future programs not currently in the President's budget will report future year Performance Output Goals based on projected funding.

CIP Programs/projects are required to reflect FY 2009-2013 Performance Output Goals, with the exception of the following:

- Programs/projects that do not exceed \$5M annually.
- Programs/projects that fund support contracts (such as CAASD, SETA, NISC) or fund program support leases.

Where, 'None' is reflected in the FY 2009-2013 Performance Output Goals sections, it denotes that no funding was allocated for that fiscal year.

EXAMPLE

The following example illustrates how the project data provided is used to support the FAA Flight Plan Goal, Objective, and Performance Target, along with a sample format of CIP project inputs:

PROGRAM DESCRIPTION

Airport Surface Detection Equipment – Model X (ASDE-X) is a modular surface surveillance system that processes multiple radar sources, multilateration, and Automatic Dependent Surveillance-Broadcast (ADS-B) sensor data to provide seamless airport movement area coverage and aircraft identification to air traffic controllers. ASDE-X is being deployed to airports with no surface surveillance systems and....

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 3** – Reduce the risk of runway incursions.
- **FAA Performance Target 1** – By FY 2010, limit Category A and B (most serious) runway incursions to a rate of no more than 0.450 per million operations, and maintain or improve through FY 2012.

Relationship to Performance Target

The ASDE-X system provides air traffic controllers with a visual representation of the traffic situation on the airport surface movement area and arrival corridors in the form of aircraft and vehicle position information and flight identifications or call signs. This increased awareness of the situation on the airport surface movement area is essential in reducing runway collision risks...

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.3** – Ensure safety and aircraft separation.

Program Plans FY 2009 – Performance Output Goals

- Achieve Initial Operating Capability (IOC) of 6 out of 35 (49% complete) ASDE-X sites.
- Deliver 12 out of 35 (74%) undelivered ASDE-X systems.

SYSTEM IMPLEMENTATION SCHEDULE

Within this section, system deployment and operational status from 2005 through 2015 for major system acquisitions will be graphically reflected. For example:

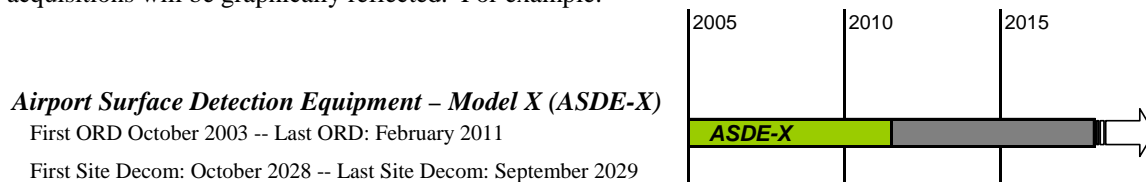


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ACTIVITY 1: ENGINEERING, DEVELOPMENT, TEST, AND EVALUATION

1A01, ADVANCED TECHNOLOGY DEVELOPMENT AND PROTOTYPING (ATDP) FY 2009 Request \$41.4M

- A, Runway Incursion Reduction Program (RIRP) – ATDP, S09.02-00
- B, System Capacity, Planning, and Improvements – ATDP, M08.28-00
- C, Operations Concept Validation and Infrastructure Evolution – ATDP, M08.29-00
- D, NAS Weather Requirements and Programs – ATDP, M08.27-01
- E, Airspace and Aeronautical Information Management Lab – ATDP, M08.28-02
- F, Airspace Management Program (AMP) – ATDP, M08.28-04
- G, Strategy and Evaluation – ATDP, M46.01-01
- H, Dynamic Capital Planning, M47.01-01
- I, Juneau Airport Wind System (JAWS), Alaska Weather Research, W10.01-00
- J, Traffic Alert and Collision Avoidance System (TCAS), A28.01-01
- X, Wake Turbulence, M08.36-01

A, RUNWAY INCURSION REDUCTION PROGRAM (RIRP) – ATDP, S09.02-00

Program Description

The Runway Incursion Reduction Program (RIRP) will continue research, development, and operational evaluation of technologies to increase runway safety. Consistent with standing National Transportation Safety Board recommendations and initiatives identified in the FAA Flight Plan, research emphasis will remain on technologies that provide for direct safety warnings to pilots and aircrews, as well as those that can be applied cost effectively at small to medium airports. The program will explore alternative small airport surface detection technology and the application of these technologies to pilot, controller, and vehicle operator situational awareness tools. Initiatives include operational evaluation of Runway Intersection Lights (RIL), Low Cost Ground Surveillance (LCGS), Final Approach Runway Occupancy Signal (FAROS) awareness tools, and upgrading capabilities of Runway Status Lights (RWSL). When appropriate, solutions will be prototyped and tested in an operational setting to validate their technical performance and operational effectiveness.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 3 – Reduce the risk of runway incursions.**
- **FAA Performance Target 1 – By FY 2010, limit Category A and B (most serious) runway incursions to a rate of no more than 0.450 per million operations, and maintain or improve through FY 2012.**

Relationship to Performance Target

The RIRP is evaluating components of a RWSL system for Airport Surface Detection Equipment – Model X (ASDE-X) and Airport Movement Area Safety System (AMASS) airports. These RWSL upgrades are intended to address the runway safety risk that remains at the busiest airports. Current analyses project that a portion of the risk of fatalities resulting from runway accidents during the period 2005-2031 will remain after the deployment of ASDE-X is completed. RWSL upgrades will add an additional layer of safety to reduce that risk. It will also contribute toward the reduction of category A and B (most serious) runway incursions. The program will begin to evaluate RILs which will advise pilots that it is unsafe to continue towards a runway intersection because of crossing traffic. It will also begin to evaluate an advanced

FAROS capability that warns pilots that the runway will be occupied during a critical portion of the landing.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.3** – Ensure safety and aircraft separation.

Program Plans FY 2009 – Performance Output Goals

- Conduct surveillance system performance analyses required to support implementation of RWSL at the three initial sites.
- Complete evaluation of RWSL performance for intersecting/converging runways.
- Complete evaluation of LCGS alternatives for low and medium density airports.
- Complete evaluation of FAROS implementation alternatives.
- Continue to perform analyses required to support implementation of RWSL at additional airports.
- Develop performance specifications and transition approved projects to acquisition/implementation.
- Continue to survey industry for emergent surface technologies to enhance runway safety.
- Initiate efforts to harmonize FAA approved surface technology enhancements with international standards.

Program Plans FY 2010-2013 – Performance Output Goals

- Continue to perform analyses required to support further implementation of RWSL.
- Continue international standardization/harmonization efforts for approved surface technologies.
- Continue to explore and evaluate emergent surface technologies to enhance runway safety.

B, SYSTEM CAPACITY, PLANNING, AND IMPROVEMENTS – ATDP, M08.28-00

Program Description

The System Capacity, Planning, and Improvements program identifies, evaluates, and formulates system capacity improvements for the NAS. This program sponsors airport capacity studies where experts from the FAA and industry are assembled in design teams to develop recommendations for improving capacity, increasing efficiency, achieving FAA Flight Plan targets, and reducing delays at specific airports. In addition, this program supports the FAA's mission to measure and improve system performance. Through planning, coordination, and data collection, this program develops and implement performance measures which assess NAS operations. The Performance Data Analysis and Reporting System (PDARS) is a fully integrated performance measurement tool designed to help the FAA improve the NAS by tracking the daily operations of the air traffic control (ATC) system. The tracking and monitoring capabilities of PDARS support studies and analysis of air traffic operations. The New Large Aircraft impact analysis is also a highly visible activity within this program. Support for the integration of the new Airbus A380 aircraft into the NAS includes developing proposed solutions for modifying structural components of airports and developing operational procedures to accommodate this aircraft at U.S. airports.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

This program will facilitate the design and improvements of new runways, airfield improvements, air traffic procedures, and other technological implementations to improve airport capacity and increase efficiency. The Airport Design Teams evaluate alternatives for increasing capacity at specific airports that

are experiencing or are projected to experience significant flight delays. Capacity studies provide recommendations and solution sets for improving capacity at the airport.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #3** – Increase capacity where needed.
- **SMP Objective #3.3** – Implement airspace and airport capacity enhancements safely.

Program Plans FY 2009 – Performance Output Goals

- Complete PDARS connection to ASDE-X at each deployed site.
- Continue evaluating alternatives for increasing capacity at specific airports that are projected to experience significant flight delays.
- Provide facility and system level metrics to support FAA goals and objectives.
- Field PDARS capabilities at MicroEARTS (Microprocessor En Route Automated Radar Tracking System) locations.
- Enable capability for PDARS to automatically transfer data to Operations Network.
- Provide a system that connects a common set of understandable corporate level performance targets and activities to daily operations.
- Conduct ground movement analyses at U.S. airports to determine whether the operation of new large A-380 aircraft would adversely impact the operation of other aircraft at that airport.

Program Plans FY 2010-2013 – Performance Output Goals

- Develop and support gate-to-gate performance analysis.
- Implement interface to allow data exchange between PDARS and the En Route Automation Modernization (ERAM) system.
- Modify PDARS existing software to maintain connectivity to future releases of ERAM.
- Continue the development of the Future Airport Capacity Task reports to identify airports where additional capacity development may be necessary.
- Coordinate international cooperative efforts to improve system capacity and efficiency via the Design Team Programs Facilitation Group and the International Terminal Benchmark Study.
- Update the Airport Capacity Benchmark Report to analyze the number of flights that the 35 Operational Evolution Partnership (OEP) airports can accommodate during optimum and reduced weather conditions.

C, OPERATIONS CONCEPT VALIDATION AND INFRASTRUCTURE EVOLUTION – ATDP, M08.29-00 (INTEGRATED WITH ADVANCED FACILITY PLANNING, F02.10-00)

Program Description

Developing operational concepts is an Office of Management and Budget (OMB) recommended first step in developing an Enterprise Architecture. This program develops and validates operational concepts that are key to Air Traffic Organization's (ATO) modernization programs and the Next Generation Air Transportation System (NextGen). This work includes developing and maintaining the overall NAS Concept of Operation and ensuring its compatibility with the International Civil Aviation Organization (ICAO) "Air Traffic Management (ATM) Global Concept". It also includes developing the detailed second level, subsidiary concepts that support validation and requirements development. Second level concepts identify the personnel and functional changes necessary for the ATO to provide customer service in ways that increase productivity and reduce net cost. Recent work includes developing second level concepts for En Route, Traffic Flow Management (TFM), Surface, Communications, and Flight Data Management programs. This information helps the aviation community anticipate what changes are needed in aircraft equipment in order to operate with the new technology being implemented in the NAS and develop new procedures.

The Operational Concept efforts looks at the changing roles and responsibilities of the Air Traffic workforce and the Advanced Facilities which derives the associated functional requirements imposed on

the NAS infrastructure. Concept development includes preparing system specifications, roles and responsibilities, procedures, training, and certification requirements. These development and validation activities support NAS modernization through: (1) concept/scenario development; (2) concept validation; (3) simulation and analysis; (4) system design; (5) metric development; and (6) modeling.

The “Advanced Facility Planning” identifies the system requirements to meet these operational concept derived needs and identifies opportunities for modernization, modification and/or expansion of air traffic control infrastructure including facilities. Not only physical plant alternatives need to be studied, but also organization of workload distribution and location of new facilities. This program does the upfront analysis to determine the future configuration of a facility, (separate new, refurbish old, collocate with another facility, or consolidation) using considerations such as risk to service. Identifying the correct investment alternative reduces cost and improves efficiency.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

Concept validation supports development, analysis, and simulation of new concepts to evaluate the following;

- Alternate roles for Air Traffic Service Providers, airspace users, and automation that could increase capacity,
- Alternative airspace structure which may increase productivity and hence capacity,
- Alternative communication, navigation, and surveillance (CNS) architecture to support the ATO’s goal of reducing cost, and;
- Alternative automation, display, and facility configuration to increase productivity and hence capacity.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure Viable Future.
- **SMP Objective #4.2** – Deliver a future air traffic system that meets customer operational needs.

Program Plans FY 2009 – Performance Output Goals

- Continue concept development and validation to identify opportunities to right size the ATC infrastructure for cost efficiency and productivity.
- Develop detailed concept and information requirements for the use of data communications in the terminal environment.
- Conduct analyses and develop concepts to support the applications of 4-D trajectory management.
- Conduct analyses and develop concept for end-to-end traffic flow management.
- Continue RTCA support.
- Support Action Plans with EUROCONTROL to coordinate concept development, validation, and measurement methodologies, including support for the Validation Data Repository.
- Investment analysis/staff studies for facility replacement/co-location/consolidation as required.
- Facilities Evolution – Conduct analysis of standard controller workstation based on the changes in service providers’ roles.
- Expand the concept development and validation of the multi-sector planner to identify opportunities for the utilization of new systems and capabilities.

Program Plans FY 2010-2013 – Performance Output Goals

- Develop criteria for evaluation of the standard controller platform to support reduced maintenance, training, and increased flexibility in establishing and implementing changes to controller roles and responsibilities.
- Conduct analyses and develop detailed NAS concept for transition to NextGen terminal operations.
- Develop Concept of Use for the advanced flight deck.
- Continue to support Action Plans with EUROCONTROL to coordinate concept development, validation, and measurement methodologies, including support for the Validation Data Repository.
- Expand cognitive and analytic models to support assessments.
- Continue RTCA support.
- Investment analysis/staff studies for facility replacement/co-location/consolidation as required.
- Facilities Evolution – Continue analysis of standard controller workstation based on the changes in service providers' roles.
- Define information and display requirements for a multi-sector planner position.

D, NAS WIDE WEATHER REQUIREMENTS AND STRATEGIC PLANNING, M08.27-01

Program Description

This program develops aviation weather policy and standards for the entire NAS, represents FAA in the Joint Program Development Office (JPDO) Weather Integrated Planning Team (IPT) and manages the Engineering, Development, Test, and Evaluation of ATO Capital weather portfolio. The purpose is to reduce the number of weather related accidents, evaluate the effectiveness of weather information to improve system operational performance, develop and implement strategies to promote US NextGen vision globally and implement global harmonization.

The funding supports contract services to develop and implement weather policies, including setting surface and airborne observation service standards for efficiency, improved forecasts, and traffic flow management tool enhancements, promoting US current and NextGen practices at ICAO for global harmonization and accelerated change, representing the Department of Transportation in working with the Office of the Federal Coordinator for Meteorology for operational efficiencies and developing system performance metrics related to weather for efficiency and capacity. This program, when working with the JPDO Weather IPT, uses contract services to align FAA weather investments and NextGen weather plans to develop required policies. Contract services also support developing the weather segment of the Corporate Mission Analysis, developing aviation weather research requirements, developing concept and requirements definition for weather and managing the transition of weather research and development into operation for accelerated safety and efficiency payoffs.

As part of transitioning weather research into operations, this program must define performance standards, evaluate human factors, check that procedures are compatible with new technology, analyze impact on controller and pilot workloads, analyze maintainability of new equipment and determine if new capabilities are consistent with the NAS Enterprise Architecture.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1 – Increase capacity to meet projected demand and reduce congestion.**
- **FAA Performance Target 1 – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.**

Relationship to Performance Target

This program contributes to the FAA's greater capacity goal by facilitating policy development for long-range efforts to modernize the air transportation system. The program funds studies that will establish metrics and determine weather provider needs. The studies will help determine opportunities to improve

weather products, leading to increased capacity. The program also facilitates the movement of aviation weather products that are designed to increase capacity, from research and development into operational use.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure Viable Future.
- **SMP Objective #4.2** – Deliver a future air transportation system that meets customers' operational needs.

E, AIRSPACE & AERONAUTICAL INFORMATION MANAGEMENT LABORATORY – ATDP, M08.28-02

Program Description

The Airspace and Aeronautical Information Management Laboratory has a leading role in developing and fielding advanced information systems and decision support tools that allow the FAA to more safely and efficiently manage the NAS. The laboratory's aeronautical information management activities include: developing information systems for performance measurement, standardization and productivity improvements, and improving the distribution of aeronautical information:

Performance Measurement. The Laboratory provides historical and near-real-time metrics for monitoring and predicting operational performance, costs and facility usage. These measurements make it possible for the FAA to evaluate the effects of past changes and identify areas for further improvements and cost savings. In addition, laboratory measures are used as a component in calculating unit costs of air traffic service and for calculating pay rates and staffing standards in the ATC facilities.

Standardization and Productivity Improvements. The Airspace and Aeronautical Information Management Laboratory provides productivity and automation support tools for local, regional and headquarters ATO divisions. The Laboratory systems are also used to evaluate the risk of obstacles and cell phone towers on airport operations and evaluate the minimum safe altitudes for aircraft approaching an airport.

Distributing Aeronautical Information. Aeronautical information is used in air traffic control systems for flight planning, capacity simulations and aircraft separation. Aeronautical information, such as charts, publications and NOTAMS, is used by pilots to safely navigate in the airspace system. Next Generation Air Transportation Systems (NextGen) will rely on new laboratory initiatives to develop the technology for dynamic distribution of aeronautical information to advanced avionics and air traffic control systems. Systems developed in the laboratory will support flexible operations, shared situational awareness, and other next generation air traffic system goals. The laboratory leads the Aeronautical Information Management (AIM) effort to streamline input, storage and output mechanisms. An important component of this work is working with international aviation organizations in the development and use of international standards and best practices for electronic exchange of aeronautical information.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 5** – Enhance the safety of the FAA's air traffic systems.
- **FAA Performance Target 1** – Limit Category A and B (most serious) operational errors to a rate of no more than 1.95 per million activities by FY 2012.

Relationship to Performance Target

The Airspace and Aeronautical Information Management Laboratory directly affects the success of current and future FAA initiatives such as Area Navigation (RNAV) and Global Positioning System (GPS) based navigation, shared situational awareness and safe air traffic operations.

Through advanced AIM automation and decision support tool development efforts underway in the Aeronautical and Airspace Laboratory, the FAA will see significant cost savings through aeronautical chart automation, consolidation and reconciliation of FAA aeronautical data sources, digital input and output of aeronautical data, and streamlined workflow processes in local facilities and FAA headquarters. However, the primary purpose of these AIM projects is to improve NAS safety by incorporating end-to-end data integrity, international standards and best practices information engineering techniques.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure Viable Future
- **SMP Objective #4.2** – Deliver a future air traffic system that meets customer operational needs.

Program Plans FY 2009 – Performance Output Goals

- Provide final operating capabilities for the survey data collection and quality control portion of the Airport Geographic Information System project. Process at least 10 airports by September 2009.
- Improve safety and quality of approach procedures by digitally managing 100% of newly created instrument approach procedures.
- Increase safety and quality of aeronautical data by incorporating Aeronautical Information Exchange Model (AIXM) into 25% of electronically distributed resources.
- Reduce customer costs and evaluation times by integrating basic screening tools for instrument approach procedures, MIAs (Minimum IFR Altitude) and MVAs (Minimum VFR Altitude). Show quantitative reduction in manual processing of Obstruction Evaluations by September 2009.
- Automate proposed obstacle evaluations.
- Develop international and domestic over flight calculations to support billing and cost accounting by September 2009.
- Ensure at least 80% of MIA and MVA evaluations and validations occur electronically.
- Increase global efficiency and safety by promoting the use of AIM data standards by conducting classes and conferences about the AIXM to at least 200 participants.
- Increase global safety, efficiency, and interoperability by enhancing open source AIXM viewer and editor system by September 2009.

Program Plans FY 2010-2013 – Performance Output Goals

- Ensure that 100% of MIA and MVA evaluations and validations occur electronically.
- Incorporate MIA and MVA information into the FAA's NAS Resource (NASR) database and regularly distribute the information to external and internal customers.
- Increase global efficiency and safety by promoting the use of AIM data standards by conducting classes and conferences about the AIXM to the users.
- Increase aeronautical information quality by ensuring FAA aeronautical information fully complies with international standards like AIXM.
- Capture 100% of airport survey data and make the information electronically available to all aeronautical information data users.
- Reduce airspace and obstruction evaluation times by automating manual processes.
- Develop real time airspace and obstruction evaluation systems that enable real time identification of airspace and obstruction issues for field personnel – cut evaluation cycles from annual reviews to daily reviews.
- Reduce the costs of FAA survey data collection activities by consolidating and standardizing the Airport Survey programs.

F, AIRSPACE MANAGEMENT PROGRAM (AMP) – ATDP, M08.28-04

Program Description

Airspace Management is the FAA initiative to improve the use of the nation's airspace, leverage new technologies, equipage, infrastructure and procedural development to maximize benefits and system efficiencies.

The Airspace Management Program (AMP) supports airspace changes that increase capacity by analyzing needed changes in facility structure such as integration and/or consolidation of facilities when airspace is transferred because of closure of military facilities. Past examples of facility redesign projects include Boston Consolidated Terminal Radar Approach Control (TRACON) and Potomac Consolidated TRACON. As the FAA increases its focus on facility efficiencies and right-sizing, Facilitated Redesign projects will take on increased emphasis at both the national and regional levels to ensure that the maximum efficiencies are achieved with right-sizing of facilities, including efficiencies achieved through airspace redesign.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

Airspace Redesign will increase system capacity by reducing any limitations that the airspace places on the system. Congestion, complexity and limited departure points in the current airspace can result in restrictions, limiting airport departure throughput. Inefficient en route holding and arrival routes can limit airport arrival throughput. Airspace Redesign is striving to address these issues both locally and system-wide.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #3** – Increase capacity where needed.
- **SMP Objective #3.5** – Identify and prioritize airspace and airport initiatives based on value.

Program Plans FY 2009 – Performance Output Goals

- Implement New York/ New Jersey / Philadelphia (NY/NJ/PHL) Metropolitan Airspace Redesign, initial sectors and routes.
- Implement Houston Area Air Traffic System (HAATS) revised sectors and routes.
- Implement Chicago Airspace Project, next phases.
- Design Western Corridor Airspace Redesign routes.
- Design Seattle Terminal Redesign routes.
- Design Western Florida Redesign routes.
- Redesign Northern California routes.

Program Plans FY 2010-2013 – Performance Output Goals

- Implement Western Corridor Airspace Redesign initial sectors and routes.
- Implement NY/NJ/PHL Redesign, next phases.
- Implement Chicago Airspace Project, final phases.
- Implement additional terminal/en route/oceanic changes.
- Implement airspace changes to complement new facility management and structural plans.

G, STRATEGY AND EVALUATION – ATDP, M46.01-01

Program Description

The FAA's Office of Performance Analysis and Strategy is responsible for assessing the performance of the NAS; and developing new strategies to safely, efficiently, and economically satisfy the projected increase in demand for ATC services. To fulfill this responsibility, the Office of Performance Analysis and Strategy performs various analyses, including:

- Detailed traffic forecasts (to include flight trajectories) to facilitate workload projections at the Service Delivery Point,
- Revenue forecasts under alternative tax and fee structures,
- Cost forecasts,
- Estimates of the operational and economic benefits of the OEP and NextGen,
- An ATO workforce plan that projects the specific skills, competencies, and numbers of employees that will be required to implement NextGen,
- Airport capacity studies,
- Aircraft emissions analyses, and
- Historical operational and financial performance assessments.

This program provides modeling and simulation tools to aid and improve the above activities. These tools will strengthen the critical thinking needed to shape integrated strategies and solutions, thereby improving decision-making and ensuring a cost-effective NAS.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 3** – Make decisions based on reliable data to improve our overall performance and customer satisfaction.
- **FAA Performance Target 1** – By FY 2008, 90 percent of major system acquisition investments are within 10 percent of annual budget and maintain through FY 2012.

Relationship to Performance Target

Currently, the FAA relies on a suite of outdated models for analyzing the impact of proposed changes to Air Traffic Management (ATM) procedures, equipment, and airport infrastructure, as well as anticipated changes in the quantity, composition, and distribution of air traffic. These models are critical for many decision-making processes (which ultimately affect NAS on-time performance), including requirements analysis, cost-benefit analysis, performance assessment (to include metrics development and target setting), and portfolio optimization. The FAA maintains models of varying scope and detail, from highly detailed airport surface models to macroeconomic models of the entire air transportation system. Some of these models do not use current ATM concepts and rely on outdated and unsupported software; others are rapidly obsolescing. Several models need to be replaced.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure Viable Future.
- **SMP Objective #4.5** – Optimize NextGen/OEP portfolio.

Program Plan FY2008 – Performance Output Goals

- Document legacy Airfield Delay Simulation Model (ADSIM).
- Develop software specification and cost analysis for improved ADSIM+.
- Begin re-programming legacy ADSIM model in a modern software language, in accordance with previously developed design.
- Perform survey of existing NAS-wide simulation models, and document requirements for new model.

Program Plan FY2009-2012 – Performance Output Goals

- Complete design, development, validation, and documentation of improved ADSIM+.
- Complete design, development, validation, and documentation of new NAS-wide simulation model.

H, DYNAMIC CAPITAL PLANNING, M47.01-01

Program Description

This program will upgrade the analytical tools used to assess and rank capital investment projects in the ATO Capital budget requests. During the development of the capital budget and in the follow on evaluation of the programs, additional tools are needed to make decisions based on quantifiable data, and analytical modeling techniques using best business practices. Collecting and analyzing data on program acquisitions through all phases of the life cycle, will improve accountability and management decision-making.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 3** – Make decisions based on reliable data to improve our overall performance and customer satisfaction.
- **FAA Performance Target 1** – By FY 2008, 90 percent of major system acquisition investments are within 10 percent of annual budget and maintain through FY 2012.

Relationship to Performance Target

The project will allow the initial procurement of financial analysis tools and consultant support to allow a better evaluation of programs through all phases of the acquisition life cycle. The improved data will lead to better decisions on program implementation, improvements in ATO's performance, and the resulting higher level of customer satisfaction.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #3** – Increase capacity where needed.
- **SMP Objective #3.5** – Identify and prioritize airspace and airport initiatives based on value.

**I, JUNEAU AIRPORT WIND SYSTEM (JAWS), ALASKA WEATHER RESEARCH,
W10.01-00**

Program Description

This program uses wind sensors to detect and deliver turbulence and dangerous wind alerts to pilots flying in and out of the Juneau International Airport, Alaska. Future efforts include algorithm tuning, operation of the prototype, and development of the end-state system. The Juneau Airport Wind System (JAWS) provides data intended for use by non-meteorologists. Wind data from JAWS will be transmitted to the Juneau Airport Traffic Control Tower (ATCT); the Juneau Automated Flight Service Station (AFSS); the Juneau National Weather Service (NWS) office; and the Anchorage Air Route Traffic Control Center (ARTCC); and it will be available to other Alaska aviation users via the Internet.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 2** – Reduce the number of fatal accidents in general aviation.
- **FAA Performance Target 2** – By FY 2009, reduce accidents in Alaska for general aviation and all Part 135 operations from the 2000-2002 average of 130 accidents per year to no more than 99 accidents per year.

Relationship to Performance Target

With improved information to the ATCT, aviation users will have the information needed to avoid hazards that cause accidents in Alaska.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.1** – Ensure airspace system is safe, efficient, and secure.

Program Plan FY2009 – Performance Output Goals

- Sustain JAWS prototype until the JAWS production system becomes operational.

Program Plans FY2010 – FY2013 Performance Output Goals

- Sustain JAWS Operational System.

J, TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM (TCAS), A28.01-01

Program Description

In 2004, RTCA reconstituted its TCAS Special Committee (SC-147), as the direct result of a TCAS related crash in Europe and a near mid-air collision that occurred in Japan. The committee examined these events and others to determine the cause and contributing factors. The committee determined that in certain encounters between two aircraft, TCAS does not issue a sense reversal (e.g. change a “Climb” command to a “Descend”) in a timely manner, if at all. Based on limited monitoring in the U.S. and Europe, approximately 11 such “reversal logic” episodes have been detected. The predicated rate of mid-air collisions associated with this problem has been estimated to be once every four years, unless a fix is implemented. A basis for a fix to the reversal logic has been identified.

Additionally, monitoring of TCAS performance has identified instances where flight crews initially respond in the opposite direction to that specified by TCAS when a negative change to the original resolution advisory (RA) is displayed and announced to the flight crews. Europeans have concluded that the primary causal factor of the opposite responses is the use of ‘Adjust Vertical Speed, Adjust’ aural annunciation which can be misinterpreted by pilots.

The Europeans have proposed two Critical Avoidance Safety logic changes known as Change Proposal 112E (CP112E), to improve the reliability of the Sense Reversal RAs, as well as CP115 to improve pilot response to the negative resolution advisory RAs.

During FY 2009 the TCAS program will oversee the validation correction to these two safety problems, complete the Safety Risk Management Document, finalize the updated TCAS II MOPS (DO-185b) and complete review process with RTCA, complete RA monitoring testing capability, and finalize rulemaking, if necessary, for the upgrade of all existing TCAS II units. This will be followed by coordination with avionics manufacturers and airlines on an implementation plan if a final rule is issued requiring an upgrade.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 1** – Reduce commercial air carrier fatalities.
- **FAA Performance Target 1** – Cut the rate of fatalities per 100 million persons on board in half by 2025.

Relationship to Performance Target

This program is focused on correcting emerging safety issues related to collision avoidance systems carried in aircraft; it improves the TCAS system's ability to resolve near-midair encounters; and the pilot's ability to react correctly to TCAS instructions. An independent collision avoidance system for pilots becomes even more essential, when Automatic Dependent Surveillance-Broadcast (ADS-B)-based capabilities enter the NAS and more responsibility for aircraft separation is transferred to the flight deck.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence
- **SMP Objective #1.1** – Ensure airspace system is safe, efficient, and secure.

X, WAKE TURBULENCE RESEARCH, M08.36-01

Program Description

This program will develop air traffic control decision support tool prototypes for evaluation as possible enablers to safely meet the predicted NextGen projected demand for increased capacity in the nation's airspace and airports. If these prototypes are successful, more flights can be accommodated in the existing airspace because the required wake mitigation separations between aircraft can be safely reduced. This program is taking the results of technology research and development and new wake separation concept modeling and simulation efforts and incorporating them into prototypes for evaluation of flight safety and impact on the NAS capability for meeting demand for more flights.

In FY 2010, it is expected that research and development will be sufficiently complete to allow the development of a prototype Wake Turbulence Mitigation for Arrivals (WTMA) decision support tool. This tool would be used by controllers in reducing wake separations imposed on aircraft following behind Boeing 757 or heavier aircraft when landing on an airport's set of closely spaced parallel runways. Research is ongoing in Europe for developing a similar solution for aircraft landing directly behind each other on a single runway. In FY 2013, it is expected that this program will begin developing an air traffic control prototype system that is based on the European research effort. The "single runway" prototype (WTMSR) will be used to evaluate its overall system safety and its ability to create more NAS capacity.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

This program's work in FY 2010 through FY 2012 on WTMA will lead to an FAA acquisition in FY 2013 to transform the capabilities of the prototype into functioning tools for use by the FAA air traffic controllers. First operation benefit will be realized during FY 2015 when the first system is used in an airport's operation. This solution will allow the reduction of the required diagonal wake turbulence separation distance to 1.5 NM or less when instrument operations are being conducted and there are favorable crosswinds. This translates to 4 to 6 more arrival slots per hour for an airport that uses its closely

spaced parallel runways for arrival operations and has a significant percentage of 757 and heavier aircraft traffic.

Strategic Management Process (SMP) and Objective

- **SMP Pathway #3** – Increase capacity where needed.
- **SMP Objective #3.3** – Implement airspace and airport capacity enhancements safely.

Program Plans FY 2009 – Performance Output Goals

- RE&D program completes its feasibility modeling of the WTMA system and operational concept.

Program Plans FY 2010 – 2013 Performance Output Goals

- 2010 – Begin WTMA prototype system development.
- 2011 – Complete prototype development and begin evaluations.
- 2012 – Finish evaluations and complete acquisition package for WTMA.
- 2013 – Begin WTMSR prototype system development.

1A02, TRAFFIC MANAGEMENT ADVISOR (TMA)

FY 2009 Request \$3.7M

- Traffic Management Advisor (TMA) – Single Center (SC), A24.03-00

Program Description

The automation capability of TMA allows air traffic controllers to more precisely meter arriving aircraft by computing a specific time for each to "cross" a fixed point in the airport landing route, while maintaining the minimum safe distance between each type of aircraft. This optimization allows more aircraft to land during peak airport operations, with peak capacity increases of 3% or more over the pre-installation baseline. TMA is based on commercial-off-the-shelf hardware and operating system software.

TMA-SC has been deployed to all en route centers and the Planned Capability Achieved milestone will be declared for the last seven systems in FY 2008. These centers are Salt Lake City, Jacksonville, Washington, Cleveland, New York, Indianapolis and Kansas City. The TMA system will also be sustained at all deployed sites.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

TMA-SC contributes to the FAA's greater capacity goal by improving capacity utilization at selected airports by an average of 3 percent. The program includes a software tool that traffic management coordinators use to plan traffic flows to major airports. It also helps controllers adjust aircraft spacing to optimize use of runways at major airports. Through time-based metering, TMA provides optimal arrival flows by dynamically feeding an airport arrival rate consistent with the airport acceptance rate.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #3** – Increase capacity where needed.
- **SMP Objective #3.3** – Implement airspace and airport capacity enhancements safely.

Program Plan FY 2009 – Performance Output Goals

- Identify technology refresh and obsolescence issues.
- Develop, test, and implement solutions for technology refresh and obsolescence issues.

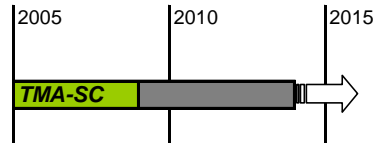
Program Plan FY2010-2013 – Performance Output Goals

- Identify technology refresh and obsolescence issues.
- Develop, test, and implement solutions for technology refresh and obsolescence issues.

System Implementation Schedule

Traffic Management Advisor – Single Center (TMA-SC)

First site PCA: December 2000 -- Last site PCA: September 2008



1A03/1A04, NAS IMPROVEMENT OF SYSTEM SUPPORT LABORATORY AND WILLIAM J. HUGHES TECHNICAL CENTER FACILITIES

FY 2009 Request \$13.0M

- System Support Laboratory Sustained Support, F14.00-00

Program Description

The William J. Hughes Technical Center (WJHTC) System Support Laboratory provides the facilities to develop, test, and integrate new systems into the NAS. Once prototype systems, used for testing, support the decision for allowing production systems to become operational, they become part of the FAA’s test bed and are used to support the operational field sites over their lifecycle. This program sustains the agency’s centralized test bed infrastructure. Testing and support facilities include: the En Route System Support Facility; Terminal System Support Facility; Oceanic System Support Facility; Flight Service Station and Weather Systems; Communications Systems; Radar Systems; Navigation and Tracking Systems; Target Generator Facility; Cockpit Simulation Facility; Human Factors Laboratory; and the fleet of specially instrumented aircraft. The test beds are also used for developmental activities associated with Research and Development programs. Maintaining a centralized core of test beds reduces the overall cost to the FAA and increases efficiency in testing and preparing new systems for operational use.

The Improvement of the System Support Laboratory Program includes reconfiguring laboratory space and upgrading and enhancing electrical and electronic equipment to allow testing of new or modified systems. It also procures unique equipment and systems that can interface and switch the various systems into multiple test and field support configurations. A centralized laboratory has the flexibility to test both individual systems and the interfaces between systems and avoids the cost of operating multiple test facilities for new equipment testing and support.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2 –** Improve financial management while delivering quality customer service.
- **FAA Performance Target 2 –** Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

This centralized testing facility serves as the FAA's research, development, testing, and field support infrastructure. With this system centralization, each Integrated Product Team/Business Unit need not establish and maintain separate infrastructure to support individual programs and fielded systems. It also enables the FAA to evaluate concepts and programs that span more than one domain of the NAS. This reduces the overall cost to FAA and improves the efficiency of testing new equipment and supporting operational facilities.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #2** – Enhance Financial Discipline.
- **SMP Objective #2.1** – Be better stewards of public funds.

1A05, WILLIAM J. HUGHES TECHNICAL CENTER INFRASTRUCTURE SUSTAINMENT

FY 2009 Request \$5.4M

- William J. Hughes Technical Center Building and Plant Support, F16.00-00

Program Description

The FAA William J. Hughes Technical Center (WJHTC) owns and operates about 1.58 million square feet of test and evaluation, research and development, and administrative facilities, plus numerous project test sites. The value of the buildings and infrastructure is about \$190.1 million (FY 2003 figures). These facilities require an annual program of capital improvements and modernization. Example projects include: (1) replacing old heating, ventilation, and air-conditioning systems; (2) upgrading the electrical distribution systems; and (3) upgrading fire-suppression systems to current life safety codes. The average annual expenditure to sustain the WJHTC is about 2.8 percent of the Center's value.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2** – Improve financial management while delivering quality customer service.
- **FAA Performance Target 2** – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

Infrastructure Sustainment at the WJHTC will control costs while delivering quality customer service by replacing old systems /equipment before serious problems occur. It will also reduce energy consumption, and cost, on a per-square-foot basis. This line item will update facilities and facility support systems to ensure that the laboratories and other facilities operate properly and can handle utility loads of the systems being tested. As the WJHTC plays a key role in developing and testing new equipment that will be used in the NAS, it is critical that the facilities operate efficiently. WJHTC effectiveness in testing and approving equipment can result in earlier system deployment and a faster reduction in air traffic delays.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #2** – Enhance Financial Discipline.
- **SMP Objective #2.1** – Be better stewards of public funds.

Program Plans FY 2009 – Performance Output Goals

- Replacement of two Electrical Substations in Building 300.
- Mechanical/Electrical System Improvements to 16 Center Facilities (Year 2 of Plan).
- Replacement of Exterior Windows and Metal Panels at Building 301.
- Water Plant (Building 33) Replacement (design/permits).

Program Plans FY 2010-2013 – Performance Output Goals

- Replace the remaining 3 electrical substations in Building 300.
- Evaluation of a Combined Heating and Power Facility (energy related).
- Water Plant (Building 33) Replacement (construction).
- Building 300 Roof Replacement.
- Mechanical/Electrical System Improvements to Center Facilities (years 3 through 6).

1A06, NextGen Network Enabled Weather (NNEW)

FY 2009 Request \$20.0M

- NextGen – NextGen Network Enabled Weather (NNEW), W11.01-01

Program Description

The Next Generation Air Transportation System (NextGen) Network Enabled Weather (NNEW) enables widespread distribution of weather products to enable collaborative and dynamic NAS decision making.

To reduce the impact of weather on daily operations three things must be achieved: 1) weather data must be commonly available, 2) weather data must require minimal interpretation by the receiver, and 3) decision support systems must be able to use the data directly. The NextGen concept for weather is to enhance common situational awareness and to integrate weather data into NextGen decision-making processes. Tens of thousands of global weather observations and sensor reports from ground-, airborne-, and space-based sources would fuse into a single, virtual database—the 4 Dimensional Weather Data Cube—constantly and rapidly updated as needed. NNEW will enable a common situational awareness and will make weather data available to air traffic management decision support tools, airborne aircraft, airline operations centers, private weather information providers, etc.

The achievement of the major operational concept elements will occur through the integration of enhanced weather information with other key components of NextGen. No longer will it be necessary to manually gather and integrate diverse weather data to realize a coherent picture of the weather situation. All categories of weather users will have improved access to timely and accurate flight information in their homes, businesses, at the airport, and in the air to support improved decision making, while enhancing safety.

In conjunction with the JPDO Weather Working Group, the initial NNEW requirements and architecture will be developed, and standards for dissemination and access to the 4-D Wx Data Cube will be completed. To verify the adequacy of the requirements, and technology readiness, the NNEW prototype will be developed. The NNEW prototype will resolve key technical questions and reduce implementation risk while demonstrating and assessing the operational benefits of a network-enabled weather environment to the FAA and system users. This work will support the first operational implementation phases of the NNEW in FY 2012. In the first phase NNEW will enable common access to advanced weather forecast technologies and observation data to FAA users and systems such as TFM decision support tools, external users and Government Agencies.

In FY 2009 the Program will conduct investment analysis, prototyping, and testing activities.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

NNEW is an enterprise service that disseminates common weather observations and forecasts to enable collaborative and dynamic NAS decision making. It enables integration of information from weather sources into all applicable NextGen decision support systems. It fuses weather observations into a common virtual, continuously updated weather information data set available to all network users. Its value hinges on developing automated decision-support tools that help mitigate the effects of weather in the NAS. NNEW enables Airline Operations Centers and TFM to better develop weather mitigation plans and replans, to select flight paths that maximize use of available capacity in weather impacted environments and it enables en route and terminal controllers to provide more precise and timely information on weather impacting pilots to quickly respond to pilot requests for deviations around hazardous weather. Increases airport capacity by providing more precise information on weather location and movement, which allows runways to remain in use longer and reopen more quickly after an adverse weather event.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure a Viable Future.
- **SMP Objective #4.2** – Deliver a future air transportation system that meets customers' operational needs.

Program Plans FY 2009 – Performance Output Goals

- Complete the Initial Investment Readiness Decision and begin the Initial Investment phase.
- Begin development of standards for weather data dissemination and 4-D Weather Data Cube—current description of the atmosphere in four dimensions.
- Develop initial prototypes of a weather data dissemination capability and 4-D Weather Data Cube.
- Implement a Network-Enabled Operations compatible dissemination test capability.

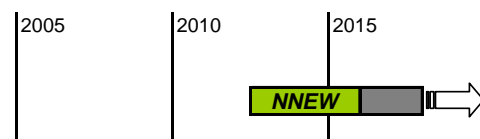
Program Plans FY 2010-2013 – Performance Output Goals

- Complete Initial and Final Investment Analysis.
- Continue development of standards for weather data dissemination and 4-D Weather Data Cube.
- Continue development of a prototype weather data dissemination capability and a prototype 4-D Weather Data Cube.
- Develop Weather SWIM Node.
- Conduct NNEW Systems Synthesis, Integration Test.
- Develop Required Total NNEW System Performance.
- Implement NNEW Oceanic and Offshore Precision Operations.
- Implement pockets of NNEW for network enabled operations.
- Achieve Initial Operational Capability of the NNEW.

System Implementation Schedules

NextGen Network Enabled Weather (NNEW)

First site IOC: September 2012-- Last site IOC: September 2015



**1A07, DATA COMMUNICATION IN SUPPORT OF NEXT GENERATION AIR
TRANSPORTATION SYSTEM (NEXTGEN)
FY 2009 Request \$28.8M**

- NextGen Data Communications, C27.01-01

Program Description

The Data Communications program will provide data communications between air traffic control facilities and aircraft, and will serve as the primary enabler for NextGen operational improvements. Data Communications will improve NAS operations by:

- Improving controller productivity and reducing controller workload by automating delivery of standardized clearances,
- Improving NAS capacity and reducing flight delay by enabling existing controller staffing to handle increased traffic,
- Enhancing safety by reducing operational errors associated with voice communications, and;
- Enabling many of the NextGen operational improvements that require negotiation or exchange of information that cannot be efficiently delivered via voice.

The Data Communications effort will augment the NAS by establishing the applications and infrastructure necessary for data exchange between controllers and pilots, as well as between ground automation systems and the aircraft.

The Data Communications project will be divided into three segments. Segment 1 will deliver the initial set of data communications services which provide early NAS benefits and lays the foundation for a data-driven NAS. Segment 2 will develop the core set of advanced NextGen-enabling operations, which would not be possible without Data Communications. Segment 3 will implement the set of air-ground messaging functions, enabling the full transformation to the NextGen concept.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

The capacity and productivity of the NAS will be improved by data communications. Initially, Data Communications will be used in conjunction with the current traffic control strategies as well as planned strategies such as Traffic Flow Management (TFM) reroutes and will reduce controller workload by automating standardized exchanges as well as enabling the initial phase of trajectory based operations. As controllers become more productive, sector capacity will grow without the need to assign additional resources. Data Communications benefits will be realized in en route, TRACON, and tower/ground operations as controllers are freed up to spend more time moving traffic efficiently. The busiest positions, whether in en route sectors, en route feeder sectors in metro corridors, terminal approach sectors, or airport clearance delivery positions in OEP airport towers, will see the most dramatic benefits.

New services enabled by Data Communications will contribute even more dramatically to air traffic capacity. Advanced 4-dimensional trajectories will enable more strategic operations that can ensure the most efficient use of airspace resources, with greatly reduced ground management oversight. More predictable traffic flows will yield better on-time performance, and minimize service impact associated with weather-related system disruptions. Many of these new services will have positive impact in other arenas: Continuous Descent Approaches, for example, will enable pilots to throttle back to idle on their descent to the airport, reducing noise, emissions, and fuel consumption. Data Communications, by

allowing exchange of data to carefully coordinate the aircraft’s position in time and space, will allow the FAA to effectively employ these approaches even in congested airspace.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure Viable Future.
- **SMP Objective #4.1** – Assure a sustainable and affordable air traffic system for the future.

Program Plans FY 2009 – Performance Output Goals

- Final Investment Decision.
- Complete Segment 1 Contract Award (s).
- Conduct Segment 2 Project Planning and Industry Coordination.

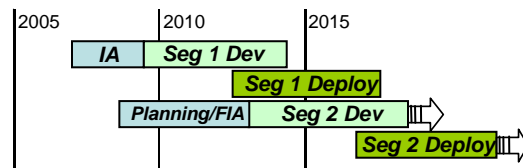
Program Plans FY 2010-2013 – Performance Output Goals

- Segment 2 Submit Regulatory Guidance, FY 2010.
- Segment 1 Subnetwork Services Agreement, FY 2011.
- Segment 1 Deploy Key Site, FY 2013.
- Segment 2 Final Investment Decision, FY 2013.

System Implementation Schedule

Data Communications in Support of NextGen

Segment 1 IOC: 2012 - 2014
Segment 2 IOC: 2017 - 2019



**1A08, NEXT GENERATION AIR TRANSPORTATION SYSTEM (NEXTGEN) –
DEMONSTRATIONS AND INFRASTRUCTURE DEVELOPMENT
FY 2009 Request \$28.0M**

- NextGen – Demonstrations & Infrastructure Development, M49.01-01

Program Description

The Joint Planning and Development Office (JPDO) leads the planning for the Next Generation Air Transportation System (NextGen). Over the past year, the JPDO developed a NextGen Concept of Operations (ConOps) and an initial Enterprise Architecture. These documents establish a framework for the future, based on today’s best information. These documents defined two major concepts which will be developed: Four Dimension (4-D) Trajectory Based Operations (TBO) and Performance-Based Air Traffic Management (PATM).

Four Dimension Trajectory Based Operations (4-D TBO) – The four dimensions measure geographic position, altitude, and time. A set of systems will collect and disseminate 4-D data to provide complete situational awareness to pilots, controllers, and air traffic managers. The goal is to allow flights to find their best route instead of restricting them to defined paths.

Air Traffic Management – FAA currently controls air traffic in the NAS using defined flight paths and airspace restrictions that do not take advantage of the full capabilities of aircraft or their systems. The NextGen concept would transition the NAS to a more collaborative environment where pilots and FAA managers would work together to tailor an aircraft’s route for optimum safety and efficiency.

Beyond defining these initial concepts, the JPDO, in coordination with the FAA Air Traffic Organization's Advanced Technology Development and Prototyping group, will test and mature these concepts and the technologies that support them.

FY 2008 is the first year JPDO requested funding for demonstrations and infrastructure development activities to test central NextGen concepts. The results will be used to identify early implementation opportunities, refine longer-term objectives, and if results dictate, eliminate certain concepts from further consideration.

In FY 2009 four demonstrations will be conducted:

1. International Air Traffic Interoperability – This demonstration is designed to help the FAA promote safe, affordable, and rapidly implemented innovations into Air Traffic Management (ATM) systems. This effort will use commercial aircraft flying oceanic routes to demonstrate and accelerate airline and Air Navigation Service Providers (ANSP) efficiency improvements using existing systems and technologies. The flight trials development stage will include system design, architecture, hardware and software development (where applicable), procedures development, component/subsystems testing and certification, simulations, and system checkout. Flight trial execution may include scripted flight tests, limited operational testing and/or extended operational evaluations with revenue aircraft. This international interoperability demonstration program contributes directly to NextGen concepts and supports international collaboration, avoids overlap, and conflicting activities with national and international organizations (FAA, DoD, and ICAO). The program will assist the international communities and the FAA in validating 4-D TBO and PATM alternatives.

2. High Density Airport (HDA) Capacity and Efficiency Improvement Project – This demonstration will serve as a transition step to TBO. This concept attempts to take advantage of existing ground technologies and functionality while leveraging airborne navigational capabilities that already exist on most commercial and many in-service airplanes. Trajectory Based Management (TBM) will be accomplished using fully defined 3-D paths (measuring spatial coordinates and altitude) to ensure aircraft sequencing and spacing. Three-D paths permit more orderly and predictable air traffic patterns and use path clearances rather than the conventional speed, altitude, and heading clearances to manage aircraft spacing. This technique has the potential to reduce controller workload and allow the airplane to precisely follow a continuous path using the accuracy of Required Navigation Performance (RNP) operations. Demonstrations will include data collection from real operations to show benefits in capacity, environmental (noise and emissions), and fuel efficiency. Site selection will require deployment of ATM ground automation prototypes to functionally support 3-D path operations. The automation tools used include the Center TRACON Automation System Traffic Management Advisor (CTAS TMA) and the En Route Descent Advisor (EDA).

3. Unmanned Aircraft Systems (UAS) 4-D Trajectory Based Demonstration – This demonstration has two objectives. The first objective will utilize the advanced capabilities of UAS to serve as a testbed for exploring future 4-D trajectory based operational concepts. The second objective examines potential concepts for the wide-spread integration of UAS into the future NextGen environment. Today's generation of UAS offer a perfect testbed for "trajectory based" concept validation, since they basically fly 4-D trajectory profiles today and are equipped with toolsets (data link, GPS, etc.) needed for 4-D. Use of UAS will allow the FAA to evaluate planned 4-D automation toolsets evolving in the next few years. More importantly to the DoD community, these demonstrations will provide a platform for validation of RTCA SC-203 UAS performance requirements now under development. This validation will provide the FAA confidence in the safety case for UAS, and allow the FAA to transition the Minimum Aviation System Performance Standards (MASPS) documents into guidance material such as Advisory Circulars and Technical Standard Orders (TSO).

4. Virtual Tower (Staffed and Autonomous) – The Virtual Tower (VT) program will demonstrate and validate the potential of emerging alternative approaches for performing local and ground air traffic control tower operations at locations other than the current ATCT. Projected growth in air traffic and the high cost of building, sustaining, and replacing ATCTs necessitate the development and evaluation of new concepts that do not require the construction of a new tower or its co-location within or immediately adjacent to the

airport property. Such a concept is envisioned and outlined in the JPDO's NextGen ConOps. The ConOps outlines a future air traffic system in which ANSP services are provided from remote locations, not requiring the ANSP to be physically present in a tower or near the airport property. The Virtual tower demonstrations will be at field sites (medium to low density airports) that are yet to be determined. The field site selection for virtual towers (both staffed and autonomous) is expected to occur in FY 2008.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

FY 2008 demonstration activities are planned to show a near-term strategy for decreasing aircraft delays and a long-term strategy for system capability enhancements. Oceanic 4-D Trajectory Management, En Route 4-D Operations, and High Density Airport time-based RNAV/RNP will identify key implementation issues, assist the FAA in developing its operational improvement plans to meet NextGen goals and objectives, and assist with implementing initiatives in FY 2009 and beyond.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure Viable Future.
- **SMP Objective #4.2** – Deliver a future air traffic system that meets customer's operational needs.

Program Plans FY 2009 – Performance Output Goals

- Conduct data linked Tailored Arrival Demonstration.
- Optimize pre-departure oceanic tools.
- Conduct Way Point Management Oceanic Concept Demonstration.
- Conduct Automatic Dependent Surveillance – Contract (ADS-C) “In Trail” Procedures Demonstration.

Program Plans FY 2010-2013 – Performance Output Goals

- Continue integration of JPDO NextGen concepts into performance-based operations.

1A09, NEXT GENERATION AIR TRANSPORTATION SYSTEM (NEXTGEN) – SYSTEM DEVELOPMENT

FY 2009 Request \$41.4M

- NextGen – System Development, M49.01-02

Program Description

The NextGen Integrated Plan identifies three key performance targets for 2025: (1) satisfy future growth in demand up to three times current levels, (2) reduce domestic curb-to-curb transit time by 30 percent, and (3) minimize the impact of weather and other disruptions to achieve 95 percent on time performance.

This research and development program focuses on four areas: safety, capacity, human factors, and environment. The safety research expands information sharing and data analysis to identify and mitigate risks across NextGen before they lead to accidents. The capacity research develops new air traffic management systems and flexible airspace categories, and measures their contributions to achieving the three times capacity target. The human factors research increases efficiency levels in air traffic control and identifies new roles for air traffic controllers as more responsibility shifts to the flight crew. The environmental research provides new procedures, technologies, and fuels to reduce emissions, fuel burn, and noise. There are eight projects under this program.

Air Traffic Control/Technical Operations Human Factors – Controller Efficiency: By 2015, this project will demonstrate three times improvement in air traffic controller efficiency (e.g., greater number of aircraft) and effectiveness (e.g., fewer operational errors) through automation and standardization of operations, procedures, and information. Progress will be measured by demonstrating 166 percent controller efficiency by 2009; 230 percent controller efficiency by 2012; and finally 300 percent controller efficiency by 2015. Research supports operational implementation by 2025.

Air Traffic Control/Technical Operations Human Factors – Air/Ground Integration: This project addresses the controller perspective in defining the changes in roles and responsibilities between pilots and controllers and in functions allocated between humans and automation required to implement NextGen. By 2015, the R&D outcome is to conduct a full mission demonstration of integrated NextGen air and ground capabilities for pilot separation responsibility and controller efficiency. There are a series of demonstrations to measure interim progress from 2011 through 2013 involving multiple research products and programs. Research supports operational implementation by 2025.

Environment and Energy – Advanced Noise and Emission Reduction: By 2015, this project will demonstrate that aviation noise and emissions can be significantly reduced in absolute terms (to enable three times capacity) in a cost-effective way and reduce uncertainties in particulate matter and climate impacts to levels that enable appropriate action. Progress will be measured by demonstrating (with the project below) no environmental restrictions at 166 percent capacity by 2010; at 230 percent capacity by 2012; and finally at 300 percent capacity by 2015. Research supports operational implementation by 2025.

Environment and Energy – Validation Modeling: By 2015, this project will provide system knowledge to understand economic (including implementation) and operational impact (environmental relative to capacity) of NextGen system alternatives. This project measures progress on environmental improvements relative to new procedures, technologies, and fuels performed in the above project. Progress will be measured by demonstrating no environmental restrictions at 166 percent capacity by 2010; at 230 percent capacity by 2012; and finally at 300 percent capacity by 2015. Research supports operational implementation by 2025.

New ATM Requirement: This project conducts research to develop systems that support the capacity enhancements for the seven solution sets of NextGen. By 2015, this project will demonstrate (1) the planned system can handle growth in demand up to three times current levels; (2) gate-to-gate transit time can be reduced by 30 percent; and (3) the system can achieve a 95 percent on-time arrival rate. Research supports operational implementation by 2025.

Operations Concept Validation – Validation Modeling: By 2015, this project will provide system knowledge to understand economic (including implementation) and operational impact (with respect to capacity improvements) of NextGen system alternatives. It will measure the proposed NextGen system alternatives to determine whether or not the system can meet the capacity targets of NextGen. It will develop methods, metrics, and models to measure capacity improvements. Progress will be measured by demonstrating capacity increases to 166 percent by 2010; 230 percent by 2012; and 300 percent by 2015.

System Safety Management Transformation: This project contributes to reducing fatalities commensurate with increases in capacity under NextGen. By 2015, the project will provide system knowledge to understand implementation and operational impact (with respect to safety) of NextGen system alternatives. The research outcomes include an infrastructure enabling the sharing of de-identified, aggregate safety information derived from various government and industry sources in a protected, aggregated manner; and demonstrating a National Level System Safety Assessment prototype to proactively identify emerging risks in NextGen. Research supports operational implementation by 2025.

Wake Turbulence – Re-categorization: This project contributes to the 2015 target to demonstrate that it is possible for NextGen to handle growth in demand up to three times current levels. It will focus on re-categorization of airspace in three steps. By 2010, it will provide static changes using the six current aircraft weight categories and adjust wake separation distances to account for fleet mix changes. By 2014,

it will develop an alternate set of flexible airspace classifications for use under specific conditions to increase the capability to place more aircraft in the same volume of airspace. By 2020, it will support dynamic, pair-wise separation. Research supports operational implementation by 2025.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

Greater Capacity Performance Target 1 is to increase airport capacity at the 35 OEP airports by 2011. The target represents an interim step toward achieving the NextGen target of three times capacity by 2025. Three times capacity is an aggressive target, and it drives risks associated with safety, environment, and efficiency. For example, achieving three times capacity could lead to similar increases in fatalities, noise and emissions, and the required number of air traffic controllers. The focus of this R&D program is to identify solutions that mitigate these risks while supporting the target of three times capacity.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure Viable Future.
- **SMP Objective #4.5** – Optimize NextGen/OEP portfolio.

Program Plans FY 2009 – Performance Output Goals

- Demonstrate 166 percent improvement in air traffic controller efficiency and effectiveness through automation and standardization of operations, procedures, and information.
- Complete preliminary human error and safety analysis concerning changes in air traffic service provider and flight crew roles and responsibilities to manage safety of the NAS.
- Develop control algorithms for ground, terminal area, and en route clean and quiet procedures.
- Define existing and planned environmental mitigation methods to counter NAS constraints of today and for NextGen.
- Develop requirements to exchange trajectory information between ATM systems.
- Develop requirements to communicate data between air and ground systems.
- Develop Aviation Safety Information Analysis Sharing Phase 2 to include NextGen member agency aviation safety information needs.
- Develop enhanced analysis tools to link observed wake behavior to standards for required separation.

Program Plans FY 2010-2013 – Performance Output Goals

- By 2012:
 - Demonstrate 230 percent improvement in air traffic controller efficiency and effectiveness through automation and standardization of operations, procedures, and information.
 - Develop method, metrics, and models to demonstrate that aviation noise and emissions can be significantly reduced in absolute terms to enable the air traffic system to handle growth in demand up to 230 percent capacity.
 - Develop method, metrics, and models to demonstrate that the system can handle growth in demand up to 230 percent of current levels.
 - Develop a transition plan to implement pilot separation responsibility integrated with change in controller role.
 - Demonstrate optimized en route operations that enhance fuel efficiency and reduce emissions.
 - Validate the Net Enabled Operations (NEO) Architecture proof-of-concept for the sharing of aviation safety information among JPDO member agencies.
- By 2013:
 - Develop draft procedures and tools for 3-mile horizontal separation in all phases of flight.
 - Complete development of wake separation standards that better utilize aircraft flight characteristics and information concerning surrounding weather conditions.

1A10, Next Generation Air Transportation System (NextGen) – Trajectory Based Operations (TBO)

FY 2009 Request \$39.5M

- NextGen – Trajectory Based Operations, M48.01-03

Program Description

Trajectory Based Operations (TBO) is a critical NextGen capability that addresses performance gaps in increasing airspace capacity and efficiency of aircraft operating in the NAS. TBO integrates trajectory planning, management, and execution across the spectrum of time horizons from strategic planning to tactical decision making. Strategic aspects of trajectory management include the advance planning and scheduling of user operations by allocating airspace to meet the increased level of demand well before flights are scheduled to operate. Overall requests are fit into available trajectories so that the demand can be accommodated. The tactical aspect involves the evaluation and adjustment of individual trajectories to ensure safe separation is maintained when weather requires changes in the planned path of flight. The flexible management of aggregate trajectories enabled by TBO allows maximum access for all traffic but gives advantages to those aircraft with advanced capabilities that support air traffic management.

The investment in TBO will support enhancement of automation systems for en route and oceanic flight and terminal operations. The ERAM, Traffic Management Advisor, and oceanic automation systems conflict alert, metering, and 4- dimensional software will be modified to assign and monitor flights along assigned trajectories. There will also be development work on improving integration of en route trajectories and terminal arrival procedures.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1 – Increase capacity to meet projected demand and reduce congestion.**
- **FAA Performance Target 1 – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.**

Relationship to Performance Target

By allowing fuller use of available airspace, TBO will increase airspace capacity and provide more efficient routes and altitudes to accommodate demand.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure a Viable Future.
- **SMP Objective #4.3** – Deliver the NextGen/OEP commitments.

Program Plans FY 2009 – Performance Output Goals

- Initiate development of separation automation enhancements.
- Initiate development of en route automation conflict resolution software.
- Design point-in-space metering for Traffic Management Advisor (TMA).
- Continue the Oceanic Trajectory Management 4-D pre-departure development.
- Develop capabilities for limited delegation of separation authority.
- Complete specification and full set of requirements for Flight Object (a collection of common information elements describing an individual flight).
- Identify cognitive support and display change requirements for early transition to support a high altitude specialty.
- Develop RNP/RNAV network to support NextGen DME concept.

Program Plans FY 2010-2013 – Performance Output Goals

- Continue software and hardware development to support TBO.
- Evaluate improvements to en route, oceanic, and terminal air traffic control.

1A11, Next Generation Air Transportation System (NextGen) – Reduce Weather Impact

FY 2009 Request \$14.4M

- NextGen – Reduce Weather Impact, M48.01-07

Program Description

Reduce Weather Impact (RWI) provides weather information for operational decision making in the NAS. RWI provides improved weather data for Air Traffic Management, Airline Operations Centers, and pilots to improve planning to avoid weather hazards and to reduce the amount of airspace closed due to weather. This solution set will develop the capabilities to integrate thousands of ground, airborne and satellite observations into a single weather information system, which will be updated continuously.

This solution set will include improvements in the areas of observations, forecasts, dissemination and integration of weather information. The observation element will seek efficiencies in sensing weather data needed to support aviation. It will eliminate redundancy among the sensor types, system configurations and ground infrastructure. It will expand use of airborne and satellite sensors to provide higher resolution weather observations. This upgrade of weather sensing systems combined with techniques to store and transmit large amounts of real time weather data will accelerate and expand the information feeds to the forecast systems being developed.

The forecast improvements will assimilate all this data to quickly and accurately forecast the intensity and future location of weather. Improved sensors and more frequent observations will provide the necessary data to develop consolidated forecasts for summer thunderstorms and winter storms, icing hazards, turbulence, wind shear conditions, visibility, volcanic ash and other weather hazards. To move to Trajectory Based Operations and Collaborative Air Traffic Management, it is necessary to have accurate data and forecasts to minimize the number of adjustments that are made to accommodate actual weather

that differs from the forecast weather. Weather forecast improvements will also provide information to other decision support tools such as: Flow Contingency Management; Tactical Trajectory Management; and Estimated Departure Clearance Time.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

Reduce Weather Impact provides improved weather observations and forecasts and tailors weather data for integration into decision support tools for collaborative and dynamic NAS decision making. It enhances capacity by making fuller use of weather information for operational decision-making. This enables the optimal selection of usable en route airspace and precise spacing for arriving and departing aircraft. The increased accuracy of forecasts and improved observations supports the capability to provide individual trajectory-based profiles, which optimize the usage of available airspace.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure a Viable Future.
- **SMP Objective #4.3** – Deliver the NextGen/OEP commitments.

Program Plans FY 2009 – Performance Output Goals

- Complete Investment Analysis Readiness Decision and begin Initial Investment Analysis.
- Develop NextGen weather transition plan.
- Implement first generation grids for 4D icing severity and 3D national ceiling & visibility.
- Conduct technology assessments of ground, direct, airborne, and satellite weather sensors.
- Demonstrate optimized airborne weather observations (i.e., gaps filled and redundant observations eliminated).
- Begin subsystem development on Multi-Purpose Airport Radar pre-prototype to resolve critical performance and cost issues.

Program Plans FY 2010-2013 – Performance Output Goals

- Complete Initial and Final Investment Analysis.
- Evaluate, transition, and integrate maturing R&D (e.g., improved forecasts for thunderstorms, icing, turbulence, etc.).
- Evaluate ground-based and airborne sensors and observing networks.
- Develop and evaluate prototype multifunction phased array radar.
- Develop indices for weather (e.g., icing), calibrate weather phenomena to aircraft types, and characterize weather information in probabilistic terms.
- Complete initial validation of algorithms for intermediate capability for translating probabilistic forecasts into traffic flow impacts.
- Develop national weather flow models.

1A12, Next Generation Air Transportation System (NextGen) – Arrivals/ Departures at High Density Airports

FY 2009 Request \$18.2M

- NextGen – Arrivals/Departures at High Density Airports, M48.01-04

Program Description

The primary goal of this solution set is to increase the throughput of the busiest airports. This initiative will develop the infrastructure to support integration of en route trajectory based operations with terminal procedures. When aircraft arrivals and departures are managed so that they are sequenced more precisely as they approach an airport or line up for departure, runway capacity can be used more efficiently.

This goal is supported by several improvements to existing systems and by adding new systems. The Traffic Flow Management (TFM) system will be upgraded with improved metering technology to ensure aircraft arrive at the planned time to reduce maneuvering in the terminal area. High-density corridors will be developed to permit aircraft to fly directly to their approach path. The program to equip airports with ground systems that permit simultaneous approaches to closely spaced parallel runways will be expanded. Ground sensors that help pilots follow taxi procedures more efficiently will be installed. All of the new procedures will be supported by data link communications, which will allow more information to be provided to the pilot.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

By allowing aircraft to be more closely spaced and improving the efficiency of operations in the terminal area, airports will be able to handle more aircraft with their existing capacity. This creates an increase in their average daily capacity.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure a Viable Future.
- **SMP Objective #4.3** – Deliver the NextGen/OEP commitments.

Program Plans FY 2009 – Performance Output Goals

- Develop a Concept of Operations and the requirements, standards and procedures for taxi conformance.
- Integrate flight data into Tower and Terminal Flow Data Systems.
- Extend the area covered by Traffic Flow Management systems.
- Develop systems that automate monitoring and reporting status of airport capacity.
- Develop procedures to guide development of systems for 4D terminal operations, reduced spacing of aircraft, and increasing operations at closely spaced parallel runways.

Program Plans FY 2010-2013 – Performance Output Goals

- Continue development of automation to support more intensive use of airport capacity.
- Procure and install equipment to support simultaneous approaches to parallel runways.
- Automate taxi instructions and the equipment to monitor aircraft following those instructions.

1A13, Next Generation Air Transportation System (NextGen) – Collaborative Air Traffic Management (CATM)

FY 2009 Request \$27.7M

- NextGen – Collaborative Air Traffic Management, M48.01-08

Program Description

This initiative will extend collaborative air traffic management to all users of the NAS. Currently, airlines have very elaborate data systems to use in consulting with FAA on how to mitigate route and capacity constraints when severe weather problems or operational issues restrict the flow of air traffic. After this solution set is implemented, all users will have the opportunity to collaborate on routes and altitudes and to evaluate in-flight changes to their planned routes of flight. Before pilots take off they will have access to information that allows them to evaluate whether to accept an alternate route or adjust their schedule to fly at a later time or later date.

In order to expand collaboration, Air Traffic Management (ATM) systems must be upgraded. Weather information will be more thoroughly integrated with the air traffic information. Information databases and the formats and communication protocols must be developed. There must be human factors work to identify appropriate ways to communicate and confer with pilots that do not fly airline aircraft. Oceanic automation systems must be upgraded to allow global data exchange for trans-oceanic flights. Flight Data Management decision support tools need to be modified to support a larger volume of inquiries. Development work must be done on and Airspace Resource Management System (ARMS).

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

Collaborative Air Traffic Management improves the decision-making involved in adjusting routes of flight and assigning altitudes when weather or other factors restrict airspace. The combination of having more information to make decisions and sharing that information improves the selection of alternatives. This results in improved efficiency, reduced delays and fuller use of the available capacity.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure a Viable Future.
- **SMP Objective #4.3** – Deliver the NextGen/OEP commitments.

Program Plans FY 2009 – Performance Output Goals

- Integrate weather data in Air Traffic Management (ATM) systems.
- Determine how SWIM and Flight Object programs can be used to help non-airline pilots to collaborate.
- Test use of global data exchange to enhance collaboration on oceanic flights.
- Develop Flight Data Management Decision Support System.

Program Plans FY 2010-2013 – Performance Output Goals

- Continue development and installation of systems supporting collaborative air traffic management.

1A14, Next Generation Air Transportation System (NextGen) – Flexible Terminal Environment

FY 2009 Request \$37.1M

- A, NextGen – Flexible Terminal Environment, M48.01-09
- B, Wake Turbulence Mitigation for Departures (WTMD)
- C, Local Area Augmentation System (LAAS) – ATDP

A, NEXTGEN – FLEXIBLE TERMINAL ENVIRONMENT, M48.01-09

Program Description

To maximize the use of available capacity at the busiest airports, aircraft operations during the busiest periods can require the use of advanced equipment that allows reduced separation between aircraft and ensures adherence to stringent navigation performance standards. Theoretical maximum capacity for a runway is about 60 operations per hour, but the number actually achieved is usually closer to 30. When aircraft use more accurate equipment and the airport and air traffic equipment are upgraded, it may be possible to approach the theoretical maximum number of operations.

Tower systems for delivering clearances and monitoring the progress of aircraft moving on the surface will have to be upgraded. New safety systems such as Runway Status Lights will have to be installed. Data link systems with coded taxi instructions will have to be installed to avoid delays related to taxiway movements. Wake Turbulence detection systems will be installed to avoid longer separations than necessary between large and small aircraft.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

The busiest airports are operating near capacity several hours of the day. Installing systems to make more efficient use of the runways has the same effect as adding more runway capacity. Requiring aircraft to equip so that they can be safely operated with less separation will improve the efficiency of runway use and increase average daily airport capacity.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure a Viable Future.
- **SMP Objective #4.3** – Deliver the NextGen/OEP commitments.

Program Plans FY 2009 – Performance Output Goals

- Complete Engineering design for control of airport surface traffic.
- Develop standards for moving maps to guide pilots as they taxi on the airport's surface.
- Develop and install wake turbulence detection systems.

Program Plans FY 2010-2013 – Performance Output Goals

- Implement and test new surface traffic management systems.
- Develop coded taxi messages.
- Install equipment to monitor aircraft surface movement.
- Support implementation of RNP/RNAV approaches.

B, WAKE TURBULENCE MITIGATION FOR DEPARTURES (WTMD)

Program Description

This program is producing and deploying air traffic control decision support tools and supporting infrastructure to safely reduce the wake turbulence separation between aircraft departing on an airport's closely spaced parallel runways. National Aeronautics and Space Administration (NASA) developed the concept and prototype for the air traffic control departure separation decision support tool, Wake Turbulence Mitigation for Departures) (WTMD) which was evaluated in FY 2007 and the beginning of FY 2008. During FY 2008, a decision was made to proceed with engineering development and production of the WTMD system for deployment to 10 of the 35 OEP airports that could benefit from this NASA technology application. The funding in FY 2009 will continue the WTMD design and production contract and will also fund FAA implementation and support preparations for its deployment and operation. The WTMD will be operational at the first airport in FY 2011. The WTMD system includes a wind profiler that will provide accurate airport wind information up to 1000 feet above the airport surface – vital information for the safe, efficient WTMD enabled reduced departure spacing on closely spaced parallel runway operations.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1 –** Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1 –** Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

This program implements a technology based solution that will allow reduction of the required wake mitigation separation for aircraft departing on an airport's closely spaced parallel runways. This solution will allow, when the runway crosswind is favorable, the lifting or reduction of the wake turbulence separation time constraint. This translates to 6 to 10 more departures per hour for an airport that uses its closely spaced parallel runways for departures and has a significant percentage of 757 and heavier aircraft traffic. The direct result is an increase in airport average daily arrival/departure capacity.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #3 –** Increase Capacity Where Needed.
- **SMP Objective #3.3 –** Implement airspace and airport capacity enhancements safely.

Program Plans FY 2009 – Performance Output Goals

- Complete critical design review of hardware and software.
- Implementation and maintenance planning.
- Hardware for first site designed and procured.

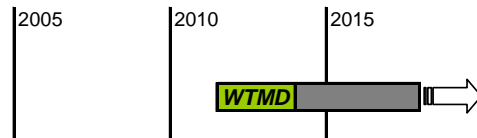
Program Plans FY 2010 – 2013 Performance Output Goals

- 2010 – WTMD production system test and evaluation (first system installed at WJHTC).
- 2011 – WTMD capability operational at first airport.
- 2012 – WTMD implementation continues.
- 2013 – WTMD capability operational at last airport (WTMD systems installed at 10 airports and WJHTC).

System Implementation Schedule

Wake Turbulence Mitigation for Departures (WTMD)

First site IOC: December 2011-- Last site IOC: September 2013



C, LOCAL AREA AUGMENTATION SYSTEM (LAAS) – ATDP

Program Description

LAAS is a Ground-Based Augmentation System (GBAS) that will provide all-weather approach capabilities to aircraft within line-of-sight distances from airports using Global Positioning System (GPS) error corrections and integrity information. The corrections are delivered to aircraft via a very high frequency (VHF) Data Broadcast signal.

This will improve aircraft safety during approaches and landings at airports that currently do not have precision guidance available. LAAS will yield the extremely high accuracy, availability, and integrity necessary for Category I, II, and III precision approaches. LAAS will provide a significant improvement in service flexibility to conduct complex terminal area procedures and landing in zero visibility conditions, which will result in reduced operating costs and increased access for users. The FAA will benefit from reduced operating costs because a single LAAS can provide service to all precision instrument runways at an airport versus the need to install and ILS at every runway. LAAS will also support the implementation of continuous descent approaches (CDA) procedures to aid noise abatement and fuel efficiency initiatives identified in NextGen.

Current activities on the LAAS program include Non-Federal approval (FAR Part 171) of a Category-I system at Memphis airport in late 2008. Boeing and Airbus are strong advocates of LAAS as the long term solution for all precision approach operations and are already equipping aircraft (e.g. Boeing 787) with LAAS avionics. The GBAS program office seeks to leverage Category-I R&D and operational experience to support the development of Category-II/III capability. This strategy involves minimal changes to Category-I equipment and utilizes the additional performance provided by more modern autoland-capable aircraft.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 1** – Reduce commercial air carrier fatalities.
- **FAA Performance Target 1** – Cut the rate of fatalities per 100 million persons on board in half by 2025.

Relationship to Performance Target

The LAAS program supports the goal to reduce commercial airline fatal accident rates by providing a navigation system whose performance exceeds existing ground based navigation systems. The LAAS will also improve aircraft safety during approaches and landings at airports that currently do not have precision guidance available.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure Viable Future.
- **SMP Objective #4.2** – Provide a future air transportation system that meets customers' operational needs.

Program Plans FY 2009 – Performance Output Goals

- Complete the certification of a Part 171 Non-Federal LAAS installation at Memphis International Airport.
- Continue the requirements development and research to achieve a Cat II/III precision approach performance capability with a LAAS system.
- Perform flight tests to demonstrate fuel savings from using LAAS guidance for precision approach.

Program Plans FY 2010-2013 – Performance Output Goals

- Complete LAAS Category II/III system design.
- Upgrade test-bed Category I LAAS system to meet performance requirements for Category II/III operations.
- Flight tests to validate meeting operational requirements.
- Expand the use of GBAS technology to other countries.

1A15, Next Generation Air Transportation System (NextGen) – Safety, Security, and Environment

FY 2009 Request \$8.0M

- NextGen – Safety, Security, and Environment, M48.01-10

Program Description

Implementation of new technologies will require that safety, security and environmental issues be addressed. Each solution set will need a thorough safety assessment to ensure that all potential safety issues have been addressed. New security programs are being introduced to ensure that controllers are aware of any unauthorized or unknown aircraft entering U.S. airspace. Aviation environmental issues are receiving increased attention worldwide.

Initial funding is requested to implement the Security Integrated Tool Set (SITS). It supports automated threat detection and tracking, data correlation, NAS impact analysis of security or emergency actions and risk-based assessment. The Safety Management System will address safety issues. Environmental impacts will be addressed as part of the overall evaluation of new projects.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

NextGen capacity initiatives cannot be implemented if they have any negative impacts on safety, security or environmental aspects of operational performance. Examining these issues is a necessary step in putting any new capabilities into operational use.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure a Viable Future.
- **SMP Objective #4.3** – Deliver the NextGen/OEP commitments.

Program Plans FY 2009 – Performance Output Goals

- Complete development of the Automatic Detection and Processing Terminal (ADAPT) application for SITS.
- Implement new information system security measures.

Program Plans FY 2010-2013 – Performance Output Goals

- Continue implementing component parts of SITS.
- Evaluate information security needs for new data sharing system and implement security measures.

1A16, Next Generation Air Transportation System (NextGen) – Networked Facilities

FY 2009 Request \$17.0M

- NextGen – Networked Facilities, M48.01-05

Program Description

Redesigning the air traffic control system provides an opportunity to review the location and function of air traffic facilities. There may be more optimal configurations of these facilities to match the new capabilities. In addition, implementation of NextGen presents an opportunity to address other important issues that are key to a modernized system. The original en route facilities do not meet some of the latest security recommendations. If they are relocated, they can be built with a larger land buffer surrounding the facility. New facilities could also be sized to better accommodate taking over additional airspace when there is a temporary failure of an adjacent facility.

This project will develop the future communications design for new facilities. It will determine how to implement new security standards recommended by the Department of Justice, and it will determine the optimal number and location of air traffic facilities needed to support air traffic control functions in the future. A side benefit will be the potential improvement in operational efficiency allowed by balancing workload and dynamically shifting control responsibilities to better match available staffing at these new facilities.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

Improving the configuration of air traffic control facilities and improving communications links among them allows higher levels of traffic to be handled during peak periods. There are also efficiencies gained by allocating larger amounts of air space to consolidated terminal facilities so aircraft can be sequenced for landing further from the airport.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure a Viable Future.
- **SMP Objective #4.3** – Deliver the NextGen/OEP commitments.

Program Plans FY 2009 – Performance Output Goals

- Develop design for future communications network for air traffic control facilities.
- Engineering design for NextGen facilities integration.

Program Plans FY 2010-2013 – Performance Output Goals

- Construct new facilities.
- Upgrade communications systems.

ACTIVITY 2. PROCUREMENT AND MODERNIZATION OF AIR TRAFFIC CONTROL FACILITIES AND EQUIPMENT

A. EN ROUTE PROGRAMS

2A01, EN ROUTE AUTOMATION MODERNIZATION (ERAM)

FY 2009 Request \$203.1M

- En Route Automation Modernization (ERAM), A01.10-01
- X, En Route Automation Modernization (ERAM) – Technical Refresh, A01.10-03

Program Description

The ERAM program comprises four segments: Enhanced Backup Surveillance (EBUS), En Route Information Display System (ERIDS), ERAM Release 1, and ERAM Releases 2/3 (maintenance and upgrade releases). The first segment, EBUS was completed during FY 2006.

ERIDS – The En Route Information Display System distributes important information such as Notices to Airmen, Pilot Reports, aeronautical charts and airport information, instrument approach and departure procedures, letters of agreement, and local procedures to air traffic controllers electronically to improve productivity and efficiency. Additionally, ERIDS reduces, and in some cases eliminates, the time necessary to process, print, manage, and distribute paper. Three prototype ERIDS systems were completed in FY 2003. National deployment of 20 systems began in FY 2006 and will be completed in FY 2008.

ERAM Release 1 – ERAM Release 1 replaces the current Host Computer System with new software and hardware to enable improvements in airspace capacity, efficiency, and safety that cannot be realized with the current system. Additionally, today's Host Computer hardware can only be maintained through 2012. Designed to handle traffic growth through the year 2020, ERAM enables controllers to better handle unplanned events, offers flexible routing options, and provides additional safety alerts to prevent collisions and congestion. Fully integrated with ERAM Release 1 is a technology refresh of the radar controller position display processors to bring them into line with ERAM's modern, redundant architecture. The current processors were deployed in 1998 and are reaching their end of service life. Their processing power is inadequate for advanced applications, and their resident graphics software language is both proprietary and outdated.

To mitigate risk, ERAM is leveraging existing FAA products and lessons learned rather than building brand-new products. Specifically, the Display System Replacement forms the basis of ERAM radar controller display functionality; User Request Evaluation Tool forms the basis of the flight data processing and data controller display functionality; Standard Terminal Automation Replacement System radar data tracker provides a standard tracker, and Microprocessor En Route Automated Radar Tracking System forms the basis for ERAM separation assurance and safety functions. ERAM Release 1 will complete the delivery of a new automation system at each En Route Air Route Traffic Control Center in the continental United States. ERAM Release 1 national deployment begins in FY 2009 and concludes in FY 2011.

ERAM Release 2/3 – The first two ERAM maintenance and upgrade software releases are planned for 2009 and 2010 respectively. These releases are required for ERAM maintenance and will include incremental functional enhancements not available in ERAM Release 1.

The ERAM technology refresh project covers the anticipated future technology refresh development and procurement activities required to extend the service life of ERAM hardware and software. Anticipated technology refresh program will begin in FY 2012.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1 –** Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1 –** Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

ERAM contributes to the FAA’s greater capacity goal by providing a fully redundant system with no loss of service when either the primary computer fails or is not available during planned system maintenance. The current Host Computer System has only limited backup functionality during an outage or maintenance action. This improved availability will preclude the need to impose restrictions on airspace users when the primary channel is not available. ERAM also increases the number of flight plans that can be stored to 7,080 (versus the current 2,600); provides flexibility in airspace configuration; and extends the radar coverage in all En Route Centers by increasing the number of radar feeds from 24 to 64. This reduces controller workload, increases productivity, and provides the necessary infrastructure to handle the anticipated growth and complexity of the NAS.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1 –** Achieve Operational Excellence.
- **SMP Objective #1.4 –** Manage airspace use and traffic optimally.

Program Plans FY 2009 – Performance Output Goals

- ERAM Key Site Government Acceptance.
- ERAM Key Site Initial Operating Capability.
- ERAM Release 2 available.
- Initiate planning for Tech Refresh.

Program Plans FY 2010-2013 – Performance Output Goals

- ERAM In-Service Decision.
- ERAM Key Site Operational Readiness Demonstration (ORD).
- ERAM Release 3 available.
- ERAM Last Site ORD.
- Tech Refresh activities baselined and execution started.

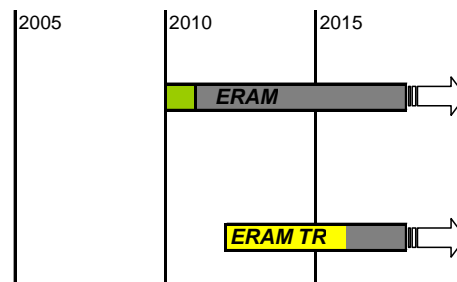
System Implementation Schedule

En Route Automation Modernization (ERAM)

First site ORD: December 2009 -- Last site ORD: December 2010

En Route Automation Modernization (ERAM) – Tech Refresh (TR)

Start TR Activities 2012 -- Complete TR Activities 2015



2A02, EN ROUTE COMMUNICATIONS GATEWAY (ECG)

FY 2009 Request \$7.4M

- En Route Communications Gateway – Technology Refresh, A01.12-02

Program Description

The En Route Communications Gateway (ECG) system is a computer system that formats and conveys critical air traffic data to the Host Computer System and the Enhanced Backup Surveillance System at the Air Route Traffic Control Centers (ARTCC). ECG increases the capacity and expandability of the NAS by enabling the current automation systems to use new surveillance technology. ECG introduces new interface standards and data formats—which are required for compatibility with International Civil Aviation Organization (ICAO) standards—and added capacity to process data from additional remote equipment such as radars. The ECG provides the automation system capacity and expandability to support anticipated increases in air traffic and changes in the operational environment. The ECG is a prerequisite to deploying the ERAM software and hardware.

The ECG is fully operational and technology refresh will sustain the capability of the ECG system and provides for purposeful evolution when opportunity permits. The ECG system was designed to ensure that new capabilities and additional functionality can be incorporated.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The ECG infrastructure provides the automation system capacity and extensibility to support anticipated increases in air traffic and changes in the operational environment. The ECG architecture is flexible and expandable and is designed to support the introduction of new services, systems, and capabilities within the NAS. For example, the ECG system provides the capacity to increase the quantity of surveillance sources monitored, eliminating possible areas of airspace where no backup surveillance capability exists.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Identify technology refresh and obsolescence issues.

Program Plans FY 2010-2013 – Performance Output Goals

- Develop, install, test, and implement technology solutions nationally.
- Deploy software changes in support of ERAM at all ARTCC's.

2A03, NEXT GENERATION WEATHER RADAR (NEXRAD)

FY 2009 Request \$3.0M

- NEXRAD Open Systems Upgrades, W02.02-00

Program Description

This modern, long-range weather radar detects, analyzes, and transmits the input data to display severe weather information on air traffic controllers' consoles. This helps controllers to determine the location, time of arrival, and severity of weather conditions to enhance both flight safety and airspace capacity. Currently there are 158 NEXRAD systems and one supplemental weather radar funded, owned and operated jointly by the Tri-Agency partners— the National Weather Service (NWS), the Federal Aviation Administration, and the Department of Defense. The NWS is the lead agency for the NEXRAD program.

Open system upgrades to the NEXRAD processors and receiver will extend NEXRAD's capabilities by improving data quality, detection ability, and increasing the number of data products generated. The Open System Upgrades incorporate advanced technology into the existing NEXRAD system to improve its detection capability, update rate, resolution and clear definition of additional types of weather conditions within discrete atmospheric regions.

The NWS recently awarded a \$43M contract to acquire the dual polarization capability for the full complement of NEXRADs. A significant portion of the FY 2009 appropriation will be used to cover costs to procure and install dual polarization hardware on the FAA's 12 NEXRAD platforms. Dual polarization will improve overall data quality of existing NEXRAD weather data products. In addition, this capability will provide the ability to detect in real time, regions of icing aloft (in-flight icing). When fully developed, and implemented on appropriate down stream system/platforms (e.g., FS21, ITWS...), this capability offers the potential to significantly reduce icing-induced accidents (and fatalities) that are common in the General Aviation (GA) community.

The NWS collects and redistributes NEXRAD weather data nation-wide and creates forecasts that are used in all phases of flight. Terminal and En route air traffic control systems and the ATC Systems Command Center are able to use the NEXRAD products and services, which are processed by the Weather and Radar Processor, Integrated Terminal Weather System, and the Corridor Integrated Weather System.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The NEXRAD program contributes to greater capacity goals by ensuring sustained operational availability of NEXRAD. NEXRAD measures precipitation intensity, storm motion, and weather echo tops, and provides this data in varied displays directly or indirectly to all OEP airports and most other air traffic control facilities in the continental United States.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Provide funding to the DOC/NWS (Lead Agency) for NEXRAD Product Improvement / Open Systems Upgrade.
- Update all NEXRAD systems with Super-resolution enhancements and Data Quality upgrades.

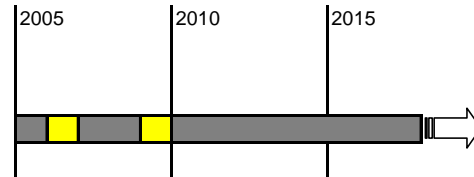
Program Plans FY 2010-2013 – Performance Output Goals

- Provide funding to DOC/NWS (Lead Agency) for NEXRAD Product Improvement / Open Systems Upgrade.
- Update all NEXRAD systems with Dual Polarization hardware and software modifications and Data Quality upgrades.

System implementation schedule

Next Generation Weather Radar (NEXRAD) - Open System Upgrades

Upgrade 1: 2006 -- Upgrade 2: 2009



**2A04, AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER (ATCSCC) RELOCATION
FY 2009 Request \$28.6M**

- ATCSCC – Relocation, F28.01-01

Program Description

The Air Traffic Control System Command Center (ATCSCC) Infrastructure Planning program will carry out the planning and finance the relocation of the command center from its present location in Herndon, VA. For the past thirteen years the facility has been housed in commercially leased space with a current cost in excess of four million dollars annually. The long-term lease expires on September 30, 2013.

The FAA ATCSCC is responsible for monitoring air traffic flows nationwide and implementing programs to reduce delays and to allow aircraft to avoid severe weather areas on a daily basis. It plays a key role in the safe and efficient operation of the NAS. In addition, it also plays a key national security role.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2 –** Improve financial management while delivering quality customer service.
- **FAA Performance Target 2 –** Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

This project will collocate the ATCSCC with another FAA facility, offering lower life cycle costs. Collocation will lower operating costs by eliminating the need for continuing the current lease, and it will avoid potentially higher capital costs by eliminating the need for land acquisition, reducing the amount of site preparation, and significantly reducing the need for additional backup power and utility systems.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #2** – Enhance Financial Discipline.
- **SMP Objective #2.4** – Reduce Unit Cost of Operations.

Program Plans FY 2009 – Performance Output Goals

- Award construction contract (Oct 2008).
- Commence construction (Dec 2008).

Program Plans FY 2010-2013 – Performance Output Goals

- Complete installation of equipment (Jan 2011).
- Complete commissioning (Mar 2011).

2A05, ARTCC BUILDING IMPROVEMENTS/PLANT IMPROVEMENTS

FY 2009 Request \$56.5M

- ARTCC Plant Modernization/Expansion – ARTCC modernization, F06.01-00

Program Description

The Air Route Traffic Control Center (ARTCC) Modernization and Expansion program supports En Route Air Traffic operations and service-level availability through facility lifecycle program management of the 21 ARTCCs and two Center Radar Approach Control (CERAP) facilities. This program expands and modernizes these facilities to accommodate growth in en route operations and new air traffic control equipment. It also renovates and upgrades en route centers to prevent outages that would delay air traffic.

The program began in the mid 80's, and is comprised of 13 standard projects that are implemented at all of the ARTCCs. To date, nine of these standard projects are complete at all the ARTCCs. ARTCCs and CERAPs must be modernized and sustained in order to support ATC operational requirements and to minimize ATC delays or outages caused by infrastructure failures. The program also includes facility sustainment funding, configuration management, and numerous special projects.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The ARTCC Modernization/Expansion program contributes to the FAA's greater capacity goal by ensuring that buildings that house en route control equipment are modified, as necessary, to meet traffic growth and accept new equipment. The program also maintains these buildings in good condition to avoid air traffic control outages due to failures in such infrastructure systems as electrical distribution systems. The program maintains the integrity of 21 ARTCCs, and two CERAP facilities, as well as upgrades facilities for integration and transition of new NAS systems. Modernizing ARTCC and CERAP building infrastructure with such projects, such as electrical wiring, heating and ventilation systems, reduces the chances of outages, which can cause air traffic delays.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Fund Combination M-1/Automation Wing Rehabilitation project at Kansas City and Memphis.
- Fund M-1 control room renovation project at Salt Lake and Denver.
- Provide \$400,000 per ARTCC for mission critical failure mode mitigation.
- Provide \$100,000 per ARTCC for local sustain.
- Conduct facility condition assessments at five ARTCCs.
- Update the national Facility Condition Assessment database.
- Fund equipment relocation as required.

Program Plans FY 2010-2013 – Performance Output Goals

- Fund Combination M-1/Automation Wing Rehabilitation project at Atlanta and Boston.
- Fund M-1 control room renovation project at Fort Worth.
- Fund Combination Host/Control Wing Basement project at Minneapolis, Los Angeles, Boston, Memphis, Chicago, Jacksonville, Seattle, Indianapolis, Fort Worth, Miami, Oakland, Cleveland, Albuquerque, Salt Lake, Kansas City, Denver, Atlanta, Washington, Houston, and New York.
- Fund Administration Wing Rehabilitation project at Fort Worth, Los Angeles, and Atlanta.
- Provide \$500,000 per year per ARTCC for critical mission failure mode mitigations, local sustain, repairs and upgrades.
- Conduct facility condition assessments at 10 ARTCCs.
- Fund Administrative Wing Rehabilitation project at one site.
- Update the national Facility Condition Assessment database.
- Fund equipment relocation as required.

2A06, AIR TRAFFIC MANAGEMENT (ATM)

FY 2009 Request \$90.2M

- TFM Infrastructure – Infrastructure Modernization, A05.01-06
- Collaborative Air Traffic Management Technologies (CATMT) –Work Package 1, A05.01-10
- Collaborative Air Traffic Management Technologies (CATMT) –Work Package 2, A05.01-11
- Route Availability Planning Tool (RAPT), A05.05-01

Program Description

The Traffic Flow Management (TFM) system is the automation backbone for the Air Traffic Control System Command Center (ATCSCC) and the nationwide Traffic Management Units that assist the ATCSCC in strategic planning and management of air traffic. The TFM system is the nation's primary source for capturing and disseminating air traffic information and is the key information source for coordinating air traffic in the NAS. TFM hosts the software decision support systems that assist in managing and metering air traffic to reduce delays and make maximum use of system capacity to balance growing flight demands with NAS capacity within a dynamic environment. The FAA use the information from this system to collaborate with aviation customers to implement programs that reduce delays and ensure smooth and efficient traffic flow through FAA-controlled airspace, thereby saving the flying public and airlines millions of dollars. TFM's customers include the airlines, general aviation, U.S. Department of Defense (DoD), U.S. Department of Homeland Security, industry, and partner countries.

The TFM Modernization (TFM-M) component modernizes the TFM infrastructure, which is approaching functional obsolescence. The core system software has become increasingly difficult to maintain and to modify, and it will not support the emerging ATM structure and system requirements.

CATMT Work Package 1 (WP1) provides new decision-support tools to deliver additional user benefits and increase the effective capacity of the NAS. WP 1 leverages the cooperative environment that was used in its predecessor, the Collaborative Decision Making Program. WP 1 will incrementally develop and integrate decision support capabilities (including procedural changes and data from new automation tools to handle bad weather departures and landings).

CATMT capabilities will:

- Provide more accurate forecasting of system capacity and user demand.
- Improve modeling, evaluation and optimization of traffic management initiatives.
- Improve information dissemination, coordination and execution of traffic flow strategies.
- Minimize and equitably distribute delays across airports and users.
- Collect and process more performance data to define metrics and identify trends.

CATMT Work Package 2 (WP 2) identifies additional new enhancements that will continue to improve the TFM decision support tool suite.

The Route Availability Planning Tool (RAPT) is a prototype system developed on behalf of the New York Port Authority for the New York airports, and it is being evaluated by the FAA. This tool helps to identify possible routes for departure during periods of severe weather. Further study of this prototype is being conducted at this time to decide whether it can and should be deployed operationally.

Relationship of Program to FAA Strategic Goal, Objective and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 2** – Increase reliability and on-time performance of scheduled carriers.
- **FAA Performance Target 1** – Achieve a NAS on-time arrival rate of 88.76 percent at the 35 OEP airports by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

The ATM program will support the Greater Capacity goal through the use of automated systems that provide more accurate and timely information for all TFM system users, improve operator and passenger access to flight information, and reduce system delays. TFM-M will upgrade the existing TFM infrastructure and will increase integration and interoperability by establishing a robust, commercially-available, and standards-compliant system. This will accelerate development and implementation of technology and tools that will improve traffic management synchronization, traffic management flow, and information management services. CATMT WP 1 and RAPT will develop and deploy critical add-on automation enhancements to help reduce airway and airport congestion. CATMT WP 2 enhancements will ultimately lead to improved passenger throughput, equitable allocation of capacity resources among users, and significant improvement in air traffic operations on-time system performance metrics.

Strategic Management Process (SMP) Pathway and Objective

TFM-M, CATMT, & RAPT:

- **SMP Pathway #1** – Achieve Operational Excellence
- **SMP Objective #1.5** – Minimize impacts of weather on the operation.

Program Plans FY 2009 – Performance Output Goals

- Begin Initial Operating Capability (IOC) of the modernized TFM system.
- Complete needed enhancements for RAPT.

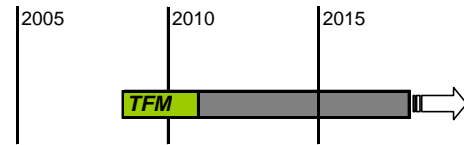
Program Plans FY 2010-2013 – Performance Output Goals

- Continue work on later phases of Airspace Flow Programs.
- Deploy CATMT WP 2 performance enhancements.
- Complete deployment of TFMS (TFM-M system).
- Deploy the Impact Assessment and Resolution capability.
- Refine the overall RAPT business case, determine an implementation strategy, and begin implementation.

System Implementation Schedule

Traffic Flow Management (TFM)

First site IOC: September 2008 -- Last site IOC: TBD



2A07, AIR/GROUND COMMUNICATIONS INFRASTRUCTURE

FY 2009 Request \$7.5M

- Radio Control Equipment (RCE) – Sustainment, C04.01-01
- Communications Facilities Enhancement – Expansion, C06.01.00
- Communications Facilities Enhancement – Air/Ground Communications RFI Elimination, C06.03.00

Program Description

The Air-to-Ground (A/G) Communications Infrastructure Sustainment program enhances operational efficiency and effectiveness by replacing old radio equipment. This radio equipment is installed at remote sites that allow communications between pilots and controllers when an aircraft is beyond normal direct transmission range. The program also renovates buildings and improves site conditions and access for these remote radio sites.

The Communications Facilities Enhancements (CFE) program provides new or relocated radio control facilities to enhance the A/G communications between air traffic control and aircraft when there are gaps in coverage or new routes are adopted by aircraft flying through the facility's airspace. The radio frequency interference elimination program provides modern communication and ancillary equipment at select remote communication facilities to eliminate interference from commercial or other radio frequency emissions and improve operational performance.

The Radio Control Equipment (RCE) program replaces obsolete radio signaling and control equipment, which allows a controller to select and use a radio channel. It improves operational performance and reduces maintenance costs. RCE is required at control end sites, such as ARTCCs, TRACON facilities, ATCTs, CERAP, Radar Approach Control, and AFSSs. This equipment is also installed at supporting facilities such as, Remote Center Air/Ground facilities that serve centers, Remote Transmitter/Receiver facilities that serve terminal facilities, and Remote Communications Outlet facilities that serve flight service stations.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

This A/G Communications programs provide communications infrastructure that makes airspace restructuring feasible. It also will reduce the number of outages and enhance communications capacity by replacing aging and increasingly unreliable communications equipment with modern equipment. These programs improve and upgrade associated sites and facilities. In addition, they enable additional capacity by providing new communications sites to conform to new air traffic patterns.

Strategic Management Process (SMP) Pathway and Objective

RCE, CFE – Expansion:

- SMP Pathway #3 – Increase capacity where needed.
- SMP Objective #3.3 – Implement airspace and airport capacity enhancements safely.

A/G Communication RFI Elimination:

- SMP Pathway #1 – Achieve Operational Excellence.
- SMP Objective #1.6 – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Attain service availability for seven CFE projects.
- Deliver 300 RCE units for sustainment requirements.
- Conduct investment analysis for new RCE procurement.

Program Plans FY 2010-2013 – Performance Output Goals

- Provide support to CFE critical sites.
- Install RCE units for sustainment as required.
- Complete RCE investment analysis, baseline program, and begin procurement and implementation.

2A08, ATC BEACON INTERROGATOR (ATCBI) – REPLACEMENT

FY 2009 Request \$13.0M

- ATC Beacon Interrogator (ATCBI) Replacement, S02.03-00
- Beacon Only Sites – Facility Establishments, S02.03-02

Program Description

The Air Traffic Control Beacon Interrogator Replacement - Model 6 (ATCBI-6) is a secondary radar used for en route air traffic control. The ATCBI-6 provides aircraft position information and identification to ATC facilities, for separation assurance and traffic management. The ATCBI-6, in conjunction with co-located primary long-range radar, also provides back-up radar approach surveillance service to numerous Terminal Radar Approach Control (TRACON) facilities in the case of lost terminal radar services and/or scheduled maintenance downtime. The ATCBI-6 system is a low-cost, highly reliable, very accurate, and more capable replacement for old, high-cost beacon interrogators with higher failure rates.

The ATCBI-6 sensors replace 30-year old ATCBI-4/5's systems, which are past their 20-year design life span and many of the parts for these older systems are obsolete. Replacement of these systems will provide improved system reliability and reduce operating costs.

The ATCBI-6 program will replace all existing en route ATCBI-4/5 systems and establish new beacon only sites. The original ATCBI-6 Replacement Program included 129 ATCBI-6 systems to replace existing operational beacons; establish support systems for training, testing, logistics, and operational support; and provide systems for three new sites. An additional 8 ATCBI-6 systems were added, due to Congressional establishments, agency cost share agreements, other government projects, and the need for additional support systems, for a total of 137 systems.

Performance data from ATCBI-6 systems already deployed shows increased mean time between outages and decreased time to restore service, which results in increased system availability and reduced maintenance staffing needs. The ATCBI-6 provides digital outputs that support other NAS modernization including Standard Terminal Automation Replacement System and common Automated Radar Terminal System user workstations.

The ATCBI-6 Beacon Only Sites (BOS) – Facility Establishment project establishes the infrastructure to support new beacon interrogators that will add radar coverage to areas that currently have none. Infrastructure to support these new systems includes property, buildings, antenna towers, power, and communications.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The ATCBI-6 systems provide aircraft position and identification data with significantly improved reliability and availability.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

ATCBI-6:

- Complete the 1 remaining ATCBI-6 system delivery from the Norfolk, VA staging facility to the site.
- Complete IOC at the remaining 17 sites including the Beacon Only Facility Establishment sites.
- Conduct additional maintenance training courses.
- Continue Rotary Joint Modification and installation.
- Complete the 3 year update of the Security Certification and Authorization Process (SCAP).

Beacon-Only Sites (BOS) Facility Establishment:

- Complete site construction at Yakutat, AK.

Program Plans FY 2010-2013 – Performance Output Goals

ATCBI-6:

- Close out activities for the Prime Contractor, Raytheon.
- Complete operational readiness and commissioning activities at all sites.
- Complete Rotary Joint Modification and installation.

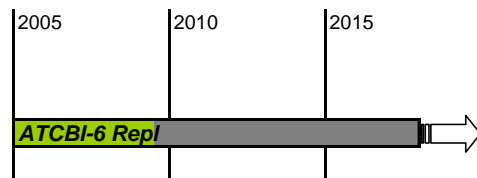
BOS Facility Establishment:

- No activity.

System Implementation Schedule

Air Traffic Control Beacon Interrogator - Model 6 (ATCBI-6) Replacement

First site ORD: July 2002 -- Last site ORD: August 2009



2A09, AIR TRAFFIC CONTROL EN ROUTE RADAR FACILITIES IMPROVEMENTS
FY 2009 Request \$5.3M

- LRR Improvements – Infrastructure Upgrades/Sustain, S04.02-03

Program Description

The Long Range Radar (LRR) Infrastructure Upgrades program sustains and improves the facilities where LRRs are installed to provide aircraft position information to FAA en route control centers and to other users (e.g., Departments of Defense and Homeland Security). These planned improvements also support the installation and lifecycle support of the secondary beacons radars (Mode Select and Air Traffic Control Beacon Interrogator Replacement); both standalone and those co-located with the long-range primary radars. Secondary beacon radars often have their antennas mounted above the long-range primary radar antennas, and the processors are installed in facilities that were constructed in the 1950's and 60's. Many of the en route secondary radar service outages can be directly linked to failing infrastructure. This project finances upgrades to the antenna drive systems and improvements to the facility infrastructure systems, such as power systems; engine generators; environmental control systems; electrical systems; and lightning protection, grounding, bonding, and shielding systems. Multiple contracts are needed to do the necessary upgrades. Contracts are specific to the component being repaired and sometimes also specific to the site where the improvement is needed.

LRR Infrastructure Upgrades consist of two phases:

Phase I – Short-Term Upgrades to Facility Infrastructure. These are limited to refurbishing heating, ventilation, and air-conditioning, engine generators, uninterruptible power supply, and lightning protection, grounding, bonding, and shielding systems and minimum structural upgrades to support ATCBI-6 deployment.

Phase II – Long-Term Upgrades to Facility Infrastructure. These will replace critical infrastructure systems if required for en route secondary beacon operations. Requirements are being defined through Web-based surveys and site surveys.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase airport capacity to meet projected demand
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The LRR program is required to support the capacity performance goal in the NAS. This infrastructure upgrade project ensures that LRRs maintain high reliability and availability required to support the performance goal.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Upgrade the existing Heating, Ventilation & Air Conditioning systems and Uninterruptible Power Sources.
- Continue support of the Improvement of Federal Building & Equipment Program.
- Continue upgrades to Lightning, Grounding, Bonding, and Shielding systems in accordance with FAA-STD-19E.
- Continue Phase II – Long-term upgrades to facility infrastructure.
- Perform en route in-service engineering.
- Continue program management support.

Program Plans FY 2010-2013 – Performance Output Goals

- Continue Phase II – Long Term Upgrades to Facility Infrastructure.
- Perform en route radar in-service engineering.
- Continue program management support.
- Perform site condition assessments on Air Route Surveillance Radar Model 1s and 2 & Air Force long-range radars (FPS).
- Select upgrades identified by the condition assessments.

2A10, VOICE SWITCHING AND CONTROL SYSTEM (VSCS)

FY 2009 Request \$23.3M

- Voice Switching and Control System (VSCS) – Tech Refresh – Phase 2, C01.02-03

Program Description

The Voice Switching and Control System (VSCS) Technology Refresh program will replace and upgrade hardware and software components for the voice switching systems in all 21 en route air traffic control centers (ARTCCs). The real time Field Maintenance/Testing System at the FAA William J. Hughes Technical Center (WJHTC) and the Training System at the FAA Academy will also be upgraded to perform the same as an operational site. These upgrades will ensure that the air-to-ground and ground-to-ground communications capabilities are reliable and available for separating aircraft, coordinating flight plans, and transferring information between air traffic control facilities in the en route environment. To date, this program has replaced all VSCS internal control systems. Equipment has been procured to replace the VSCS Traffic Simulation Unit at the FAA WJHTC. This test bed is being used to test the capabilities of the upgraded systems to determine if they meet the formal baseline requirements established for VSCS performance. Additional upgrades will be completed to ensure that the VSCS continues to provide reliable voice communications, which can support future en route operations.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The VSCS Technology Refresh program supports the greater capacity goal by improving the system reliability of en route voice communications for both current and future operations by replacing and upgrading components of the obsolete, non-supportable VSCS hardware and software. In addition, there are ongoing system expansions at specific ARTCCs to support greater capacity.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Continue work on internal Local Area Network (LAN) modification.
- Continue design work on Programming Language for Microcomputers (PLM) to C software conversion for Ground-to-Ground switch and VSCS Common Equipment (VCE).
- Initiate PECO Inc. power supply replacement design work.
- Continue power supply refurbishment.
- Continue activities for depot test equipment replacement.

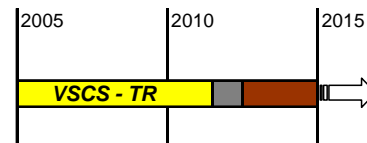
Program Plans FY 2010-2013 – Performance Output Goals

- Continue PECO Inc. power supply design.
- Complete testing of internal LAN, PLM to C software, depot test equipment, and Training and Backup System (VTABS) Test Controller modification.
- Initiate delivery of new PECO Inc. power supply.
- Initiate delivery of modifications that result from internal LAN, PLM to C conversion, depot test equipment, and VTABS Test Controller modification.
- Continue power supply refurbishment.

System Implementation Schedule

Voice Switching and Control System (VSCS) - Tech Refresh

First site IOC: 2002 -- Last site IOC: 2011



2A11, OCEANIC AUTOMATION SYSTEM

FY 2009 Request \$20.7M

- Advanced Technologies and Oceanic Procedures (ATOP), A10.03-00

Program Description

The ATOP program replaced oceanic air traffic control systems and procedures, and it modernized the Oakland, New York, and Anchorage ARTCCs, which house oceanic automation systems. Future efforts will provide technology refresh for the automation equipment. ATOP fully integrates flight and radar data processing, detects conflicts between aircraft, provides data link and surveillance capabilities, and automates the previous manual processes. The program office will conduct modeling and simulations, to forecast benefits, and now that ATOP is in operational use, will gather and document performance data and metrics to measure productivity, efficiency, and user satisfaction.

ATOP allows the FAA to discontinue the use of the difficult communications and intensively manual processes that limited controller flexibility in handling airline requests for more efficient tracks over long oceanic routes. The program provides the automation, Automatic Dependent Surveillance-Contract (ADS-C), and conflict resolution capability required to reduce oceanic aircraft separation from 100 nautical miles to 30 nautical miles.

ATOP has been implemented at three ARTCCs. The data initially used to calculate the benefits is changing; therefore, there is a need to analyze this data and provide a baseline and a model to show the fuel savings from ATOP and provide a meaningful metric for FY 2007. Further development of the fuel burn

model and metrics for FY 2008 and the out years, through the use of a comprehensive oceanic analysis, simulation and modeling capability, will be used to explore the contributing elements in fuel efficiency.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 2** – Increase on-time performance of scheduled carriers.
- **FAA Performance Target 1** – Achieve a NAS on-time arrival rate of 88.76 percent at the 35 OEP airports by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

ATOP will allow properly equipped aircraft (i.e., ADS-C, Controller-Pilot Data Link Communication, Required Navigation Performance-4 nm) and qualified aircrews to operate using reduced oceanic separation criteria. This will enable more aircraft to fly optimal routes and reduce aircraft flight time (and increase fuel and payload efficiency) during oceanic legs of their flights. Reduced lateral (side-to-side) separation may provide space for additional routes between current locations or new direct markets. Reduced longitudinal (nose-to-tail) separation may provide more opportunities to add flights without delays (e.g., climbs, descents, reroutes, or speed penalties.) This will increase the on-time arrival rate.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #3** – Increase capacity where needed.
- **SMP Objective #3.4** – Refine separation standards.

Program Plans FY 2009 – Performance Output Goals

- Perform model enhancements of fuel burn and boundary crossing models to calculate baseline fuel efficiency for common market pairs.
- Conduct Independent Operational Test and Evaluation for radar at New York Center.
- Initiate Phase B of facility modifications at Oakland Center.
- Continue providing support of the ATOP facilities with the implementation of Preplanned Product Improvements.
- Implement reduction of the separation standards in the U.S. controlled Pacific Ocean.
- Initiate Technology Refresh of the WJH Technical Center and Anchorage ARTCC.

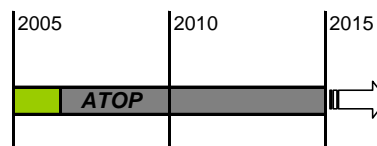
Program Plans FY 2010-2013 – Performance Output Goals

- Complete Phase B of facility modifications at Oakland Center.
- Calculate baseline fuel efficiency for additional market pairs and for all Oakland, New York and Anchorage flights.
- Complete Hardware/ Technology refresh at the Oakland and New York ARTCCs.
- Continue providing support of the ATOP facilities with the implementation of Preplanned Product Improvements.

System Implementation Schedule

Advanced Technologies and Oceanic Procedures (ATOP)

First site IOC: June 2004 -- Last site IOC: March 2006



2A12, CORRIDOR INTEGRATED WEATHER SYSTEM (CIWS)

FY 2009 Request \$5.9M

- Corridor Integrated Weather System (CIWS), W07.02-00

Program Description

CIWS will improve use of en route airspace capacity during adverse weather affecting the most heavily traveled corridors. The system uses data from weather radars to portray severe weather phenomena such as thunderstorms to help traffic management efforts to select the most efficient routes for aircraft to follow when direct routes are unavailable due to severe weather. Accurate and timely prediction of hazardous weather activity is essential to minimizing the amount of time lost from flying a longer route to avoid the severe weather.

The CIWS prototype demonstration began in 2001 and has been evaluated at 15 FAA locations in the congested northeastern quarter of the contiguous United States. CIWS provides coverage over the Continental United States (CONUS) and southern Canada. Canadian coverage allows assessment of the usage of important Playbook routes during periods of significant convective weather. The playbook is used by the air traffic command center to select the most efficient alternate routes when major corridors are restricted by severe weather. CIWS prototype displays currently operate at eight Air Route Traffic Control Centers (Cleveland, Washington, Chicago, Boston, New York, Indianapolis, Minneapolis, and Kansas City), the Air Traffic Control System Command Center, six major terminals (New York City, Chicago, Detroit, Pittsburgh, Cleveland, and Cincinnati), as well as several major airline operations centers. CIWS display functions will be integrated into the Traffic Flow Management Situation Display (TSD) extending the use of CIWS beyond the 15 current locations. The CIWS will be transitioned into the NAS and operated and maintained from the FAA William J. Hughes Technical Center (WJHTC).

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

The CIWS will minimize the restrictions on en route airspace capacity, when adverse weather is affecting operations, by providing more accurate and timely prediction of the present and future location of that weather. The CIWS prototype demonstration efforts have shown that finer positional and temporal resolution of storm location can improve the use of airspace capacity in congested airspace. Air routes can be kept open longer before being impacted by weather and can be reopened earlier. Similarly, better knowledge of future storm position enables controllers to reroute pilots around storms more efficiently. Increased information on current and predicted storm heights allows users to identify opportunities to safely fly over storm areas. The CIWS prototype demonstration has also shown that providing more accurate and timely weather predictions to NAS users improves collaborative decision-making to minimize delays.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.5** – Minimize impacts of weather on the operation.

Program Plans FY 2009 – Performance Output Goals

- Continue operation and maintenance of CIWS prototype.
- Complete CIWS Technology Transfer package.
- Complete transition engineering associated with moving CIWS operations to WJHTC.
- Secure physical resources associated with operating CIWS at WJHTC.
- Procure CIWS hardware and install at WJHTC.

Program Plans FY 2010-2013 – Performance Output Goals

- Continue operation and maintenance of CIWS prototype.
- Complete installation of CIWS at WJHTC.
- System testing of CIWS at WJHTC.
- CIWS operations and maintenance will be transitioned to WJHTC.

2A13, SAN JUAN RADAR APPROACH CONTROL (CERAP)

FY 2009 Request \$6.0M

- San Juan Facility Remediation, F08.01-01

Program Description

The San Juan Center Radar Approach Control (CERAP) was constructed in 1964 and was designed especially to resist hurricane forces. A structural evaluation completed in July 2005 identified significant deficiencies for several of the onsite buildings. Extensive structural modifications are necessary to bring the facility into code compliance and to protect the occupants. Efforts are underway to determine the best solution for upgrading this service to reduce the risk for disruption of air traffic operations.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

Sustaining the service at San Juan CERAP (ZSU) supports the FAA Flight Plan Capacity goal by maintaining the air traffic control services offered in the region.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Develop plan for future San Juan ATC facility.

Program Plans FY 2010-2013 – Performance Output Goals

- None.

2A14, NEXT GENERATION VHF AIR-TO-GROUND COMMUNICATIONS SYSTEM (NEXCOM)

FY 2009 Request \$46.4M

- A, Next-Generation VHF A/G Communications System (NEXCOM)– Segment 1a, C21.01-01 and Next-Generation VHF A/G Communications System (NEXCOM) – Segment 2 , C21.02-01
- B, Communications Facilities Enhancement – Ultra High Frequency Radio Replacement, C06.04.00 (Originally included with 2A07, Air/Ground Communications Infrastructure)

A, NEXT-GENERATION VHF A/G COMMUNICATIONS SYSTEM (NEXCOM) – SEGMENT 1A, C21.01-01 AND, NEXT-GENERATION VHF A/G COMMUNICATIONS SYSTEM (NEXCOM) – SEGMENT 2, C21.02-01

Program Description

The NEXCOM program replaces and modernizes the aging and obsolete NAS air-to-ground (A/G) analog radios. Replacing the radios is part of a larger program to eliminate existing NAS limitations that will affect the air traffic system's capability to effectively manage the projected U.S. air traffic requirements of the future. These limitations include FAA very high frequency (VHF) radio frequency spectrum saturation, inadequate A/G radio equipment maintainability and reliability, and lack of A/G information security and communications control.

NEXCOM's new radio technologies support the FAA's goal of Greater Capacity by making more efficient use of existing spectrum. Furthermore, replacing very old radios and their higher failure rates with newer radios will reduce the future growth rate of O&M costs, a cost avoidance.

The NEXCOM program was rebaselined in December, 2005. NEXCOM will be implemented in two segments, 1a and 2. Segment 1a addresses the high- and ultrahigh-sector air traffic voice channels for aircraft flying en route above 24,000 feet. Only Segment 1a has been approved to date.

Segment 1a will replace all en route radios with Multimode Digital Radios (MDRs) by 2013. The first installation was in 2004. The program has been designed for growth and flexibility. The MDRs can emulate the existing analog protocol, thus facilitating transition, or they can operate in the more efficient 8.33 kHz voice mode currently in use in Europe, or with additional expenditures in a later phase they can operate in the VDL-3 mode especially designed for Air Traffic Control. The VDL mode provides integrated data and voice. The spectrally efficient 8.33 kHz voice-only mode recovers the spectrum needed for a stand-alone data communications system (i.e., Datacom program). The integrated plan for NextGen envisions an automated air/ground trajectory capability. The ATC paradigm shift from workload-intensive tactical control to automation-assisted strategic traffic management needs a data link, and the MDR will provide the spectrum for this link and has the option to provide the link itself directly.

Segment 2 will implement new radios that will service the high-density terminal areas and the flight service operations.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

NEXCOM will reduce the number of unplanned outages by replacing existing communications equipment with modern digital communications A/G equipment. The second stage of the program will increase capacity by expanding the number of communication channels within the spectrum assigned to the FAA. This capability increases the capacity to meet current and near-term air traffic control radio communication demands.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #3** – Increase Capacity Where Needed
- **SMP Objective #3.3** – Implement airspace and airport capacity enhancements safely.

Program Plans FY 2009 – Performance Output Goals

- Segment 1a: Procure 2,004 (13,796 out of 15,800-87%) and install 2,404 (10,196 out of 15,800 – 65%) additional MDRs in En Route facilities.
- Segment 2: Conduct investment analysis.

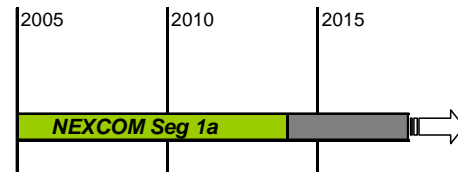
Program Plans FY 2010-2013 – Performance Output Goals

- Segment 1a: Procure 1,196 (15,800 total-100%) and install 5,640 (15,800 total – 100%) additional MDRs in En Route facilities, by September 30, 2013.
- Segment 2: Complete investment analysis, baseline program, and begin procurement and implementation of new radios that will service the high-density terminal areas and the flight service operations.

System Implementation Schedule

Next-Generation VHF A/G Communications System (NEXCOM) – Segment 1a

First site IOC: July 2002 -- Last site IOC: September 2013
First Site Decom: July 2022 -- Last Site Decom: September 2032



B, COMMUNICATIONS FACILITIES ENHANCEMENT – UHF REPLACEMENT, C06.04.00 (ORIGINALLY INCLUDED WITH 2A07, AIR/GROUND COMMUNICATIONS INFRASTRUCTURE)

Program Description

The ultra high frequency (UHF) radio replacement project replaces aging equipment used to communicate with Department of Defense aircraft. The FAA maintains the UHF A/G communications service for air traffic control of military operations in the United States. The Backup Emergency Communications replacement program provides a dedicated channel/sector in place of a priority-based, shared outlet system and replaces a 1970s technology system that is logistically unsupportable.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

This UHF radio replacement program provide communications infrastructure that makes airspace restructuring feasible. It also will reduce the number of outages and enhance communications capacity by

replacing aging and increasingly unreliable communications equipment with modern equipment. This program improves and upgrades associated sites and facilities.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #3** – Increase capacity where needed.
- **SMP Objective #3.3** – Implement airspace and airport capacity enhancements safely.

Program Plans FY 2009 – Performance Output Goals

- Procure and begin installation of 1,512 UHF Radios (8,638 total out of 11,780-73%).

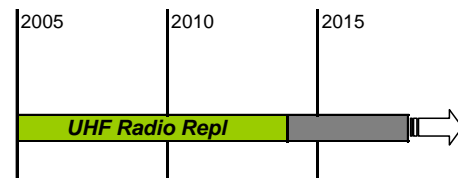
Program Plans FY 2010-2013 – Performance Output Goals

- Procure and begin installation of 3,142 UHF Radios (11,780 total-100%).

System Implementation Schedule

Communications Facilities Enhancement – Ultra High Frequency (UHF) Radio Replacement

First ORD: June 2004 -- Last ORD: September 2013



2A15, SYSTEM-WIDE INFORMATION MANAGEMENT (SWIM)

FY 2009 Request \$41.0M

- System Wide Information Management (SWIM), A31.01-01

Program Description

The System Wide Information Management (SWIM) Program is an information management and data sharing system for the NextGen. SWIM will provide policies and standards to support data management, and the formats needed to enter data to NAS systems, retrieve it, secure its integrity, and control its access and use. SWIM is being developed incrementally. The initial phase of SWIM, which is referred to as Segment 1, includes capabilities that were selected based upon the needs of various data communities, maturity of concepts of use, and the ability of existing programs to accommodate development of these SWIM capabilities within their existing program plans. Future segments will be defined in a similar manner and will include additional capabilities that move the FAA toward the data sharing required for NextGen programs.

SWIM will reduce the number and types of interfaces, reduce unnecessary redundancy of information and better facilitate information-sharing, improve predictability and operational decision-making, and reduce cost of service. The improved coordination that SWIM will provide will allow for the transition from tactical conflict management of air traffic to strategic trajectory-based operations. In addition, SWIM will provide the foundation for greatly enhanced information exchange and sharing with other agencies.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2** – Improve financial management while delivering quality customer service.
- **FAA Performance Target 2** – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

SWIM will support a transition to network-enabled operations, providing the same high quality, timely data to many users and applications, therefore reducing the number of unique, point-to-point interfaces for application-to-application data exchange. SWIM will reduce redundancy of information (multiple sources of information adds cost and increases risk for using slightly different information for similar decisions) and will facilitate horizontal (cross-federal) information-sharing. SWIM is a program for collaboration and consolidation through information technology. To the extent possible, SWIM will be built into existing NAS systems instead of being acquired as a new, standalone capability.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #2** – Enhance Financial Discipline.
- **SMP Objective #2.4** – Reduce Unit Cost of ATO Operations.

Program Plans FY 2009 – Performance Output Goals

- Identify initial set of SWIM standards and make them available to both internal users and external users such as U.S. Department of Defense (DoD), Department of Homeland Security (DHS) and airline operations centers to govern their access to FAA's traffic flow and flight management data.

Program Plans FY 2010-2013 – Performance Output Goals

- Achieve initial standardized SWIM segment 1 capability in traffic flow and flight management between the traffic flow management system (TFM) and en-route automation modernization (ERAM).

2A16, AUTOMATIC DEPENDENT SURVEILLANCE BROADCAST (ADS-B) – NATIONAL AIRSPACE SYSTEM (NAS) WIDE IMPLEMENTATION

FY 2009 Request \$300.0M

- Automated Dependand Surveillance - Broadcast (ADS-B) National Implementation – Segment 1 and 2, S10.04-01

Program Description

The Surveillance and Broadcast Services (SBS) program office is implementing Automated Dependand Surveillance – Broadcast (ADS-B), Traffic Information Services – Broadcast (TIS-B) and Flight Information Services – Broadcast (FIS-B) NAS Wide. ADS-B is the cornerstone technology for the Next Generation Air Transportation System. This new system promises to significantly reduce delays and enhance safety by using aircraft broadcasted position based on precise signals from the Global Navigation Satellite System instead of those from traditional radar to pinpoint aircraft locations to track and manage air traffic.

ADS-B: ADS-B is an advanced surveillance technology that provides highly accurate and more comprehensive surveillance information via a broadcast communication link. ADS-B receives flight data

from aircraft, via a data link, derived from on-board position-fixing and navigational systems. Aircraft position (longitude, latitude, altitude, and time) is determined using GPS, an internal navigational reference system, or other navigation aids. The aircraft's ADS-B equipment processes this position information, along with other flight parameters, [such as identification, indication of climb or descent angle, velocity, next waypoint, and other data that is limited only by the equipment's capability] for a periodic broadcast transmission, typically once a second, to the ADS-B ground station. The information will be used for surveillance applications and Air Traffic Services Displays on automation systems such as Common Automated Radar Tracking System (CARTS), Standard Terminal Automation Replacement System (STARS), Microprocessor En Route Automated Radar Tracking System (MicroEARTS), En Route Automation Modernization (ERAM), HOST, and Advanced Technologies and Oceanic Procedures (ATOP).

In addition to the ground-based ADS-B receiver, nearby aircraft within range of the broadcast and equipped with ADS-B avionics may receive and process the surveillance information for display to the pilot using the aircraft's multi-function display. Pilots could use the aircraft's multi-function display to ensure adequate aircraft separation. Finally, ADS-B equipment may be placed on ground vehicles or obstacles to allow locating and identifying them.

TIS-B: TIS-B is a service that provides ADS-B equipped aircraft with surveillance data about both ADS-B and non-ADS-B equipped aircraft, providing a more complete "picture" of nearby air traffic. TIS-B uses surveillance information provided by one or more other surveillance sources, such as secondary or primary surveillance radar. The surveillance information is processed and converted for use by ADS-B equipped aircraft. TIS-B can also be used in ADS-B implementations involving multiple ADS-B data links to provide a cross-link or gateway between ADS-B equipped aircraft that could use it to ensure separation with a similarly equipped aircraft. This TIS-B sub-function is identified as Automatic Dependent Surveillance – Rebroadcast (ADS-R). Two communication link protocols have been approved for ADS-R use; Universal Access Transceiver (UAT), used mostly by general aviation aircraft, and the 1090 extended squitter, which broadcasts but does not receive signals, and is normally used by commercial transport aircraft.

FIS-B: Flight Information Services provide ground-to-air broadcast of non-air traffic control advisory information which provides users valuable, near real-time information to operate safely and efficiently. FIS-B products include graphical and textual weather reports and forecasts, Special Use Airspace Information, Notices to Airmen, and other aeronautical information.

Segment 1 of the program requires two In-Service Decisions. The first is scheduled for December 30, 2008, and will provide the authority to proceed with NAS-Wide deployment of Essential Services TIS-B/FIS-B. The second is scheduled for September 30, 2010, and will provide the authority to proceed with NAS-Wide deployment of Critical Services (Surveillance). This includes integration, certification, and approval of 3 and 5-mile separation standards using ADS-B as a surveillance source. The areas that Segment 1 will focus on are: Gulf of Mexico (Communications, Weather, and Surveillance); Louisville, KY (Surveillance/TIS-B/FIS-B); Philadelphia, PA (Surveillance/TIS-B/FIS-B); Southeast Alaska, Juneau Area (Surveillance/TIS-B/FIS-B and Wide Area Multilateration); and Expansion of Broadcast Services – East Coast, Midwest to North Dakota, Western Arizona through California and Oregon, (TIS-B/FIS-B).

Segment 2 of the program is expected to begin in FY 2009 and the schedule for deployment of services for the remainder of the NAS will be developed jointly by the FAA and the service provider, ITT, based on a roadmap that will provide for maximum operational benefit and based on the potential for early equipage and a select pocket of users that will optimize the user and government benefits.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 2 –** Increase reliability and on-time performance of scheduled carriers.
- **FAA Performance Target 1 –** Achieve a NAS on-time arrival rate of 88.76 percent at the 35 OEP airports by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

ADS-B is a technology that will allow implementation of new air traffic control procedures that will make better use of existing airspace. This, in effect, is an increase in capacity and will result in fewer delays and more optimal routing for aircraft.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure Viable Future.
- **SMP Objective #4.3** – Deliver the NexGen/OEP commitments.

Program Plans FY 2009 – Performance Output Goals

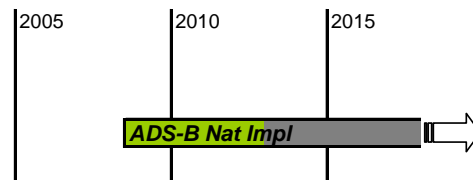
- In-Service Decision for Broadcast Services.
- Deliver enhanced communications and weather services to the Gulf of Mexico.
- Complete Operational Service & Environment Definition for surface alerting.
- Complete Operational Performance Assessment for surface alerting.
- Complete hazard analysis for surface alerting.

Program Plans FY 2010-2013 – Performance Output Goals

- Initial Operating Capability (IOC) for ADS-B at Louisville.
- IOC for ADS-B at Gulf of Mexico.
- IOC for ADS-B at Philadelphia.
- IOC for ADS-B at Juneau.
- Surveillance and Broadcast Service In-Service Decision for ADS-B.
- Complete required rule making to support ADS-B Services.
- Complete TIS-B & FIS-B deployments & continue ADS-B deployments.
- Develop plan for removal of legacy surveillance systems.
- Achieve IOC for surface alerting.

System Implementation Schedule

***Automatic Dependent Surveillance-Broadcast (ADS-B)
National Airspace System (NAS) Wide Implementation***
First site IOC: August 2008 -- Last site IOC: 2013



2A17X, AUTOMATED DETECTION AND PROCESSING TERMINAL (ADAPT)

FY 2009 Request \$0.0M

- Automated Detection & Processing Terminal (ADAPT), A29.01-01

Program Description

The ADAPT will be used to validate the identity and legitimacy of the aircraft operating within or entering the NAS.

For years the Air Traffic Control System has possessed a capability called Beacon Code Interrogator. The aircraft transmits a signal that identifies the aircraft call sign and altitude as just two of many sets of information that may be exchanged between the air and ground systems. Mode 3/A is the common military and civil mode for aircraft identification. This system is also called within the military and civilian application as IFF or Identification Friend or Foe.

This capability has supported identification of aircraft as they enter the NAS approaching the Air Defense Identification Zones (ADIZ) on our borders. Since the attacks of 9/11, the focus or the “mission need” of identifying “friend or foe” is now required inside domestic airspace in addition to aircraft approaching an ADIZ.

ADAPT is a highly integrated set of database systems provided by FAA, Commerce, Department of Homeland Security, and Transportation Security Administration of all aircraft approved or not approved to fly in the NAS. The database is integrated with the Enhanced Traffic Management System (ETMS) and the Aircraft Situation Display (ASD). Once flight plan data (Aircraft Call Sign/Registration) is entered into ETMS via the HOST/ERAM, the ADAPT database compares its data against the ETMS Beacon Code aircraft related data. If questionable data, data mismatches, or data unsubstantiated by any of the many integrated databases etc. are detected and associated with the interrogated aircraft operating within the system, the associated aircraft data block or beacon code color changes to red on the ASD.

This aircraft is now a “target of interest” and its red data block visually alerts specialists within the FAA and various security agencies (external to FAA) of a possible threat. This decision support tool then enables tracking, monitoring, and analysis. Sensitivity towards the targets position and tracking to temporary flight restrictions, Restricted Areas, nuclear facilities, VIP movements, etc. will heighten the criticality and immediacy of decision processes towards the identified target.

ADAPT is currently a working prototype that is partially integrated into daily operations on a limited basis. The implementation goal is to fully integrate the capability into FAA en route control centers (ARTCC), the Air Traffic Control Systems Command Center (ATCSCC), and identified homeland security priority locations/facilities.

Relationship of Program to DOT Strategic Goal, Objective, & Performance Target

- **DOT Strategic Goal 5 – Homeland and National Security.**
- **DOT Strategic Outcome 1** – Balance homeland and national security transportation requirements with the mobility needs of the Nation for personal travel and commerce.
- **DOT Strategy** – Support and implement U.S. security strategies and plans related to transportation.

Relationship to Performance Target

ADAPT provides a new capability for homeland and national security by identifying suspect aircraft prior to entering and also identifying aircraft already flying within the NAS that pose a threat. This capability improves national security and directly supports the FAA’s role in that mission.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence
- **SMP Objective #1.7** – Support national aviation security needs.

B. TERMINAL PROGRAMS

2B01, AIRPORT SURFACE DETECTION EQUIPMENT – MODEL X (ASDE-X) **FY 2009 Request \$32.7M**

- Airport Surface Detection Equipment – Model X (ASDE-X), S09.01-00
- X, ASDE-X – Tech Refresh & Disposition, S09-01-01

Program Description

ASDE-X is a modular surface surveillance system that processes multiple radar sources, multilateration, and Automatic Dependent Surveillance-Broadcast (ADS-B) sensor data to provide seamless airport movement area coverage and aircraft identification to local airport air traffic controllers. There are 3 types of ASDE-X installations: new establishments (airports with no current surface surveillance capability), replacements (airports where existing Airport Surface Detection Equipment Model 3 (ASDE-3)/ Airport Movement Area Safety System (AMASS) systems will be replaced with ASDE-X), and ASDE-X Upgrade sites [airports where the ASDE-3 systems will be upgraded with ASDE-X capability (multilateration, fusion tracking, color displays, and ASDE-X safety logic replaces AMASS)]. The main difference between the ASDE-X and ASDE-X Upgrade configurations is the surface surveillance transmitter/radar antenna. ASDE-X uses the new Surface Movement Radar while the ASDE-X Upgrade uses the existing ASDE-3 radar. ASDE-X is planned for deployment to 35 operational sites (10 new establishments, 4 replacements, and 21 ASDE-X Upgrades) and three support systems.

An analysis by the ASDE-X Team determined that a technology refresh is required for system hardware, but not software. The hardware refresh will begin in 2012 and be required every five years thereafter.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 3 – Reduce the risk of runway incursions.**
- **FAA Performance Target 1 – By FY 2010, limit Category A and B (most serious) runway incursions to a rate of no more than 0.450 per million operations, and maintain or improve through FY 2012.**

Relationship to Performance Target

The ASDE-X system provides air traffic controllers with a visual representation of the traffic situation on the airport surface movement area and arrival corridors, including aircraft and vehicle position information and flight identifications or call signs. This increased awareness of the situation on the airport surface movement area is essential in reducing runway collision risks and critical Category A & B runway incursions. ASDE-X Safety Logic is an enhancement that uses surveillance information from ASDE-X to determine if the current and/or projected positions and movement characteristics of tracked aircraft and vehicles present a potential collision situation. Visual and audible alerts are provided to the controllers, which include critical information about the targets involved, such as ID and surface occupied.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1 – Achieve Operational Excellence.**
- **SMP Objective #1.3 – Ensure safety and aircraft separation.**

Program Plans FY 2009 – Performance Output Goals

- Achieve Initial Operating Capability (IOC) of 6 out of 35 (49% complete) ASDE-X sites.
- Deliver 12 out of 35 (74%) undelivered ASDE-X systems.

Program Plans FY 2010-2013 – Performance Output Goals

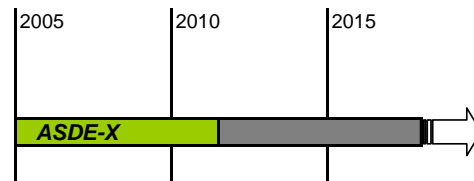
- Deliver last 4 out of 35 (100%) ASDE-X systems.
- Achieve IOC at last 15 out of 35 (100%) ASDE-X systems.
- For the technology refresh in FY 2012 and FY 2013, replacements will be implemented for the following system components: Keyboard-Video-Mouse (KVM) Extender (Transmitter), KVM Extender (Receiver), Transmitter Module Assembly (Remote Unit), Printed Wire Assembly (PWA) Receiver (Remote Unit), PWA Enhanced Decoder (Remote Unit), 56K modem (Remote Unit) and the Central Processing Unit Assembly (Data Processor).

System Implementation Schedule

Airport Surface Detection Equipment – Model X (ASDE-X)

First ORD October 2003 -- Last ORD: February 2011

First Site Decom: October 2028 -- Last Site Decom: September 2029



2B02, TERMINAL DOPPLER WEATHER RADAR (TDWR) – PROVIDE

FY 2009 Request \$6.1M

- Terminal Doppler Weather Radar – Service Life Extension Program (SLEP), W03.03-01

Program Description

The primary mission of the TDWR is to enhance the safety of air travel through timely detection, reporting, and display of hazardous weather conditions—wind-shear events, microburst and gust fronts, and thunderstorms—in and near an airport’s terminal approach and departure zone. TDWRs are installed at higher-density airports with high occurrences of thunderstorms, and provide controllers current information on severe weather so that they can issue warnings to pilots. TDWRs are operational at 46 airports. TDWR weather data is also transmitted to FAA automation systems and to an increasing number of National Weather Service weather forecast offices.

The TDWRs were installed in the 1990s, and many components of the existing system require replacement to ensure these radars are available during severe weather conditions. The antenna drive systems need rebuilding; the computer processors are out of date; and several other components need to be upgraded and modernized. The planned upgrades in this service life extension program are scheduled to be completed in 2013.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 1 – Reduce commercial air carrier fatalities.**
- **FAA Performance Target 1 – Cut the rate of fatalities per 100 million persons on board in half by 2025.**

Relationship to Performance Target

The TDWR SLEP contributes to safety goals by continuing TDWR service, improving TDWR software architecture integration, and replacing old components with more reliable components, all of which will enable the TDWR to reliably operate until the planned end of service life goal (2025).

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Install TDWR Radar Data Acquisition (RDA) Retrofit Units at 15 operational sites.
- Install TDWR elevation gears (bearings) and lube stations at 6 operational sites.
- Buy 20 TDWR brushless antenna drive motor modification kits and install one at an operational site.

Program Plans FY 2010-2013 – Performance Output Goals

- FY 2010 – Modify 15 sites with production RDA mod kits; modify 8 sites with new elevation bearings and lube stations; procure 18 production antenna drive systems and install 9 of them.
- FY 2011 – Modify 15 sites with RDA production mod kits; modify 8 sites with new elevation bearings and lube stations; procure the last 9 antenna drive systems.
- FY 2012 – Modify 8 sites with new elevation bearings and lube stations; install 16 antenna drive systems; install the last RDA production mod kit.
- FY 2013 – Modify 5 sites with new elevation bearings and lube stations; install 5 production antenna drive systems.

System Implementation Schedule

- RDA Retrofit: Complete last modification in FY 2012.
- Elevation Drive Enhancement: Complete last modification in FY 2013.
- Brushless Drive Motors and controllers: Complete last modification in FY 2013.

2B03, STANDARD TERMINAL AUTOMATION REPLACEMENT SYSTEM (STARS) (TAMR PHASE 1)

FY 2009 Request \$28.2M

- Standard Terminal Automation Replacement System – Technical Refresh (TAMR Phase 1), A04.01-01
- Standard Terminal Automation Replacement System – Terminal Enhancements, A04.01-02

Program Description

The Standard Terminal Automation Replacement System (STARS) is a joint Department of Defense and Department of Transportation (FAA) program to modernize terminal air traffic control automation systems. The STARS is a digital processing and display system that replaces the aging air traffic control equipment at our Automated Radar Terminal System (ARTS) IIIA and other high activity Terminal Radar Approach Control (TRACON) facilities and airport traffic control towers. Air traffic controllers use the STARS automation and displays to ensure the safe separation of military and civilian aircraft, at several airports within the nation's airspace. This investment is part of a phased approach to modernizing our terminal air traffic control equipment. The program updates existing TRACONs and towers with state-of-the-art systems featuring large-screen, high-resolution, color displays, and is expandable to accommodate future air traffic growth and new hardware and software. STARS addresses technology, mobility, and security gaps with the existing systems.

As in any commercial-off-the-shelf (COTS) based system, an aggressive hardware “technology refreshment” program is absolutely essential. Planning for technology refreshment enables identification and qualification of affected components before they become inoperable due to obsolescence. For example, the processor currently used in STARS is no longer available from the manufacturer. The consequences of obsolescence have collateral implications in the areas of engineering, training, maintenance and many other disciplines.

On April 20, 2004, the FAA Joint Resources Council (JRC) directed a phased approach to terminal automation modernization. The JRC approved STARS as a replacement for 47 critical site systems within three years. Thus, the current scope of the STARS program is to deploy systems to the remaining designated sites, and sustain and enhance those systems at the 47 sites. By the end of FY 2008, 46 of the 47 STARS will be operational within the NAS. The final site deployment is still pending availability of new a facility.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

As of June 30, 2006, STARS had an adjusted equipment availability of 99.9995% at all operational sites. (Source: National Outage Database, through May 2007) STARS is fully operational at 18 (out of a total of 35) OEP airports. In addition to high availability, STARS has an improved controller data display and data manipulation capabilities, enabling controllers to increase aircraft density without compromising safety.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Complete initial phase of the system processor and peripheral equipment qualification and purchase.
- Complete qualification for a terminal controller workstation display monitor replacement, tower controller monitor replacement, and eliminate costly inter-dependency of the system processors and operating system.
- Complete qualification of newly discovered end of life hardware items.
- Develop STARS software enhancements to improve system performance, efficiency, ease of use, and support.

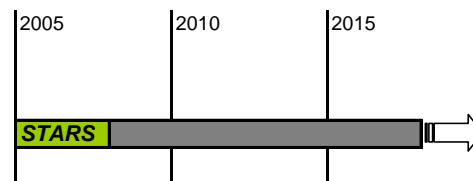
Program Plans FY 2010 –2013- Performance Output Goals

- Continue to sustain and enhance the operational STARS systems and implement technology refreshment as necessary.

System Implementation Schedule

Standard Terminal Automation Replacement System (STARS)

First site IOC: October 2002 -- Last site IOC: September 2007



2B04, TERMINAL AUTOMATION MODERNIZATION/ REPLACEMENT PROGRAM (TAMR PHASE 3)

FY 2009 Request \$3.0M

- A, Terminal Automation Modernization – Replacement (TAMR) – Phase 3, A04.07-01

Program Description

Terminal automation systems are essential for supporting the fast tempo of operations at our nation's busiest airports. The automation systems rely on information from radar and weather sensors, along with flight plan information for each aircraft to safely and efficiently maintain aircraft separation at or near airports.

The Terminal Automation Modernization and Replacement program provides a phased approach to modernizing the automation systems at the FAA's Terminal Radar Approach Control (TRACON) facilities and their associated Air Traffic Control Towers (ATCT) throughout the NAS.

TAMR Phase 3, when approved, would begin the modernization/replacement of automation systems at the remaining 106 TRACONS not being addressed by the investments in other earlier phases of the program. The FAA will continue to sustain the automation systems at these sites while monitoring system performance to identify any deterioration in service for these systems. Planning and business case development for TAMR Phase 3 will begin in 2009 with future activities pending a JRC decision.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

By providing state-of-the-art equipment, outages are reduced, thereby reducing delays at the 99 remaining ARTS IIE sites and 7 ARTS IIIIE sites not addressed in either TAMR Phase 1 or TAMR Phase 2.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Begin planning, investment analysis, and business case development activities for Phase 3 to address performance shortfalls at the remaining 106 ARTS sites.

Program Plans FY 2010-2013 – Performance Output Goals

- To Be Determined - pending JRC decision.

2B05, TERMINAL AUTOMATION PROGRAM

FY 2009 Request \$4.3M

- A, Flight Data Input/Output (FDIO) Replacement, A01.11-01
- B, Terminal Sustainment, A03.04-01

A, Flight Data Input/Output (FDIO) Replacement, A01.11-01

Program Description

FDIO equipment provides standardized flight plan data, safety related data, and other information to air traffic controllers at TRACON and ATCT facilities. FDIO prints flight data information on paper strips to assist controllers in tracking aircraft and anticipating the arrival of aircraft in the sector under their control.

The FDIO equipment operates on older 1980s technology that is becoming unsupportable. Over 500 ATCTs and TRACON facilities have FDIO equipment. The on-going FDIO Replacement program replaces the end-of-life/obsolete/near obsolete FDIO equipment with fully compatible (form/fit/function) COTS equipment. The FDIO Replacement configuration provides redundancy by installing 2 Remote Control Units (RCUs). New thermal printers replace the aging 9 pin dot matrix printers. It also includes an extensive lightning protection configuration that provides grounding for all FDIO peripherals, which prevents damage to the FDIO system.

En Route centers (ARTCCs) distribute FDIO data to ATCTs and TRACONs using the original 1980s equipment with no nationally approved replacement program in place until 2012 (ERAM release 2 or 3). The FDIO Replacement program for centers will replace end-of-life/obsolete FDIO equipment with new components that will establish a common base Internet Protocol infrastructure to meet the future ERAM/SWIM architectural needs

Additionally, the FAA FDIO Replacement program provides acquisition and engineering support to Department of Defense (DoD) facilities with FDIO equipment in accordance with memoranda of agreement.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The FDIO program replaces end-of-life, obsolete FDIO equipment with modern COTS equipment, thereby reducing potential outages and delays.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Continue to procure hardware and software for 30 systems to replace equipment in the field.

Program Plans FY 2010-2013 – Performance Output Goals

- Continue to procure hardware and software for 30 systems per year to replace equipment in the field.

B, Terminal Sustainment, A03.04-01

Program Description

The Terminal Sustainment program will continue to maintain existing FAA Automated Terminal Radar Systems (ARTS) and their associated displays. These older systems are upgraded with new functionalities and component replacements to sustain operational needs.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

Maintaining the Common ARTS systems, by addressing hardware and/or software issues, will ensure the systems can handle air traffic growth and accommodate changes to meet future air traffic safety and capacity demands.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Continue to fix problem reports and perform hardware maintenance on ARTS IIE and IIIIE systems.
- Reduce the number of Program Trouble Reports.

Program Plans FY 2010-2013 – Performance Output Goals

- Continue to fix problem reports and perform hardware maintenance on ARTS IIE and IIIIE systems.
- Reduce the number of Program Trouble Reports, which identify software problems.

2B06, TERMINAL AIR TRAFFIC CONTROL FACILITIES – REPLACE **FY 2009 Request \$134.3M**

- A, ATCT/TRACON Replacement, F01.02-00
- X, Terminal PCS Moves, M51.01-01

A, ATCT/TRACON Replacement, F01.02-00

Program Description

The FAA provides air traffic control services from more than 500 Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) facilities and must continually replace these buildings to ensure an acceptable level of air traffic control services and to meet current and future operational requirements. The average age of control towers is 27 years, and some are 60 years old. As the volume and complexity of terminal air traffic control increases, so does the need to have additional positions in the ATCT/TRACON facilities (i.e., helicopter positions, Visual Flight Rule traffic advisories, runway monitors, etc.). Control towers built 20 years ago often do not meet today's operational requirements. In addition, some terminal facilities must be upgraded to conform to current building codes and design standards.

ATCT/TRACON facilities that cannot meet present-day operational requirements are being replaced. New facilities will accommodate future growth, current building codes, and design standards. The FAA will fund terminal facility replacement programs in six phases to provide sound financial management of these projects. Phase 0 includes investment analysis and requirements development; phase I includes site selection and advanced engineering; phase II incorporates facility equipment design and procurement, environmental studies, and site adaptation; phase III is facility construction; phase IV continues funding for equipment installation and utilities installation; and phase V funds demolition of the old tower or TRACON being replaced and restoration of the old site.

Relationship of Program to FAA Strategic Goal, Objective and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The Terminal Air Traffic Control Facilities program contributes to the FAA greater capacity goal by replacing ATCTs and TRACONs to meet current and future operational requirements. Some replacements are required to accommodate growth in air traffic; others are needed to provide added space for new equipment; and, in some cases, the tower must be replaced to ensure that controllers have an unobstructed view of the runways and taxiways. The average control tower is 27 years old, and as volume and complexity of terminal air traffic control increases, so does the requirement for additional positions in ATCT/TRACON facilities.

New and replacement facilities support the FAA capacity goal: to provide a system that meets or exceeds air traffic demand. Strategic location, adequate height, and cab size of an airport traffic control tower will provide an efficient working environment, enable controllers to achieve an aerial view of the airport, and enable them to see aircraft at the outer aircraft movement areas.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Start construction at five sites.
- Equipment installation and commissioning seven sites.

Program Plans FY 2010-2013 – Performance Output Goals

- Continue siting studies, design, site work, construction, electronic design, electronic installation, and decommission and restoration.
- Provide Other Transaction Agreement support. [In cases where an airport sponsor constructs a usable facility with Federal funds, FAA provides these funds through the Other Transactions Agreements (OTA) process. The OTA process allows the FAA to turn over the project management – and the funds appropriated for the project – to the airport sponsor for construction of the proposed facility.]

X, Terminal PCS Moves, M51.01-01

Program Description

This project supports the Terminal Facilities Program by providing Permanent Change of Stations (PCS) funding to support the cost of relocating controllers from their existing facility to a new collocated facility. Construction of a new airport traffic control tower triggers a review of whether it would be more cost effective to combine its associated TRACON with adjacent TRACONs or to rebuild it as an independent facility. If a decision is made to collocate TRACONs, the controllers at those facilities would be relocated to the new facility.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2** – Improve financial management while delivering quality customer service.
- **FAA Performance Target 2** – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

Generally, collocating TRACONs whenever possible saves taxpayer money by eliminating the need for FAA to operate and maintain multiple facilities, automation systems, voice switches, and the overhead associated with the TRACON infrastructure.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #2** – Enhance Financial Services.
- **SMP Objective #2.4** – Reduce Unit Cost of Operations.

2B07, ATCT/TERMINAL RADAR APPROACH CONTROL (TRACON) FACILITIES – IMPROVE

FY 2009 Request \$37.9M

- ATCT/TRACON Modernization, F01.01-00

Program Description

The FAA must continually upgrade and improve terminal facilities and equipment to provide an acceptable level of service and to meet current and future operational requirements. Improvements include replacing facility components that are deteriorating such as: roofs, air conditioners, tower cab consoles; undersized generators and environmental equipment. In addition to the renovation projects, modernization includes facility upgrades such as adding operating positions for controllers and training space, rehabilitating administrative and equipment space to accommodate facility expansion, and expanding base-buildings to support current and future demand.

ATCT/TRACON facilities have also had to be modernized to address additional operational and safety requirements, including upgraded visibility of the entire airport surface, accessibility, hazardous materials, seismic, and security standards that didn't exist when they were constructed. Facility improvements must be completed with minimal impact on existing operations. An initial evaluation by the U.S. Army Corps of

Engineers found that a number of FAA ATCT/TRACON facilities do not meet current seismic code criteria. This program has initiated building improvements to bring the facilities up to a level to withstand a seismic event by complying with Executive Order 12941 that mandates compliance with the Interagency Committee on Seismic Safety in Construction seismic standards and the “DOT Policy for Seismic Safety of New and Existing DOT Owned or Leased Buildings”.

Relationship of Program to FAA Strategic Goal, Objective and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The ATCT/TRACON Modernization program upgrades and improves facilities to support the NAS. This program will enable facilities to meet current operational, environmental, and safety needs economically instead of replacing or relocating the entire facility. This effort will result in a smooth and orderly transition of new equipment into FAA terminal facilities, minimizing disruption of the operating system. This program will also improve the operational efficiency and environmental systems of obsolete and deteriorated ATCT/TRACON facilities. The improvements to facility infrastructure such as electrical distribution systems, heating and air-conditioning, and structural problems will extend the service life of facilities and minimize outages that would delay air traffic.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Conduct planning projects (e.g., Life Cycle Assessments, Conditions Assessments, etc.) to determine requirements.
- Initiate an average of 84 new projects to improve, repair, and sustain infrastructure at ATCT/TRACON facilities.
- Conduct analysis on the longer-term plans for facilities.

Program Plans FY 2010-2013 – Performance Output Goals

- Continue facility sustainment, repair, and modernization work within available funding.
- Initiate an average of 84 modernization related projects per year.

2B08, TERMINAL VOICE SWITCH REPLACEMENT (TVSR)

FY 2009 Request \$8.4M

- Voice Switches – Terminal Voice Switch Replacement (TVSR) II, C05.02-00

Program Description

The ongoing TVSR program involves replacing the aging, obsolete voice switches in the Air Traffic Control Towers and Terminal Radar Approach Control facilities. Voice switches enable air traffic controllers to communicate with aircraft as well as other air traffic control facilities. The TVSR program ensures that controllers continue to have reliable voice communications in the terminal environment. The program consists of several multiyear equipment contracts for voice switches, including; Small-Tower Voice Switches, Enhanced Terminal Voice Switches, Rapid Deployment Voice Switches model IIA, Voice Switch Bypass Systems, and Interim Voice Switch Replacement. To date, this program has replaced 378 of

421 terminal switches throughout the NAS. The program also provides the contract vehicles for the FAA to procure voice switch equipment for new and modernized terminal facilities.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The TVSR program supports the greater capacity goal by improving system reliability of terminal voice communications by replacing aging electronic switches with modern digital equipment. This reduces outages and prevents delays.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Deliver 10 new voice switches to terminal facilities.

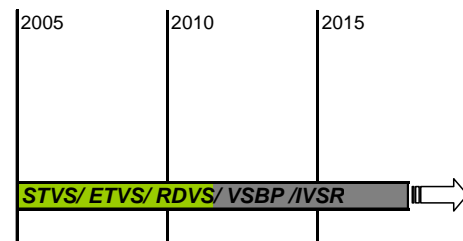
Program Plans FY 2010-2013 – Performance Output Goals

- Deliver terminal voice switches at the rate of 10 per year to various FAA terminal facilities until program total reached.

System Implementation Schedule

Small-Tower Voice Switches (STVS), Enhanced Terminal Voice Switches (ETVS), Rapid Deployment Voice Switches (RDVS) model IIA, Voice Switch Bypass Systems (VSBP), and Interim Voice Switch Replacement (IVSR)

First site IOC: 1994 (2006) -- Last site IOC: 2011



2B09, NAS FACILITIES OSHA AND ENVIRONMENTAL STANDARDS COMPLIANCE

FY 2009 Request \$26.0M

- NAS Facilities OSHA & Environmental Standards Compliance – NAS Facilities OSHA, F13.03-00
- Environmental and Occupational Safety and Health Compliance and Fire/Life Safety for Airport Traffic Control Towers, F13.03-00

Program Description

NAS Facilities Occupational Safety and Health Administration (OSHA) & Environmental Standards Compliance provides comprehensive ATO-wide environmental, occupational safety and health management to meet Federal, state, and local legal requirements and negotiated agreements. ATO-W's Environmental Occupational Safety & Health (EOSH) Services is the lead organization within ATO charged with the protection of employee well being and the environment. Through policy development, technical assistance, employee training, compliance monitoring, and corrective actions, EOSH Services strives to integrate risk management into each level of the ATO infrastructure lifecycle: from system and

facility design, through infrastructure management, and decommissioning. The OSHA and Environmental Compliance program directly supports ATO strategic objectives of operational excellence and sound financial management through:

1. **Supporting workforce productivity** through the proactive management of workforce health and safety in the form of training, awareness, and building a total safety culture;
2. **Enhancing NAS operational integrity** through the design, maintenance, and decommissioning of facilities and equipment that meet compliance requirements and thereby avoid temporary and long-term shutdowns;
3. **Identifying, mitigating, and managing corporate environment, safety and health liabilities** that may impose significant financial costs on the Agency.

To achieve its mission, EOSH Services manages numerous programs covering a wide range of disciplines, from fire/ life safety to pollution prevention.

The Fire/Life Safety program implements fire/life safety upgrades at Airport Traffic Control Towers. Additionally, it develops fire prevention plans and trains tower occupants, resident engineers, maintenance technicians and employees on maintenance requirements for new systems.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 1** – Make the organization more effective with stronger leadership, increased commitment of individual workers to fulfill organization-wide goals, and a better prepared, better trained, safer, diverse workforce.
- **FAA Performance Target 3** – Reduce the total workplace injury and illness case rate to no more than 2.44 per 100 employees by the end of FY 2011 and maintain through FY 2012.

Relationship to Performance Target

In support of the workplace injury and illness performance target, ATO will meet the following activity targets:

- ATO managers will use at least two means of communication, such as meetings, informal discussions, and awareness experiences, to inform employees of available Occupational Safety and Health (OSH) policies and safe work practices by July 26, 2009.
- ATO will conduct an EOSH program evaluation in each service area to evaluate program effectiveness no later than August 21, 2009.
- ATO will continue to conduct and document workplace inspections at ATO facilities by July 31, 2009.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #2** – Enhance Financial Discipline.
- **SMP Objective #2.4** – Reduce Unit Cost of Operations.

Program Plans FY 2009 – Performance Output Goals

- Initiate fire life safety upgrades for 20 ATCTs.
- Perform system hazard analysis on at least five new/emerging NAS system.
- Support acquisition management organizations by providing OSH and environmental technical assistance on five systems.
- Finalize existing EOSH training standards into uniform course titles.
- Establish consistent annual OSH inspection information for selected NAS facilities.
- Implement national Arc Flash analysis implementation guidance.
- Implement implementation guidance for fall protection program with respect to rescue from heights.
- Conduct at least one field review for hearing conservation program.
- Conduct at least one indoor air quality program field review.
- Conduct at least one environmental compliance program field review.
- Continue to perform safety hazard analyses on NAS in-service equipment.
- Continue implementing written safety programs.
- Conduct quality assurance/quality control evaluation of EOSH Program implementation in at least one Service Area.
- Continue implementation of ATO Environmental Management System (EMS).

Program Plans FY 2010-2013 – Performance Output Goals

- Initiate fire life safety upgrades for 80 ATCTs.
- Perform system hazard analysis on at least one new/emerging NAS system per year.
- Support acquisition management organizations by providing OSH and environmental technical assistance on five systems per year.
- Prepare course materials for at least one EOSH course with a uniform course title per year.
- Establish consistent annual environmental inspection information for selected NAS facilities.
- Conduct at least one field review for hearing conservation program per year.
- Develop standardized training course for confined space.
- Continue implementing electrical safety and Lockout/Tagout safety programs Perform review on the status of fall protection Personal Protective Equipment in the service areas.
- Conduct at least one indoor air quality program field review per year.
- Conduct at least one environmental compliance program field review per year.
- Continue to perform safety hazard analyses on NAS in-service equipment.
- Continue implementing written safety programs.
- Conduct quality assurance/quality control evaluation of EOSH Program implementation in at least one Service Area per year.
- Continue implementation of ATO EMS.

2B10, AIRPORT SURVEILLANCE RADAR (ASR-9)

FY 2009 Request \$8.8M

- ASR-9 / Mode S SLEP, Phase 1B – Transmitter Modification, S03.01-05
- ASR-9 / Mode S SLEP, Phase 2, S03.01-06

Program Description

The ASR-9 and Mode S surveillance systems were designed and fielded in the 80's/90's and are quickly reaching the end of their service life. Studies conducted in 2000 – 2003 revealed that continued investment is required to sustain the current level of surveillance services provided by these systems. The results of an investment analysis conducted in November 2003 indicated that a Service Life Extension Program (SLEP) for both systems was the preferred solution. The FAA developed a multi-phased strategy that addresses critical, near-term sustainment issues, identified as those elements that represent immediate, serious risk to this service (Phase 1) and identifies the next highest set of major impact risks and develops affordable long-term solutions to ensure continued surveillance services at ASR-9/Mode-S sites (Phase 2).

The first phase was further separated into two segments: Phase 1, Segment A; and Phase 1, Segment B. A final investment decision was approved for Phase 1, Segment A in September 2004, which implemented modifications to the ASR-9 antenna at selected sites to mitigate the risk of structural collapse, while addressing Occupational Safety and Health Administration (OSHA) issues and replacing the obsolete control and monitoring equipment at all sites. A final investment decision was approved for Phase 1, Segment B in June 2005, which will implement modifications to the ASR-9 transmitter at all sites to improve the reliability and maintainability of these systems. Phase 2 consists of implementing additional modifications to the ASR-9 radar systems to sustain primary surveillance in terminal airspace through 2025. The sustainment of the ASR-9 aligns with the Surveillance Roadmap Decision, and the Automatic Dependent Surveillance-Broadcast (ADS-B) backup strategy.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The ASR program contributes to the goal of greater capacity by maintaining existing airport capacity and meeting future air traffic demands. The ASR-9 serves airports with high activity levels and will not be replaced by the ASR-11. The SLEP projects being performed will address the most critical performance issues in order to improve system reliability, thus preventing delays due to radar outages at the high activity airports.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

Phase 1B

- Continue installation of the ASR-9 transmitter modification at operational sites.

Phase 2

- Commence ASR-9 Phase 2 modification development and begin implementation at operational sites.

Program Plans FY 2010-2013 – Performance Output Goals

Phase 1B

- Complete ASR-9 transmitter modification installations.

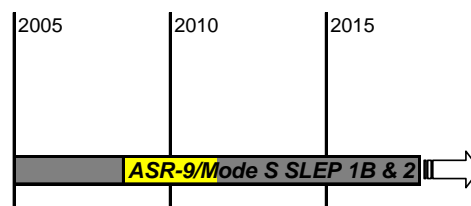
Phase 2

- Complete ASR-9 Phase 2 modification development and continue implementation at operational sites.

System Implementation Schedule

Airport Surveillance Radar-Model 9 (ASR-9)/Mode Select (Mode S) Service Life Extension Program (SLEP) Phase 1B and 2

Phase 1B: First site ORD: March 2008 -- Last site ORD: February 2011



2B11, TERMINAL DIGITAL RADAR (ASR-11)

FY 2009 Request \$17.1M

- A, ASR-11 – ASR-7/ASR-8 Replacement, DoD Takeover, New Establishments, S03.02-01
- B, ASR-11 – Tech Refresh, S03.02-04

A, ASR-11 – ASR-7/ASR-8 Replacement, DoD Takeover, New Establishments, S03.02-01

Program Description

The ASR-11 radar system replaces the aging ASR-7/8s and Air Traffic Control Beacon Interrogator (ATCBI) - Model 4/5s with a single, integrated digital primary and secondary radar system. The ASR-11 radar interfaces with legacy automation systems, as well as digital automation systems.

The ASR-11 radar system also provides six-level National Weather Service calibrated weather capability. This six-level weather data presented on air traffic control displays will result in significant improvement in situational awareness for both controllers and pilots for weather in the proximity of the airport. This weather capability is not available with the existing ASR-7/8 radar systems.

The ASR-11 radar program will also replace the aging infrastructure with new radar support equipment and building modifications, including advanced grounding/bonding and lightning protection systems, digital or fiber optic telecommunications, emergency backup power supplies, and enhanced physical security.

The program was originally scheduled to provide 112 ASR-11 radar systems. In FY 2005, FAA established an interim program baseline to deploy the ASR-11 radar system to 66 sites. The FAA completed an alternative analysis in FY 2006 and determined that additional systems would not be procured. There will be 38 ASR-8 radars that will remain in the NAS.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The ASR-11 radar system provides improved reliability and maintainability compared to existing legacy ASR-7/8 systems. The ASR-11 system provides technology that will improve mean time to repair and mean time between outage performances over the existing ASR-7/8 and ATCBI-4/5 systems. The resulting improvement in operational availability, due to the reduced number of occurrences and duration of outages, will reduce aircraft delays that result from these outages.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Deliver 6 ASR-11 systems.
- Complete Initial Operating Capability of systems at 11 sites.
- Procure 13 demolitions/restorations.
- Start demolition/restorations at 13 legacy ASR-7/8 system sites.

Program Plans FY 2010-2013 – Performance Output Goals

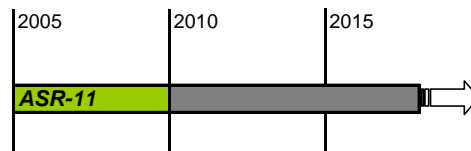
- Start demolition/restorations at 21 legacy ASR-7/8 system sites.

System Implementation Schedule

Airport Surveillance Radar - Model 11 (ASR-11)

First site ORD: December 2003 -- Last site ORD: September 2009

First Site Decom: December 2023 -- Last Site Decom: September 2029



B, ASR-11 – Tech Refresh, S03.02-04

Program Description

The ASR-11 Technology Refresh program replaces and upgrades obsolete ASR-11 commercial off-the-self (COTS) hardware and software to ensure the continued operation of the radar system through its designated lifecycle. Segment 1 Tech Refresh (FY 2009 – FY 2013) is included in this program description and Segment 2 (Beyond FY 2013) will be delineated in later submissions.

Segment 1: The Low Overhead Array Processors (LOAP), which are used in the signal processor cabinet are 1980's technology and are no longer in production. Current processor and memory utilization of some of these processor cards run at 80-90%. There is no possibility for expansion using these cards, and adding additional processor cards to distribute the processing would require major software modification and re-coding. The vendor did buy a large number of the processors to support all systems procured through FY 2007 over their expected lifetime. The vendor, DoD, and the FAA participated in early development discussions to investigate other possible mitigations and improvements to ensure that the ASR-11 systems would support future capabilities. The first upgrade based upon these development discussions is the Advanced Signal Data Processor (ASDP) that is a replacement to the existing signal processor cabinet. The ASDP will be implemented in the production systems available in FY 2008 and beyond from the vendor. It is likely the existing systems will be retrofitted, because changing signal processors in deployed systems will have major benefits.

The funding planned for FY 2008 through FY 2015 for Technology Refresh will be used to retrofit the signal processor cabinet with the ASDP modification kits for the 66 systems procured by the FAA.

The major objectives of the ASDP are:

- Develop form-fit-function (drop-in) replacement for the Signal Data Processor, including elimination of the LOAPs.
- Use scalable hardware and software architecture to permit easy future growth with minimal cost and effort.
- Use COTS processing technology and backplane.
- Increase available spare memory capacity over 100%.

Beginning in FY 2009 the Technology Refresh effort will start replacing and upgrading known obsolete ASR-11 COTS hardware and software to ensure the continued operation of the radar system through its designated lifecycle. The effort will replace the obsolete hardware cards within the signal data processing card rack with the ASDP. The ASDP reduces the number of processing cards from 16 to 3.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The ASDP design reduces the total number of Line Replaceable Units (LRU's) required in the system. It will eliminate the need for four LRUs: pulse compressor, synchronizer LOAPs, and beam/ Sensitivity Time Constant (STC) cards. The ASDP design reduces the total number of supported cards for the ASR-11 system from 16 to three, and the new architecture eliminates the proprietary custom backplane that constrained connectivity to the system. By reducing the number of LRUs, future O&M cost are reduced. Additionally, the entire architecture is scalable and it will accommodate any future software modifications.

This change will increase operational availability in all previously deployed and commissioned ASR-11 systems in the NAS and reduce service outages.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Procure 14 ASDPs.
- Deliver and install 10 out of 66 ASDPs.

Program Plans FY 2010-2013 – Performance Output Goals

- Procure 52 ASDPs
- Deliver and install 48 out of 66 ASDPs.

2B12, DOD/FAA FACILITIES TRANSFER

FY 2009 Request \$1.4M

- DoD/FAA ATC Facility Transfer/Modernization – Original Program, F04.01-00

Program Description

In a few locations, the FAA has allocated responsibility for air traffic control to Department of Defense facilities, and in other locations, FAA air traffic control equipment has been located on military bases. When these bases were identified for closure under the Base Closure and Realignment Act of 2005, the air traffic control facilities were transferred to FAA. Modernization of existing military systems is essential to ensure they meet NAS performance requirements. At each transferred site, the FAA must engineer, construct, install, certify, and commission modernized NAS systems. Types of systems modernized by this program include: communications, weather surveillance, navigation, power, automation, and security.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

This program sustains the capacity previously allocated to military facilities and enhances the reliability of air traffic control (NAS) equipment acquired by facility transfers. It also provides modernization of legacy military systems in the NAS, and sustains adjusted operational availability for the reportable facilities that support the 35 OEP airports.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plan FY2009 – Performance Output Goals

- Continue installation of a modernized power distribution system at El Toro, California
- Conduct a flight inspection at Bermuda per the FAA/Government of Bermuda memorandum of cooperation, AIA/CA-79.
- Design and install security and utility modernization at base closure sites in Willow Grove, PA and Brunswick, ME.

Program Plan FY2010-2013 – Performance Output Goals

- Continue modernization at Brunswick, Maine.
- Conduct flight inspections at Bermuda per the FAA/Government of Bermuda memorandum of cooperation, AIA/CA-79.
- Complete modernization at El Toro, California.
- Complete modernization at Willow Grove, Pennsylvania.
- Complete modernization at C.E. Kelly, Pennsylvania.

2B13, PRECISION RUNWAY MONITOR

FY 2009 Request \$1.0M

- Precision Runway Monitor (PRM), S08.00-00

Program Description

The PRM system uses a highly accurate electronic scan (e-scan) radar that tracks and processes aircraft targets at a 1-second update rate (as opposed to 4.8 seconds with conventional radars). The PRM system provides controllers with automatic alerts and high-resolution displays that, in conjunction with specific procedures, enables pilots to fly simultaneous independent approaches to parallel runways spaced less than 4,300 feet apart during Instrument Meteorological Conditions. Without PRM, these closely-spaced parallel runways can be used for simultaneous independent approaches only during Visual Meteorological Conditions. The inability of pilots to conduct such approaches during adverse weather reduces throughput and increases delays.

The surveillance roadmap shows the transition from the use of existing surveillance radar systems to ADS-B as the primary means of surveillance. This roadmap identifies a requirement to investigate other sites that may be candidates for installation of the multilateration Precision Runway Monitor Alternate (PRM-A) system and to investigate the feasibility/necessity for performing a Service Life Extension Program on the existing legacy PRM systems. FY 2009 funding will support these activities.

Relationship of Program to FAA Strategic Goal, Objective, and Performance

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

The PRM program supports the FAA greater capacity goal by allowing more aircraft to land during Instrument Meteorological Conditions at airports with closely spaced parallel runways. Normally, the capacity of an airport to handle arriving aircraft is reduced when visibility is restricted, which results in delays. PRM provides a high update rate radar capability that feeds a very accurate display of respective

aircraft positions, enabling controllers to ensure that simultaneous independent approaches to parallel runways less than 4,300 feet apart are safe during low visibility conditions. Aircraft approaching an airport without PRM during low visibility conditions must be alternated along parallel approach paths, which diminishes the airport's effective capacity and causes delays.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #3** – Increase capacity where needed.
- **SMP Objective #3.3** – Implement airspace and airport capacity enhancements safely.

2B14, RUNWAY STATUS LIGHTS (RWSL)

FY 2009 Request \$27.0M

- Runway Status Lights (RWSL) – Segment 1, S11.01-02

Program Description

The RWSL System integrates a light warning system with approach and surface surveillance systems to provide a visual signal indicating to pilots and vehicle operators that it is unsafe to enter, cross or begin takeoff on a runway. The RWSL system is driven automatically using computer processing of integrated Airport Surface Detection Equipment – Model X and terminal surveillance information. The RWSL system software detects the presence and motion of aircraft and surface vehicles on or near the runways, illuminates red runway-entrance lights (RELS) if the runway is unsafe for entry or crossing, and illuminates red takeoff-hold lights (THLs) if the runway is unsafe for departure. The system extinguishes the lights automatically as appropriate when the runway is no longer unsafe. The RWSL program received approval from the JRC for 19 operational and 2 support sites.

Relationship of Program to FAA Strategic Goal, Objective, and Performance

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 3** – Reduce the risk of runway incursions.
- **FAA Performance Target 1** – By FY 2010, limit Category A and B (most serious) runway incursions to a rate of no more than 0.450 per million operations, and maintain or improve through FY 2012.

Relationship to Performance Target

The overall year to date trend for runway incursion rate suggests an increasing rather than decreasing rate and while the numbers are not statistically conclusive their initial trend suggests that additional effort is required to ensure that the Flight Plan performance target is achieved. The establishment of additional installations of RWSL will contribute toward the accomplishment of the Flight Plan performance target.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.3** – Ensure safety and aircraft separation.

Program Plans FY 2009 – Performance Output Goals

- Award a contract for software design, development, test, and implementation activities at a key site at an operational airport.
- Procure two FAA support systems for the Academy and Program Support Facility.

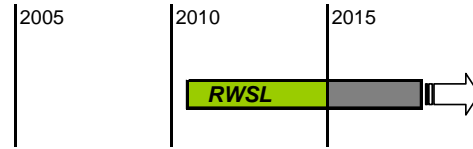
Program Plan FY 2010-2013 – Performance Output Goals

- First ORD in FY 2010.
- Procure systems for deployment to 18 out of 19 operational sites.
- Complete installation of 16 of 19 operational sites.
- Complete ORD of 16 of 19 operational sites.

System Implementation Schedule

Runway Status Lights (RWSL)

First site IOC: August 2010 -- Last site IOC: July 2014



2B15, NATIONAL AIRSPACE SYSTEM VOICE SWITCH (NVS)

FY 2009 Request \$10.0M

- NAS Voice Switch, C05.03-01

Program Description

The NAS Voice Switch (NVS) will be a real-time, critical part of the ATC infrastructure that provides the connectivity for efficient communications among air traffic controllers, pilots, and ground personnel. ATC communications service affects safety, traffic flow capacity, and efficiency. The NVS will replace the service that is currently provided by 17 different voice switch system configurations. The focus will be on designing a replacement switch with standardized components that will reduce maintenance and parts inventory costs.

The current switch technology deployed in the NAS will not support the expected future NextGen concept of operations for either: networked facilities, or such concepts as dynamic re-sectorization and off-loading during non-peak operations. The NVS will support current and future ATC operations as envisioned by both government and industry forecasters.

Relationship of Program to FAA Strategic Goal, Objective, and Performance

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

Voice switches provide a critical function to ATC communications by configuring and controlling communications between and among ATC service providers and users. ATC communications service affects safety, traffic flow capacity, and efficiency. The NVS program supports the greater capacity goal by improving the system reliability of voice communications for both current and future operations by replacing and upgrading the obsolete, non-supportable hardware and software. The NVS program will also be capable of being flexible to support reduction of the number of facilities and the resulting work load adjustments.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure viable future.
- **SMP Objective #4.2** – Deliver a future air traffic system that meets customer’s operational needs.

Program Plans FY 2009 – Performance Output Goals

- Complete investment analysis activities.
- Achieve executive decision to initiate program.
- Initiate industry prototyping.
- Finalize solution analysis and costing.
- Start source selection.

Program Plans FY 2010-2013 – Performance Output Goals

- Achieve JRC decision to proceed with program.
- Complete industry prototyping.
- Award contract and initiate development of system.
- Achieve IOC of Terminal Systems.

2B16, WEATHER SYSTEMS PROCESSOR (WSP)

FY 2009 Request \$0.7M

- ASR-WSP – Technology Refresh/Product Improvement W09.01-00

Program Description

The Airport Surveillance Radar (ASR) WSP improves safety by providing wind shear and severe weather alerts for tower and TRACON controllers. WSP uses the ASR-9 search radar for weather information. It generates microburst and windshear alerts, detects precipitation, and predicts gust fronts and storm-cell motion before they impact runway/flight operations. The FAA installed WSPs at 34 medium-sized, ASR-9 equipped airports in lieu of the more expensive Terminal Doppler Weather Radar. All 34 WSPs became operational between 1999 and FY 2005. After seven years of service life, many commercial components of the WSP have been discontinued. Replenishment studies estimate service could be lost due to a lack of spare parts within three years unless new commercial sources of spares are qualified, additional parts procured and computer technology refreshed. The first phase of the technology refresh program began in FY 2007 to replace failing and obsolete hardware, enabling the system to operate until 2013. Completion of Phase I is expected in FY 2010. Phase II will address the remainder of WSP service life issues.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012

Relationship to Performance Target

Wind shear is a known cause of fatal aviation accidents. The WSP warns air traffic controllers of wind shear and microburst events throughout the terminal area so that pilots can be informed and take action to avoid them in the air, on arrival and upon departure. Additional benefits to safety and capacity accrue through WSP gust front and storm motion predictions that allow both ATC tower and TRACON to coordinate responses to traffic flow changes during hazardous weather. Technical Refresh and Produce Improvement will contribute to maintaining operational availability by extending the service life of the WSP system.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Continue Phase I Technology Refresh at 12 sites.

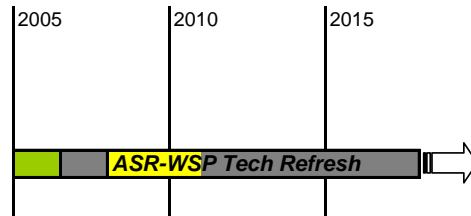
Program Plans FY 2010-2013 – Performance Output Goals

- Complete Phase I Technology Refresh at the remaining 5 sites.

System implementation schedule

Airport Surveillance Radar (ASR) Weather Systems Processor (ASR-WSP) – Technology Refresh/Product Improvement

First site ORD: 2008 -- Last site ORD: 2010



2B17, VOICE RECORDER REPLACEMENT PROGRAM (VRRP)

FY 2009 Request \$10.8M

- Voice Recorder Replacement Program – Next Generation Recorders (VRRP), C23.01-00

Program Description

The NAS System Requirements Document (NAS-SR-1000) requires that both air-to-ground (A/G) and ground-to-ground (G/G) communications be recorded and stored for later retrieval. This applies to all ATC domains, including Air Traffic Control Towers (ATCT), Terminal Radar Approach Control (TRACON) facilities, Air Route Traffic Control Centers (ARTCC), Automated Flight Service Stations (AFSS), and the FAA’s Air Traffic Control System Command Center. FAA Order 7210.3T *Facility Operation and Administration* requires that ATC facilities “record operational communications to the maximum extent practicable.”

The voice recorder provides the legal recording capability for conversations between air traffic controllers, pilots, and ground-based air traffic facilities in all ATC domains and is used in the investigation of accidents and incidents and routine evaluation of ATC operations.

As the voice recorder technology has continued to evolve, early digital voice recorders have experienced obsolescence and supportability issues. These digital recording systems are reaching the end of their service life and they use obsolete operating systems and parts that are no longer manufactured.

The Next Generation Voice Recorder Replacement Program (NGVRRP) will replace the obsolete digital voice recorders and any remaining analog recorders and provide digital voice recording functionality at new facilities. The replacement of aging voice recorders will reduce operational costs.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The NGVRRP voice recording system will support the goal of sustaining operational availability by replacing aging and obsolete equipment currently in the field. System outages and downtime for repair will

be significantly reduced due to the higher availability and improved operational technology of the next generation of voice recorders.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Deliver voice recorders to 92 sites.

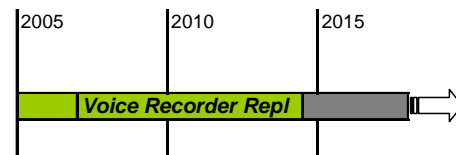
Program Plans FY 2010-2013 – Performance Output Goals

- Deliver voice recorders at the rate of 92 per year to various FAA facilities.

System implementation schedule

Voice Recorder Replacement

First site IOC: 2007 -- Last site IOC: 2014



2B18, HOUSTON AREA AIR TRAFFIC SYSTEM (HAATS)

FY 2009 Request \$3.6M

- Large TRACONs – Houston Area Air Traffic System (HAATS), F02.11-01

Program Description

The HAATS program provides infrastructure for implementing the redesigned airspace in the Houston area. The increases in airport capacity created by the initial airport expansions of George Bush Intercontinental and William P. Hobby Airports cannot be supported by the existing airspace design and existing FAA facilities and equipment. The Operational Evolution Partnership (OEP) identifies the redesign of the Houston, TX, terminal airspace as both a mid-and long-term project. The HAATS program will implement the airspace redesign by providing the infrastructure, national airspace improvements, and by publishing new procedures. Capacity increases resulting from expansion projects of George Bush Intercontinental, William P. Hobby, and Ellington Field Airports will provide significant benefits to the entire NAS.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 2** – Commission nine new runway/taxiway projects, increasing the annual service volume of the 35 OEP airports by at least 1 percent annually, measured as a five-year moving average, through FY 2012.

Relationship to Performance Target

The HAATS program contributes to the FAA greater capacity goal by the expansion of the en route and terminal airspace. The HAATS program will provide the infrastructure, system improvements, and implementation of the new en route and terminal procedures associated with the redesigned airspace. New and replacement facilities support the FAA capacity goal: to provide a system that meets or exceeds air traffic demand. Arrival capability will increase to 132 from 96 and departure capability will increase to 120 from 100.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #3** – Increase capacity where needed.
- **SMP Objective #3.3** – Implement airspace and airport capacity enhancements safely.

Program Plans FY 2009 – Performance Output Goals

- Continue developing charts and procedures to support implementation of the new airspace.
- Begin installing modifications to various computer automation programs to accommodate the new airspace and procedures.
- Continue construction, certification and commissioning of new facilities to support expanded airspace and procedures modifications including; ASRs, Air Route Surveillance Radars (ARSRs), Remote Control Air Ground (RCAGs), Remote Transmitter/Receivers, a communications network, and new sectors at the Houston ARTCC

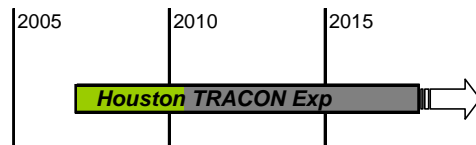
Program Plans FY 2010-2013 – Performance Output Goals

- Continue developing charts and procedures to support implementation of the new airspace.
- Complete construction, certification and commissioning of new facilities to support expanded airspace and procedures modifications including; ASRs, ARSRs, RCAGs, Remote Transmitter/Receivers, a communications network, and new sectors at the Houston ARTCC.
- Complete development, flight inspection, and publication of the charts and procedures to support implementation of the new airspace.
- Complete installation and certification of modifications to various computer automation programs to accommodate the new airspace and procedures.
- Complete airspace modifications identified in the National Airspace Redesign.
- Complete training of ATO personnel on new facilities, equipment, airspace, and procedures.

System implementation schedule

Houston TRACON Expansion/Sustainment

First site IOC: March 2006 -- Last site IOC: June 2010



2B19, INTEGRATED DISPLAY SYSTEM (IDS)

FY 2009 Request \$7.0M

- Integrated Display System (IDS) – Technical Refresh and Sustainment, A03.05-01

Program Description

The Integrated Display System (IDS4) is a local and wide area network information dissemination and display system. IDS4 consolidates information from several operational NAS weather subsystems and other operational sources onto a single display, and distributes the data to air traffic controllers and airspace managers at TRACON, ATCT, and ARTCC facilities. FAA began regional procurement in 1990 and currently has 2230 IDS4 workstations located at approximately 390 FAA facilities nationwide. Recent obsolescence issues and loss of proprietary software support makes it necessary to partially replace this system to sustain its functionality.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The IDS provides important information to air traffic controllers. This program replaces/modernizes the existing IDS-4 with upgraded components to improve its reliability and reduce potential outages.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Finalize planning, investment analysis, and business case development activities.
- Complete contract award and begin procurement and installation.

Program Plans FY 2010-2013 – Performance Output Goals

- Replace IDS4 as they fail based on a decision matrix that determines whether component replacement or total system replacement is most cost effective.

2B20, AIRPORT SURVEILLANCE RADAR (ASR-8) SERVICE LIFE EXTENSION PROGRAM FY 2009 Request \$3.0M

- ASR – 8 SLEP, S03.05-01

Program Description

The FAA procured and fielded the Airport Surveillance Radar Model 8 (ASR-8) system in the late 1960's to early 1970's. The system is a primary radar that provides target information to air traffic controllers at low and medium activity airports by detecting the radar energy reflected off an aircraft. In 2007 the FAA Joint Resources Council approved the surveillance Backup Strategy, which required keeping primary radar in terminal areas. As a result, 38 operational and 2 support ASR-8 systems will remain in the NAS until 2025. The ASR-8 SLEP will ensure radar data is available and will meet the needs of future Air Traffic Control systems through 2025.

In FY 2007 the FAA initiated an investment analysis of three alternatives to determine the most feasible solution for addressing obsolescence issues and sustaining ASR-8 radar service to 2025. The FAA plans to complete this analysis and make an investment decision in FY 2008.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The ASR-8 SLEP program contributes to the goal of greater capacity by maintaining existing capacity and meeting future air traffic demands at low and medium activity level airports. The modifications to the

ASR-8 will improve reliability and availability. This supports the performance target to sustain operational availability at 99.7 percent or better.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability

Program Plan FY 2009 – Performance Output Goals

- Award contract for the design and development of the SLEP alternative.

Program Plan FY2010-2013 – Performance Output Goals

- Complete development.
- Complete test at a key site.
- Begin production implementation.

2B21, INTEGRATED TERMINAL WEATHER SYSTEM (ITWS)

FY 2009 Request \$4.5M

- ITWS – Development/Procurement/Pre-Planned Product Improvement (P3I), W07.01-00 and ITWS – Segments 2 and 3, W07.01-01

Program Description

The Integrated Terminal Weather System (ITWS) is an air traffic management tool that provides air traffic controllers and traffic managers graphic, full-color displays of essential weather information at major U.S. airports. ITWS was developed to fill the need of air traffic managers, controllers, and airlines for a tool that integrated weather data from a number of sources and provided customers a single, easily used and understood display of support products. ITWS depicts current and short-term predictions of terminal weather through the integration of data from FAA and National Weather Service sensors and systems, as well as from aircraft in flight. ITWS weather information is immediately useable by air traffic controllers and managers without further meteorological interpretation.

The ITWS program includes development, installation, testing, training, maintenance, and lifecycle operational support. The FAA has completed development and deployed 22 operational ITWS. In 2008, the program will seek a JRC final investment decision to deploy 12 operational ITWS systems within the approved cost baseline. The program also includes technical planning support for the transition of terminal weather capabilities to System-Wide Information Management (SWIM) and NextGen Network Enabled Weather (NNEW).

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

Traffic managers can use ITWS to plan traffic flow reconfiguration and to coordinate with personnel in the TRACONS, ATCTs, ARTCCs, and the ATCSCC to minimize cancellations and delays and sustain average daily capacity.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.5** – Minimize impacts of weather on the operation.

Program Plans FY 2009 – Performance Output Goals

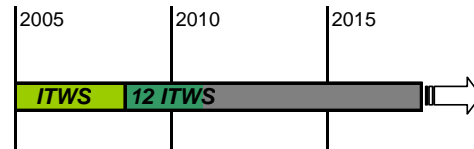
- Pending JRC investment approval, complete site surveys, order communications lines for, and deliver and install ITWS at up to 6 out of 34 operational (82%) sites.
- Initiate activities to evolve ITWS telecommunications to SWIM.
- Initiate activities to evolve ITWS service to transition to NNEW.

Program Plans FY 2010-2013 – Performance Output Goals

- Complete 6 remaining ITWS production system installations.
- Achieve IOC and commission ITWS at 12 sites out of 34 operational (100%): Las Vegas, Nashville, Wichita, Raleigh-Durham, New Orleans, Indianapolis, Columbus, Tulsa, San Juan, Louisville, Oklahoma City, and Dayton.
- Demonstrate SWIM and NextGen-compatible ITWS capabilities.

System Implementation Schedule

Integrated Terminal Weather System (ITWS)
 First ORD: October 2003 -- Last ORD: 2008 (22nd Unit)
 Pending JRC Approval: Last ORD: 2010 (34th Unit)



2B22X, TERMINAL AUTOMATION MODERNIZATION/ REPLACEMENT PROGRAM (TAMR PHASE 2)

FY 2009 Request \$0.0M

- X, Terminal Automation Modernization – Replacement (TAMR) – Phase 2 Tech Refresh, A04.05-02

Program Description

Terminal automation systems are essential for supporting the fast tempo of operations at our nation's busiest airports. The automation systems rely on information from radar and weather sensors, along with flight plan information for each aircraft to safely and efficiently maintain aircraft separation at or near airports.

The Terminal Automation Modernization/Replacement program (TAMR) provides a phased approach to modernizing the automation systems at the FAA’s Terminal Radar Approach Control (TRACON) facilities and their associated Air Traffic Control Towers (ATCT) throughout the NAS. Phase 2 of the TAMR Program addresses the operational shortfalls at nine (9) sites. In 2006 through 2008, the FAA replaced the Automated Radar Terminal System (ARTS) IIE systems with STARS at 5 sites - West Palm Beach, FL; Pensacola, FL; Anchorage, AK; Corpus Christi, TX; and, Wichita, KS; and, modernized the ARTS IIIIE systems at 4 sites - Chicago, IL; Denver, CO; Minneapolis/St. Paul, MN; and, St. Louis, MO. The replaced/modernized systems provide state-of-the-art digital radar and flight data processing as well as color display systems that provide additional functionality and support the projected growth in air traffic capacity demands. Color displays provide a significant improvement for air traffic controllers in determining weather intensity.

As in any COTS based system, an aggressive hardware “technology refreshment” program is absolutely essential. Planning for technology refreshment enables identification and qualification of affected components before they become inoperable due to obsolescence. In order to ensure that automation

services are available and reliable through 2025, the FAA will pursue a cyclical technology refreshment approach at these nine sites.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

By providing state-of-the-art equipment, outages are reduced, thereby reducing delays at the nine (9) major airports supported by this investment.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Develop acquisition strategy to acquire solutions for performing a technology refreshment of the system hardware/software.

Program Plans FY 2010-2013 – Performance Output Goals

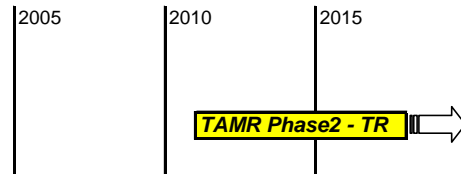
- In 2010, the FAA plans to award contract(s) to design/develop solutions for accomplishing a technology refreshment of the terminal system hardware/software.
- In 2011, the design/development of technology refreshment solutions should be completed and deployment to the nine sites will begin.
- By 2013, the initial technology refreshment of hardware/software in the STARS and Common ARTS systems will be completed at the 9 sites.
- Technology refreshment will be accomplished in several cycles as components reach the end of their useful life or become unavailable.

System Implementation Schedule

Terminal Automation Modernization/Replacement (TAMR Phase 2) - Tech Refresh

First site IOC: 2011 -- Last site IOC: 2024*

*Note: Tech Refresh will be cyclical



C. FLIGHT SERVICE PROGRAMS

2C01, AUTOMATED SURFACE OBSERVING SYSTEM (ASOS)

FY 2009 Request \$8.5M

- Automated Surface Weather Observation Network (ASWON) – ASOS – Pre-Planned Product Improvements (P3I), W01.02-02

Program Description

ASWON is an umbrella program that consists of the following surface weather sensor systems: the Automated Surface Observing System (ASOS), Automated Weather Observation System (AWOS), Automated Weather Sensor Systems (AWSS), and Stand Alone Weather Sensors (SAWS).

These systems are located at airports and measure and report weather conditions such as temperature, barometric pressure, visibility, and wind velocity. This program upgrades and modernizes the sensors that detect weather conditions. The ASOS preplanned product improvement (P3I) program was rebaselined in 2006 to upgrade/sustain the performance of 571 ASOS with Enhanced Precipitation Identification (EPI) sensor and ceilometer.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The ASWON program supports the FAA greater capacity goal by supplying automated surface weather observations at over nine hundred locations (based on AWOS, ASOS, SAWS and AWSS) to meet the needs of pilots, operators, air traffic personnel, downstream automation systems, and terminal forecast.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.5** – Minimize impacts of weather on the operation.

Program Plans FY 2009 – Performance Output Goals

- Complete development of EPI sensor to measure additional precipitation types at the airport.
- Complete the EPI sensor operational acceptance test.
- Procure 250 ceilometers as part of the ASOS P3I project.
- Deploy 37 ceilometers.

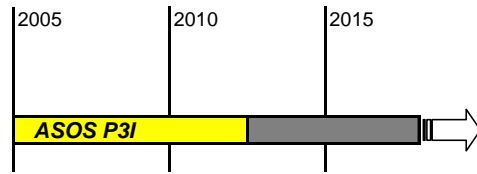
Program Plans FY 2010-2013 – Performance Output Goals

- Procure 290 EPI sensors in FY 2010 and 281 in FY 2011 as part of the ASOS P3I project.
- Deploy 50 EPI sensors in FY 2010, 261 in FY 2011, and 260 in FY 2012.
- Procure 164 ceilometers in FY 2010 and last 164 in FY 2011 as part of the ASOS P3I project.
- Deploy 223 ceilometers in FY 2010, 163 in FY 2011, and the last 155 in FY 2012.

System Implementation Schedule

Automated Surface Observing System (ASOS) - Pre Planned Product Improvement (P3I)

First site ORD: 2005 -- Last site ORD: 2012



2C02, FLIGHT SERVICE STATION (FSS) MODERNIZATION

FY 2009 Request \$14.6M

- Alaska Flight Services Modernization, F05.04-01

Program Description

The overall Alaskan Flight Service Modernization (AFSM) program will address the shortfalls of: automation, voice switch, facilities, and business continuity. The Operational and Supportability Implementation System (OASIS) became the operational automation system because the unique Alaskan flight service systems were experiencing security and data integrity issues. The period of performance for the OASIS contract may only be continued under the present contract through February 2010. The AFSM program has been segmented into two parts. Segment 1 is Automation and Segment 2 is Voice Switch, Facilities, and Flight Service Delivery. Business continuity will be addressed during both Segment 1 and Segment 2 through elimination of single-points-of-failure. Segment 1 Automation will have a core set of requirements that must be in place on day 1 of operation with contract options to develop and implement valid requirements that are not available when the replacement systems is first operational (i.e., web-based services, self-service remote briefing stations, remote airport advisories, etc.).

Segment 2: Facilities and Flight Service Delivery will study the current locations of facilities, where the demand for service is originating, conditions of current facilities and quality of life issues, and identify the most cost effective and efficient means of flight service delivery that maintains or improves safety. Alternatives to be studied include: 1) keep the 17 current facilities, 2) ensure the right mix of facilities are located in the best locations to provide service to customers, and 3) rely on a centralized architecture (need at least 2 facilities to maintain business continuity). Upon completion of Segment 1 (currently scheduled for February 2010), Segment 2 will begin Investment Analysis activities.

The AFSM system will provide up to the minute, pilot briefing data by integrating weather graphics with text based weather and aeronautical information. Automated weather, aeronautical and flight planning updates will be integrated with NOTAM and flight planning databases. A web portal will make data available to both FAA personnel and pilots, and will increase access to flight service information in even the most remote locations. A new voice switch will increase operational flexibility by allowing frequencies to be shifted to other flight service facilities to meet productivity demands. Additionally, flight service buildings will be updated to meet OSHA and Americans with Disabilities Act requirements. Building power, electrical, and safety systems will be updated to ensure the new equipment will meet our standards for reliability in the facilities.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 2 –** Reduce the number of fatal accidents in general aviation.
- **FAA Performance Target 2 –** By FY 2009, reduce accidents in Alaska for general aviation and all Part 135 operations from the 2000-2002 average of 130 accidents per year to no more than 99 accidents per year.

Relationship to Performance Target

The AFSM program system will directly contribute to the FAA's increased safety goal by increasing the availability and capabilities of the current flight service systems. There are operational limitations and inherent vulnerabilities with the present system, and the AFSM system and facilities upgrade will provide timely and accurate weather and aeronautical information. It will also provide automated monitoring and alerting of in-flight deviations and warnings of weather encounters. The AFSM program will provide web based (self-briefing) services and a series of remote briefing terminals throughout the state. This will increase pilot aeronautical information awareness by giving them access to the same products used by the flight service specialists.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence
- **SMP Objective #1.3** – Ensure safety and aircraft separation.

Program Plans FY 2009 – Performance Output Goals

- Complete source selection technical evaluations for Segment 1 Automation.
- Award the automation contract – 1st quarter.
- Begin integration and test efforts for Automation.
- Perform pre-installation site surveys to determine specific facility upgrade needs.
- Complete site acceptance and automation system acceptance tests.
- Complete system development, implementation and keysite deployment.
- Complete NAS integration activities for Automation.
- Complete Security Certification and Authorization Process for Automation system.
- Continue facility sustainment activities.

Program Plans FY 2010-2013 – Performance Output Goals

- Begin acquisition efforts for the voice switch.
- Begin source selection activities for the Voice Switch.
- Complete voice switch source selection technical evaluation.
- Award the voice switch contract.
- Begin integration and test efforts for the Voice Switch.
- Perform pre-installation site surveys to determine specific facility upgrade needs.
- Complete site acceptance and voice switch system acceptance tests.
- Complete voice switch development, implementation and deployment.
- Complete NAS integration activities for voice switch.
- Complete Security Certification and Authorization Process for voice switch.
- Conduct surveys to determine where service efficiency may be improved (i.e. traffic studies, demand for service, quality of life, effectiveness and efficiencies to be gained, etc.).
- Recommend facility reconstruction, rehabilitation, and adaptation as dictated by survey findings and operational requirements.
- Begin acquisition efforts for facilities and flight service delivery.
- Prepare source selection requirements and initial screening information request documents for facilities and flight service delivery.
- Begin awarding contract(s) for the facilities and flight service delivery.

2C03, WEATHER CAMERA PROGRAM

FY 2009 Request \$2.0M

- Weather Camera Program – Segment 1, M08.31-01 (Formerly Alaska MIH & Video Equipment, M09.31-00)

Program Description

A disproportionate number of all U.S. aircraft crashes occur in Alaska. Between 1990 and 2006, there were 1497 commuter and air taxi crashes in the United States of which 520 of those accidents occurred in Alaska. Alaska accounts for 35% of all commuter and air taxi crashes.

Limited weather information in Alaska contributes to a higher risk of accidents and flight inefficiencies. Without weather information about their destination airport and route of flight, pilots cannot make informed decisions on whether it is safe to fly or continue their flight. This leads to accidents and unnecessary fuel costs. Installing more automated weather systems is limited by the geography and cost. The National Transportation Safety Board (NTSB) Safety Study: Aviation Safety in Alaska, November 1995, recommended that the FAA assist the National Weather Service (NWS) with an evaluation of the technical feasibility and aviation safety benefits of remote color video weather observing systems in Alaska. The evaluation identified a need for pictorial views of current weather conditions, which would be accessible to the aviation community.

The mission of the Weather Camera Program is to improve safety and efficiency by providing weather visibility information in the form of near real-time camera images to aviation users. Weather images from airports and strategic en route locations are provided to pilots and flight service station specialists for enhanced situational awareness, preflight planning and en route weather briefings. Images are updated every ten minutes and stored for six hours. These images are made available through a user-friendly, web-enabled application.

This FY 2009 budget request of \$2,000,000 continues administration of the Weather Camera program and funds installation of additional camera sites. Equipment for 25 weather camera sites will be procured and installed.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 2** – Reduce the number of fatal accidents in general aviation.
- **FAA Performance Target 2** – By FY 2009, reduce accidents in Alaska for general aviation and all Part 135 operations from the 2000-2002 average of 130 accidents per year to no more than 99 accidents per year.

Relationship to Performance Target

One of the Flight Plan strategies for reducing accidents in Alaska is to expand and accelerate implementing safety and air navigation improvement programs. The FAA will continue to enhance aviation safety throughout the state of Alaska by supplying visual meteorological information to pilots and expanding the use of weather cameras. Specific targets: 1) Increase safety: reduce weather camera preventable accidents by 18%, and 2) Improve operator efficiency: reduce unnecessary flight time by 36%.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.1** – Ensure airspace system is safe, efficient, and secure.

Program Plans FY 2009 – Performance Output Goals

- 25 new weather camera facilities operational.

Program Plans FY 2010-2013 – Performance Output Goals

- Install additional weather camera facilities.

D. LANDING AND NAVIGATIONAL AIDS PROGRAMS

2D01, VHF OMNIDIRECTIONAL RANGE (VOR) WITH DISTANCE MEASURING EQUIPMENT (DME)

FY 2009 Request \$7.5M

- Very High Frequency Omni-Directional Range (VOR) Collocated with Tactical Air Navigation (VORTAC), N06.00-00

Program Description

This program replaces, relocates, or converts VOR and VORTAC facilities to improve NAS efficiency and capacity. VOR, Tactical Air Navigation (TACAN), and VORTAC (combination VOR and TACAN) systems provide navigational guidance for civilian and military aircraft in both the en route and terminal areas. The FAA navigation roadmap indicates the decisions will be made in the future regarding whether VOR or TACANS systems will remain in service or be shut down. If they are retained, they will continue to provide satellite navigation backup and define VOR routes and procedures for legacy users. VORTAC supports the transition to both Area Navigation (RNAV) and the Next Generation Air Transportation System (NextGen) by maintaining the present level of en route and terminal navigation service. Until that transition is complete, VORTACs must remain in service and they must be relocated, technologically refreshed, or replaced. Currently 60% of the VORTAC systems are beyond their estimated service life. It is projected that within 10 -15 years all existing VORTAC systems will be beyond their estimated service life.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

Replacing, relocating, or converting VOR and VORTAC facilities increases NAS system efficiency. These facilities are experiencing signal deterioration due to various environmental factors and parts obsolescence, and they must be sustained to avoid a deterioration in operational availability.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Convert approximately three (3) VOR systems to Doppler VORs.

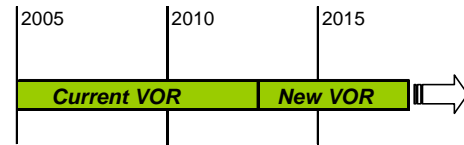
Program Plans FY 2010-20113 –Performance Output Goals

- Convert approximately ten VOR systems to Doppler VOR.
- Relocate four (4) VOR Antenna Systems.

System Implementation Schedules

New VHF Omnidirectional Range (VOR)

First site IOC: December 2013 -- Last site IOC: January 2018



2D02, INSTRUMENT LANDING SYSTEMS (ILS) – ESTABLISH

FY 2009 Request \$7.5M

- Instrument Landing Systems (ILS), N03.01-00

Program Description

The ILS program buys and installs partial and full Category I, II, and III instrument landing systems and associated precision approach equipment at qualified airports. These systems enable aircraft to land in weather conditions where visibility is very limited. The ILS provides vertical and horizontal guidance information to the pilot to allow safe landings through touchdown and rollout. Approach lighting provides visual cues for the pilot to see the runway, once the ILS minimum altitude (normally 200 feet above the runway for a Category I approach and lower for Category II and III) is reached.

An ILS system has several components (a localizer for horizontal guidance, a glide slope for vertical guidance, and markers to determine horizontal distance from the runway) and supporting equipment (distance measuring equipment, approach lighting systems, runway visual range indicators to measure visibility along the runway, and other systems to provide visual cues for finding the runway) to provide approach guidance when visibility is obscured by low clouds or fog.

The ILS along with required Approach Lighting Systems (i.e., Approach Lighting System with Sequenced Flashing Lights Model 2 (ALSF-2) and Medium-intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR)), improve both system safety and capacity at equipped runways by providing precision approach capability in the U.S. and world wide for aircraft landing in adverse weather conditions.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

Establishing ILS precision approach capability allows lower visual minimums for landings and helps to maximize NAS use. Lowering visual minimums allows operations in poor weather conditions, which, in effect, is the same as an increase in airport capacity.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #3** – Increase Capacity Where Needed.
- **SMP Objective #3.3** – Implement airspace and airport capacity enhancements safely.

Program Plans FY 2009 – Performance Output Goals

- Procure approximately five (5) ILS Systems.
- Commission or return to service approximately 24 ILS locations.

Program Plans FY 2010-2013 – Performance Output Goals

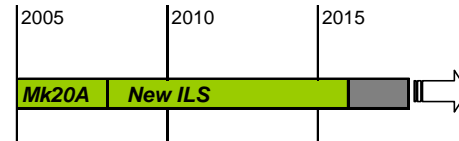
- Procure approximately 19 ILS Systems.
- Commission approximately 52 ILS locations.

System Implementation Schedules:

New Instrument Landing Systems (ILS)

First site IOC: June 2008 -- Last site IOC: December 2015

First Site Decom: January 2023 -- Last Site Decom: December 2030



2D03, WIDE AREA AUGMENTATION SYSTEM (WAAS) FOR GPS

FY 2009 Request \$99.0M

- A, Wide Area Augmentation System (WAAS) – LPV Segment, N12.01-00
- B, Wide Area Augmentation System (WAAS) – Surveys and Procedures, N12.01-06

A, WIDE AREA AUGMENTATION SYSTEM (WAAS) – LPV SEGMENT, N12.01-00

Program Description

The Wide Area Augmentation System (WAAS) consists of a network of GPS monitoring sites, processing facilities, and satellite earth stations, that provide correction & integrity messages to geostationary satellites, which broadcast this information to single frequency (L1-CA) user avionics. User avionics apply the corrections to accurately determine an aircraft's 3-dimensional (3D) position in space. The WAAS messages enable aircraft to determine their position with an accuracy that supports all RNAV and RNP operations, Localizer Performance with Vertical guidance (LPV) approach operations that are equivalent to instrument landing system (ILS) down to 200 feet above the landing surface, and position reporting for Automated Dependent Surveillance Broadcast (ADS-B) operations. WAAS provides service to all of the contiguous United States, Hawaii, most of Alaska, the Caribbean, and significant portions of Canada and Mexico. Modernization of GPS by the U.S. Department of Defense (DoD) will provide a second civil frequency (L5), protected for aviation starting with the GPS IIF and GPS IIR-M satellites, with initial launch planned for 2008, and continuing with GPS III, with initial launch in the 2013 timeframe. WAAS services will improve as the system is retrofitted to augment the additional GPS L5 civil signal. WAAS results in safety and capacity improvements in the national airspace and can reduce FAA operations costs by enabling the removal of a portion of the legacy ground-based navigation (VOR, NDB, and ILS) infrastructure.

WAAS addresses the following performance gaps:

- Lack of NAS-wide precise navigation capability at low altitudes that is needed to support FAA safety goals and continued air traffic growth;
- Lack of stable vertical guidance at smaller airports in all weather conditions;
- Increasing maintenance costs for ground navigation systems.

The NextGen Integrated work plan cites WAAS as one of the key Positioning, Navigation, and Timing service enablers – specifically to support the objective of performance based navigation (RNP/RNAV), broad area precision navigation, aircraft trajectory based operations, and super density operations within NAS. The FAA Flight Plan states WAAS is an enabling technology to establish improved NAS-wide public RNP/RNAV route structure. Further, WAAS qualifies as a critical supporting technology for ADS-B implementation.

WAAS became operational (commissioned) on July 10, 2003. Following commissioning, WAAS began the full LPV Performance (FLP) segment (Phase II), which is a mixed life cycle program involving

development, modernization, and performance enhancement in conjunction with operations and maintenance scheduled to be completed in 2008. In 2009, WAAS will have two remaining segments: 1) Phase III - Full LPV-200 Performance (from 2009 – 2013) and 2) Phase IV - Dual Frequency Operations (formerly known as the Global Navigation Satellite System Landing System (GLS) upgrade) 2014 – 2028 to leverage the improvements the Department of Defense will make as part of its GPS modernization program.

The Dual Frequency portion of the program was initially scheduled to begin in 2009. The WAAS program was rebaselined in 2007 to align this portion of the program with the DoD GPS modernization program. Dual Frequency operations will significantly improve availability and continuity of precision approach service during periods of severe solar storm activity and provide additional protection against interference to the GPS enabling FAA to decommission additional ground-based navigation aids. Following the dual frequency operations development, WAAS will require continued technical refresh to sustain the commercial off the shelf (COTS) based system hardware and software

In September 2007, FAA successfully commissioned WAAS Reference Stations (WRS) in Canada and Mexico. The WAAS team currently is working towards completing the final phase of the FLP contract with two remaining performance upgrades scheduled towards the end of the FY 2008. The team is also working to award a contract before the end of FY 08 to support the Phase III activities. Recently, the GNSS (Global Navigation Satellite System) Evolutionary Architecture Study panel was established to assess the long-term (Phase IV) strategies for the WAAS program. In support of the FAA Flight Plan's international leadership goals, the WAAS team is actively working with Europe, Japan, and India through cooperative agreements to certify their respective WAAS-type systems.

Activities in FY 2009 and beyond include: replacing obsolete hardware and software; adding a fifth geosynchronous communications satellite to the network; supporting WAAS avionics integration to encourage additional WAAS equipage; setting standards for dual frequency avionics to prepare for when the full constellation of GPS satellites has two civil use frequencies; paying lease costs for existing communications satellites; developing WAAS precision approach procedures; and technical engineering support.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 2 –** Reduce the number of fatal accidents in general aviation.
- **FAA Performance Target 1 –** By FY 2009, reduce the number of general aviation and nonscheduled Part 135 fatal accidents from the 1996-1998 average of 385 per year to no more than 319 accidents per year.

Relationship to Performance Target

In terminal area and approach operations, a Flight Safety Foundation Report found that there is nearly an 8-fold reduction in approach accident rates (53 per million for non-precision approaches vs. 7 per million for precision approaches) when precision approaches were used. Specifically, 141 accidents could be prevented over a 20 year period and save over 250 lives when using WAAS for vertically guided approaches at airports where stable vertical guidance is not available or not used today. WAAS provides vertical and horizontal guidance enabling pilots to make stable, vertically guided approaches to all runway ends in the continental United States and most of Alaska. Presently precision vertically guided approaches using ILS are only available at 870 of the nations 19,000 public and private use airports.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1 –** Achieve Operational Excellence.
- **SMP Objective #1.3 –** Ensure safety and aircraft separation.

Program Plans FY 2009 – Performance Output Goals

- Complete development and testing of Full LPV Capability WAAS to provide LPV service over 95% of the United States and 2/3 of Alaska.
- Add one additional country cooperating with the United States on the use of GNSS.
- Develop 500 additional WAAS approach procedures for runways.
- Provide WAAS service at 300 runway ends currently not served by ILS.
- Provide necessary inputs to improved statewide public RNP/RNAV WAAS enabled route structure (where supported by WAAS).

Program Plans FY 2010-2013 – Performance Output Goals

- Develop and publish 2000 additional WAAS LPV approach procedures.
- Add additional countries cooperating with the United States on the use of GNSS.
- Provide WAAS service at runway ends currently not served by ILS.
- Integrate an additional geostationary satellite into the WAAS software.

System Implementation Schedule

FY 2009 Hardware Upgrade #1 – WRS Upgrade Kits

FY 2010 Hardware Upgrade #2 – Comm. Architecture Upgrade

FY 2011 Hardware Upgrade #3 – Obsolescence Upgrade I

FY 2009 Software Upgrade #1 – Ionospheric threat Robustness

FY 2010 Software Upgrade #2 – Availability and Continuity Enhancement I

FY 2011 Software Upgrade #3 – 5th GEO Interface

FY 2012 Hardware Upgrade #1 – Safety Computer

FY 2013 Hardware Upgrade #2 – Obsolescence Upgrade II

FY 2012 Software Upgrade #1 – Compiler OS Upgrade

FY 2013 Software Upgrade #2 – Availability and Continuity Enhancement II

5th GEO Procurement Commencement (FY 2009)

Ground Uplink Station (GUS) Installation (FY 2009)

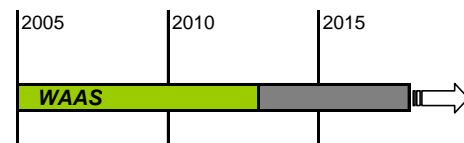
Satellite Payload Development (FY 2009-2013)

5th GEO System Integration & Test (FY 2010-2013)

5th GEO Operational FY 2013

Wide Area Augmentation System (WAAS)

Commissioned July 2003 -- Full Precision: 2013



**B, WIDE AREA AUGMENTATION SYSTEM (WAAS) – SURVEYS AND PROCEDURES,
N12.01-06**

Program Description

Developing a Localizer Performance with Vertical guidance (LPV) Instrument approach procedure requires an accurate survey. This survey is specific to the approach and provides detailed obstacle information used to ensure aircraft separation from the obstructions, and it establishes minimum altitudes allowed for flying that LPV approach. The survey information can also be used for other purposes such as development of other instrument approach procedures (Required Navigation Performance (RNP), Lateral Navigation/Vertical Navigation (LNAV/VNAV), Lateral Navigation (LNAV), etc.).

Survey data is essential in ensuring information about the existing obstructions surrounding an airport is fully reflected in the published approach. Historical data suggests the number of surveys will be larger than the number of approach procedures because 20-30% of surveyed airport approaches will not be capable of supporting an LPV. It is likely this percentage will be higher in future years because the airports most likely to support a LPV approach are selected first, and the remaining airports are likely to have more issues. Airport runway ends that do not qualify for an LPV procedure due to obstacles or terrain may qualify for an LP (Localizer Performance) approach procedure, which provides horizontal guidance to the pilot. LP approaches will utilize WAAS and benefit the user by offering potentially lower minimums than other non-precision approaches.

Developing LPV procedures is a necessary step toward realizing the benefits from WAAS. The FAA Flight Plan goal calls for development of 300 new procedures in FY 2009 and FY 2010. Based on historical data, it is estimated that 450-500 approach surveys will be required each year to support this number of usable procedures. LPV and LP procedures developed in a current fiscal year require surveys from the previous year. Hence, surveys acquired in FY 2009 will be used to support procedure development in FY 2010.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 2** – Reduce the number of fatal accidents in general aviation.
- **FAA Performance Target 1** – By FY 2009, reduce the number of general aviation and nonscheduled Part 135 fatal accidents from the 1996-1998 average of 385 per year to no more than 319 accidents per year.

Relationship to Performance Target

In terminal area and approach operations, a Flight Safety Foundation Report found that there is nearly an 8 fold reduction in approach accident rates (53 per million for non-precision approaches versus 7 per million for precision approaches) when precision approaches were used. Specifically, 141 accidents could be prevented over a 20 year period and save over 250 lives if we develop procedures that use WAAS for vertically guided approaches at airports where stable vertical guidance is not available or not used today. WAAS provides vertical and horizontal guidance which improves safety by enabling pilots to make stable, vertically guided approaches to all runway ends in the continental United States and most of Alaska that have a published approach procedure. Presently precision vertically guided approaches using ILS are only available at 870 of the nations 19,000 public and private use airports.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.3** – Ensure aircraft safety and separation.

Program Plans FY 2009 – Performance Output Goals

- Complete enough airport obstruction surveys to develop 300 LPV procedures.

Program Plans FY 2010-2013 – Performance Output Goals

- Complete enough airport obstruction surveys each year to allow development of 300 LPV procedures in each of the subsequent years.

2D04, RUNWAY VISUAL RANGE (RVR)

FY 2009 Request \$5.0M

- Runway Visual Range (RVR) – Replacement/Establishment – N08.02-00

Program Description

The Runway Visual Range (RVR) provides pilots and air traffic controllers with a measured value for the horizontal visibility at key points along a runway. That data is used to decide whether it is safe to take off or land during limited visibility conditions. The new-generation RVR is also safer because the equipment is mounted on frangible, low-impact-resistant structures that break away if hit by aircraft during takeoff or landing. Replacement decisions are prioritized based on the level of activity at the airport, where they are located, and life-cycle issues, such as: Reliability, Availability and Maintainability. This project also provides the equipment for new sites, including new runways and existing runways that have recently qualified for an Instrument Landing System installation.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The RVR decreases diversions and delays at an airport by providing a more exact measure of the runway visibility. During reduced visibility weather conditions, RVR system products are used by Air Traffic to establish airport operating categories; thus, properly equipped aircraft with a trained crew may continue operations under reduced visibility Category I and Category II/III conditions. The RVR information affects airline scheduling decisions and air traffic management decisions regarding whether flight plans should be approved for an aircraft to fly to an airport with low visibility.

Older RVR systems are maintenance intensive, resulting in excessive downtime, which negatively affects airport traffic flow capacity and reduces adjusted operational availability. The replacement or upgraded equipment requires less maintenance and repair time, which reduces system downtime, consequently improves traffic flow capacity, and improves adjusted operational availability.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.5** – Minimize impacts of weather on the operation.

Program Plans FY 2009 – Performance Output Goals

- Procure nine (9) RVR systems.
- Complete eight (8) RVR projects.
- Start six (6) new RVR projects.

Program Plans FY 2010-2013 – Performance Output Goals

- Procure 21 RVR systems.
- Complete 37 RVR projects.
- Start 31 RVR projects.

System Implementation FY 2009 Schedule

Runway Visual Range (RVR)

Location	Start	Finish
Allegheny, PA (AGC)	2/1/2008	6/30/2009
Salem, OR (SLE)	2/1/2008	1/31/2009
Yakima, WA (YKM)	2/1/2008	1/31/2009
Sioux Folk, SD (FSD)	4/1/2007	10/31/2009
Binghamton, NY (BGM)	2/1/2008	6/30/2009
Syracuse, NY (SYR)	2/1/2008	6/30/2009
Las Vegas, NV (LAS)	2/1/2008	6/30/2009
Erie, PA (ERI)	2/1/2008	6/30/2009

* These have been identified as candidate projects but not yet confirmed.

2D05, APPROACH LIGHTING SYSTEM IMPROVEMENT PROGRAM (ALSIP)

FY 2009 Request \$10.0M

- Visual Nav aids – ALSIP Continuation, N04.03-00

Program Description

The intent of the Approach Lighting System Improvement Program (ALSIP) is to bring approach lighting systems, built before 1975, up to current standards and to reduce the severity of landing accidents by replacing rigid structures with lightweight and low-impact resistant structures that collapse or break apart upon impact. The High Intensity Approach Lighting System with Sequenced Flashing Lights Model 2 (ALSF-2) provides visual information on runway alignment, height perception, roll guidance, and horizontal reference for Category II and III Precision Approaches. The Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) provides visual information on runway alignment, height perception, roll guidance, and horizontal references for Category I Precision Approaches.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 1** – Reduce commercial air carrier fatalities.
- **FAA Performance Target 1** – Cut the rate of fatalities per 100 million persons on board in half by 2025.

Relationship to Performance Target

The ALSIP replaces rigid approach lighting structures with lightweight and low-impact resistant structures that collapse or break apart upon impact. This reduces damage to aircraft that may strike these structures during departure or landing, which directly affects the goal of reducing aircraft fatal accidents.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.3** – Ensure safety and aircraft separation.

Program Plans FY 2009 – Performance Output Goals

- Complete the implementation of five (5) MALSR carryovers and one (1) ALSF-2 project.
- Start the implementation of three (3) new MALSR replacement projects.
- Commission or Return to Service approximately five (5) MALSR and three (3) ALSF-2.

Program Plans FY 2010-2013 – Performance Output Goals

- Complete the implementation of one (1) ALSF-2 system.
- Start the implementation of 16 MALSRS systems.
- Commission or Return to Service approximately one (1) ALSF-2 Systems.
- Procure approximately 15 MALSRS Systems.
- Commission or Return to Service approximately 15 MALSRS Systems.

System Implementation FY 2009 Schedule

Approach Lighting System Improvement Program (ALSIP)

Location	Start	Finish
ALSF-2		
Knoxville, TN Rwy23R (BUI)	1/1/2006	11/30/2008
Orlando, FL 36R (OJP)	6/2/2004	4/17/2009
Jamaica, NY 13L (TLK)	7/12/2004	10/1/2008
MALSRS		
Baltimore, MD - Rwy 33L (BUX)	5/1/2007	11/30/2008
Chantilly, VA - Rwy 19L (SGC)	5/1/2007	11/30/2008
Columbus, OH - Rwy 9R (OSU)	8/1/2007	3/31/2009
Riverside, CA - Rwy 9 (RAL)	8/1/2007	4/30/2009
Adak, AK - Rwy 23 (ADK)	4/1/2006	4/30/2009

2D06, DISTANCE MEASURING EQUIPMENT (DME)

FY 2009 Request \$6.0M

- Sustain Distance Measuring Equipment (DME), N09.00-00

Program Description

DMEs are radionavigation aids that are used by pilots to determine the aircraft’s distance from the DME. The DME program replaces obsolete, first generation DME technology with modern technology electronics that will improve operations and facility performance. Replacement equipment reduces maintenance expense and repair downtime required for DME systems. Low Power DME (LPDME) will replace ILS marker beacons at existing and newly established Category I ILS locations. High Power DME (HPDME) will be used to support RNAV procedures that are used as a backup to satellite navigation.

To support the Commercial Aviation Safety Team (CAST) recommendations, the DME program is procuring and installing DME systems at recommended sites. These systems will support the reduction of controlled-flight-into-terrain (CFIT) accidents at the most vulnerable locations in the NAS. There are 451 identified CAST DME sites. However, the FAA recommends installing DME at 177 locations. This number would cover 80 percent of all operations. For safety reasons, the industry wants to discontinue using step-down or “dive-and-drive” non-precision approach procedures, in which the pilot descends to the minimum allowable altitude to try to see the runway. Using DME minimizes the need to do this.

To support RNAV requirements a minimum of 100 new HPDMEs will be required. An additional 150 HPDMEs will be required to replace the first generation 20 year old solid state DME technology collocated with VOR. These HPDMEs will support the planned reduction of VORs shown in the roadmaps. These HPDMEs will be stand-alone thus reducing maintenance cost. The remaining 250 HPDMEs will need to be replaced within 15 years due to their age and supportability costs.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

The new DME can provide distance information to more than 200 aircraft simultaneously, compared to less than 50 aircraft for the existing older systems, thus increasing the number of aircraft that can simultaneously use the DME. Availability of the new DME is greater than 99.95%.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Procure approximately 17 DME Systems.
- Commission approximately 17 LPDME Systems.

Program Plans FY 2010-2013 – Performance Output Goals

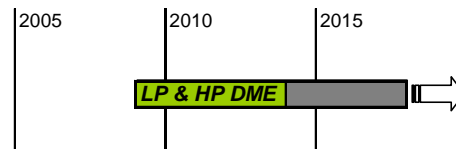
- Procure approximately 28 DME Systems.
- Commission approximately 35 DME Systems.

System Implementation Schedules:

Low and High Power Distance Measuring Equipment (DME)

First site IOC: June 2009 -- Last site IOC: September 2013

First Site Decom: December 2029 -- Last Site Decom: January 2033



2D07, VISUAL NAVAIDS – ESTABLISH/EXPAND

FY 2009 Request \$1.7M

- Visual Navaids – Visual Navaids for New Qualifiers, N04.01-00

Program Description

This program supports the procurement, installation, and commissioning of Precision Approach Path Indicator (PAPI) systems and Runway End Identification Light (REIL) systems. A PAPI provides visual approach glide slope information to pilots and enables them to make a stabilized descent with a safe margin of approach clearance over obstructions. The PAPI consists of four (4) lamp housing assemblies arranged perpendicular to the edge of the runway. The PAPI projects a pattern of red and white lights along the desired glide slope so a pilot can tell whether or not they are on the glide slope. A REIL is a non-precision visual aid that provides rapid and positive identification of the approach end of a runway to the pilot. The REIL is a system consisting of two simultaneously flashing white lights, one on each side of the runway landing threshold.

The implementation of PAPI systems satisfies Commercial Aviation Safety Team (CAST) and Land and Hold Short Operations (LAHSO) requirements.

- The FAA plans to implement the 170 highest priority PAPI installations. This number would cover 80% of commercial airline operations.

- LAHSO is an air traffic control tool used to increase airport capacity by allowing simultaneous approaches on intersecting runways. PAPI systems are required at airports when they are approved for LAHSO.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increase safety.**
- **FAA Objective 1 – Reduce commercial air carrier fatalities.**
- **FAA Performance Target 1 – Cut the rate of fatalities per 100 million persons on board in half by 2025.**

Relationship to Performance Target

Installing PAPI lights at CAST locations will enhance system safety by reducing the probability of a Controlled Flight into Terrain accident during approach and landing. Installing the REIL system will reduce accidents because the system clearly identifies the runway's end to the pilot.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1 – Achieve Operational Excellence.**
- **SMP Objective #1.3 – Ensure safety and aircraft separation.**

Program Plans FY 2009 – Performance Output Goals

- Procure six (6) PAPI systems.
- Complete the implementation of ten (10) CAST PAPI projects.
- Start the implementation of six (6) CAST PAPI projects.

Program Plans FY 2010-2013 – Performance Output Goals

- Procure 14 PAPI and 28 REIL systems.
- Complete the implementation of 26 PAPI and 28 REIL projects.
- Start the implementation of 43 PAPI and 28 REIL projects.

2D08, INSTRUMENT FLIGHT PROCEDURES AUTOMATION (IFPA)

FY 2009 Request \$10.9M

- Instrument Flight Procedures Automation (IFPA), A14.02-01

Program Description

FAA's Aviation System Standards directorate maintains more than 14,000 instrument flight procedures in use at over 4,000 paved airport runways, accommodating requirements for both precision and non-precision approaches and departures. Maximizing implementation and use of Instrument Landing Systems (ILS), Microwave Landing System, Global Positioning System Area Navigation (GPS/RNAV), and Wide Area Augmentation System (WAAS) will increase the capacity of the NAS and requires development of new and revised instrument flight procedures.

The existing IAPA system, which provides the basis for instrument flight procedure development and maintenance, has been heavily modified since being developed in the early 1970s and does not meet all of today's functional or integration requirements. The current IAPA system is barely able to support the existing inventory of 14,000 instrument flight procedures. A modern integrated system is needed to accommodate the expected growth of the NAS. Aviation System Standards has identified technological opportunities to replace IAPA and consequently increase functional capabilities, which raises the organization's ability to meet current and expected future demand for instrument flight procedures within the NAS. The CIP will fund the acquisition of a new software application suite, to be called Instrument Flight Procedures Automation (IFPA). IFPA will be more efficient and encompassing to support

instrument flight procedures development. It will include functionality for developing approaches, missed approaches, circling, Standard Terminal Arrival Routes (STAR), airways, and departures. In addition, IFPA will contain an integrated obstacle evaluation application, replacing a mostly manual process. Along with development of the new IFPA tools, integration across three Aviation System Standards organizations will be accomplished—the National Flight Procedures Group, Flight Inspections Operations Group, and the National Aeronautical Charting Group—eliminating manual effort and duplication of data. New COTS standard desktop workstations and COTS server upgrades are also included in the CIP funding.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2 –** Improve financial management while delivering quality customer service.
- **FAA Performance Target 2 –** Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

The IFPA system ensures continued progress toward this target by building and upgrading automation systems, including the replacement of the obsolete legacy Instrument Approach Procedure Automation (IAPA) system. Upgrading automation systems allows for efficiency of time and cost savings in development of instrument procedures for approaching and departing an airport.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway 2 –** Enhance Financial Discipline.
- **SMP Objective 2.4 –** Reduce Unit Cost of Operations.

Program Plans FY 2009 – Performance Output Goals

- Reduce Instrument Flight Procedure production cycle time by an additional 7 days – Cycle time reduced from 167 to 160 days.
- Reduce new Instrument Flight Procedure (IFP) development time by 8 hours – Task time reduced from 120 to 112 hours.
- Reduce IFP amendment time by 7 hours – Task time reduced from 38 to 31 hours.
- Reduce obstacle evaluation time by 3 minutes – Task time reduced from 27 to 24 minutes

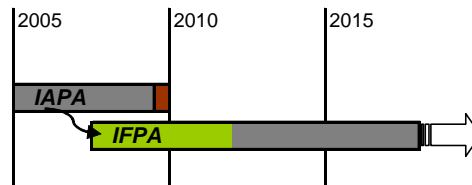
Program Plans FY 2010-2013 – Performance Output Goals

- Achieve final IFP production cycle time of 149 days.
- Achieve final task efficiencies across all measured tasks.

Instrument Flight Procedures Automation (IFPA)

Last site Decom: November 2010

First site IOC: June 2007 -- Last site IOC: September 2011



2D09, NAVIGATION AND LANDING AIDS – SERVICE LIFE EXTENSION PROGRAM (SLEP)
FY 2009 Request \$1.0M

- Visual Nav aids – Sustain, Replace, Relocate, N04.04-00

Program Description

Navigation and Landing Aids – Service Life Extension Program, modernizes and replaces navigation aids (NAVAIDS) at sites where reliability availability and maintainability are trending below FAA standards for precision approach systems. NAVAIDS include: Medium Intensity Approach Lighting Systems with Runway Alignment Indicator Lights (MALSR) for Category I approaches, High Intensity Approach Lighting System with Sequenced Flashing Lights (ALSF-2) for Category II/III approaches, and Precision Approach Path Indicator (PAPI) Lights and Runway End Identifier Lights (REIL).

This program also modernizes and replaces Instrument Landing Systems (ILS) which are not performing to FAA standards. An ILS has several components such as: localizers, glide slopes, distance measuring equipment, etc.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The older electronic guidance systems and NAVAIDS are maintenance intensive, resulting in excessive downtime, which negatively impacts airport traffic flow capacity. The replacement or upgraded equipment will require less maintenance and repair time, which reduces system downtime and consequently improves traffic flow capacity.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Extending the service life of five (5) ALSF-2 at OEP airports by replacing the constant current regulators and installing a monitor for category II/III approaches.

Program Plans FY 2010-2013 – Performance Output Goals

- Install three (3) MALSRs.
- Install one (1) ALSF-2.
- Extend the service life of 19 ALSF-2 at OEP airports by replacing the constant current regulators and installing a monitor for category II/III approaches.
- Procure and install 27 REILS.
- Relocate four (4) navigation systems.
- Replace one (1) glideslope tower.
- Replace two (2) light station wires.
- Replace four (4) localizer antenna platforms.

2D10, VASI REPLACEMENT – REPLACE WITH PRECISION APPROACH PATH INDICATOR
FY 2009 Request \$4.0M

- Visual Nav aids – Replace Visual Approach Slope Indicator (VASI) with Precision Approach Path Indicator (PAPI), N04.02-00

Program Description

The International Civil Aviation Organization (ICAO) has recommended that all International airports replace the Visual Approach Slope Indicator (VASI) lights with Precision Approach Path Indicators (PAPI) lights to standardize the equipment used to allow pilots to determine visually that they are on the proper glideslope for landing. This program supports the procurement, installation, and commissioning of PAPI systems in order to comply with this ICAO recommendation.

At the inception of this program, there were approximately 1,387 older (pre-1970's) VASI at international and other validated locations requiring replacement. The first phase of the program addresses replacement of VASI systems at approximately 207 ICAO runways. The other older VASI systems in the NAS are also being replaced. As of July 31, 2007 we have completed approximately 130 ICAO VASI replacements and approximately 515 Non-ICAO VASI replacements.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 2** – Increase reliability and on-time performance of scheduled carriers.
- **FAA Performance Target 1** – Achieve a NAS on-time arrival rate of 88.76 percent at the 35 OEP airports by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

Replacing VASI with PAPI improves on-time performance by improving availability of the visual approach slope guidance systems used to help pilots touch down at the appropriate location on the runway. When these older VASI approach slope indicators fail, air traffic controllers cannot use certain procedures such as Land and Hold Short to increase airport capacity and prevent aircraft delays.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Procure 24 PAPIs for replacement projects.
- Complete the implementation of 10 PAPI projects.
- Start the implementation of 12 new PAPI projects.

Program Plans FY 2010-2013 – Performance Output Goals

- Procure 90 PAPI systems.
- Complete the implementation of 107 PAPI projects.
- Start the implementation of 94 PAPI projects.

2D11, GPS CIVIL REQUIREMENTS

FY 2009 Request \$20.7M

- GPS Civil Requirements, N12.03-01

Program Description

The Global Positioning System (GPS) is a satellite-based system that provides Position, Navigation, and Timing (PNT) service to multiple civil and government users with no direct user charges. GPS provides two PNT services; the Precise Positioning Service (PPS), using the dual L1-C/A (L band signal - Coarse Acquisition signal) and L2 signals, and the Standard Positioning Service (SPS), using the single L1-C/A signal. Only SPS is available for worldwide use by the civil community. Currently, GPS consists of second-generation satellites (GPS-II) and the Operational Control Segment (OCS). As the satellites reach the end of their useful life, the GPS program will transition from GPS-II to the third generation (GPS-III) and the modernized Operational Control Segment (OCX). Modernization adds three new civil signals (L1C, L2C, and L5), and signal monitoring for all civil signals. The L1-C/A, L2C, and L5 signals are considered part of the baseline civil GPS capability funded by the DoD. Modernization starts with the remaining GPS-II satellites (Block IIRM and IIF) awaiting launch and continues on the new GPS-III (Block A, B, and C) satellites and OCX.

The National Space-based PNT policy (NSPD-39) requires civil agencies to fund new and unique civil GPS capabilities, specifically, the L1C signal and civil signal monitoring with DOT serving as the lead civil agency. DOT has directed FAA to include the funding to implement L1C and civil signal monitoring in the FY2009-13 budget requests and FAA will serve as the implementing agency for the civil funded capabilities.

Implementation of the L1C signal requires system design and development activities that will be performed by the GPS-III and OCX prime contractors, managed by the U.S. Air Force GPS Wing. In FY 2009, the work required to implement L1C includes systems engineering, system design, and program management. The GPS Signal Monitoring system will consist of a worldwide network of 18-21 GPS monitor stations connected to two processing facilities. The monitor stations must be installed at geographically dispersed locations worldwide such that every GPS satellite can be continuously monitored from at least two stations. The monitor stations will collect real-time measurements of the GPS signals (L1C, L1-C/A, L2C, and L5) and forward this information to the processing facilities where a suite of software algorithms will determine the accuracy, integrity, continuity, and availability performance to verify that modernized GPS system is safe for use.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion
- **FAA Performance Target 1** – Achieve an average daily airport capacity for the 35 OEP airports of 104,338 arrivals and departures per day by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

The GPS signal monitors support the implementation of NextGen capabilities by ensuring that aircraft navigation systems have continuous information on the accuracy and integrity of GPS satellites. Using GPS is a central element of using ADS-B for surveillance.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure Viable Future.
- **SMP Objective #4.5** – Optimize NextGen/OEP Portfolio.

Program Plans FY 2009 – Performance Output Goals

- To be negotiated with DoD prior to executing an Interagency Agreement with the USAF GPS Wing.

Program Plans FY 2010-2013 – Performance Output Goals

- To be negotiated with DoD prior to executing an Interagency Agreement with the USAF GPS Wing.

E. OTHER ATC FACILITIES PROGRAMS

2E01, FUEL STORAGE TANK REPLACEMENT AND MONITORING **FY 2009 Request \$6.1M**

- Fuel Storage Tanks, F13.01-00

Program Description

The FAA Fuel Storage Tank (FST) program designs, fields, and sustains fuel storage systems that support critical FAA operations across the NAS. The FST systems include the storage tank (both above ground and underground tanks containing a variety of liquids: gasoline, diesel, propane, oils, glycol, etc.); the flow control devices (pipe, hoses, pumps, valves, etc.); electronic leak detection and inventory control devices; and electronic/electrical system operation devices (control boards, technician operations stations, switched relays, etc.). The FST program active inventory includes over 3,000 FST systems and historical data is retained on over 1,400 previously closed/removed systems.

The majority of FAA storage tanks are used for emergency electrical generator operations. The emergency generators provide NAS facilities with an alternative power supply during periods of commercial power company outages. A loss of integrity on any FST component will affect the operational capacity of the emergency generator systems and may ultimately result in a total facility failure.

Storage tanks have historically contained materials that could cause an adverse environmental impact or result in personal injury if accidentally released. In response to the risk of accidental release, the federal government, the various State legislatures, local county governments and city jurisdictions have all passed statutes specifying the minimum requirements for the construction, installation, removal, and operations of storage tank systems. Additional regulations affecting storage tank system operations have been established under the jurisdiction of state and local building codes, fire protection codes, airport operating authority requirements, and occupational safety and health acts.

Relationship of Program to DOT Strategic Goal, Objective, & Performance Target

- **DOT Strategic Goal 4 – Environmental Stewardship.**
- **DOT Outcome 1 –** Reduce pollution and other adverse effects of transportation and transportation facilities.
- **DOT Strategy –** Adopt transportation policies and promote technologies that reduce or eliminate environmental degradation.

Relationship to Performance Target

The FST Replacement and Monitoring project supports the Environmental Stewardship goal by developing, promoting, and executing FST environmental compliance strategies and designing/fielding system components and methods of system operation that reduce the risk of leaking FST systems, enhance operational readiness, and minimize adverse impacts to personal and environmental safety.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Continue ARTCC FST Upgrade initiative.
- Remedy integrity failures as identified.
- Respond to regulatory enforcement actions.
- Continue systems replacement in accordance with life-cycle management goals.

Program Plans FY 2010- 2013 – Performance Output Goals

- Continue ARTCC FST Upgrade initiative.
- Remedy integrity failures as identified.
- Respond to regulatory enforcement actions.
- Continue systems replacement in accordance with life-cycle management goals.

2E02 UNSTAFFED INFRASTRUCTURE SUSTAINMENT (FORMERLY FAA BUILDINGS AND EQUIPMENT)

FY 2009 Request \$15.3M

- FAA Buildings and Equipment Sustain Support – Unstaffed Infrastructure Sustainment, F12.00-00

Program Description

The Unstaffed Infrastructure Sustainment (UIS) Program renovates the infrastructure supporting NAS equipment to enable it to prevent damage to equipment and system outages. It includes NAS real property improvements and structures which are normally not staffed. The UIS includes:

- FAA property improvements: access roads, grounds, fencing, storm water controls, parking lots, security lighting, and walkways.
- FAA facilities: buildings, shelters, roofs, sheds, fuel tanks (heating only), plumbing, heating, ventilating and air conditioning (HVAC) equipment, alarms and lighting.
- NAS antenna and equipment towers: structural repairs and refurbishment.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The FAA Unstaffed Infrastructure Sustainment Program supports the FAA's greater capacity goal by refurbishing existing FAA-owned unstaffed facilities and structures serving airports. These airports require reliable and continuous operation and condition reporting of surveillance, navigation, communication, and weather equipment. In addition the infrastructure protects the electronic equipment from weather hazards, radio interference, and unauthorized entry. Failure of the infrastructure will result in NAS equipment failures directly reducing capacity of the NAS.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Sustain five (5) Instrument Landing System (ILS) facilities at the benchmark OEP airports.
- Accomplish 30% of the directed unstaffed facility condition assessments.
- Refurbish 10 long-range radar facilities.
- Repair/improve 10 facility service roads.
- Upgrade/repair/replace air conditioning systems at 10 facilities.

Program Plans FY 2010-2013 – Performance Output Goals

- Sustain 10 ILS facilities at the benchmark airports.
- Complete directed facility condition assessments.
- Refurbish 10 long-range radar facilities.
- Repair/improve 10 facility service roads.
- Upgrade/repair/replace air conditioning systems at 10 facilities.

2E03, AIR NAVIGATIONAL AIDS AND ATC FACILITIES (LOCAL PROJECTS)

FY 2009 Request \$1.5M

- Air Navigation Aids Facilities – Local Projects, M08.04-00

Program Description

Critical equipment outages require local emergency actions to restore communications, surveillance, weather information, and air traffic control equipment. In addition, the FAA must modify facilities and equipment to accommodate operational changes. The unplanned modifications include minor adjustments to air traffic control positions in air traffic control towers or air route traffic control centers; raising or relocating air/ground communications antennas to reduce frequency interference; correcting fire hazards; and improving minor security deficiencies. Also, local project funds are used to restore lost service caused by major storms, fires or other damage.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

Emergency adjustments to NAS facilities mitigate costly long-term maintenance and safety incidents. They also reduce delays and flight cancellations.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

2E04, AIRCRAFT RELATED EQUIPMENT PROGRAM

FY 2009 Request \$7.8M

- A, Aircraft and Related Equipment Program, M12.00-00
- B, Aircraft and Related Equipment Program – Boeing Simulator Replacement, M12.01-01
- X, Airbus Simulator Purchase – Advanced Fly-By-Wire Simulator – Technical Refresh, M12.01-03

A, AIRCRAFT RELATED EQUIPMENT PROGRAM, M12.00-00

Program Description

The FAA operates a fleet of specially equipped flight inspection (FI) aircraft to check navigation and landing aids and certify flight procedures before publishing them for public use. FI aircraft conduct airborne evaluations of electronic signals used to guide aircraft departures, determine en-route position, and ensure safe arrival flight procedures. In order to certify that these procedures and the navigational aids (NAVAIDS) are safe to use, FI aircraft must be equipped with an independent onboard truth system to precisely determine the aircraft's actual location in order to verify the accuracy of the NAVAID or procedure.

The FI fleet and its on-board technology continue to age and become more costly and labor intensive to maintain. Existing navigation and avionics systems are rapidly becoming obsolete. These systems must be upgraded and sustained to provide adequately equipped FI aircraft that are capable of satellite-based navigation and sustaining the safety of both the existing ground-based and the emerging satellite-based NAVAIDS in the NAS.

ARE includes several individual projects that have been combined into an Evolution Plan, which is a systematic program for upgrades to the FI aircraft and related systems, the operational and technical support infrastructure, and the mission specific equipment.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 1** – Reduce commercial air carrier fatalities.
- **FAA Performance Target 1** – Cut the rate of fatalities per 100 million persons on board in half by 2025.

Relationship to Performance Target

The FAA improves air safety by ensuring that flight inspection aircraft and systems are equipped and modified to validate and certify the accuracy of navigational aid electronic signals, as well as validate and certify the safety of approach/departure flight procedures and terminal routes at all airports within the NAS and at military facilities world wide.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Continue Beech 300 FI aircraft enhancement with the installation of Pro Line 21 navigation flight management systems.
- Procure Next Generation Flight Inspection System (NAFIS) PC displays, test equipment, training and documentation.
- Begin installation & testing of NAFIS in FI aircraft.
- Purchase equipment, integrate multi-mode receivers, and install progressively on FI aircraft.
- Purchase further airborne transceivers and complete non-recurring engineering development for global satellite communication and data system.

Program Plans FY 2010-2013 – Performance Output Goals

- Complete Beech 300 Enhancement and installation of Pro Line 21 navigation flight management systems.
- Continue progressive installation of NAFIS in FI aircraft.
- Continue installation of global satellite communication and data systems on FAA FI aircraft.
- Purchase remaining airborne transceivers and start installation of global satellite communication and data systems on FAA FI aircraft.
- Begin Challenger 601 enhancement (avionics and interior).
- Begin Next Generation Air Traffic System Surveillance and Broadcast Services equipage.
- Begin Data Communications equipage.
- Begin Challenger 604 Enhanced Vision System installation and integration.

B, AIRCRAFT RELATED EQUIPMENT PROGRAM – BOEING SIMULATOR REPLACEMENT, M12.01-01

Program Description

The Boeing Simulator Replacement Program procured a new, advanced Boeing 737 (B737-800) Next Generation (NG) aircraft simulator that is configured similar to aircraft in the commercial airline fleet. Technology refresh of some of the simulator's components is needed. The simulator enables the FAA to perform meaningful and relevant evaluations of projects affecting the large transport aircraft category. The simulator can be used for operational evaluation of the latest aviation technologies, equipment, and procedures using flight simulation rather than actual flight hours, which are very costly. Moreover, it is much safer to simulate certain hazardous events (e.g., loss of power) than to perform these events in an actual aircraft. Data gathered from flight simulation activities are used to support safety investigations as well as to develop regulations and flight procedures. The FAA awarded the simulator contract in March 2003.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 1 – Reduce commercial air carrier fatalities.**
- **FAA Performance Target 1 – Cut the rate of fatalities per 100 million persons on board in half by 2025.**

Relationship to Performance Target

The B737-800 NG simulator improves air safety by providing the FAA with the capability to conduct operational evaluation programs on conventional aircraft designs. Regulatory guidance resulting from increased RE&D, plus findings from accident investigation simulations, will contribute to the reduction of the fatal accident rate for air carriers. The timeliness capability provided by the simulator will result in faster analysis of aircraft black box data from accident investigations.

Program Plans FY 2009 – Performance Output Goals

- Continue with technological refresh to update visual system liquid crystal display.
- Issue single maintenance contract for B737-800 NG and Airbus simulators for one year with four one year options.

Program Plans FY 2010-2013 – Performance Output Goals

- Continue technical refresh.
- Upgrade peripheral/software updates.
- Conduct computer hardware system upgrades.
- Exercise options years for the maintenance contract issued in FY 2009.

**X, AIRBUS SIMULATOR PURCHASE – ADVANCED FLY-BY-WIRE SIMULATOR –
TECHNICAL REFRESH, M12.01-03**

Program Description

The FAA Flight Technologies and Procedures Division (AFS-400) acquired an aircraft simulator that will replicate the performance and handling characteristics of a heavy commercial transport aircraft with fly-by-wire (FBW) flight control attributes. AFS-400 is responsible for the development, analysis, and introduction into the NAS of new concepts and technologies for aircraft navigation and instrument flight operations. AFS-400 establishes and governs policies, criteria, and standards by which terminal and en route flight procedures are established and maintained. The Division also is responsible for approving special instrument approach procedures and requests for waivers of standards.

The new simulator, an Airbus 330/340 convertible, Level D, advanced technology, large aircraft, FBW, side-stick control; full-flight simulator must carry out vital safety-of-flight operational evaluation activities, including Required Navigational Performance (RNP) and Operational Evolution Plan (OEP) evaluations. This simulator supports modernization and development initiatives for the evolving NAS environment as well as future FAA and National Transportation Safety Board (NTSB) safety initiatives. Therefore, this simulator must be representative of an existing digital FBW, side-stick control, air carrier type aircraft, as well as other certified simulators of advanced design that are in use by various air carrier operators. Also, it will be used on a limited basis for Aviation Safety Inspector (ASI) training and certification programs.

The FAA's access to outside simulator facilities will not be sufficient to meet the anticipated growth and need for permanent access to this technology for operational evaluation and research. Therefore, the FBW simulator technology must be maintained at a close to current level in the future if the FAA continues to meet the increased safety goals for the NAS. AFS-400 in FY 2012 will begin a technical refresh of the Airbus 330/340 Simulator that will take two to three years to complete and will include the purchase and installation of peripheral/software updates, computer system upgrades, visual system's image generators, imaging software, and projectors. Aircraft Avionics (hardware and software) and cockpit display systems will be brought to the current revision levels.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 1 –** Reduce commercial air carrier fatalities.
- **FAA Performance Target 1 –** Cut the rate of fatalities per 100 million persons on board in half by 2025.

Relationship to Performance Target

The FBW simulator improves air safety by providing the FAA with the capability to conduct operational evaluation programs on FBW aircraft designs. Regulatory guidance resulting from increased RE&D, plus findings from accident investigation simulations, will contribute to the reduction of the fatal accident rate

for air carriers. The timeliness capability provided by the FBW simulator will result in more use of the simulator to analyze aircraft black box data from accident investigations.

Program Plans FY 2009 – Performance Output Goals

- None.

Program Plans FY 2010-2013 – Performance Output Goals

FY 2012-2014:

- Perform technical refresh to include the purchase and installation of peripheral/software updates.
- Conduct computer system upgrades.
- Update the visual system's image generators, imaging software, projectors to the current technology.
- Update the Aircraft Avionics (hardware and software) and cockpit display systems to the current revision.

2E05, AIRPORT CABLE LOOP SYSTEMS – SUSTAINED SUPPORT

FY 2009 Request \$7.0M

- Airport Cable Loop Systems – Sustained Support, F10.00-00

Program Description

This program will replace existing on-airport, copper-based, signal/control cable lines that have deteriorated. The primary focus will be on projects at airports with high traffic counts and enplanements. The obsolete underground telecommunications cable infrastructure systems are vulnerable to failure and could cause flight delays related to outages. These lines feed airport surveillance radar, air/ground communications, and landing systems data and information to the tower, and operational and maintenance information to FAA-staffed facilities. Where cost-effective, the program will install fiber-optic cable in a ring formation to provide redundancy and communications diversity. The ring configuration allows information to flow from either side if there is a break in the cable. The airport cable loop program takes advantage of opportunities to save cost by coordinating projects with major construction projects (e.g. tower relocations, and runway projects).

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

The Airport Cable Loop Systems Sustained Support Program will reduce potential failures, delays, and outages by replacing obsolete underground cable infrastructure systems. The program improves signaling and communications primarily at large airports with high traffic counts and enplanements.

Strategic Management Plan (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Complete system installation at Boston-Logan and Hartsfield Atlanta International Airports.
- Begin Phase I Cable loop construction at Ronald Reagan Washington National, Houston, Charlotte Douglas, and Covington Northern Kentucky (Cincinnati) Airports.
- Begin Phase II Cable loop construction at Portland International Airport.
- Begin Equipment installation at La Guardia and Seattle International Airport.
- Begin Replacement of old fiber optics equipment at Newark, Austin, Dallas-Ft. Worth, and Denver International Airport
- Begin Planning and Design Phase for Washington Dulles.

Program Plans FY 2010-2013 – Performance Output Goals

- Complete installations at La Guardia, Houston, Seattle, Ronald Reagan Washington National, Charlotte Douglas, Covington Northern Kentucky (Cincinnati), Newark, Austin, Dallas-Ft. Worth, Denver, and Portland International Airport.
- Complete development of engineering packages for Washington Dulles International and Baltimore/Washington International Airports.
- Begin fiber-optic system upgrade planning at San Francisco International Airport.
- Begin Planning and Design Phase for Anchorage, Andrews Air Force Base, San Diego, Ontario, Oakland, Cleveland, Honolulu, and Pittsburgh International Airport.

2E06, ALASKAN NAS INTERFACILITY COMMUNICATIONS SYSTEM (ANICS)

FY 2009 Request \$5.0M

- Alaskan NAS Interfacility Communications System (ANICS) Satellite Network – ANICS Modernization – Phase I, C17.02-01

Program Description

The ANICS project was implemented to achieve system-wide NAS interfacility telecommunication diversity throughout Alaska. The previous telecommunications system, which relied on a single satellite link, did not have the reliability of ANICS. Diversity was achieved between remote locations and central FAA facilities by maintaining parallel communications paths using redundant earth stations or an earth station in conjunction with leased service. Single points of failure generally have been eliminated by co-locating ANICS earth stations at FAA facilities. When a failure does occur, the channel paths are reconfigured by the Network Operations Control Center (NOCC) located in the Anchorage Air Route Traffic Control Center (ARTCC).

ANICS is a “transparent” communications carrier, in that it accepts messages from users and transports those messages to their destination without modification or processing. The ANICS network carries reliable voice/data communications to and from the ARTCC, Air Traffic Control Towers (ATCT), and Automated Flight Service Stations (AFSS).

ANICS establishes circuit connectivity for the following NAS services provided by air traffic controllers and flight service personnel in Alaska:

- Remote Control Air Ground (RCAG) and Remote Communications Outlets for voice communication with pilots,
- En route Communications & Flight Service Station Radio Voice Communications,
- En route and Terminal Radar Surveillance Data; Digitized Radar Data and Digitized Beacon Data,
- AFSS and Flight Service Station (FSS) Operations Flight Service Data Processing System, Digital Aviation Weather Network,
- Weather Advisories, Briefings, and Products; e.g., Automatic Surface Observation System (ASOS), Automated Weather Observation System (AWOS), AWOS Data Acquisition System (ADAS), Airport Weather Information System, etc.
- Remote Maintenance Monitoring,

- WAAS Reference Station (WRS), and
- Capstone Ground Base Transceivers.

ANICS Modernization Phase 1 will sustain operational availability by minimizing outages for critical and essential communications between pilots and air traffic controllers. Many of the ANICS equipment parts and some of the software are outdated and will be replaced or upgraded in phase 1. Phase 1 will replace components such as:

- Antenna feed assemblies,
- Power boxes,
- Deicers,
- Radomes, and
- Cabling.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 2** – Reduce the number of fatal accidents in general aviation.
- **FAA Performance Target 2** – By FY 2009, reduce accidents in Alaska for general aviation and all Part 135 operations from the 2000-2002 average of 130 accidents per year to no more than 99 accidents per year.

Relationship to Performance Target

ANICS supports FAA's strategic goal of increased safety and the objective of reducing accidents rates in Alaska by improving communications availability. Alaska has a significantly higher number of general aviation (GA) and air taxi (Part 135) aircraft accidents than any other state. In FY 2007 sixty-eight (68) accidents occurred as of 9/1/07. Many of them were fatal. Major causes include extreme weather conditions and mountainous terrain near remote locations. Pilots need accurate and timely weather information to fly in these conditions.

Air safety is improved by minimizing outages for critical and essential communications links between pilots and air traffic controllers. These links between FAA facilities and pilots must provide accurate and reliable information on air traffic movement, weather, and radar data. Minimizing outages depends on providing maintenance personnel, who monitor and control FAA air navigation equipment, with ready access to real time system performance data.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.1** – Ensure Airspace System is safe, efficient, and secure.

Program Plans FY 2009 – Performance Output Goals

- Modernize a minimum of 15 ANICS facilities.

Program Plans FY 2010-2013 – Performance Output Goals

- Continue to upgrade the 64 ANICS facilities until complete in FY 2013.

System Implementation Schedule

- The existing ANICS Network is being upgraded by replacing older parts.
- 64 sites are being upgraded over the course of a several years.

2E07, FACILITY DEPOSITION

FY 2009 Request \$5.0M

- Decommissioning, F26.01-01

Program Description

The June 2005 GAO report entitled *Air Traffic Operations, The Federal Aviation Administration Needs To Address Major Air Traffic Operating Cost Control Challenges*, states that the FAA needs to expand its efforts to cut operational costs to address an expected gap between budget forecasts and expenses. Recommendations include speeding up the decommissioning of ground-based navigational aids.

In recent years the FAA has decommissioned many redundant or underutilized facilities, but funding to effect any environmental testing, property restoration, and equipment disposal has not been identified. In addition, the FAA has plans to decommission entire classes of facilities such as Non-Directional Beacons and Remote Communications Facilities.

This program funds disposition activities including:

- Termination Environmental Due Diligence Audits (EDDAs);
- Testing for environmental clean-up/hazmat abatement, and disposal;
- Non-hazmat real property site restoration, demolition, and disposal;
- Lease termination liabilities;
- Equipment (personal property) removal, reuse, and disposal;
- Removing telecommunications systems, services, and circuits;
- Frequency spectrum reallocation;
- Modification of the National Airspace System Resources (NASR) database, aeronautical charts, and terminal procedures publications; and
- Addressing cultural and historic preservation and natural resource protection issues.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2** – Improve financial management while delivering quality customer service.
- **FAA Performance Target 2** – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

By providing funds for the final disposition of structures, equipment, and real estate that are no longer required by the FAA, this program will eliminate the on-going costs for maintaining assets no longer required by the agency.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #2** – Enhance Financial Discipline.
- **SMP Objective #2.4** – Reduce Unit Cost of Operations.

2E08, ELECTRICAL POWER SYSTEMS – SUSTAIN/SUPPORT
FY 2009 Request \$51.0M

- Power Systems Sustained Support, F11.00-00

Program Description

The Electrical Power Systems Sustain Support (Power) program is an infrastructure sustain and renewal program. Other NAS ATC programs fund the initial purchase and installation of components for backup power systems and power regulation and protection equipment. Electrical power systems are necessary to allow continued operation of air traffic control facilities when there is an interruption in commercial power sources. These power systems also protect sensitive electronic equipment from commercial power surges and fluctuations. After replacement equipment/facilities have been commissioned, the Power program replaces, refurbishes and renews components of the existing power system and cable infrastructure when necessary to maintain and improve the overall electrical power quality, reliability, and availability.

Program elements include replacing, refurbishing, or sustaining: batteries in critical power and power-conditioning systems; uninterruptible power systems; engine generators; airport power cable; and lightning protection and grounding systems. Projects are prioritized using NAS metrics of capacity, demand, and passenger value, and specific expert information.

The Power program is critical to both maintaining and increasing NAS capacity by sustaining the reliability and availability of NAS electrical power equipment. These actions avoid power disruptions to NAS equipment that result in costly delays. Without reliable NAS power systems, air traffic control electronics cannot deliver their required availability and commercial power disruption results in flights being kept on the ground, placed in airborne holding patterns, or re-routing to other airports. The Power program also prevents expensive damage to critical air traffic control electronic equipment, and avoids the resulting outages of NAS equipment that would produce costly delays.

Modern complex hardware and associated software are experiencing extended service disruptions when exposed to small power fluctuations. These factors result in the need for power systems with better reliability, and availability, particularly for the planned NextGen system.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

All NAS facilities are dependant on the availability, reliability, and quality of NAS power. Planned electrical power equipment support and sustain activities minimize disruption of air traffic, and maximize availability and reliability of NAS systems. Power systems sustain airport capacity by providing power that reduces the incidence of NAS delays caused by equipment outages that would otherwise have occurred during commercial power disturbances.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Sustain existing NAS power systems by completing about 360 projects:
 - Replace failed batteries.
 - Replace obsolescent Uninterruptible Power System units.
 - Install cost efficient Direct Current power distribution systems as replacement for power backup.
 - Replace worn out engine generators.
 - Replace deteriorated and “at risk” airport power cables.
 - Refurbish ineffective lightning protection and grounding systems.
 - Sustain the reliability of ARTCC power distribution equipment.
 - Begin ARTCC reliability upgrades to address identified issues.
 - Establish Power Systems Operational Support Center.

Program Plans FY 2010-2013 – Performance Output Goals

- Sustain existing NAS power systems by completing about 400 projects per year:
 - Replace failed batteries.
 - Replace obsolescent Uninterruptible Power System units.
 - Install cost efficient Direct Current power distribution bus systems as replacement for power backup.
 - Replace worn out engine generators.
 - Replace deteriorated and “at risk” power cables.
 - Refurbish ineffective lightning protection and grounding systems.
 - Sustain the reliability of ARTCC power distribution equipment.
 - Continue ARTCC reliability upgrades to address identified issues.
- Develop more proactive programs to sustain and support NAS power systems:
 - Improve management of NAS power systems inventory by better utilization of NAS databases.
 - Prioritize program effort by location identifiers, importance of the NAS facility supported and by ranked economic value.
 - Highlight “pop up” activities and develop incidence reduction strategies.
 - Expand the needs assessment process to provide guidance to other program offices.

2E09, AIRCRAFT FLEET MODERNIZATION

FY 2009 Request \$3.0M

- Flight Standards Inspector Aircraft Replacement, M11.02-00

Program Description

The FAA’s Office of Aviation Safety (AVS) is responsible for regulating and overseeing the civil aviation industry. The Flight Standards Service (AFS) organization, which is a component of AVS, regulates both general aviation and air carriers.

AVS requires a fleet of aircraft for currency and proficiency flying by nationally based Aviation Safety Inspectors (ASI) and also for the Initial and Recurrent Turboprop program. There are 640 ASI’s that need proficiency flying once a quarter. These proficiency flights are necessary to ensure that the ASI’s can accurately assess operator skill levels while accomplishing their regulatory checks. The ASI also needs sufficient proficiency to recover the aircraft should the operator/applicant get into an unsafe situation.

Proficiency depends on flying modern aircraft that are configured like the current commercial fleet, so that ASI’s have current experience in the types of aircraft operations they are checking. Inspectors must practice proper management of aircraft in highly congested airspace including operations in poor weather conditions. To obtain that experience, they must fly an aircraft rather than use a simulator.

This investment will be for nine (9) aircraft configured to modernize the current fleet of aircraft. Procurement of three (3) aircraft is anticipated in FY 2008, one (1) in FY 2009, and five (5) in FY2010.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 1** – Reduce commercial air carrier fatalities.
- **FAA Performance Target 1** – Cut the rate of fatalities per 100 million persons on board in half by 2025.

Relationship to Performance Target

To provide the necessary level of performance and proficiency flying required to meet ASI's needs in regulatory requirements, new aircraft must be purchased to ensure ASIs are fully qualified to check flight operations of commercial operators. Currency of ASIs will sustain the high level of safety for general aviation and air carrier operators reduce fatal accidents.

Program Plans FY 2009 – Performance Output Goals

- Accept delivery of one (1) aircraft for service.

Program Plans FY 2010-2013 – Performance Output Goals

- Accept delivery of five (5) of nine (9) aircraft for service.

2E10, AIRCRAFT FLEET MODERNIZATION – INTERNATIONAL AIRCRAFT

FY 2009 Request \$24.9M

- International Flight Inspection Aircraft – Bombardier Challenger Purchase, M11.03-00

Program Description

The FAA is upgrading its capability to perform the FAA mission of flight inspecting DoD facilities, and providing reimbursable flight inspection services to foreign governments. These efforts support national security as required by agreements with DoD. Before and during military deployments, FAA must certify the safety of runways, navigational aids, landing systems, and supporting equipment.

FAA's fleet of three Hawker aircraft can no longer support current and anticipated worldwide military contingencies, international flight inspection missions, and domestic requirements including Required Navigation Performance (RNP) Flight Inspection. The Hawker aircraft do not have the necessary range, mission payload, or response time, and the avionics are inadequate for current and future requirements. The Hawker aircraft do not have "new NAS" flight inspection capability including systems to check Wide Area Augmentation System/Lateral Precision with Vertical guidance (WAAS/LPV) & RNP procedures.

The FAA will replace three Hawker flight inspection aircraft with a Challenger 600 series aircraft. The U.S. Air Force will also purchase a Challenger aircraft. The proceeds from the trade-in of the three Hawker aircraft will be used to offset the purchase price of the FAA Challenger aircraft. The FY 2009 funding request is to supplement the trade-in value of the three Hawker aircraft to complete the acquisition. The contractor is not obligated to accept the Hawker aircraft for trade-in after FY 2009. If the contract option is not exercised, firm-fixed pricing for the Challenger aircraft is no longer valid, and procurement at a later date could increase the cost by an additional \$5 million.

Procuring the aircraft will decrease FAA's operating and maintenance costs because it will reduce FAA's Flight Inspection fleet by two aircraft. A 20 percent increase in productivity of work formerly done by the Hawker aircraft is expected resulting in an annual reduction of 400 international flight-hours. This program also supplies the Agency's flight inspection program with increased capability to support

certification of new RNP, WAAS, and Area Navigation (RNAV) instrument flight procedures and flight inspection of navigational aids in the NAS.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 1** – Reduce commercial air carrier fatalities.
- **FAA Performance Target 1** – Cut the rate of fatalities per 100 million persons on board in half by 2025.

Relationship to Performance Target

The FAA improves air safety by ensuring that flight inspection aircraft and systems are equipped and modified to validate and certify the accuracy of navigational aid electronic signals, as well as validate and certify the safety of approach/departure flight procedures and terminal routes at all public airports in the NAS, domestic and international DoD sites, and other facilities as determined by domestic and international reimbursable customers

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.3** – Ensure safety and aircraft separation.

Program Plan FY2009 – Performance Output Goal

- Exercise contract option that has been awarded to Bombardier Corporation for one (1) Challenger aircraft.
- Facilitate trade-in of three (3) British Aerospace Model Bae-800s.

Program Plans FY2010-2013 – Performance Output Goals

- Monitor finishing process of Challenger 605 aircraft at Bombardier.
- Delivery/testing/acceptance of the International Flight Inspection Aircraft.

ACTIVITY 3. NON-AIR TRAFFIC CONTROL FACILITIES AND EQUIPMENT

A. SUPPORT EQUIPMENT

3A01, HAZARDOUS MATERIALS MANAGEMENT

FY 2009 Request \$18.0M

- Environmental Cleanup/HAZMAT, F13.02-00

Program Description

The FAA has identified more than 700 contaminated sites at over 200 distinct locations nationwide that require investigation, remediation, and closure activities. Environmental Cleanup site investigations have indicated that toxic contamination resulted from a variety of hazardous substances: cleaning solvents, fuels, pesticides, asbestos, polychlorinated biphenyls (PCBs), and heavy metals. FAA organizations, including the Mike Monroney Aeronautical Center and the William J. Hughes Technical Center, have mandatory remediation and monitoring schedules in place as part of negotiated agreements with regulatory agencies. These agreements require the FAA to remediate contaminated soil and groundwater. Extensive contamination at the FAA Technical Center prompted the Environmental Protection Agency (EPA) to place the site on the EPA National Priorities List, indicating its status as one of the Nation's most environmentally dangerous sites (i.e. Superfund site). In addition, contaminated sites and past noncompliance with requirements of the Hazardous Materials Management (HAZMAT) program account for a large portion of the unfunded environmental liabilities documented in the FAA's Financial Statement.

To clean up these contaminated sites and comply with applicable environmental regulations, the FAA developed the HAZMAT program. The FAA must continue mandated program activities to achieve compliance with all Federal, State and local environmental cleanup regulations, including the Resource Conservation and Recovery Act (RCRA) of 1976, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, and the Superfund Amendment and Reauthorization Act (SARA) of 1986. FAA program activities include: conducting site investigations; managing hazardous materials; including hazardous waste accumulation, handling and disposal; installing groundwater monitoring wells; remediating site contamination; and operating air pollution controls. The FAA performs assessment, remediation and closure activities as aggressively and proactively as funding will allow. Future planned efforts include conducting contaminant investigations, implementing site remediation projects and completing required regulatory closures. Additionally, during FY 2007, the FAA attained 93 percent "No Further Remedial Action Planned (NFRAP)" closure documentation for FAA sites listed on EPA's Federal Hazardous Waste Compliance Docket.

Relationship of Program to DOT Strategic Goal, Objective, & Performance Target

- **DOT Strategic Goal 4 – Environmental Stewardship.**
- **DOT Outcome 1** – Reduce pollution and other adverse environmental effects of transportation and transportation facilities.
- **DOT Strategy** – Adopt transportation policies and promote technologies that reduce or eliminate environmental degradation.

Relationship to Performance Target

The HAZMAT program supports the environmental stewardship goal by conducting required cleanup activities for contaminated sites within existing NAS land and structures. The program achieves this objective through assessment, remediation, and closure activities for contaminated sites. These activities result in a safe and environmentally sound workplace, and protection of the natural resources of

surrounding communities. The program works to ensure continuing compliance with the Hazardous Materials Management program. Further, the program ensures that the FAA maintains compliance with the Department of Transportation's Strategic Plan (2006-2011) performance goal of achieving NFRAP status for 94 percent of all FAA sites listed on the EPA's Federal Hazardous Waste Compliance Docket.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #2** – Enhance Financial Discipline.
- **SMP Objective #2.4** – Reduce Unit Cost of Operations.

Program Plans FY 2009 – Performance Output Goals

- Maintain 93 percent NFRAP for all sites listed on the EPA's Federal Hazardous Waste Compliance Docket.
- Complete remediation activities for PCB and fuel contamination at the Bimini, Bahamas Very High Frequency Omnidirectional Radio (VOR) Maintenance Facility (MF) and the Non-Directional Beacon (NDB).
- Attain regulatory closure for the Omaha Ex Air Force Station.
- Provide report to the EPA on the Ronald Reagan Washington National Airport (DCA) South Investigation Site Supplemental Site Investigation. Initiate steps to obtain regulatory closure for the site.
- Continue to conduct investigation and closure activities at the FAA Technical Center near Atlantic City, New Jersey.
- Continue to support the Decommissioning Program (F26.01-01) with technical assistance and funding for remediation of environmental contamination found at these sites.
- Achieve regulatory closure of the Cape Yakataga (CYT) landfill, which is currently eroding into the Yakataga River.
- Achieve regulatory closure of the Skwentna, Alaska (SKW) landfill, and ensure the landfill is in post-operational monitoring.
- Attain the Closure-Long Term Monitoring phase for the Chlorinated Groundwater Plume at the Mike Monroney Center (AMC).

Program Plans FY 2010-2013 – Performance Output Goals

- Attain regulatory closure and NFRAP for DCA and begin the process of delisting the site from the Federal Hazardous Waste Compliance Docket
- Attain regulatory closure for the Kirksville, Air Route Surveillance Radar site with the EPA.
- In FY 2010 through FY 2011, attain 94% NFRAP status for all sites listed on the EPA's Federal Hazardous Waste Compliance Docket.

3A02, AVIATION SAFETY ANALYSIS SYSTEM (ASAS)

FY 2009 Request \$18.9M

- Regulation and Certification Infrastructure System Safety (RCISS) – Segment 1, A17.01-01
- Regulation and Certification Infrastructure System Safety (RCISS) – Segment 2, A17.01-02

Program Description

The ASAS program provided the automation hardware, software, and communication infrastructure to support aviation safety information databases and access to them by the increasingly mobile FAA safety work force. ASAS will be sunset in FY 2009. RCISS is the next generation infrastructure, which will build upon the ASAS legacy infrastructure to better support fact based decision-making. Whether through providing enhanced access to data by inspectors and engineers while in the field or through the development of new systems which provide data to the work force and the safety applications, RCISS will continue to provide the workforce with the systems to support the certification and regulation of aircrews, airlines, and other licensed companies in aviation. Having information readily available improves the

ability of safety personnel to develop safety regulations and oversee the civil aviation industry. With the consolidation of IT infrastructures within the FAA and Aviation Safety it is critical that RCISS address disaster recovery requirements, improve management of the infrastructure and application systems through advancements in IT technologies and provide enterprise wide solutions for economical development of future software applications.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 1** – Reduce commercial air carrier fatalities.
- **FAA Performance Target 1** – Cut the rate of fatalities per 100 million persons on board in half by 2025.

Relationship to Performance Target

Inspection and review of airline safety programs and practices are integral to the FAA safety program. The RCISS provides the infrastructure to support the workforce's need for information on the safety record of an airline and the actions required to meet regulations and directives. This new infrastructure will dramatically enhance the capability of the workforce to complete assignments while conducting work in the field. Having this information allows the safety inspectors to determine if the airline is complying with good safety practices, which is essential to FAA's role in preventing accidents.

Program Plans FY 2009 – Performance Output Goals

- Continue the deployment and support of mobile devices with enhanced telecommunications services to 25% of the Office of Aviation Safety (AVS) workforce.
- Continue the transition to a centralized data storage and processing environment.
- Continue the development of a disaster recovery facility, co-located within an existing FAA Data Center, to support critical and non-critical AVS safety data and systems.
- Continue technology refreshment of legacy AVS infrastructure components in support of AVS national safety applications.
- Complete re-hosting of mainframe application into web-based server environment.

Program Plans FY 2010-2013 – Performance Output Goals

- Complete the deployment of mobile devices with enhanced telecommunications services to the AVS Safety workforce.
- Complete the transition to centralized data storage and processing environment.

3A03, LOGISTICS SUPPORT SYSTEMS AND FACILITIES (LSSF)

FY 2009 Request \$9.3M

- Logistics Center Support System (LCSS), M21.04-01

Program Description

LCSS will replace the Logistics and Inventory System (LIS) and be a fully integrated National logistics (supply support) system that will reduce cost and provide increased visibility of NAS assets. LCSS will provide for improved supply support as the Agency transitions to NextGen.

LCSS will be a web-based system that uses state-of-the-art tools to extend and leverage the existing agency investment in LIS. The new tools will be based on object-driven open architecture and will allow interfaces to be integrated. LCSS will incorporate the use of COTS applications and enhancements to improve asset visibility, provide serial number tracking, warranty information, shop floor control and spares modeling. These functions will provide a more complete picture of the financial position of logistics within the agency.

The FAA Logistics Center (FAALC) manages the central NAS inventory warehouses and distribution facilities for the FAA. It provides routine and emergency logistics products and services to 8,000 FAA customers at 41,000 facilities and 28,000 sites, as well as to the Department of Defense (Air Force, Navy, and Army), state agencies, and foreign countries by providing 80,000 parts and services through its facilities. It supplies, tracks, and accounts for Capital and Ops funded parts totaling \$1B.

Examples of NAS support that FAALC provides include:

- Annually issues over \$300M in assets to ATO-W technical operations specialists, and
- Satisfied over 110,000 NAS requirement transactions in FY 2004.

The Logistics Center provides inventory management of stock levels, demand forecasting, contract management, customer assistance, and special project support for NAS installation and repair. They are an ISO 9001:2000 certified distribution, warehousing, and repair facility, and they are certified for the design, implementation, and maintenance of software systems in support of the NAS.

LIS is a 17-year-old customized mainframe system with an obsolete system design that is technically difficult and expensive to maintain. It is unable to incorporate technology and business changes to meet the accelerating growth in requirements of the National Airspace System.

The replacement system will improve the tracking of parts failures to better manage spare parts inventory; automate the tracking of repairable parts as they are processed through the shops; upgrade the ability to identify parts that have high failure rates so they can be replaced or improved; and maintain an inventory of obsolete parts, so decisions can be made about repairing or replacing them.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2 –** Improve financial management while delivering quality customer service.
- **FAA Performance Target 2 –** Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

The LCSS program will support enhanced cost-control measures and improved decision-making by:

- 1) Provide the right part, at the right time, to the right place. Metric: Issue Effectiveness: Target goal is 84% effectiveness.
- 2) Provide NAS components and parts that are not defective. Metric: Confirm defective products: Target goal is no more than 12 defects per 1,000 issues.
- 3) Provide services that meet or exceed customer expectations. Metric: Customer satisfaction surveys: Target goal is 86% customer satisfaction.
- 4) Delivering parts and services on time and defect-free reduces potential air traffic system outages and avoids the cost of duplicate shipping and handling.

Program Plans FY 2009 – Performance Output Goals

- Assemble LCSS software solution; build internal and external interfaces to the FAA and DoD systems.
- Achieve interim development.

Program Plans FY 2010-2013 – Performance Output Goals

- Complete, test, and deploy complete LCSS software solution.
- Monitor LCSS implementation and continue COTS software upgrades/maintenance.

3A04, NATIONAL AIRSPACE SYSTEM (NAS) RECOVERY COMMUNICATIONS (RCOM)
FY 2009 Request \$10.0M

- Command & Control Communications (C3), C18.00-00

Program Description

The RCOM program gives the FAA the C3 capability to directly manage and operate the NAS during local, regional and national emergencies, when normal common-carrier communications are interrupted. The NAS C3 provides and enhances a variety of fixed-position, portable, and transportable C3 systems to support emergency operations. Such C3 systems include the automatic digital network/defense messaging system; secure telephone unit third generation/secure telephone equipment; secure facsimile; very high frequency (VHF)/frequency modulated (FM); high-frequency single-side band; satellite telephone network; wireless notification system; secure conferencing system; Emergency Operations Network (EON); and the classified Automated Detection and Process Terminal (ADAPT) for communicating in emergency situations. These C3 systems enable the FAA and other Federal agencies to exchange classified and unclassified messages to protect national security. The RCOM program also supports the Washington Operations Center Complex and modernizes several FAA “continuity of operations” sites, which ensures FAA executives have the ability to command and communicate during times of crisis.

Relationship of Program to DOT Strategic Goal, Objective, & Performance Target

- **DOT Strategic Goal 5 – Homeland and National Security.**
- **DOT Outcome 1** – Balance homeland and national security transportation requirements with the mobility needs of the Nation for personal travel and commerce.
- **DOT Strategy** – Support and implement U.S. security strategies and plans related to transportation.

Relationship to Performance Target

The RCOM program contributes to the FAA’s security goal by ensuring that the FAA’s C3 structure can provide classified and unclassified, time-critical, public and NAS information for the FAA Administrator during emergencies. The FAA Administrator shares this information with staff members, key regional managers, the Secretary of Transportation, and other national-level executive personnel.

Program Plans FY 2009 – Performance Output Goals

- Procure and install VHF/FM equipment for Chicago System Maintenance Office (SMO), Pacific Northwest Mountain SMO, Gateway SMO and Memphis SMO.
- Implement Phase III of Emergency Operations Network.
- Procure equipment for classified portion of ADAPT.
- Engineer system requirements for VHF/FM Pittsburgh SMO, Red River SMO and Gateway SMO.
- Support Communication Support Team missions as required.
- Continue modernizing classified facilities as required.
- Continue modernization of Regional Operations Centers nationwide.
- Continue work on various interagency classified projects.
- Implement upgrade of the nationwide HF system.

Program Plans FY 2010-2013 – Performance Output Goals

- Procure and install additional secure facsimile units and secure conferencing systems.
- Procure and install VHF/FM equipment for the Columbia SMO, Pittsburgh SMO, Salt Lake City SMO, Lone Star SMO, Ohio SMO, Hawaii-Pacific SMO, Rocky Mountain SMO, Red River SMO, Rio Grande SMO, Superior SMO, Dakota-Minnesota SMO, and Great Plains SMO.
- Engineer system requirements for VHF/FM Salt Lake City SMO, Lone Star SMO, Ohio SMO, Hawaii-Pacific SMO, Rocky Mountain SMO, Rio Grande SMO, Superior SMO, Dakota-Minnesota SMO, and Great Plains SMO.
- Continue modernizing classified facilities as required.
- Support Communication Support Team missions as required.
- Deliver additional secure conferencing systems as required.
- Upgrade and enhance satellite telephone network system.
- Continue modernizing Regional Operations Centers nationwide.
- Continue efforts on various interagency classified projects.
- Continue support of classified portion of ADAPT.

3A05, FACILITY SECURITY RISK MANAGEMENT

FY 2009 Request \$15.0M

- A, Facility Security Risk Management (FSRM), F24.00-00
- X, Facility Security Risk Management (FSRM) – Phase 2, F24.01-01

Program Description

The Facility Security Risk Management (FSRM) Program was established in response to Presidential Decision Directive 63, Critical Infrastructure Protection (later superseded by Homeland Security Presidential Directive (HSPD) 7, Critical Infrastructure Identification, Prioritization and Protection), which required all Federal agencies to assess the risks to their critical infrastructure and take steps to mitigate that risk. The program provides risk mitigation at all FAA staffed facilities. The program provides an integrated security system that includes access control, surveillance, x-ray machines, metal detection, and intrusion detection. Other upgrades include adding guardhouses, visitor parking, fencing, perimeter hardening, window blast protection, and lighting.

FSRM Phase 2 includes integrating the individual facilities into a Physical Access Control System (PACS) and adding access control at security level 1 facilities, such as Federal Contract Towers and Manufacturer Certification Offices. Phase 2 is pending JRC approval, which is planned for third quarter FY 2008.

The FSRM Program also supports the FAA's response to HSPD-12, *Policy for a Common Identification Standard for Federal Employees and Contractors*; HSPD-16, *Aviation Security* and the Airport Security Improvement Act of 2000.

The program is currently in the solicitation process to procure a Physical Access Control System (PACS) that will provide access control, surveillance and intrusion detection. The award date is February 29, 2008. A contract was awarded in FY 2005 to maintain all existing security equipment.

Relationship of Program to DOT Strategic Goal, Objective, & Performance Target

- **DOT Strategic Goal 5 – Homeland and National Security.**
- **DOT Outcome 1** – Balance homeland and national security transportation requirements with the mobility needs of the Nation for personal travel and commerce.
- **DOT Strategy** – Support and implement U.S. security strategies and plans related to transportation.

Relationship to Performance Target

The FSRM Program provides the infrastructure enhancements needed to reduce risks to facilities critical to the NAS. These enhancements reduce the risk of unauthorized access and provide early identification of potential security problems.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.7** – Support national aviation security needs.

Program Plans FY 2009 – Performance Output Goals

- Upgrade and accredit 30 of 210 remaining facilities (14%).

Program Plans FY 2010-2013 – Performance Output Goals

- Upgrade and accredit 180 of 180 remaining facilities (100%).

3A06, INFORMATION SECURITY

FY 2009 Request \$12.0M

- NAS Information Security – Information Systems Security, M31.00-00

Program Description

The FAA must ensure the integrity and availability of all its critical information systems, networks, and administrative systems under conditions of increased cyber terrorism and malicious activities by hackers and other unauthorized personnel. In the Homeland Security Presidential Directive/HSPD 7, FAA was directed to protect and ensure the integrity, confidentiality, and availability of all National Airspace Information Systems as well as federal information. Under the Federal Information Security Management Act (FISMA) of 2002, FAA must ensure that all information systems identify and provide information security protection equal to the risk and magnitude of the harm resulting from unauthorized access, use, disclosure, disruption, modification, or destruction of information that support the agency, aviation safety and security, and the NAS.

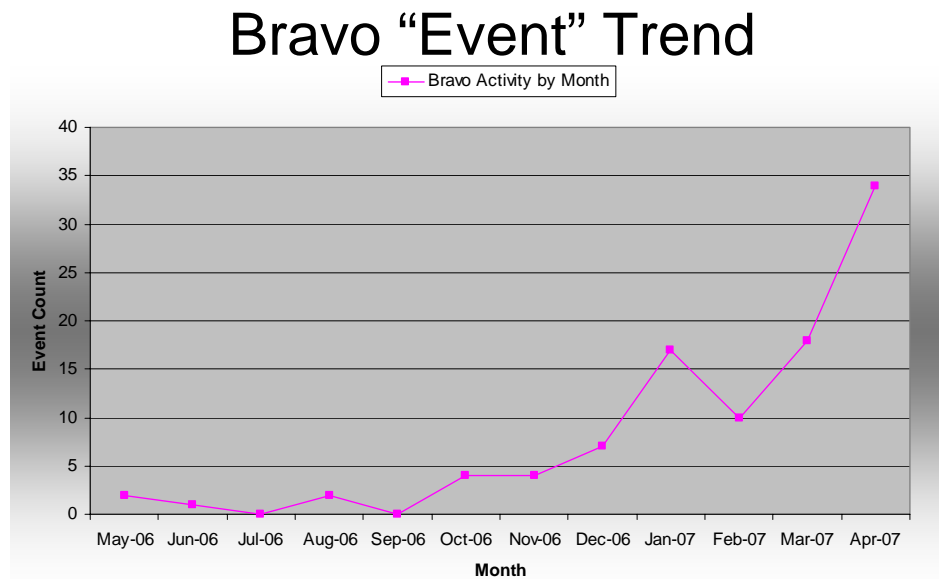
In FY 2005 GAO conducted an audit of cyber security controls in the NAS. Significant shortfalls were highlighted in the areas of remediation, and certification and accreditation. The FAA will complete the recommendations in that audit. The FISMA requires the Inspector General (IG) to perform annual assessments on the agency's Information Systems Security (ISS) program. The FAA continuously works on these annual recommendations. Each year Congress provides a letter grade assessment of the cyber security program. While DOT/FAA has improved its grade in recent years (FY 2007 C minus to B), there is much more to do.

The FAA Cyber Security program is a partnership between the FAA Chief Information Officer (CIO) organization and FAA lines of business and staff offices (LOBs/SOs) with a focus on protecting our information technology (IT) infrastructure. The program is comprised of the following areas: Cyber Security Management Center (CSMC); IT and ISS awareness and training; IT research and development (R&D); policy, standards, and requirements; program evaluations; and system certification and compliance. This comprehensive Cyber Security effort offers information security awareness training of the agency's key ISS personnel, development and evaluation of policies and standards, formulation of system requirements, certification of systems and ensures their compliance with federal regulations, protection of FAA's computer enterprise, and response to computer security incidents.

This program directly supports the FY 2008-2012 FAA Flight Plan, Organizational Excellence Goal, Objective 3, and Performance Target: Achieve zero cyber security events that disable or significantly degrade FAA service. Without sufficient effort in this area, FAA is in danger of not meeting its goal of

zero cyber security events that disable or significantly degrade FAA services. The sharp increase in “Bravo” events and the number of alerts is proof that FAA is becoming more of a target.

Bravo events are targeted attacks on federal government systems, which pose a serious and imminent threat to those systems. These are events specific in nature, objective and patterned. They are by design hostile intent, and, so far, FAA has had 81 such attacks. Understanding all aspects of these events dictates that they be detected and prevented to the maximum extent to which the target (in this case FAA or agencies) is capable. The development of the term “Bravo” was initiated as an indirect route to allow the communication of these events and the identification and mitigation of systems that have been compromised or affected by these sophisticated attacks. The chart below shows the monthly Bravo event trend for May 2006 thru April 2007.



5/22/2007

The office of the Chief Information Officer (AIO’s) work continues with a strategy, which is a comprehensive, proactive approach to preventing and isolating intrusions in the agency’s computer networks. This cyber defense strategy involves hardening of the individual system and network elements, isolating those elements and backing up those elements to avoid services disruptions.

Relationship of Program to DOT Strategic Goal, Objective, & Performance Target

- **DOT Strategic Goal 5 – Homeland and National Security.**
- **DOT Outcome 1** – Balance homeland and national security transportation requirements with the mobility needs of the Nation for personal travel and commerce.
- **DOT Strategy** – Support and implement U.S. security strategies and plans related to transportation.

Relationship to Performance Target

The FAA supports and implements security strategies and plans by: (1) ensuring effective preparedness, detection, response, and recovery regarding cyber attacks; (2) integrating information security efforts into all acquisition and operation phases to protect FAA people, buildings, and information; and (3) supporting the nation’s efforts to safeguard homeland security, in particular the aviation infrastructure and industry.

Program Plans FY 2009 – Performance Output Goals

- Correct NAS vulnerabilities discovered through the certification and authorization process.
- Provide CSMC enhancements to support NAS and the NAS Security Information Group.
- Enhance the NAS Enterprise Architecture regarding cyber security protection by developing cyber security requirements and reviewing certification and authorization work.
- Conduct initiatives to improve the reliability, availability, and integrity of NAS systems during various forms of cyber attack.
- Develop plans and provide management support to integrate the network connections from LOBs/SOs into the FAA Internet Protocol Version 6 compliant backbone.

Program Plans FY 2010-2013 – Performance Output Goals

- Correct NAS vulnerabilities discovered through the certification and authorization process.
- Certify and authorize spiral releases of complex systems and newly designed systems.
- Provide CSMC enhancements to support NAS and the NAS Security Information Group.
- Enhance the NAS Enterprise Architecture regarding cyber security protection by developing cyber security requirements and reviewing certification and authorization work.
- Conduct initiatives to improve the reliability, availability, and integrity of NAS systems during various forms of cyber attack.
- Complete concept of operation and implement strategy for automated recovery, which involves isolating those systems that have been affected by a virus, instituting the fix, and making sure that affected systems get back online as soon as possible.
- Develop architecture and engineering efforts for alternative solutions to secure new NAS systems.
- Monitor and take all actions necessary to ensure that the NAS information technology systems are not interrupted and are available at all times.
- Address vulnerabilities discovered through certifications and authorizations completed in prior years.
- Evaluate and acquire enhanced tools used by the CSMC to address complex and rapidly changing cyber threats and vulnerabilities.

3A07, SYSTEM APPROACH FOR SAFETY OVERSIGHT (SASO)

FY 2009 Request \$14.3M

- System Approach for Safety Oversight (SASO), A25.01-00
- X, System Approach for Safety Oversight (SASO) – Phase 2, A25.02-01

Program Description

Preventive system safety oversight is recognized as the most effective and efficient way of preventing accidents. The SASO program will develop and implement a new proactive systems safety approach that significantly improves the FAA's ability to identify and address hazards and safety risks before they result in accidents. Since these risks exist in the operations of large and small air carriers, repair stations, pilot and mechanic schools, designee programs and other sectors of the aviation environment, SASO will re-engineer the oversight processes in each of these areas. Existing certification, inspection, designee oversight, and investigation procedures, as well as the current regulations, will be evaluated, and overhauled where necessary. New processes will be structured to focus on; collecting, analyzing, and disseminating critical safety data; identifying indicators of systemic and individual hazards; and eliminating those conditions that pose safety risk.

Existing information systems and tools will be examined to determine their ability to support systems safety oriented oversight. Redundant applications will be consolidated. Obsolete and unsuitable systems will be removed and replaced with an integrated suite of databases and analysis tools that coincide with the new systems-based, risk management-oriented processes. Newly designed processes and information systems will encompass all necessary human factors considerations to ensure their effective implementation, and the workforce will be trained in their application. The new systems and analysis/decision support tools will consistently provide accurate, critical information needed to make

timely safety decisions, and the newly engineered oversight processes will emphasize the use of this data by the FAA when making critical decisions. Finally, the program will exchange information from these systems with national and international government and industry organizations throughout the aviation community to increase awareness of systemic safety risks and maximize levels of safety.

The SASO program will consolidate 56 independent FAA safety systems into five enterprise systems. This will provide easier access to safety information for employees that monitor industry safety. Information will also be shared with industry professional, both within and outside the U.S., who are working to improve aviation safety.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 1 –** Reduce commercial air carrier fatalities.
- **FAA Performance Target 1 –** Cut the rate of fatalities per 100 million persons on board in half by 2025.

Relationship to Performance Target

SASO will contribute to a reduction in accident rates over the period FY 2003 through FY 2022. SASO proposes to achieve these results by reengineering oversight processes for system safety and automating system safety functions.

Program Plans FY 2009 – Performance Output Goals

- Complete commercial air carrier oversight system automation.
- Complete evaluation of commercial air carrier oversight system effectiveness and efficiency.
- Complete reengineering repair station oversight business processes.
- Complete reengineering air taxi and commuter oversight business processes.
- Continue mitigation of cultural/organizational problems or obstacles to change.
- Complete SASO Phase I.

Program Plans FY 2010-2013 – Performance Output Goals

- Initiate SASO Phase II.
- Complete repair station oversight system automation.
- Complete evaluation of repair station oversight system effectiveness and efficiency.
- Complete automation of air taxi and commuter oversight systems.
- Complete reengineering aerial applicator oversight business processes.
- Complete automation of aerial applicator oversight systems.
- Complete reengineering training center and school oversight business processes.
- Complete automation of training center and school oversight systems.
- Complete reengineering general aviation oversight business processes.
- Complete automation of general aviation oversight systems.
- Complete integration of commercial air carrier, air taxi, commuter, repair stations, training center, and school oversight systems.
- Continue mitigation of cultural/organizational problems or obstacles to change.

3A08, AVIATION SAFETY KNOWLEDGE MANAGEMENT ENVIRONMENT (ASKME) **FY 2009 Request \$7.9M**

- Aviation Safety Knowledge Management Environment (ASKME), A26.01-00

Program Description

The Aviation Safety Knowledge Management Environment (ASKME) is a suite of information technology (IT) tools designed to support and enable the FAA Aircraft Certification Service (AIR) to more efficiently certify new aircraft and modifications to existing aircraft. The program has been established to provide a comprehensive automation environment for critical safety business processes for the Office of Aviation Safety through deployment of 18 integrated business solutions (18 projects) between Fiscal Year 2008 and Fiscal Year 2016. ASKME will provide for the electronic storage and retrieval of FAA technical documentation and lessons learned from previous certifications that involved aircraft design and manufacturing safety issues so that they can be accessed and shared more easily. This technical data includes the rationale for design and production certification decisions, interpretations of rules and policies, and audits of aircraft industry manufacturers. In addition, ASKME will provide tools to improve the ability to identify potential unsafe conditions by analyzing this documentation along with safety information such as Service Difficulty Reports, National Transportation Safety Board safety recommendations and reports, accident reports, and Maintenance Difficulty Reports. Finally, ASKME will provide electronic tools for capturing key safety related data resulting from its standard business activities for rulemaking and policy development, airworthiness directives, design certification, production/manufacturing certification, airworthiness certification, designee management, evaluation and audit, external inquiries, enforcement, continued operational safety management, and international coordination. ASKME obtained its baseline decision (FY 2008-FY 2012) on June 20, 2007 from the FAA Joint Resources Council.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 1 – Reduce commercial air carrier fatalities.**
- **FAA Performance Target 1 – Cut the rate of fatalities per 100 million persons on board in half by 2025.**

Relationship to Performance Target

The Aircraft Certification Service (AIR) is responsible for ensuring that civil aircraft are designed and manufactured to operate safely within the NAS. ASKME will provide the automated systems to conduct safety data analysis and data gathering, as well as the collection of lessons learned as it applies to AIR's safety-related responsibilities. The projected savings over the life of the program is estimated at 174 avoided fatalities and a total savings of \$494.96M (then year dollars at 80% high confidence level).

Program Plans FY 2009 – Performance Output Goals

- Work Tracking Software (WTS) – Continue design and development activities for the “Risk Based Resource Targeting” (RBRT) technology which will be used to allocate resources to examining aircraft design variables with the greatest risk.
- Monitor Safety Related Data (MSRD) – Complete design, development, test, and deployment activities for the “Monitor Safety & Analyzed Data” (MSAD) technology component based on requirements gathered.
- Monitor Safety Related Data (MSRD) – Finalize documented detailed system specification requirements for the “Internal Oversee System Performance” (OSPi).
- Assimilate Lessons Learned (ALL) – Finalize documented detailed system specification requirements for the ALL sub-function and initiate contracting activities for design and development in FY 2010.

Program Plans FY 2010-2013 – Performance Output Goals

- Finalize documented detailed system specification requirements phase (first phase for application development lifecycle) for the following ASKME deliverables:
 - MSRD-OSPe (External Oversee Safety Performance) – FY 2010.
 - WTS-WAT (Work Activity Tracking) – FY 2010.
 - EDA (Engineering Design Approval) – FY 2011.
 - DTE (DDS Technical Evaluations) – FY 2011.
 - WTS-Budget Management – FY 2013.
 - Airworthiness Directives Development – FY 2013.
- Scan historical safety-related documentation for population in the Electronic File Service repository – FY 2010-FY 2012.
- Complete design, development, test, and deployment phases (follows system specification requirements phase) for the following ASKME deliverables:
 - DS/PP (Designee Supervision / Past Performance) – Starts FY 2009, Ends FY 2010.
 - ALL (Assimilate Lessons Learned) – Starts FY 2010, Ends FY 2010.
 - MSRD-OSPi (Internal Oversee Safety Performance) – Starts FY 2010, Ends FY 2011.
 - MSRD-OSPe (External Oversee Safety Performance) – Starts FY 2010, Ends FY 2011.
 - WTS-WAT (Work Activity Tracking) – Starts FY 2011, Ends FY 2013.
 - EDA (Engineering Design Approval) – Starts FY 2012, Ends FY 2013.
 - DTE (DDS Technical Evaluations) – Starts FY 2012, Ends FY 2013.
- Begin design and development phase activities for the for the following ASKME deliverables:
 - WTS Budget Management – Starts FY 2013, Ends FY 2014.
 - Airworthiness Directives Development – Starts FY 2013, Ends FY 2015.

3A09X, LOGICAL ACCESS CONTROL

FY 2009 Request \$0.0M

- Logical Access & Authorization Control Svc (LAACS), M31.02-01

Program Description

On August 27, 2004, Homeland Security Presidential Directive (HSPD) 12 was issued. This directive set the policy for a Common Identification Standard and mandated government-wide implementation of secure and reliable forms of both physical and logical identification to gain access to buildings and information and communications systems. This directive followed multiple orders over several years, including NIST SP800-53, and E-Authentication and E-Gov from 1997 through 2003. The latter directs departments and agencies to increase the security of government logical resources including Information Systems (IS), Information Technology (IT) and data. Additionally, since HSPD-12, there have been additional orders and directives for increasing the security surrounding government logical resources, including FIPS-200 in 2006 which mandates compliance with NIST SP 800-53.

The LAACS program is the planning, acquisition, and implementation of the first integrated, enterprise identity management system (IDMS) with an associated service to help application and IT resource owners increase the security protecting their resources. A full-suite IDMS COTS product will integrate multi-level authentication, with multi-role authorization and multi-level asset audit security controls to the internal and external access of data and systems. This provides multi-level criterion to ensure a standardized level of identity security is applied to each application for its required level of assurance. LAACS controls who accesses what data with what forms of identity, at what times, from what locations, and with what methods. Audit logs provide near real-time threat assessments, as well as the capability for post-threat forensics. Additionally, LAACS provides automated workflow provisioning to manage account setup, modification, and de-activation to improve the efficiency and effectiveness of security controls. The latter is especially important in managing emerging threats and the single most compelling reason to implement an enterprise IDMS. With a single action, an individual's access to all logical assets is eliminated or reduced, i.e., de-provisioned or role modified.

With the implementation of an advanced, commercial identity management system, the government will be able to expand government-to-business and government-to-citizen contacts while protecting the external entity's intellectual property and privacy. This investment addresses, at minimum, the following security goals, mandates, orders, and requirements:

1. Privacy Act (5 U.S.C. 522a)
2. HSPD-12
3. President's Management Agenda (Human capital, financial performance, expanded E-Government)
4. Federal Information Processing Standards 199, 200, 201
5. National Institute of Standards and Technology 800-53, 63
6. Sarbanes Oxley
7. Health Insurance Portability and Accountability Act

LAACS will provide an enterprise security infrastructure to allow and promote secure electronic commerce between government, citizens, and industry - nationally and internationally. LAACS will support the Public Key Infrastructure trust model used globally, as well as other trust models which protect privacy for electronic access of publicly available data. A critical part of this plan is to ensure authentication of each internal user's identity (100,000 employees and contractors) and their privilege level before granting access to government logical resources. Other trust models will be supported to provide for the private and secure access of the public or industry to government logical resources.

Finally, in conjunction with LAACS, the FAA must develop and set standards and policies for logical access control, including the maintenance and use of encryption keys.

Relationship of Program to DOT Strategic Goal, Objective, & Performance Target

- **DOT Strategic Goal 5 – Homeland and National Security.**
- **DOT Outcome 1** – Balance homeland and national security transportation requirements with the mobility needs of the Nation for personal travel and commerce.
- **DOT Strategy** – Support and implement U.S. security strategies and plans related to transportation.

Relationship to Performance Target

The implementation of LAACS will enable the agency to protect the Department of Transportation and FAA NAS or Non-NAS logical resources against cyber terrorism and malicious activities by hackers and other unauthorized personnel. The implementation of LAACS will enable the agency to reduce identity fraud, protect personal privacy, keep sensitive information secure, support business continuity planning, respond rapidly and consistently to internal and external security threats, and improve the accountability and oversight of agency information and information systems. This effort will substantially increase the assurance of reliability, availability, and integrity of department and agency IS, IT, and data.

B. TRAINING, EQUIPMENT, AND FACILITIES

3B01, AERONAUTICAL CENTER INFRASTRUCTURE MODERNIZATION **FY 2009 Request \$13.5M**

- Aeronautical Center Infrastructure Modernization, F18.00-00

Program Description

The Aeronautical Center Infrastructure Modernization program funds renovation of critical leased and owned facilities to enable, sustain, and ensure they remain viable for present and future FAA employees, students, and contractors. Funding from this program allows renovation of facility space used by Air Operations, Engineering Training (Radar/Nav aids), NAS Logistics, airmen/aircraft registration, and Business Services. FY 2009 funding will be used for facility renovation and building system replacement, storm sewer replacement, and telecommunications infrastructure upgrade. This CIP replaces major building systems not provided for by any other funding sources or lease agreement.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2** – Improve financial management while delivering quality customer service.
- **FAA Performance Target 2** – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

The Aeronautical Center Infrastructure Modernization program sustains a cost effective workplace for Air Operations, Engineering, and Training that contribute to the FAA's 99.7% NAS system availability goal. This program reduces the cost of Air Traffic Organization (ATO) operations by providing facilities that are lower in cost when compared with Oklahoma City GSA metropolitan leased facilities and GSA national averages for leased facilities. Eighty percent (80%) of Aeronautical Center space is used for direct support of the ATO by AJW 14/173/223 (Engineering Organizations), Aviation System Standards (AVN), the Logistics Center, Air Traffic Control training, ATO Technical Operations Training and Certification. This program enhances financial discipline by providing Technical Operations and Air Traffic training through updated training facilities for resident and computer-based learning and development. In addition, 13% of Aeronautical Center space provides business service facilities for the DOT/DELPHI/Prism/Castle Data Center Operations, consolidated Accounting Operations services, Acquisition, ATO Data Center Operations, and Aviation Safety (AVS/CAMI).

Program Plan FY2009 – Performance Output Goals

- Systems Training Building (STB) design. Begin basement floor replacement construction to correct life safety issues.
- Design and construct Hangar 9 fire suppression system to protect FAA aircraft whose value exceeds \$600M.
- Storm Sewer Replacement - Phase 2 of 4.
- Telecommunications: Implement Cisco network for Aeronautical Center backbone to provide redundancy, reliability, security and availability. Router backplanes will be replaced to support increased bandwidth needed by Data Centers and increasing user requirements. Hardware/software upgrades will support newer model telephones and replace old hardware. Single mode fiber will be provided to north center campus for increased redundancy of core routers on the network, increased bandwidth to Data Centers and individual Aeronautical Center users.

Program Plan FY2010-2013 – Performance Output Goals

- Complete Hangar 9 fire suppression system construction.
- Complete renovation construction of STB basement floor.
- Renovation construction of the Multi-Purpose Building (MPB).
- Telecommunications upgrades will include: installation of telecom equipment to replace network switches, uninterruptible power supply units, wireless access points, and core routers. Security assessment/disaster recovery testing; upgrades to IPE controller and hardware/software upgrades to campus fiber plans, upgrades of network software management tools, and additional telecommunications fiber/copper.

System Implementation Schedule

The following buildings will be returned to service as phased renovation construction is completed:

- Flight Inspection Building, FY 2010.
- Air Navigation Facility #2, FY 2009.
- Hangars 8 and 9 fire suppression systems, FY 2009-2010.
- Systems Training building, FY 2013.
- Storm Sewer replacement, phases 3 and 4.

3B02, NATIONAL AIRSPACE SYSTEM (NAS) TRAINING FACILITIES

FY 2009 Request \$1.4M

- NAS Training – Equipment Modernization, M20.00-00

Program Description

The FAA Academy conducts technical training for air traffic controllers, airway facilities technicians, aviation safety inspectors, and other specialists, and is also responsible for internal training infrastructure. Training on new systems being installed as part of the NAS modernization requires updated simulators, training media, and communications equipment. In FY 2009, the Academy plans to continue implementation of an Interactive Simulation Training System (ISTS), which allows trainees to learn the operation and/or maintenance of various types of equipment, as well as concepts critical to their assigned duties. This system will significantly cut training costs, and it will result in a well-trained technical workforce. Following achievement of full operational capability in 2008, technology refresh will be required to continue the capability.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 1** – Make the organization more effective with stronger leadership, increased commitment of individual workers to fulfill organization-wide goals, and a better prepared, better trained, safer, diverse workforce.
- **FAA Performance Target 5** – Maintain the air traffic control workforce at or above the projected annual totals in the Air Traffic Controller Workforce Plan.

Relationship to Performance Target

The NAS Training Equipment Modernization program enhances operational/maintenance training for NAS systems by providing modern simulators, training media, and communication equipment. It also increases training efficiency by reducing the time it takes to train this workforce. This equates to less time spent in training and more time on position in the facility. Operational efficiency is improved because the Academy-trained technical workforce is applying the newly acquired skills to the operational elements of the NAS. In addition to significantly improving the efficiency and effectiveness of virtually all FAA Academy technical training, the ISTS will certainly help the FAA meet annual hiring goals established by the Air Traffic Controller Workforce Hiring Plan.

3B03, DISTANCE LEARNING

FY 2009 Request \$1.5M

- Distance Learning, M10.00-00

Program Description

The Distance Learning program will replace Computer-Based Instruction (CBI) Delivery Platforms at all CBI Learning Centers, increase connectivity, and upgrade network multimedia support and services. The system consists of about 1,400 Learning Centers located at virtually every FAA facility around the world. The FAA is replacing the platforms for two reasons: (1) to support high-performance media and simulations required in many lessons; and (2) because replacement parts for current platforms are becoming obsolete and hard to obtain.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2** – Improve financial management while delivering quality customer service.
- **FAA Performance Target 2** – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

The major benefit of distance learning is the substantial reduction in student time away from work, and student travel and per diem costs associated with resident-based training. In addition, distance learning delivery methods increase training effectiveness, increase training opportunities for all FAA employees, and provide flexibility in training schedules through local management control. The FAA CBI system must deliver initial operator, transition, and maintenance training for many NAS programs. By providing a standard training delivery and equipment simulation platform across all NAS programs, the need for such equipment and the space it would occupy is much reduced. All of these factors contribute to a reduction in

the unit cost of service for en route, terminal, and flight service. This program contributes well over \$10M savings each year. These efficiencies combine to produce a better prepared, better trained, safer diverse workforce. Such an improvement in working conditions and workforce skills preparation is expected to support the 10-15% savings goal for selected products and services.

3B04, NAS TRAINING FACILITIES - SIMULATOR

FY 2009 Request \$12.0M

- Training Simulators – Tower Cab, M20.01-02

Program Description

The NAS Training Simulator project will acquire and deploy training simulators to selected air traffic facilities in the field. Similar technology implemented at the Academy and by the US Air Force has proven successful. This project focuses on using technology to assist FAA in training newly hired controllers during the next 10 years in response to projected staffing requirements. This program provides funding to acquire simulators, training media, and communications equipment for air traffic facilities.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 1** – Make the organization more effective with stronger leadership, increased commitment of individual workers to fulfill organization-wide goals, and a better prepared, better trained, safer, diverse workforce.
- **FAA Performance Target 5** – Maintain the air traffic control workforce at or above the projected annual totals in the Air Traffic Controller Workforce Plan.

Relationship to Performance Target

Through the use of simulation at Terminal facilities, the FAA can further enhance training for air traffic controllers in a high fidelity, realistic environment. Not only will this reduce on-the-job training time, but also significantly reduce operational errors. Students need the simulated environment to reach the skill level necessary to become a fully proficient controller.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #2** – Enhance Financial Discipline.
- **SMP Objective #2.4** – Reduce unit cost of operations.

Program Plans FY 2009 – Performance Output Goals

- Continue the acquisition and installation of simulators at selected air traffic control tower hub locations.
- Continue the installation of simulator software databases for selected air traffic control tower hub and satellite locations.
- Continue air traffic instructor simulator training at selected hub locations.
- Continue the implementation of Contractor Logistic Services.

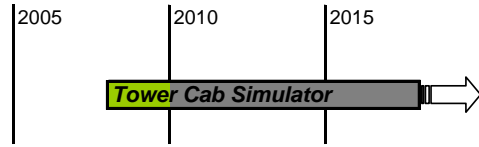
Program Plans FY 2010-2013 – Performance Output Goals

- Complete installation of simulator software databases at selected air traffic control tower hubs.
- Complete air traffic instructor simulator training.
- Continue Contractor Logistic Services.
- Perform technology refresh on the deployed simulator systems.

System Implementation Schedule

Tower Cab Simulator

First site IOC: March 2008 -- Last site IOC: September 2009



ACTIVITY 4. FACILITIES AND EQUIPMENT MISSION SUPPORT

4A01, SYSTEM ENGINEERING AND DEVELOPMENT SUPPORT

FY 2009 Request \$32.0M

- A, CIP Systems Engineering and Technical Assistance – SETA and other Contractors, M03.01-00
- B, Provide ANF/ATC Support (Quick Response), M08.01-00
- C, Web CM, M03.01-01

A, CIP SYSTEMS ENGINEERING AND TECHNICAL ASSISTANCE – SETA AND OTHER CONTRACTORS, M03.01-00

Program Description

This SETA project allows the FAA to contract for critical expertise to assist in system engineering and other technical areas used to develop the NAS Architecture and key modernization projects. The System Engineering support staff work on four of the key modernization plans: the Flight Plan, NAS Operational Evolution Plan, Capital Investment Plan, and the NAS Aviation Research Plan. System engineering and integration are key to the NAS Enterprise Architecture's success and to maintaining interface control between current systems and new systems.

Besides system engineering, the contracts under this program support the ATO in developing systems for automation, communications, navigation and landing aids, surveillance, and weather. Also provided are program management, financial management and investment analysis support to assist with planning, decision making, and budgetary oversight of the activities involved in implementing newly acquired systems, components, and equipment in existing operational NAS facilities.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2** – Improve financial management while delivering quality customer service.
- **FAA Performance Target 2** – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

The SETA project contributes to organizational excellence by providing support for designing and managing NAS modernization. With contractor assistance, the FAA is able to plan, analyze, and manage NAS system improvements more effectively. In addition, financial management and investment analysis support helps the FAA track cost, balance competing budgetary resources, and make important decisions necessary to ensure that limited program dollars provide the greatest return on investment.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4** – Ensure Viable Future.
- **SMP Objective #4.2** – Provide a future air transportation system that meets customers' operational needs.

B, PROVIDE ANF/ATC SUPPORT (QUICK RESPONSE), M08.01-00

Program Description

This program provides quick response support for ATO organizations to solve issues related to information technology and financial management systems. Examples include: providing additional ATO Cost Accounting Reports; installing an Information Technology (IT) link to support operations research; IT support for the DELPHI accounting system; and ensuring connectivity for automation systems in the multiple FAA buildings. It also provides emergency engineering response for unforeseen regional problems such as relocating an antenna for a remote communication facility and removing a decommissioned tower. These projects are unexpected and must be done swiftly.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2** – Improve financial management while delivering quality customer service.
- **FAA Performance Target 2** – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

This project improves financial management by supporting the systems that generate financial baselines and track costs for individual projects. It allows financial management system problems to be corrected quickly so detailed cost and schedule information is available when needed. This allows managers to more quickly identify programs that are at risk and take corrective action. Quick action to resolve regional issues and sustain regional operations leads to a higher level of customer satisfaction.

Strategic Management Plan (SMP) Pathway and Objective

- **SMP Pathway #1** – Achieve Operational Excellence.
- **SMP Objective #1.6** – Optimize Service Availability.

C, WEB CM, M03.01-01

Program Description

Configuration Management (CM) is a vital component of the NAS life cycle systems management. FAA Order 1800.66 prescribes that CM shall apply to all NAS systems, subsystems, and components, including the documentation describing the NAS. WebCM is based on state of the art technology that replaces the labor-intensive functionality provided by the FAA's existing Document Control (DOCCON) system. The efficient management of CM information is critical to the operation of CM functions and activities as well as the management of FAA systems throughout their lifecycle. WebCM provides an automated and integrated capability to the Agency's CM community for managing the NAS CM processes.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2** – Improve financial management while delivering quality customer service.
- **FAA Performance Target 2** – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

WebCM provides an enterprise solution capability to managers, engineers, field technicians, and other personnel for managing, monitoring, and reporting on NAS systems. It is an agency-wide accessible tool that provides timely and accurate CM-related information as well as interfaces to related information systems. WebCM will reduce the NAS change control process cycle time during requirements, acquisition, and operational phases; and thereby provide long-term cost savings to the FAA.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #2** – Enhance Financial Discipline.
- **SMP Objective #2.4** – Reduce unit cost of operations.

4A02, PROGRAM SUPPORT LEASES

FY 2009 Request \$43.5M

- Program Support Leases, M08.06-00

Program Description

This program reviews and approves real property requirements needed to operate the NAS. It also budgets for the payments for approximately 2,398 land leases, 672 space leases, and 75 leases covering both land and space for operational facilities. It also funds the purchase of land when economically advantageous.

For FY 2009, the request will fund approximately 3,145 leases and will include:

- Payment of rents on approximately 3,145 land and/or space leases that directly support navigation, communication, weather, and air traffic control facilities;
- Costs associated with the rental and management of land and/or space for service/maintenance centers, deployment/development centers, laboratories, test beds, and other types of facilities that support the deployment and operation of technical facilities;
- Payments for condemnation of real property interests;
- Funds for conversion of existing leases to fee ownership;
- Costs for real estate appraisals, market surveys, title reports, and other costs associated with the acquisition and management of real property assets;
- Funds for costs to relocate offices, facilities, personnel, and equipment and combine or consolidate multiple offices when technically feasible and economically advantageous.
- Funds for the management and administration costs for establishing and maintaining a database of leases and owned facilities, for developing business tools to enhance logistics activities, and for implementing program efficiency practices; and
- Funding for certain costs associated with real property disposals with sale proceeds to be used to offset other direct and related program costs.

- Funding for costs associated with the termination of ATO leases or the re-use of vacated Automated Flight Service Station space for other ATO purposes.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2 – Improve financial management while delivering quality customer service.**
- **FAA Performance Target 2 – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:**
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

In support of the Agency Flight Plan Goal of Organizational Excellence this program is improving management of the FAA's real property assets; thus, contributing to the Organizational Excellence Objective 2, Improve financial management while delivering quality customer service. Real property costs are being effectively controlled through:

1. The oversight and approval of all requests for additional real property rights,
2. The oversight and approval of all major maintenance and enhancements to existing real estate, and
3. The co-location of sites that currently are leased separately; hence, eliminating rents, utility costs, and maintenance costs for the excess space.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #2 – Enhance Financial Discipline.**
- **SMP Objective #2.4 – Reduce unit cost of operations.**

4A03, LOGISTICS SUPPORT SERVICES (LSS)

FY 2009 Request \$7.9M

- NAS Regional/Center Logistics Support Services, M05.00-00

Program Description

The Logistics Support Services (LSS) program uses contractor-supplied services to perform real property acquisition and materiel management contracting activities in support of FAA CIP projects, and to conduct accounting system capitalization and property control-related activities. These services currently represent a significant portion of the workforce for acquisition, real estate, and materiel management in the three Logistics Service Areas and at the Aeronautical and Technical Centers. The LSS program is instrumental in establishing new or upgraded facilities, including air traffic control towers and TRACONS throughout the NAS. LSS resources will also continue to be used for asset tracking and documentation efforts to obtain and maintain a clean audit opinion. The services also support the FAA Facility Security Risk Management (FSRM) program.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2** – Improve financial management while delivering quality customer service.
- **FAA Performance Target 2** – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target:

The program maintains documentation, suitable for independent audit, which is the basis for the accounting system's summary of the capital cost of facilities throughout the FAA. Having accurate accounting records and improving cost controls for real property management improves efficiencies in acquisition, leasing and managing property.

4A04, MIKE MONRONEY AERONAUTICAL CENTER LEASES **FY 2009 Request \$15.8M**

- Mike Monroney Aeronautical Center – Leases, F19.00-00

Program Description

The Mike Monroney Aeronautical Center lease provides all the land and 80% of the facility space comprising the Aeronautical Center, including maintenance of leased structures and building exteriors and replacement of major building systems within leased buildings: 1100 acres of land, 2.8M square feet of facility space.

The lease is comprised of the following components:

- Master Lease – Land, base rent, maintenance, and insurance,
- Airmen and Aircraft Registry Lease – Land, base rent, maintenance, and insurance,
- Thomas Road warehouse lease,
- Tower space for TDWR target generators,
- Building 50, and
- Grounds Maintenance.

The Center requires large parcels of land as NAS test sites for surveillance radar, communications, weather, and navigation/landing systems, as well as warehouse, administrative office space, and training facilities for 5,500 employees and contractors, and 30,000 students annually. The Center supports air traffic training, aviation research, engineering support of NAS equipment, logistics supply and repair, aviation medical research, and other important aviation regulation, registration, certification, and business functions.

The Aeronautical Center is a Level IV security site based on numbers of employees, facility square footage, sensitivity of records, volume of public contact, and mission-critical facilities whose loss, damage, or destruction may have serious or catastrophic impact on the NAS.

Funding for this program provides for the FY 2009 lease costs as specified in the lease agreement. The lease will expire in 2028.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2** – Improve financial management while delivering quality customer service.
- **FAA Performance Target 2** – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

The Mike Monroney Aeronautical Center Lease sustains a cost effective workplace for Air Operations, Engineering, and Training that contribute to the FAA's 99.7% NAS system availability goal. Eighty percent (80%) of Aeronautical Center space is used for direct support of the ATO by Engineering Organizations, Aviation System Standards (AVN), the Logistics Center, Air Traffic Control training, ATO Technical Operations Training and Certification.

This program enhances financial discipline by providing Technical Operations and Air Traffic training through updated training facilities for resident and computer-based learning and development. In addition, 13% of Aeronautical Center space provides business service facilities for the DOT/DELPHI/Prism/Castle Data Center Operations, consolidated Accounting Operations services, Acquisition, ATO Data Center Operations, and Aviation Safety (AVS/Civil Aeromedical Institute (CAMI)). The Aeronautical Center leases ensure a viable future for the FAA by supporting the delivery of a future air traffic system to meet customer's operational needs. The Aeronautical Center has been designated by Presidential Decision Directive (PDD) 63 as 'US critical infrastructure' for the future.

4A05, TRANSITION ENGINEERING SUPPORT

FY 2009 Request \$10.7M

- A, NAS Implementation Support Contract (NISC), M22.00-00
- B, NAS Implementation Support Contract (NISC) – Configuration Management, M22.01-01

A, NAS IMPLEMENTATION SUPPORT CONTRACT (NISC), M22.00-00

Program Description

NISC provides technical expertise to assist the agency in deploying, implementing, and integrating many different components and equipment into the NAS within established modernization schedules. Some of the work products that support transition, implementation, and integration activities include: transition plans and timelines, equipment waterfall schedules, engineering site preparation packages, site implementation plans, analysis of environmental impacts, test procedures, site test monitoring, and corporate work planning.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2** – Improve financial management while delivering quality customer service.
- **FAA Performance Target 2** – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

The FAA's transition engineering support contract provides experienced personnel at cost effective rates to support the ATO service centers and headquarters offices with the planning and coordination of NAS programs. It also provides support to key FAA program management functions. This support assists the FAA in the financial management of a variety of F&E NAS modernization programs and projects.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #2** – Enhance Financial Discipline.
- **SMP Objective #2.5** – Increase Productivity.

B, NAS IMPLEMENTATION SUPPORT CONTRACT (NISC) – CONFIGURATION MANAGEMENT, M22.01-01

Program Description

Configuration Management (CM) is a Systems Engineering Discipline ensuring the cross-organizational coordination of engineering designs, facility and equipment baselines, and development and implementation of engineering changes.

CM improves the safety, efficiency, and effectiveness of the NAS through the identification, documentation, and control of changes to the functional and physical characteristics of air traffic systems. It strengthens management of configuration documentation, the predictability of performance, control of logistics supply/support costs, and planning future requirements for NAS systems. CM must occur during acquisition, development, test, deployment, and in-service phases of a systems life cycle.

CM establishes the methods and practices to be employed in accomplishing this mission in a cost efficient and effective manner. The contract supports an integrated review of whether new equipment is compatible with existing systems, and whether information flows between systems follow necessary protocols.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2** – Improve financial management while delivering quality customer service.
- **FAA Performance Target 2** – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
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 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

CM, as a systems engineering discipline, supports the FAA's goal of organizational excellence ensuring the cross-organizational coordination of engineering designs, facility and equipment baselines, and development and implementation of engineering changes. CM establishes the methods and practices to be employed in accomplishing this mission in a cost effective efficient and effective manner.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway 1** – Achieve Operational Excellence.
- **SMP Objective 1.6** – Optimize service availability.

4A06, FREQUENCY AND SPECTRUM ENGINEERING

FY 2009 Request \$3.5M

- NAS Interference Detection, Locating, and Mitigation (NAS IDLM), M43.01-00

Program Description

Through an interagency agreement in 2005 between the Departments of Defense, Homeland Security, and Transportation, the FAA is tasked to develop national assets for enhanced interference detection and location capabilities to help mitigate the adverse impacts of radio frequency interference (RFI) on present and future U.S. radionavigation, surveillance, and communications systems, especially the Global Positioning System (GPS). The NAS IDLM program will provide frequency spectrum integrity by minimizing RFI impact on Communications, Navigation, and Surveillance (CNS) radio services throughout the NAS. The program will record user reports (i.e., air traffic controllers, pilots) to quickly investigate, identify, locate, and mitigate sources of radio interference.

The IDLM program will procure replacement RFI vehicles and associated RFI investigation equipment used to find the source of the reported interfering radio signal. It will install fixed monitoring sites around two OEP airports. Each site will monitor the GPS and other critical aviation frequencies around the airport to automatically detect, identify, and locate any RFI signal source allowing for quick resolution.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 1** – Increase capacity to meet projected demand and reduce congestion.
- **FAA Performance Target 3** – Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the 35 OEP airports through FY 2012.

Relationship to Performance Target

NAS IDLM supports sustaining operational availability by locating and mitigating radio frequency interference to any FAA communication, navigation, or surveillance system to return it to service. This activity is critical to assuring that the critical radio transmissions for air traffic control are not blocked out by interference.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway 1** – Achieve Operational Excellence.
- **SMP Objective 1.6** – Optimize Service Availability.

Program Plans FY 2009 – Performance Output Goals

- Resolve 80% of all reported RFI incidents within 9 days.

Program Plans FY 2010-2013 – Performance Output Goals

- Resolve 80% of all reported RFI incidents within 9 days.

4A07, TECHNICAL SUPPORT SERVICES CONTRACT (TSSC)
FY 2009 Request \$22.0M

- Technical Support Services (TSS), M02.00-00

Program Description

TSSC is the agency's primary vehicle to provide a supplemental work force to install capital equipment. This contract helps the FAA ensure timely installation of equipment for NAS modernization. Engineers and technicians, hired under TSSC, oversee prime contractors' installation of equipment and perform direct capital project work. They perform site surveys, site preparation, and equipment installation, as well as several other contract functions to ensure that the installation schedules will be met. Without this supplemental source of engineers and technical staff, installation and equipment modernization projects would be delayed.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 2** – Improve financial management while delivering quality customer service.
- **FAA Performance Target 2** – Organizations throughout the agency will continue to implement cost efficiency initiatives such as:
 - 10-15% savings for strategic sourcing for selected products and services;
 - By the end of FY 2009 reduce leased space for Automated Flight Service Stations from approximately 510,000 square feet to approximately 150,000 square feet;
 - 3% reduction in help desk operating costs through consolidations; and;
 - Annual reduction of \$15 million in Information Technology operating costs.

Relationship to Performance Target

In a typical year, more than 3,700 separate projects are completed by FAA using the TSS. Customers using TSS benefit from high quality contractor labor support that is experienced, flexible, reliable, and cost effective. The quality of this customer service is substantiated by the consistently high customer (engineer and Engineering Technical Officer) participation, which is at 89 percent, and the satisfaction scores from the bi-annual award fee process, in which the contractor is rated higher than 90 percent.

The TSS contributes to cost control by helping the FAA install new equipment on a timely basis. This avoids added costs for holding and storing equipment and allows the FAA and the aviation industry to receive equipment and system modernization benefits on schedule.

Cost savings have also resulted from TSS moving its regional management counterparts into vacant, unused FAA space which saved tens of thousands of dollars in lease rental agreements that would have been paid through the contract vehicle. This cost-effective measure has taken place at several offices within all three FAA Service Area organizations.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #2** – Enhance Financial Discipline.
- **SMP Objective #2.5** – Increase Productivity.

4A08, RESOURCE TRACKING PROGRAM (RTP)

FY 2009 Request \$4.0M

- Resource Tracking Program (RTP), M08.14-00

Program Description

The RTP is a computer management system (including hardware, software, development, training, and support) used by the FAA Service Centers, the Technical Center, and the Aeronautical Center for identifying requirements, internal budget preparation, implementation planning, resource estimating, project tracking, and measuring performance of projects. The Corporate Work Plan (CWP), which is part of the RTP, enables users to share FAA's project data during the various stages of implementation (i.e., planning, scheduling, budgeting, execution, and closeout). The CWP system and its supporting data are continuously used for reporting project metrics to project managers, responsible engineers, program offices, and various other customers.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 6 – Organizational Excellence.**
- **FAA Objective 3** – Make decisions based on reliable data to improve our overall performance and customer satisfaction.
- **FAA Performance Target 2** – By FY 2008, 90 percent of major system acquisition investments are on schedule and maintain through FY 2012.

Relationship to Performance Target

The RTP contributes to the FAA organizational excellence goal by providing an enterprise level project management system. The legacy RTP systems currently operates in a distributed environment. The final steps in centralizing the system are underway. The centralized system will increase the quality of customer service. Both management and engineers will have up to date information on projects. Furthermore, the centralization effort will standardize reporting at all management levels allowing managers to better control overall project costs.

Strategic Management Plan (SMP) Pathway and Objective

- **SMP Pathway #2** – Enhance Financial Discipline.
- **SMP Objective #2.2** – Make the NAS more effective.

4A09, CENTER FOR ADVANCED AVIATION SYSTEM DEVELOPMENT (CAASD)

FY 2009 Request \$76.0M

- CIP Systems Engineering & Technical Assistance – MITRE, M03.02-00

Program Description

The CAASD is an FAA-sponsored Federally Funded Research and Development Center (FFRDC) operated under a long-term Sponsoring Agreement with the MITRE Corporation. A Product Based Work Plan (PBWP) is developed within the context of the FAA Flight Plan, Next Generation Air Transportation System (NextGen) Integrated Plan, Operational Evolution Partnership (OEP), National Aviation Research Plan (NARP), other agency long-range plans, and the CAASD Long Range Plan (FY 2008-2012). The PBWP and FFRDC Long Range Plan, approved by the FAA's FFRDC Executive Board, define an outcome-based program of technically complex research, development, and system engineering assignments designed to support the goals and requirements of the NAS and the NextGen. CAASD activities include:

NAS and NextGen Systems Integration and Evolution. Develop/integrate the NextGen enterprise architecture (EA), operational concepts, capability action plans, and roadmaps to achieve an integrated evolution and align agencies' EAs; analyze NAS-wide strategic issues involving multiple outcomes for efficient investment and operational decisions; provide definition, structure, and content for the NAS EA and ensure alignment with the evolving NextGen architecture; provide recommendations for U.S. and international flight data processing to improve NAS operations and global harmonization.

Communications Modernization. Conduct technical analyses on architecture alternatives; conduct engineering analysis, network definition, and transition strategy studies for the FAA's Voice Communications and SWIM programs to provide robust network-enabled operations and to reduce the overall FAA communications costs; provide technical and operational insight into the implementation of digital and data communications services in the NAS. Ensure that FAA and the user community understand the operational benefits to be gained.

Performance Based NAS. Provide new concepts for achieving a performance-based NAS; conduct technical analyses to identify airports and runways that will benefit from RNP and RNAV procedures; develop algorithms and prototype performance case analyses to validate Flight Standards procedure development tools; analyze and model all aspects of navigation assets, including Wide Area Augmentation System (WAAS), Local Area Augmentation System, (LAAS), divestiture of navigation aides, modernization of GPS, and interoperability with other Global Navigation Satellite System (GNSS) systems.

En Route Evolution. Perform system engineering analyses for new technologies, capabilities, and procedures for the en route system architecture and operational applications; develop concept of operations and prototypes to demonstrate and evaluate new capabilities and procedures; develop and conduct field evaluations of a simulation training prototype that will provide effective transition of automation and procedural advancements into operation use; validate the operational feasibility and expected productivity gains from changing roles and responsibilities in the en route domain.

Terminal Operations and Evolution. Provide technical and operational insight into systems that can safely permit reduced separation standards and/or significantly increase overall system capacity and productivity; provide technical and operational expertise to enhance the quality and efficiency of TRACON controller training, to allow for reduced training time and cost, improve trainee success rates, and improve workforce capabilities (e.g., reduced operational errors, improved productivity).

Airspace Design and Analysis. Structure and execute technical analyses that will influence FAA and Industry decisions on airspace design and management; investigate, innovate, and develop modeling, simulation, and analysis capabilities facilitating airspace design; explore issues that influence strategic airspace management and design policy, such as sectorization concepts.

NAS System Operations. Assess system performance; develop improved analytic techniques and capabilities for system operations analysis; develop operational strategies to manage emerging, chronic congestion problems by modeling capacity, delay, predictability, ripple effects, and access issues; develop improved measurement techniques for assessing operations; design, model, and assess new system operations procedures for new capabilities and airspace changes that will be implemented in the near future.

Traffic Flow Management (TFM) Operational Evolution. Provide assessment of concept maturity, operational feasibility, and implementation risks; advance the maturity of concepts to account for uncertainty (e.g. probabilistically) in predictions and decision making, by developing algorithms and prototype capabilities and conducting (human-in-the-loop) evaluation that will improve the FAA's ability to predict imbalances between traffic demand and real NAS capacity; translate concepts into requirements and assess the impact of enhancement capabilities on the TFM modernization system.

Future NAS Performance and Analysis. Improve understanding of the future environment, including anticipated demand at airports and for airspace; perform analyses to assess the affordability and long-term economic implications of different investments, operational changes, or proposed policies.

Aviation Safety. Perform technical analyses of NAS-wide accident and runway incursion risk to identify airports or specific types of operations with the highest risk, and prioritize implementation of appropriate operational and technological mitigations, leading to a reduction in accidents and runway incursions; identify/assess the feasibility of new/advanced capabilities and standards that mitigate NAS safety issues.

Mission Oriented Investigation and Experimentation (MOIE). Develop the tools and techniques for studying system capacity, throughput, performance, system dynamics and adaptation to technology- and policy-driven change; strengthen FFRDC systems engineering skills and tools by exploring new regimens and leveraging collaborations with industry, academia, and the broader aviation research community.

NAS-Wide Information System Security. Provide guidance on security threats, technology, standards, and practices being applied in other government and commercial enterprises in order to evolve Information Systems Security (ISS) to adapt to changing threats and technology advances; develop requirements and recommend solutions for effective cyber incident management program; advise the FAA on creating an IT infrastructure that will be resilient, flexible, and adaptable, and provide a defense-in-depth strategy..

Broadcast and Surveillance Services. Research ADS-B ground and cockpit-based solutions; prototype basic and advanced ADS-B applications that will result in improved efficiency and capacity for FAA and the airlines; assess the impact of ADS-B on safety, capacity, and efficiency benefits for the FAA and users; develop domestic and international requirements and engineering standards for future ADS-B applications, in close coordination with the users and manufacturers, as part of RTCA, the International Civil Aviation Organization, FAA, Requirements Focus Group, and Eurocontrol standards development activities.

Special Studies, Laboratory and Data Enhancements. Provide a research environment where prototypes and capabilities can be brought together with the appropriate mixture of fidelity and development flexibility to facilitate integration investigations, compressed spiraling of operational concepts and procedure development, exploration of new technologies, visualization of concepts, exploration of human factor issues, and transition of prototypes between the lab and the field.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 2 – Greater Capacity.**
- **FAA Objective 2 –** Increase reliability and on-time performance of scheduled carriers.
- **FAA Performance Target 1 –** Achieve a NAS on-time arrival rate of 88.76 percent at the 35 OEP airports by FY 2011 and maintain through FY 2012.

Relationship to Performance Target

The CAASD assists the FAA in analyzing and designing new systems to increase the efficiency and effectiveness of NAS systems. It performs analytical research, develops operational concepts, and tests new procedures. FAA adoption of these new systems and procedures for use in the NAS improves on-time performance, increases capacity, and provides a safer and more efficient air transportation system.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #4 –** Ensure Viable Future.
- **SMP Objective #4.5 –** Optimize NextGen/OEP Portfolio.

4A10, AERONAUTICAL INFORMATION MANAGEMENT (AIM)

FY 2009 Request \$11.6M

- Aeronautical Information Management (AIM) Modernization, A08.03-01

Program Description

The Aeronautical Information Management Program is a consolidation of three previous CIP programs: NAS Aeronautical Information Management Enterprise System (NAIMES); NOTAM Infrastructure/Distribution; and Military Operations (MILOPS). The program will modernize and/or develop the hardware and software that supports the following set of core services to NAS users.

- NAS Status Information
 - Notices-to-Airmen (NOTAMs)
 - Wide Area Augmentation System (WAAS)/Global Positioning System (GPS) navigation service status
 - Military / Special Use Airspace (SUA) status
 - Central Altitude Reservation Function (CARF)
- NAS Infrastructure Information
 - Access to base aeronautical information
- Flight Planning
 - Flight plan support (DoD and other users)
 - Flight plan filing
 - Flight plan message dissemination
- Weather Information Dissemination

The program will improve aeronautical information services by adopting modern information technology and improvements in business processes and aeronautical information policies. Target capabilities in Aeronautical Information Modernization include:

- Centralize and standardize NOTAMs;
- Migrate to fully digital NOTAM, weather, and flight plan services;
- Streamline and automate processes for generating status changes such as airspace reservations/activation and NOTAM;
- Centralize and standardize definition and scheduling of military airspace including SUA, air traffic control assigned airspace (ATCAA), and altitude reservations (ALTRV);
- Improve quality and value of pilot briefing and flight planning services by integrating digital weather, and digital NOTAM into the briefing and analysis services; and
- Integrate aeronautical information services into System Wide Information Management (SWIM) and other NextGen capabilities.

NOTAM Modernization (formerly NOTAM Infrastructure/Distribution) provides a standardized, automated NOTAM distribution system that ensures that NOTAMs are delivered to ATC facilities in a timely, accurate, and reliable manner. NOTAMs inform pilots, controllers, and flight service specialists of changes in conditions in the NAS, such as runways closed for construction, restrictions on operations for special events, and other important changes. NOTAM data from the United States NOTAM System (USNS) will be transmitted to the Airport Traffic Control Towers (ATCTs), Terminal Radar Approach Controls (TRACONS), Air Route Traffic Control Centers (ARTCCs), and FAA Contract Towers. In addition, the system provides for NOTAM receipt acknowledgement and an evolutionary path for the eventual distribution of all classes of NOTAMs (Domestic, Flight Data Center, International Civil Aviation Organization (ICAO), and Military).

NOTAM Realignment facilitates transformation of the Joint DoD and FAA USNS and Master Database into a unified Federal NOTAMs system supporting ICAO compliant NOTAMs and aeronautical information. In FY 2008, Phase 1 incorporates former Local (L) NOTAMs into the Master Database as

Distant (D) NOTAMs, providing additional important aeronautical information such as taxiway conditions. Keywords are affixed to all D NOTAMs to assist in grouping them into easily recognizable categories. In the FY 2009-2010 timeframe, Phase 2 will improve NOTAM quality and ensure that appropriate Q codes are applied by converting all NOTAM and aeronautical information into fully ICAO-compliant series.

The final component of AIM Modernization is the MILOPS Systems. MILOPS includes several information technology systems to assist the FAA and military with coordination and distribution of special use airspace (SUA, ATCAA, and ALTRV) geometrical descriptions and scheduling information. In the MILOPS program, MILOPS systems are in various stages of development – the Special Use Airspace (SUA) Management System (SAMS) and the Military Airspace Data Entry (MADE) system are modern systems for coordinating and tracking airspace use by the military. The Altitude Reservation Function (CARF) for managing altitude reservations (ALTRV) is a legacy program targeted for early migration in the AIM Modernization program.

Relationship of Program to FAA Strategic Goal, Objective, and Performance Target

- **FAA Strategic Goal 1 – Increased Safety.**
- **FAA Objective 1 – Reduce commercial air carrier fatalities.**
- **FAA Performance Target 1 – Cut the rate of fatalities per 100 million persons on board in half by 2025.**

Relationship to Performance Target

The Aeronautical Information Management Program will modernize and improve the processing and distribution of critical NOTAM information to ATC facilities and pilots, so it is received in a timely and standardized format. It will also update the information systems reporting on SUA and WAAS availability. Assuring that this information is available to pilots and air traffic facilities will help prevent pilot errors such as attempting to land on a closed runway. This will help avoid potentially fatal commercial airline accidents.

Strategic Management Process (SMP) Pathway and Objective

- **SMP Pathway #1 – Achieve Operational Excellence.**
- **SMP Objective #1.3 – Ensure safety and aircraft separation.**

Program Plans FY 2009 – Performance Output Goals

- Begin phased implementation of AIM Programs modernization.
- Increase NOTAM quality by ensuring 100% of new NOTAM policy guidelines are incorporated into NOTAM entry systems by January 2009.
- Complete development of consolidated aeronautical information portal for external and internal customers.
- Finalize site preparation and installation and disaster recovery sites.
- Increase NOTAM quality by adopting ICAO standards and ensuring 100% of NOTAMs have properly Q-code classification.

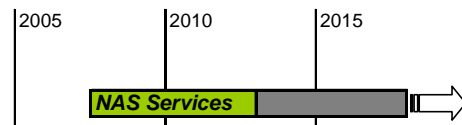
Program Plans FY 2010-2013 – Performance Output Goals

- Implement transition plans from legacy systems to modernized systems.
- Finalize initial implementation and deployment of system modernization by September 2013.
- Develop NOTAM policy Notices and Orders to support digital NOTAM format.
- Attain the target that 25% of all airport NOTAMs are submitted electronically.

Program Implementation Schedule

Aeronautical Information Management Modernization

First site IOC: June 2007 -- Last site IOC: September 2013



Federal Aviation Administration

National Airspace System

Capital Investment Plan

Appendix C

Fiscal Years 2009 – 2013

BLI Number	Capital Budget Program	FY 2009 Budget	FY 2010	FY 2011	FY 2012	FY 2013
Activity 1: Engineering, Development, Test, and Evaluation		\$343.60	\$747.2	\$848.6	\$924.7	\$1,216.8
1A01	Advanced Technology Development and Prototyping (ATDP)	\$41.40	\$36.9	\$37.2	\$35.2	\$32.4
1A02	Traffic Management Advisor (TMA)	\$3.70	\$0.0	\$0.0	\$0.0	\$0.0
1A03	NAS Improvement of System Support Laboratory	\$1.00	\$1.0	\$1.0	\$1.0	\$1.0
1A04	William J. Hughes Technical Center Facilities	\$12.00	\$12.0	\$12.0	\$12.0	\$12.0
1A05	William J. Hughes Technical Center Infrastructure Sustainment	\$5.40	\$5.5	\$5.6	\$5.7	\$5.9
1A06	NextGen Network Enabled Weather (NNEW)	\$20.00	\$25.0	\$25.0	\$25.0	\$25.0
1A07	Data Communication in support of Next Generation Air Transportation System (NextGen)	\$28.80	\$28.6	\$36.7	\$38.1	\$25.0
1A08	Next Generation Air Transportation System (NextGen) - Demonstrations and Infrastructure Development	\$28.00	\$30.0	\$30.0	\$30.0	\$30.0
1A09	Next Generation Air Transportation System (NextGen) - System Development	\$41.40	\$102.9	\$104.0	\$105.3	\$108.3
1A10	Next Generation Air Transportation System (NextGen) - Trajectory Based Operations	\$39.50	\$90.1	\$90.8	\$87.0	\$67.8
1A11	Next Generation Air Transportation System (NextGen) - Reduce Weather Impact	\$14.40	\$62.0	\$62.0	\$64.1	\$100.7
1A12	Next Generation Air Transportation System (NextGen) - Arrivals/Departures at High Density Airports	\$18.20	\$74.2	\$85.3	\$110.0	\$316.1
1A13	Next Generation Air Transportation System (NextGen) - Collaborative Air Traffic Management (CATM)	\$27.70	\$111.4	\$103.9	\$84.3	\$87.8
1A14	Next Generation Air Transportation System (NextGen) - Flexible Terminal Environment	\$37.10	\$102.0	\$106.9	\$45.8	\$30.8
1A15	Next Generation Air Transportation System (NextGen) - Safety, Security, and Environment	\$8.00	\$27.0	\$33.0	\$0.0	\$0.0
1A16	Next Generation Air Transportation System (NextGen) - Networked Facilities	\$17.00	\$38.6	\$115.2	\$281.2	\$374.0
Activity 2: Air Traffic Control Facilities and Equipment		\$1,558.61	\$1,459.3	\$1,305.3	\$1,484.2	\$1,413.4
A. En Route Programs		\$857.85	\$678.3	\$573.7	\$721.5	\$662.8
2A01	En Route Automation Modernization (ERAM)	\$203.05	\$170.9	\$131.5	\$183.2	\$171.1
2A02	En Route Communications Gateway (ECG)	\$7.40	\$12.6	\$16.3	\$19.8	\$18.5
2A03	Next Generation Weather Radar (NEXRAD)	\$3.00	\$3.0	\$3.0	\$3.0	\$0.0
2A04	Air Traffic Control System Command Center (ATCSCC) Relocation	\$28.60	\$10.3	\$2.1	\$2.1	\$0.0
2A05	ARTCC Building Improvements/Plant Improvements	\$56.50	\$56.5	\$57.0	\$62.0	\$62.4
2A06	Air Traffic Management (ATM)	\$90.20	\$31.6	\$15.2	\$8.5	\$13.4
2A07	Air/Ground Communications Infrastructure	\$7.50	\$4.8	\$4.9	\$5.3	\$4.5
2A08	ATC Beacon Interrogator (ATCBI) - Replacement	\$13.00	\$4.7	\$0.0	\$0.0	\$0.0
2A09	Air Traffic Control En Route Radar Facilities Improvements	\$5.30	\$5.3	\$5.6	\$5.8	\$5.9
2A10	Voice Switching Control System (VSCS)	\$23.30	\$17.0	\$15.9	\$0.0	\$0.0
2A11	Oceanic Automation System	\$20.70	\$12.7	\$20.8	\$10.0	\$7.1
2A12	Corridor Integrated Weather System (CIWS)	\$5.90	\$8.4	\$17.4	\$22.7	\$4.0

BLI Number	Capital Budget Program	FY 2009 Budget	FY 2010	FY 2011	FY 2012	FY 2013
2A13	San Juan Radar Approach Control (CERAP)	\$6.00	\$0.0	\$0.0	\$0.0	\$0.0
2A14	Next Generation VHF Air/Ground Communications System (NEXCOM)	\$46.40	\$79.9	\$70.6	\$92.4	\$97.2
2A15	System-Wide Information Management (SWIM)	\$41.00	\$54.3	\$38.2	\$22.5	\$8.0
2A16	Automatic Dependant Surveillance - Broadcast (ADS-B) NAS Wide Implementation	\$300.00	\$200.4	\$175.2	\$284.2	\$270.7
2A17X	Automated Detection & Processing Terminal (ADAPT)*	\$0.00	\$6.0	\$0.0	\$0.0	\$0.0
	B. Terminal Programs	\$375.76	\$440.7	\$432.9	\$473.2	\$477.0
2B01	Airport Surface Detection Equipment - Model X (ASDE-X)	\$32.70	\$11.1	\$0.0	\$8.4	\$11.0
2B02	Terminal Doppler Weather Radar (TDWR) - Provide	\$6.10	\$9.9	\$8.6	\$7.7	\$2.1
2B03	Standard Terminal Automation Replacement System (STARS) (TAMR Phase 1)	\$28.20	\$47.0	\$47.0	\$47.8	\$57.0
2B04	Terminal Automation Modernization/ Replacement Program (TAMR Phase 3)	\$3.00	\$50.0	\$50.0	\$80.0	\$90.0
2B05	Terminal Automation Program	\$4.30	\$2.4	\$2.4	\$2.5	\$2.5
2B06	Terminal Air Traffic Control Facilities - Replace	\$134.30	\$150.0	\$160.0	\$165.0	\$165.0
2B07	ATCT/Terminal Radar Approach Control (TRACON) Facilities - Improve	\$37.90	\$42.6	\$48.0	\$53.3	\$52.7
2B08	Terminal Voice Switch Replacement (TVSR)	\$8.40	\$10.3	\$0.0	\$0.0	\$0.0
2B09	NAS Facilities OSHA and Environmental Standards Compliance	\$26.00	\$26.0	\$26.0	\$26.0	\$26.0
2B10	Airport Surveillance Radar (ASR-9)	\$8.80	\$2.2	\$0.0	\$0.0	\$0.0
2B11	Terminal Digital Radar (ASR-11)	\$17.10	\$12.6	\$4.4	\$4.4	\$4.4
2B12	DOD/FAA Facilities Transfer	\$1.40	\$1.4	\$1.4	\$1.5	\$1.5
2B13	Precision Runway Monitors	\$1.00	\$0.0	\$0.0	\$0.0	\$0.0
2B14	Runway Status Lights (RWSL)	\$26.96	\$11.8	\$18.2	\$24.2	\$11.8
2B15	National Airspace System Voice Switch (NVS)	\$10.00	\$40.0	\$50.0	\$50.0	\$50.0
2B16	Weather System Processor (WSP)	\$0.70	\$0.3	\$0.0	\$0.0	\$0.0
2B17	Voice Recorder Replacement Program (VRRP)	\$10.80	\$11.9	\$9.6	\$0.0	\$0.0
2B18	Houston Area Air Traffic System (HAATS)	\$3.60	\$2.0	\$0.0	\$0.0	\$0.0
2B19	Integrated Display System (IDS)	\$7.00	\$3.0	\$4.0	\$0.0	\$0.0
2B20	ASR-8 Service Life Extension Program	\$3.00	\$0.0	\$0.0	\$0.0	\$0.0
2B21	Integrated Terminal Weather System (ITWS)	\$4.50	\$4.5	\$2.2	\$0.0	\$0.0
2B22X	Terminal Automation Modernization/ Replacement Program (TAMR Phase 2)*	\$0.00	\$1.7	\$1.1	\$2.4	\$3.0
	C. Flight Service Programs	\$25.10	\$30.8	\$32.2	\$22.6	\$12.9
2C01	Automated Surface Observing System (ASOS)	\$8.50	\$6.7	\$6.7	\$1.3	\$0.0
2C02	Flight Service Station (FSS) Modernization	\$14.60	\$20.3	\$22.3	\$16.5	\$8.5
2C03	Weather Camera Program	\$2.00	\$3.8	\$3.2	\$4.8	\$4.4
	D. Landing and Navigation Aids Programs	\$173.30	\$174.8	\$146.6	\$141.9	\$139.8

BLI Number	Capital Budget Program	FY 2009 Budget	FY 2010	FY 2011	FY 2012	FY 2013
2D01	VHF Omnidirectional Radio Range (VOR) with Distance Measuring Equipment (DME)	\$7.50	\$5.0	\$5.0	\$5.0	\$2.5
2D02	Instrument Landing Systems (ILS) - Establish	\$7.50	\$21.8	\$7.8	\$5.0	\$7.0
2D03	Wide Area Augmentation System (WAAS) for GPS	\$99.00	\$100.9	\$101.1	\$100.5	\$100.3
2D04	Runway Visual Range (RVR)	\$5.00	\$5.0	\$5.0	\$5.0	\$4.0
2D05	Approach Lighting System Improvement Program (ALSIP)	\$10.00	\$10.0	\$5.0	\$5.0	\$3.0
2D06	Distance Measuring Equipment (DME)	\$6.00	\$8.0	\$6.0	\$5.0	\$5.0
2D07	Visual Nav aids - Establish/Expand	\$1.70	\$3.2	\$3.2	\$3.4	\$5.0
2D08	Instrument Flight Procedures Automation (IFPA)	\$10.90	\$7.9	\$0.5	\$0.0	\$0.0
2D09	Navigation and Landing Aids - Service Life Extension Program (SLEP)	\$1.00	\$6.0	\$6.0	\$6.0	\$8.0
2D10	VASI Replacement - Replace with Precision Approach Path Indicator	\$4.00	\$7.0	\$7.0	\$7.0	\$5.0
2D11	GPS Civil Requirements	\$20.70	\$0.0	\$0.0	\$0.0	\$0.0
	E. Other ATC Facilities Programs	\$126.60	\$134.7	\$119.9	\$124.9	\$120.9
2E01	Fuel Storage Tank Replacement and Monitoring	\$6.10	\$6.2	\$6.3	\$6.4	\$6.6
2E02	Unstaffed Infrastructure Sustainment (formerly FAA Buildings and Equipment)	\$15.30	\$14.5	\$15.0	\$15.7	\$16.3
2E03	Air Navigational Aids and ATC Facilities (Local Projects)	\$1.50	\$2.5	\$2.6	\$2.6	\$2.7
2E04	Aircraft Related Equipment Program	\$7.80	\$10.0	\$9.0	\$13.0	\$9.0
2E05	Airport Cable Loop Systems - Sustained Support	\$7.00	\$5.0	\$5.0	\$5.0	\$5.0
2E06	Alaskan NAS Interfacility Communications System (ANICS)	\$5.00	\$3.0	\$2.0	\$2.0	\$1.0
2E07	Facility Disposition	\$5.00	\$5.0	\$5.0	\$5.0	\$5.0
2E08	Electrical Power Systems - Sustain/Support	\$51.00	\$70.0	\$70.0	\$70.0	\$70.0
2E09	Aircraft Fleet Modernization	\$3.00	\$15.0	\$0.0	\$0.0	\$0.0
2E10	Aircraft Fleet Modernization - International Aircraft	\$24.90	\$0.0	\$0.0	\$0.0	\$0.0
2E11X	Independent Operational Test/Evaluation*	\$0.00	\$3.5	\$5.0	\$5.2	\$5.3
	Activity 3: Non-Air Traffic Control Facilities and Equipment	\$133.80	\$154.2	\$176.6	\$138.0	\$81.1
	A. Support Equipment	\$105.40	\$138.6	\$165.5	\$126.7	\$69.6
3A01	Hazardous Materials Management	\$18.00	\$20.0	\$20.0	\$20.0	\$20.0
3A02	Aviation Safety Analysis System (ASAS)	\$18.90	\$15.3	\$18.6	\$10.0	\$14.6
3A03	Logistics Support Systems and Facilities (LSSF)	\$9.30	\$9.3	\$0.0	\$0.0	\$0.0
3A04	National Airspace System (NAS) Recovery Communications (RCOM)	\$10.00	\$12.0	\$12.0	\$12.0	\$12.0
3A05	Facility Security Risk Management	\$15.00	\$40.0	\$54.4	\$23.0	\$1.0
3A06	Information Security	\$12.00	\$12.0	\$12.0	\$12.0	\$12.0
3A07	System Approach for Safety Oversight (SASO)	\$14.30	\$6.8	\$23.5	\$23.5	\$0.0
3A08	Aviation Safety knowledge Management Environment (ASKME)	\$7.90	\$8.1	\$14.8	\$17.2	\$0.0

BLI Number	Capital Budget Program	FY 2009 Budget	FY 2010	FY 2011	FY 2012	FY 2013
3A09X	Logical Access Control*	\$0.00	\$15.1	\$10.2	\$9.0	\$10.0
	B. Training, Equipment, and Facilities	\$28.40	\$15.6	\$11.1	\$11.3	\$11.5
3B01	Aeronautical Center Infrastructure Modernization	\$13.50	\$9.8	\$10.1	\$10.3	\$10.5
3B02	National Airspace System (NAS) Training Facilities	\$1.40	\$0.0	\$0.0	\$0.0	\$0.0
3B03	Distance Learning	\$1.50	\$1.5	\$1.0	\$1.0	\$1.0
3B04	NAS Training Facilities - Simulator	\$12.00	\$4.3	\$0.0	\$0.0	\$0.0
	Activity 4: Facilities and Equipment Mission Support	\$227.00	\$238.3	\$249.5	\$256.8	\$273.7
4A01	System Engineering and Development Support	\$32.00	\$32.7	\$32.3	\$32.9	\$33.5
4A02	Program Support Leases	\$43.50	\$47.6	\$49.1	\$50.5	\$52.1
4A03	Logistics Support Services (LSS)	\$7.90	\$8.0	\$8.5	\$8.5	\$8.5
4A04	Mike Monroney Aeronautical Center Leases	\$15.80	\$16.2	\$16.6	\$17.0	\$17.5
4A05	Transition Engineering Support	\$10.70	\$15.0	\$15.0	\$15.0	\$15.0
4A06	Frequency and Spectrum Engineering	\$3.50	\$2.5	\$2.0	\$0.0	\$0.0
4A07	Technical Support Services Contract (TSSC)	\$22.00	\$22.0	\$22.0	\$22.0	\$30.0
4A08	Resource Tracking Program (RTP)	\$4.00	\$4.0	\$4.0	\$4.0	\$4.0
4A09	Center for Advanced Aviation System Development (CAASD)	\$76.00	\$80.3	\$90.0	\$98.9	\$105.1
4A10	Aeronautical Information Management (AIM)	\$11.60	\$10.0	\$10.0	\$8.0	\$8.0
	Activity 5: Personnel Compensation, Benefits, and Travel	\$460.50	\$487.0	\$514.0	\$542.0	\$573.0
5A01	Personnel and Related Expenses	\$460.50	\$487.0	\$514.0	\$542.0	\$573.0
	* BLI numbers with X represent outyear programs not requested in the FY 2009 President's Budget.					
	Out-year funding amounts are estimates that assume enactment of the Administration's reauthorization proposal to reform FAA's financing system by adopting cost-based user fees and fuel taxes for the costs of air traffic services.					
	Total Year Funding	\$2,723.51	\$3,086.0	\$3,093.9	\$3,345.6	\$3,558.0
	Targets January 2008	\$2,723.51	\$3,086.0	\$3,093.9	\$3,345.6	\$3,558.0

Federal Aviation Administration

National Airspace System

Capital Investment Plan

Appendix D

Fiscal Years 2009 – 2013

LIST OF ACRONYMS AND ABBREVIATIONS

A	
A/G	air-to-ground
ABAS	aircraft based augmentation system
ACE-IDS	automated surface observing system controller equipment information display system
ADAPT	automatic detection and processing terminal
ADAS	automated weather observation data acquisition system
ADIZ	air defense identification zone
ADS-B	automatic dependent surveillance-broadcast
ADS-C	automatic dependent surveillance-contract
ADS-R	automatic dependent surveillance- rebroadcast
ADSIM	airfield delay simulation model
AEFS	advanced electronic flight strip system (intro only used once)
AFS	Office of Flight Standards Service
AFS-400	FAA Flight Technologies and Procedures Division
AFSM	Alaskan flight service modernization
AFSS	automated flight service station
AIM	aeronautical information management
AIO	Office of the Chief Information Officer
AIR	FAA Aircraft Certification Service
AISR	aeronautical information system replacement
AIXM	aeronautical information exchange model
ALL	assimilate lessons learned
ALSF-2	approach lighting system with sequenced flashing light model 2
ALSIP	approach lighting system improvement program
ALTRV	altitude reservations
AMASS	airport movement area safety system
AMC	Mike Monroney Center
AMP	airspace management program
ANF	air navigation facilities
ANICS	Alaskan national airspace system interfacility communications system
ANSP	air navigation service providers
ARE	aircraft and related equipment
ARMT	airport resource management tool
ARSR	air route surveillance radar
ARTCC	air route traffic control center
ARTS	automated radar terminal system
ASAS	aviation safety analysis system
ASD	aircraft situation display
ASDE-3	airport surface detection equipment – model 3
ASDE-X	airport surface detection equipment – model x
ASDP	advanced signal data processor
ASI	aviation safety inspectors
ASKME	aviation system knowledge management environment
ASOS	automated surface observing system
ASR	airport surveillance radar
ASR-7, 8, 9, 11	airport surveillance radar model 7, 8, 9, and 11
ASWON	automated surface weather observation network

ATC	air traffic control
ATCAA	air traffic control assigned airspace
ATCBI	air traffic control beacon interrogator
ATCBI-4, 5, and 6	air traffic control beacon interrogator model 4, 5, and 6
ATCSCC	air traffic control system command center
ATCT	airport traffic control tower
ATDP	advanced technology development prototyping
ATM	air traffic management
ATO	Air Traffic Organization
ATOMS	air traffic operations management system
ATOP	advanced technologies and oceanic procedures
AVN	Office of Aviation System Standards
AVS	Office of Aviation Safety
AWOS	automated weather observing system
AWSS	automated weather sensor systems
B	
BLI	budget line item
BOS	beacon only sites
C	
C3	Command and control communications
CAEG	computer aided engineering graphics
CARF	central altitude reservation facility
CARTS	common-automated radar tracking system
CAASD	Center for Advanced Aviation System Development
CAST	commercial aviation safety team
CATM	collaborative air traffic management
CATMT	collaborative air traffic management technologies
CBI	computer-based instruction
CDA	continuous descent approach
CDTI	cockpit display of traffic information
CERAP	center radar approach control
CERCLA	Comprehensive Environmental Response and Liability Act
CFE	communications facilities enhancement
CIO	chief information officer
CIP	capital investment plan
CIWS	corridor integrated weather system
CM	configuration management
CNS	communications, navigation and surveillance
COI	community of interest
Conops	concept of operations
COTS	commercial off-the-shelf
CP	change proposal
CSMC	cyber security management center
CSPR	closely spaced parallel runways
CTAS	center TRACON automation system
CWP	corporate work plan
D	
3-D	three dimensional
4-D	four dimensional
DFM	departure flow management
DASI	Digital altimeter setting indicator
DELPHI	DOT accounting system

DHS	Department of Homeland Security
DINS	defense internet NOTAM service
DME	distance measuring equipment
DOCCON	document control
DoD	Department of Defense
DOT	Department of Transportation
DOTS	dynamic ocean tracking system
DS/PP	designee supervision/past performance
DSP	departure spacing program
DSR	display system replacement
DUATS	direct user access terminal system
E	
EA	enterprise architecture
EBUS	enhanced backup surveillance
ECG	en route communication gateway
EDA	en route descent advisor
EDA	engineering design approval
EDDA	environmental due diligence audit
EFS	electronic flight strip
EFSTS	electronic flight strip system
EMS	environmental management system
EON	emergency operations network
EOSH	environmental & occupational safety and health
EPA	Environmental Protection Agency
EPI	enhanced precipitation identifiers
ERAM	en route automation modernization
ERIDS	en route information display
ERTSS	en route training simulation system
ETMS	enhanced traffic management system
ETVS	enhanced terminal voice switches
F	
FAA	Federal Aviation Administration
FAALC	FAA logistics center
FAROS	final approach runway occupancy signal
FBW	fly by wire
FDIO	flight data input/output
FDP	flight data processor
FFRDC	federally funded research and development center
FI	flight inspection
FIS-B	flight information service – broadcast
FISMA	Federal Information Security Management Act
FLP	full LPV performance
FM	frequency modulated
FS-21	flight service automation system
FSRM	facility security risk management
FSS	flight service station
FST	fuel storage tank
FTI	FAA telecommunications infrastructure
FY	fiscal year
G	
G/G	ground to ground
GA	general aviation

GBAS	ground based augmentation system – wide area augmentation system
GDP	gross domestic product
GEO	geosynchronous communication satellite
GLS	GNSS landing system
GNSS	global navigation satellite system
GPS	global positioning system
GUS	ground uplink station
H	
HAATS	Houston area air traffic system
HADDS	host air traffic management data distribution system
HAZMAT	hazardous materials
HAD	high density airport
HPDME	high power distance measuring equipment
HF	high frequency
HSPD	Homeland Security Presidential Directive
I	
IAPA	instrument approach procedures automation
ICAO	International Civil Aviation Organization
IDL	interference detection, location and mitigation
IDMS	identity management system
IDS	information display system
IFF	identification friend or foe
IFPA	instrument flight procedures automation
IFR	instrument flight rule
ILS	instrument landing system
IOC	initial operating capability
IPT	integrated product team
IS	information system
ISO	international standards organization
ISS	information systems security
ISTS	interactive simulation training system
IT	information technology
ITWS	integrated terminal weather system
IVSR	interim voice switch replacement
J	
JAWS	Juneau airport wind system
JPDO	joint planning and development
JRC	joint resources council
L	
L5	additional frequency for GPS satellites
LAAS	local area augmentation system
LAACS	logical access and authorization control service
LAHSO	land and hold short operations
LAN	local area network
LCGS	low cost ground surveillance
LCSS	logistical center support system
LIS	logistics and inventory system
LLWAS	low-level wind shear alert system
LNAV	lateral navigation
LOB	line of business
LOAP	low overhead array processors

LP	localizer performance
LPDME	low power distance measuring equipment
LPV	lateral precision with vertical guidance
LRR	long-range radar
LRU	line replaceable units
LSS	logistics support services
LSSF	logistics support system and facilities
M	
MADE	military airspace data entry
MALSR	medium-intensity approach light system with runway alignment indicator lights
MASPS	minimum aviation system standards
MDR	multimode digital radio
MEARTS	microprocessor en route automated radar tracking system
MF	maintenance facility
MIA	minimum IFR altitude
MIAWS	medium intensity airport weather system
MILOPS	military operations
MLAT	multilateration
MMAC	Mike Monroney Aeronautical Center
MOIE	mission oriented investigation and experimentation
MOPS	minimum operational performance standards
MBP	multi-purpose building
MSAD	monitor safety and analyzed data
MSRD	monitor safety related data
MVA	minimum VFR altitude
N	
NAFIS	next generation flight inspection system
NAIMES	national airspace system aeronautical information management enterprise system
NAP	next generation automation platform
NAS	national airspace system
NASA	National Aeronautics and Space Administration
NASE	NAS adaptive services environment
NASR	national airspace system resources
Nav aids	navigation aids
NDB	non-directional beacon
NDS	NOTAM distribution system
NEO	net enabled operations
NEXCOM	next generation air/ground communications
NEXRAD	next generation weather radar
NextGen	next generation air transportation system
NFRAP	no further remedial action planned
NG	next generation
NGVRRP	next generation voice recorder replacement program
NISC	national airspace system implementation support contract
NLDN	national lightning detection network
NEW	NextGen network enabled weather
NOCC	network operations control center
NOTAM	notice to airmen
NTSB	National Transportation Safety Board
NVS	national airspace system voice switch
NWS	National Weather Service

O	
OASIS	operational and supportability implementation system
OCS	operational control segment
OCX	modernized operational control segment
OEP	operational evolution partnership
OFDPS	offshore flight data processing system
OMB	Office of Management and Budget
OPM	Office of Personnel Management
Ops	Operations
ORD	Operational readiness demonstration
OSHA	Occupational Safety and Health Administration
OSPe	oversee system performance - external
OSPi	oversee system performance - internal
OTA	other transactions agreements
OT&E	Operational test and evaluation
P	
P3I	pre-planned product improvement
PACS	physical access control system
PAPI	precision approach path indicator
PATM	performance-based air traffic management
PBWP	product based work plan
PCB	polychlorinated biphenyl
PCS	Permanent change of station
PDARS	performance data analysis and reporting system
PDR	preliminary design review
PIREPS	pilot reports
PLM	programming language for microcomputers
PNT	position, navigation and timing
PPS	precision positioning service
PRM	precision runway monitor
PWA	printed wire assembly
R	
R #	release number
RA	resolution advisory
RAPT	route availability planning tool
RBRT	risk based resource targeting
RCAG	remote center air/ground
RCE	radio control equipment
RCISS	regulation and certification infrastructure system safety
RCOM	recovery communications
RCU	remote control unit
RDA	radar data acquisition
REIL	runway end identifier lights
REL	runway entrance lights
RFI	radio frequency interference
RIL	runway intersection lights
RIRP	runway incursion reduction program
RNAV	area navigation
RNP	required navigation performance
RPM	revenue passenger mile
RTP	resource tracking program
RVR	runway visual range

RWI	reduce weather impact
RWSL	runway status lights
S	
SAIDS	system Atlanta information display system
SAMS	special use airspace management system
SASO	system approach for safety oversight
SAT	site acceptance test
SAWS	standalone weather sensors
SBAS	space based augmentation system – local area augmentation system
SBS	surveillance and broadcast services
SC	special committee
SCAP	security certification and authorization process
SETA	system engineering and technical assistance.
SID	standard instrument departure
SITS	security integrated tool set
SLEP	service life extension program
SMA	surface management advisor
SMO	system maintenance office
SMP	strategic management process
SMS	safety management system
SO	staff office
SPS	standard positioning service
SR	system requirements
STAR	standard terminal arrival routes
STARS	standard terminal automation replacement system
STB	system training building
STC	sensitivity time constant
STD	Standard
SUA	special use airspace
SWIM	system-wide information management
T	
TACAN	tactical air navigation antenna
TAMR	terminal automation modernization replacement
TBM	trajectory based management
TBO	trajectory based operations
TCAS	traffic alert and collision avoidance system
TDDS	terminal data distribution system
TDLS	tower data link service
TDWR	terminal Doppler weather radar
TFDM	tower flight data manager
TFM	traffic flow management
TFM-M	traffic flow management modernization
TFMS	traffic flow management system
THL	takeoff hold lights
TIS-B	traffic information service-broadcast
TMA	traffic management advisor
TMA-SC	traffic management advisor - single center
TMU	traffic management unit
TR	technical refresh
TRACON	terminal radar approach control
TSD	traffic flow management situation display
TSO	technical standard order

TSS	technical support services
TSSC	technical support services contract
TVSR	terminal voice switch replacement
TWIP	terminal weather information for pilots
U	
UAS	unmanned aircraft system
UAT	universal access transceiver
UHF	ultra high frequency
UIS	unstaffed infrastructure sustainment
URET	user request evaluation tool
USNS	U.S. Notices to Airmen system
V	
VASI	visual approach slope indicator
VCE	VSCS common equipment
VHF	very high frequency
VLJ	very light jet
VNAV	vertical navigation
VOR	very high frequency omni-directional range
VORTAC	very high frequency omni-directional range collocated with tactical air navigation
VRRP	voice recorder replacement program
VSCS	voice switching and control system
VT	virtual tower
VTABS	VSCS training and backup system
W	
WAAS	wide area augmentation system
WARP	weather and radar processor
WAT	work activity tracking
WINS	weather information network server
WJHTC	William J. Hughes Technical Center
WM/LAT	wide area multilateration
WMSCR	weather message switching center replacement
WP	work package
WRS	WAAS reference stations
WSP	weather systems processor
WT	Wake turbulence
WTMA	wake turbulence mitigation for arrivals
WTMD	wake turbulence mitigation for departures
WTMSR	wake turbulence mitigation for single runway
WTS	work tracking software
WX	Weather