Federal Aviation Administration

National Airspace System

Capital Investment Plan

Fiscal Years 2002 - 2006

April 2001

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NAS Modernization

Overview

The Federal Aviation Administration's (FAA) Strategic Plan sets the following long-term mission goals for aerospace:

SAFETY: By 2007, reduce U.S. aviation fatal accident rates by 80 percent from 1996 levels.

SECURITY: Prevent security incidents in the aviation system

SYSTEM EFFICIENCY: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

This Capital Investment Plan (CIP) flows from these goals while also sustaining current National Airspace System (NAS) services. The FAA Strategic Plan specifies strategies to achieve the Safety goal through progressively lowering accidents and incidents. Security is attained through a focus on protecting the traveling public, protecting our own employees at FAA facilities, and protecting the NAS from information security threats. The System Efficiency goal emphasizes NAS modernization, free flight, and systems integration. This CIP brings together the capital programs contributing to all three goals.

Economic Vitality Linked to Aviation

America's aviation industry is soaring into the 21st century, with projected increases in business, recreational, and personal travel. U.S. airlines alone expect that they will carry twice as many passengers by the year 2015 as they do today.[1] Traffic growth in operations and the introduction of the regional jets to serve smaller communities and airline hubs are expanding. The total number of domestic passengers on U.S. air carriers is expected to increase from 604.1 million in 2000, and grow 3.6 percent per year to 927.4 million passengers in 2012. In addition, U.S. air carrier international enplanements are projected to increase from 54.6 million in 2000 to 108.4 million in 2012, a growth of 5.9 percent each year. This brings total passenger enplanements over the one billion mark.

The fleet of large air carrier aircraft is expected to grow from 4,417 aircraft in 2000 to 6,313 by 2012. The most stunning growth rate is projected to occur in the regional jet fleet, with an expected rise from 569 aircraft in 2000 to 2,190 aircraft in 2012, a 11.9 percent increase. The cargo fleet is also expected to grow by 4.2 percent a year from 1,073 aircraft in 2000 to 1,760 in 2012[2].

In order to manage the increasing operational load on the NAS, the air traffic control system and supporting services must be state-of-the-art, supported by a coordinated long-term modernization effort. NAS users — general aviation, airlines, and the military — will also need to make a significant investment in avionics to take advantage of new capabilities.

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[1] *Air Transport Association speech at the 2000 FAA Forecast Conference*
Economic Impact of Civil Aviation on the U.S. Economy – 2000, March 2000, presents impact based on 1998 data
[2] *FAA Aerospace Forecast Fiscal Years 2001-2012, March 2000*

NAS Architecture

Gaining system efficiency and safety improvements requires a sound plan for modernization based on an evolving concept of how users will operate in that system. In January 1999 the FAA Administrator approved the NAS Architecture, representing the aviation community consensus on modernization. The Architecture provides a consistent view of changes in the NAS and is an overview of the larger architecture database used to maintain configuration control on modernization and infrastructure sustainment that traces technical and programmatic interdependencies. In Fiscal Year (FY) 2001, the NAS Architecture is being expanded through Operational Evolution Planning, a joint FAA/industry effort to define the necessary safety analyses, staffing, certification, training, procedures development and airspace actions necessary to address capacity and demand problems in the NAS. This additional planning effort will be incorporated in the NAS Architecture to provide a more complete picture of requirements and resources necessary to deliver services and capabilities in the NAS.

The NAS Architecture is based on life cycle cost estimates, which include costs for research, procurements, installation, upgrades, maintenance, decommissioning, and associated personnel costs. Internet access to the NAS Architecture is available through http://www.nas-architecture.faa.gov/cats/.

The NAS Architecture is a long-term plan for the evolution of the NAS, both sustainment and enhancements, to 2015. This CIP aligns the architecture to the Office of Management and Budget (OMB) 5-year budget planning guidance and funding proposed under the Wendell H. Ford Aviation Investment and Reform Act (AIR-21), PL 106-181.

The CIP balances investments among safety, security, and efficiency. Safety will continue to have the highest priority for capital investment spending. Operating improvements are focused on sustaining existing core services, which provide traffic separation, navigation, communications, and traffic flow management. Investment in new methods and technologies for managing capacity and demand are included and have evolved from modernization initiatives and Spring/Summer 2000 partnering with the air carriers on delay reduction. As funding increases under AIR-21, there is a balanced portfolio of sustained and improved NAS services tied to delivery of capabilities and benefits.

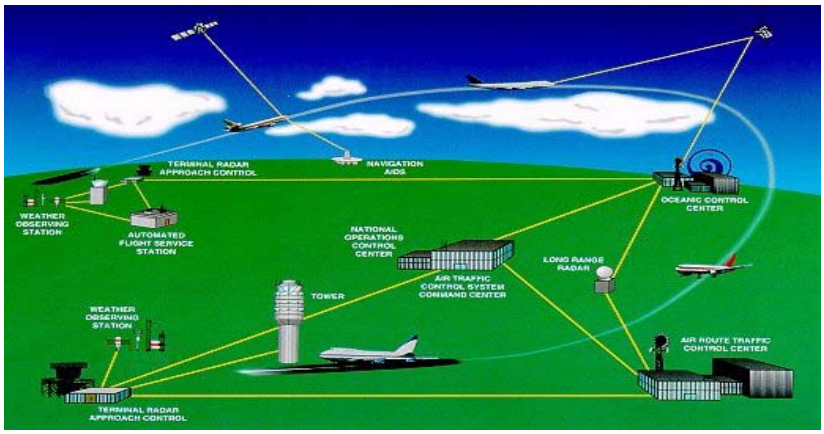
Capital Investment Plan Highlights

This CIP aligns NAS modernization to the FY 2001 capital appropriation and OMB funding projections for FY 2002 through 2006. Appendix A summarizes the projected funding profile by budget line item.

The CIP focuses on services provided within the NAS, such as separation assurance, traffic synchronization, navigation, and strategic traffic flow management — and capabilities necessary to improve services. Capabilities are made up of specific programs tied to specific budget line items. The funding profiles are provided in Appendix A. Appendix B tracks goals, accomplishments and planned actions by budget line item.

The NAS service providers include:

- FAA
- Department of Defense
- Private services providing
  - Weather
  - Communications
  - Flight planning support



The National Airspace System (NAS) is comprised of the people, procedures, equipment, and airports that combined provide the NAS air traffic services

The NAS Architecture's capital resource priorities are:

- Sustain current NAS services and the facilities necessary to deliver these services while ensuring safety
- Support safety initiatives that improve current safety services and reduce accident and incident rates as traffic grows
- Deploy security measures to reduce risk to the travelling public and our workforce
- Add new capabilities to improve efficiency, capacity, access, predictability, and flexibility in delivery of services

Spring/Summer 2000 identifies major delay drivers and focuses priorities for FY 2001 and beyond:

- En route Congestion
- En route Weather
- Terminal/Airport Congestion
- Terminal Weather

Objectives of the FAA 5-Year Plan (FY 2002 - FY 2006)

Ensure Availability of Existing Services while Modernizing the NAS to Accommodate Aviation Growth

With the FY 2002 budget, the FAA will use capital resources to protect our investment in the infrastructure, provide the levels of safety, security, and efficiency needed to operate the National Airspace System, and continue technological change.

Aviation users and service providers agree that the need to modernize is urgent. The number of passengers and flights to carry them continues to keep pace with the growth in the economy; therefore, air carrier operations are forecast to increase 15 percent between now and 2005. A collaborative partnership between the FAA and the airlines was established in March 2000 to execute strategies dealing with expected convective weather delays. Nevertheless, the Spring/Summer of 2000 was one of the worst seasons for delay ever, caused by a combination of convective weather and airline labor actions. In November 2000, both the FAA and the airlines evaluated the outcomes of the Spring/Summer 2000 efforts. The recommendations are being incorporated in operational plans for 2001and adjustments have been made in this CIP to support the capital investments needed for the operational evolution of the NAS.

The capital investment profile for FY 2002-2006 will enable the FAA to achieve incremental gains in airspace capacity and efficiency. Capital investments will be combined with procedural and airspace changes to deliver the capabilities necessary for the Nation's air transportation system. The CIP represents an unprecedented partnership with the aviation users.

Although some users would prefer greater capitalization to produce benefits earlier, this CIP balances the investments across three key categories:

- Modernizing the existing critical infrastructure to sustain services,
- Providing new safety and security capabilities, and
- Introducing new capabilities to improve efficiency.

A choke Point is airspace that generates unusually high levels of delays in the system. These delays may take the form of increased miles-in-trail restrictions, holding aircraft both on the ground and in the air, increased restrictions, and reduced flexibility in moving aircraft from point to point.

While the CIP supports the funding of the NAS Architecture, there are costs beyond facilities and equipment necessary to deliver new capabilities addressing capacity and demand. Development of procedures, airspace changes, training, user investment in certified avionics, and new runways must be put in place to expand capacity. Costs and schedules for such actions are being developed as a direct result of a NAS Operational Evolution Plan. The FY 2002 request includes measures like increased use of area navigation, airspace changes to eliminate choke points, and the necessary safety analyses to increase system capacity.

Investments follow three guidelines:

- Safety will not be compromised and must be improved to keep pace with growing operations,
- Current operations must be sustained and capacity expanded to support demand, and
- The FAA must keep annual costs to itself and the users at a reasonable level through improved business practices.

Linking CIP Performance to Agency Goals

The FAA Strategic goals support the Department of Transportation's (DOT) Strategic Plan. Both plans have Safety and National Security goals. Both have Environmental goals (FAA's is an "enabling" goal that helps FAA achieve, among other things, an efficient aerospace system). The DOT Mobility and Economic Growth goals are addressed by the FAA's System Efficiency goal that is necessary to achieve economic growth. The full set of DOT and FAA goals are provided in Appendix B.

The Architecture is FAA's evolving blueprint to achieve FAA's System Efficiency strategic goal and support a safe and secure aerospace system. The CIP, in turn, is a funding source for FAA Corporate Projects, the near-term change efforts that support a wide range of FAA performance goals, such as reducing runway incursions, operational errors, and delays. These FAA performance goals are executed to achieve DOT and FAA strategic goals. The CIP provides the link between FAA's strategic and performance goals, its capital programs, and the budget.

Appendix B, Goal Matrix, contains the DOT, FAA and program goals for capital programs. Not all agency goals are dependent upon a capital investment. Safety, security, and efficiency goals are defined separately. Programs are grouped by their major emphasis. Many programs address multiple goals. For example, weather programs contribute both to safety and efficiency, but are presented within one or the other matrix based on their primary contributions.

Program goals are expressed in terms of program accomplishments in 2000, 2001 and 2002 expected results, and key events occurring between 2003 and 2006. This allows for comparison with goals set in the FY 2001 CIP.

Modernization By 2005

A benchmark for modernization is 2005. This date was identified by the White House Commission on Aviation and Security and was reported in last year's CIP. Substantial improvements need to be in place by 2005 to support safety, security and aviation's growth. The CIP allows the FAA to sustain core infrastructure needs to ensure reliable service is continued while concurrently achieving user benefits. Where practical, implementations have been phased to provide partial benefits prior to 2005. An example is Free Flight Phase 1 (FFP1) and Free Flight Phase 2 (FFP2). FFP1 provides early benefits to selected locations agreed to in partnership with the users, while FFP2 deploys the same capabilities to additional locations. Some long-range programs in the architecture will begin deployment, but will not be completed by 2005. Items in italics are operational though some are continuing delivery; non-italicized items are under development but not yet operational.

Significant Modernization Programs Completed and Services Being Delivered Before the End of 2005	**Purpose of Investment**
Weather Systems	
Integrated Terminal Weather Service (ITWS)	Safety and efficiency gains by integrating terminal weather information
Next Generation Weather Radar (NEXRAD)	Weather surveillance for air traffic control
Weather and Radar Processor (WARP)	Delivers weather to en route controllers
Terminal Doppler Weather Radar (TDWR)	Surveillance for terminal safety and capacity
Weather Systems Processor (WSP)	Safety system processing weather from ASR-9
Automated Surface Observing System (ASOS)	Real time weather to pilots for safety
Low-level Windshear Alerting System (LLWAS)	Safety system
Communications	
Tower Data Link System Upgrades (TDLS)	57 airports – pre-departure clearances are delivered by data link reducing errors and improving safety
Graphical Weather Service/Flight Information Service (GWS/FIS)	Safety system – uplink of weather and flight information for general aviation operations
Controller/Pilot Data Link Communications (CPDLC) Build I/IA	Safety and efficiency system – reduces errors and reduces pilot and controller workload
Multi-sector Oceanic Data Link(ODL) Services	Safety and efficiency system – enables diversity in oceanic communications and reduces errors
Future Telecommunications Infrastructure (FTI)	Critical infrastructure – communications circuits
Enhanced Terminal Voice Switches (ETVS)	Critical infrastructure – selects controller communications links
Flight Service Station (FSS) Voice Switches	Critical infrastructure – selects communications links

Significant Modernization Programs Completed and Services Being Delivered Before the End of 2005	Purpose of Investment
Navigation and Landing	
TACAN Antenna Upgrades	Efficiency – reduces power and supportability requirements
Distance Measuring Equipment (DME)	Safer Skies initiative – provides distance from Navigational Aids (navaids) and airports
Non Directional Beacons (NDB)	Critical infrastructure – sustains capability
GPS Local Area Augmentation (LAAS) CAT I	Safety and Efficiency system provides additional precision approaches to runways
GPS Wide Area Augmentation (WAAS) en route and VNAV/LNAV landing	Safety system – provides GPS corrections and vertical guidance on landing to reduce controlled flight into terrain
Runway Visual Range (RVR)	Critical infrastructure – provides visibility for precision approaches
Instrument Landing System (ILS)	Critical infrastructure and safety – sustains and expands locations with precision approach and landing
Approach Lighting System Improvement Program (ALSIP)	Critical infrastructure and safety – provides visual lighting for precision approaches
Long-range navigation – C (LORAN-C)	Infrastructure – sustains existing en route navigation system operated by the Coast Guard
Surveillance	
Airport Surface Detection Equipment (ASDE-3)	Safety system – surface movement surveillance
Airport Movement Area Safety System (AMASS)	Safety system – runway incursion alerts
Airport Surface Detection Equipment (ASDE-x)	Safety system surface movement surveillance at additional airports
Precision Runway Monitor (PRM)	Efficiency system – rapid update surveillance to separate traffic approaching parallel runways
Air Traffic Control Beacon Interrogator (ATCBI-6)	Critical infrastructure – replaces aging interrogators
Air-to-air Automatic Dependent Surveillance – Broadcast (ADS-B)	New technology with safety and efficiency benefits – pilots can see each other electronically
Air-to-ground ADS-B at Selected locations	Safety and efficiency system – new high precision surveillance needed to add operational benefits
Mode-Select (Mode-S) Surveillance Upgrades	Critical infrastructure upgrades
Automation	
Host and Oceanic Computer System Replacement (HOCSR)	Critical infrastructure – all centers operational
En Route Display System Replacement (DSR)	Critical infrastructure – all centers operational
En Route Communications Gateway (ECG)	Critical infrastructure – center communications
Terminal Early Display Configurations (EDC)	Critical infrastructure – replaces aging terminal displays with color displays
Free Flight Phase 1(FFP1)	Efficiency systems – multiple automation tools
Free Flight Phase 2 (FFP2)	Efficiency systems – will deploy automation and communications tools to additional locations

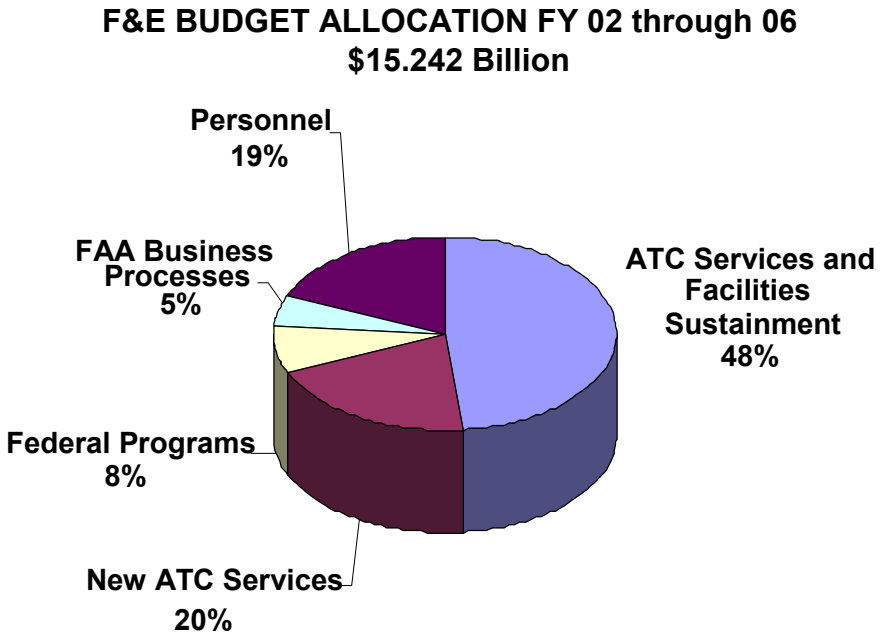
Significant Modernization Programs Completed and Services Being Delivered Before the End of 2005	Purpose of Investment
Enhanced Traffic Management System (ETMS)	Efficiency and infrastructure – essential automation backbone for collaborative decision making and traffic flow management
Advanced Technologies and Oceanic Procedures (ATOP)	Safety and efficiency system – replacing outdated oceanic infrastructure and adds improvements to safety reduce separation
Critical Systems Information Security Measures	Security – measures to protect NAS operations
Facilities	
Power Systems Upgrades	Critical infrastructure – replaces aging backup power, grounding, bonding and shielding
Large terminal radar approach control (TRACON) Consolidations	Critical infrastructure and efficiency – consolidates airspace and procedures
Physical Security Measures	Security – protects FAA employees from physical attack and protects continued services

Some key modernization programs continue beyond 2006, but have deliveries and become operational at certain sites before 2005.

Significant Modernization Programs and Services Continuing Delivery Beyond 2005	Purpose of Investment
Communications	
Next Generation Air-Ground Communications – Digital Voice Communications (NEXCOM)	Critical Infrastructure, safety and efficiency – replaces analog air-ground communications, recovers needed spectrum, adds data link, and reduces communications errors and workload
CPDLC Build II	Efficiency and safety system – expands use of data link in the en route environment
Navigation	
GPS WAAS – Full Capabilities	Safety system – provides integrity, accuracy and availability of GPS for all flight phases
GPS LAAS Category I/II/III (CAT I/II/III)	Efficiency system – adds precision approach procedures at airports
Surveillance	
Airport Surveillance Radar (ASR-11)	Critical infrastructure – replaces terminal radars
Air-to-ground Automatic Dependent Surveillance-Broadcast (ADS-B)	Safety and efficiency system – improves surveillance in all flight phases and on the airport
Automation	
Standard Terminal Automation Replacement System (STARS)	Critical infrastructure – replaces existing terminal automation and provides the platform for efficiency gains
En Route Automation Modernization (eRAM)	Critical infrastructure, safety and efficiency – replaces aging computer software that supports all ATC functions

For FY 2002 through 2006, the FAA is proposing to spend a total of $15.242 billion on NAS sustainment and modernization. The allocation of this expenditure by category is depicted in the charts below and summarized as follows:

- ATC Services and Facilities Sustainment: At almost 50 percent, this category represents the capital resources necessary to sustain services.
- Personnel: This includes FAA personnel and support contractors directly involved in the engineering, acquisition, and installation of systems and services.
- New ATC Services: Free Flight Phase 1 and 2, Data Link, and Safe Flight 21 are examples of the programs included in this category.
- Federal Programs: This category includes such programs as hazardous material cleanup, facility security risk management (FSRM), airport explosive detection systems, and programs to enhance physical and information security.
- FAA Business Processes: Automation support for safety inspectors, support of training and test facilities, NAS performance monitoring, and process improvements are included.



Challenges Facing the FAA

Safety

FAA has set an ambitious strategic goal for aerospace safety: *By 2007, reduce U.S. aviation fatal accident rates by 80 percent from 1996 levels*. One of the FAA's most important safety challenges is how to evolve the NAS to meet the projected growth in demand for services while achieving this safety goal. Continued growth in the aviation system will inevitably lead to greater pressure on current safety programs associated with air traffic control and airport operations. Another challenge associated with projected increase in demand is to safely increase capacity under all instrument meteorological conditions. For ultimate success, both en route and terminal capacity must be increased during instrument flight conditions. The FAA's first obligation is sustaining safety as the capacity diminishes in weather.

New technology is being introduced into the NAS offering the opportunity to take aviation systems to new levels of efficiency and safety. The transition to full use of these technologies presents major challenges in the timely safety analyses, certification, and development of procedures for the capabilities that these new technologies enable. There are increased training challenges and significant work to define changes in operating specifications and procedures. For these reasons, the FY 2002 budget contains a request to add 75 new safety, flight procedures and certification positions, funded by the facilities and equipment appropriation, to work directly on implementing improvements to the NAS.

Further globalization in the aviation industry requires FAA leadership to support the development of cooperative relationships throughout the world. This will require additional safety personnel to participate in international standards organizations, work on joint research and development efforts, and flight trials. Joint certification of some new technologies will be necessary to realize global benefit.

Without additional safety positions to work on the operational changes in the NAS, the FAA will be slow to certify new avionics, modify airspace, and introduce procedures necessary to deal with the conditions that affect capacity and delay. These additional positions will conduct the safety and certification work necessary to implement modernization changes that support user demands for improved services with higher safety and improved efficiency.

Security

In carrying out its strategic goal to *prevent security incidents in the aviation system*, the FAA develops and implements regulatory policies, programs, and procedures to prevent criminal, terrorist and other disruptive acts against civil aviation. The FAA protects its employees, facilities, and equipment; assist in interdicting unlawful drugs and narcotics coming into the U.S.; and supports the national security strategy and counter-terrorism policy.

To accomplish its security objectives, the agency has adopted three performance outcomes:

- Improve detection of improvised explosives devices and other weapons,
- Improve airport access control, and
- Improve FAA infrastructure security and information security.

As early as 2010, the airlines are expected to be carrying one billion passengers annually, 60 percent more than was carried in 1999. This projected increase will significantly impact passenger and baggage screening and will demand better design of airport security checkpoints.

The NAS is critical to the Nation's economy

- 4.7 percent of Gross Domestic Product
- $976 billion in economic activity
- 10.9 million jobs
- Market for new aircraft in next 20 years - $1 trillion

System Efficiency

FAA's System Efficiency strategic goal is to: *Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.* An efficient aerospace system that meets users needs has enough capacity to meet demand, is predictable, is flexible enough that users can meet their needs, and provides access for all users.

The FAA and the aviation industry are facing increasing delays, primarily caused by convective thunderstorms that occur in the spring and summer months. While there are technology improvements that can improve capacity, there is no "silver bullet" to eliminate delays. Delay is the consequence of the lack of capacity in an operating environment of growing demand that becomes further compounded by en route and terminal weather events. The FAA must modernize, the airlines must equip with improved technologies, and airports must build runways.

During this last decade, 18 runways were commissioned at U.S. airports; 5 at large hubs, 9 at medium hubs, and 4 at small hubs. Additionally, new airports were opened at Denver, Colorado and Fayetteville, Arkansas, and former military airfields converted to civilian use in Alexandria, Louisiana, Austin, Texas, Belleville, Illinois, Pease International Tradeport, New Hampshire, and Marquette, Michigan.

During the next five years, commercial air transportation is expected to grow by 15 to 20 percent to serve an additional 100 million passengers at U.S. airports by 2004. Over 1,000 large jets will enter the fleet and the regional jets will continue their aggressive growth. Air cargo is expected to grow more rapidly than passenger growth. About half of all cargo is carried on passenger flights. The majority of all-cargo flights generally occur during off-peak hours with little impact on delay and congestion, except at major cargo hubs.

The 25 Busiest Airports account for 63 percent of passengers and 86 percent of delay. By 2006, these airports will increase to 2 million operations per year.

Currently, traffic at the 25 busiest airports exceeds their practical capacity by about 1 million operations a year. These additional operations are handled by spreading the flights out away from the desired times of operation. Either demand is reduced, or capacity expanded to bring the NAS into balance. It is normal to experience some delay in the NAS, the challenge is to manage excessive delay.

Airports are taking action to relieve a portion of the delay by constructing as many as 15 new runways that will be opened to traffic between now and 2006. If all of these runways are built as scheduled, they will add about 1.4 million operations a year in capacity. New runways not only require navigational aids, but new procedures, airspace changes, and possible increases in air traffic control staffing. Unfortunately, not all of the 25 busiest airports are able to add new runways.

While it may appear that airports are adding sufficient capacity, this is not the case. The current 1 million operations gap will rise to 1.6 million, even after adding these new runways. Many airports without current plans for additional runways are unable to do so due to increasing environmental sensitivity or physical limits on possible future expansion. As such, delay problems at some airports will continue.

NAS Air Traffic Services include:

- **Separation Assurance** – ensures aircraft maintain a safe distance from other aircraft, terrain, obstacles, and certain airspace not designated for civil air travel
- **Navigation** – provides navigational guidance to enable NAS users with suitable avionics to operate their aircraft safely and efficiently under various weather conditions
- **Traffic Synchronization** – provides expeditious flight sequencing for the large number of aircraft using the NAS during any given period
- **Traffic Management – Strategic Flow** –provides for orderly flow of air traffic from a system perspective
- **Flight Planning** – provides both flight plan support and data processing
- **Advisory** – provides weather, traffic, and NAS status information to pilots
- **Emergency and Alerting** – monitors for distress or urgent situations (in-flight and on the ground) and provides appropriate response
- **Airspace Management** – provides design, allocation, and stewardship of the national airspace resource
- **Infrastructure/Information Management** – management and operation of the infrastructure and optimal use of NAS resources. Includes systems such as surveillance, communication, navigation aids, automation, and the radio spectrum, which supports these aeronautical services.

The Modernization Challenge

Aviation Industry Growth Exceeding NAS Capacity

More people want to fly, so the number of flight operations is increasing accordingly. With this growth, the flying public and the flight provider expect that a flight can meet arrival and departure times, and is always safe and secure. This is true for all classes of users including general aviation pilots, who expect access to airspace and predictable, available, and affordable services. The airline expects that airport delays will not disrupt the subsequent flight of that aircraft. It is this service predictability and reliability that sustains hub and spoke operations and allows passengers to meet their connections. The Department of Defense expects to have access to the national airspace for training, national defense, and to deploy in support of national foreign policy.

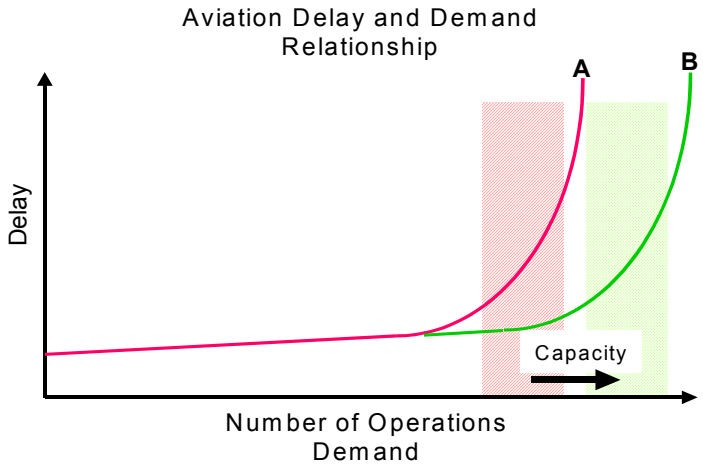
The FAA's role in meeting these expectations is to:

- Safely and efficiently separate individual aircraft,
- Provide for sustained flow of flights between airports, and
- Assure that the flow does not become too complex or the instantaneous volume too large for the system to be managed safely.

Air traffic control and management is supported by communications, navigation, surveillance, automation, procedures, airspace design, and flight inspection which provides the structure of sectors, routes, and instrument procedures. Over-saturation of the system is prevented through traffic restrictions and sector limits to assure safe operation. Air traffic controllers utilizing surveillance equipment, procedures, and separation standards, all assisted by automation implement the separation assurance so essential for safety.

Improvements to date have focused on exploiting the marginal capacity left in the current system to provide increased throughput and flight efficiency. These efforts have been effective, at current traffic levels, in managing flow and complexity and adding some flight-by-flight gains. But the forecasted growth in demand for aviation services cannot be met by solely localized improvements to the air traffic control and management system.

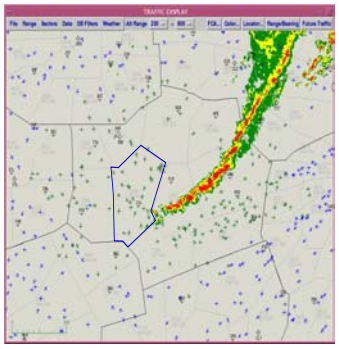
When weather reduces the available runway capacity or when schedules exceed capacity, delay increases rapidly. Airlines want to work slightly above the airport capacity so there is a loading on the NAS. As the number of aircraft increase, delay begins to rise sharply, as illustrated below in curve A. Before reaching this knee in the curve, there is excess capacity in the system and aircraft operations can be added with little or no effect on delay. Improvements that increase capacity, such as adding a new runway, shift the capacity curve to the right, as indicated by the green-hashed area. When the demand/delay curve shifts to the right, delay is reduced until the number of operations increase to the point where delay begins to grow again along curve B.



Capacity Benchmarks
The FAA, in cooperation with the airport and its users is developing airport capacity benchmarks for the top 34 delay-constrained airports. These benchmarks will show the throughput capacity of the airports under different weather conditions and help maintain a capacity/demand balance.

Capital investments by the airports and the FAA are necessary to move capacity to the right in the above graph. When airlines over-schedule and exceed capacity at an airport, or if weather disrupts airport operations, demand exceeds capacity and aircraft must be delayed to sustain safety. Delays at hub airports can rise quickly and significantly impact airline schedules and performance of the entire NAS.

Severe Weather Disrupts Airspace



Adverse weather in en route airspace blocks access to flights. Most of the delay is caused by convective thunderstorms that cross west to east in large fronts throughout the summer. Overall NAS throughput is significantly impacted. Capital investments in weather surveillance have improved NAS performance. However, as illustrated in the chart on the following page, the 2000 convective weather impacts at air traffic control center (ARTCCs) and airports were greater in June and July of 2000 than in 1999 and delays grew.

Month	Number of Convective Weather Days – 13 Centers	Number of Convective Weather Days – 22 Airports
June 99	72	76
June 00	125	141
July 99	99	99
July 00	144	153

Cumulative Number of Days When Convective Weather Seriously Impacted NAS Capacity for 13 Centers and 22 Delay Constrained Airports

AIR-21 Increases

The FAA has leveraged the increased capital appropriations in FY 2001 and the requested funding based on AIR-21 in FY 2002 to initiate or expands certain programs. The following table summarizes key areas of capital investment directly supported by the AIR-21 increases. Details are discussed regarding these efforts in appropriate sections of the CIP and in the appendices.

Safety	
Runway Incursions	Adds surface surveillance at 25 airports using ASDE-x
Visual Approach Aids	Safer Skies initiative to reduce controlled flight into terrain
Electronic Navigation Aids	Safer Skies initiative with instrument landing systems, distance measuring equipment, and related equipment to reduce controlled flight into terrain
Safe Flight 21	Alaska's Capstone project expanded to address controlled flight into terrain and weather improvements
Security	
Explosive Detection	Increased funding in FY 03 for detection equipment
Information Security	Supports modification of existing and new systems to meet Information Systems Security (ISS) requirements and improve the agency's Computer Security Incident Response Capability
Efficiency	
En Route Automation Modernization	Begins the replacement of the aging en route software and adds functionality supporting demand in traffic growth
Free Flight Phase 2	Deploys free flight tools and eliminates a 3-year gap between completion of Free Flight Phase 1 and deployment to additional locations
Airspace and Procedural Improvements	Adds area navigation approaches and departures, implements reduced vertical separation standards in domestic airspace above FL 290, implements new en route and terminal sectors to relieve choke points, and supports airspace analyses
Spring/Summer 2000 Lessons Learned	Funding within several projects supports changes in traffic management distribution of information, use of forecasting products, and modeling
Support to New Runways	Provides facilities and equipment for new runways at delay-constrained airports so that runways will open with airspace changes, procedures, systems and personnel in place to use the added capacity
Safe Flight 21	Ohio Valley capacity and efficiency demonstrations and evaluations expanded with more emphasis on certification
Dedicated Staffing	Identifies 75 additional positions in Flight Standards and Aircraft Certification dedicated to NAS modernization

Safety Initiatives and Safer Skies

The FAA's Strategic Plan is focused around three mission goals: safety, security, and system efficiency. The Agency's strategic safety goal is further broken down to the following objectives:

By 2007, reduce U.S. aviation fatal accident rates by 80 percent.

- *Fatal Aircraft Accident Rate: By 2007, reduce the U.S. commercial aviation fatal accident rate per aircraft departure, as measured by a three year moving average, by 80 percent from the three-year average for 1994-1996.*
- *Overall Aircraft Accident Rate: Reduce the rate per aircraft departure.*
- *Fatalities and Losses by Type of Accident: Reduce the number of fatalities and losses from accidents that occur for each major type of accident.*
- *Occupant Risk: Reduce the risk of mortality to a passenger or flight crewmember on a typical flight.*

The FAA's strategies are accident prevention, information sharing, and improving FAA certification and surveillance. The accident prevention strategies have two parts. The first is *Safer Skies* - working with the aerospace community, analyze the recurrence causes of accidents and develop and implement interventions to reduce or prevent them. A second part, risk mitigation, is a major focus for FAA capital programs. Risk mitigation seeks to develop and field systems, technologies, and procedures that target the high risk hazards in the NAS, and develop an integrated safety risk management process that ensures that hazards are identified, assessed, and managed to reduce risk.

The risk mitigation strategy focuses on deploying systems that will reduce specific hazards in the NAS. An example of this is the development of the airport surveillance detection equipment (ASDE)-x technology. This system is intended to reduce the number and severity of the risk associated with runway incursions. The FAA is acquiring these technologies and other systems designed to reduce the risk associated with the highest safety hazards in the NAS, such as runway incursions, mid-air collisions, flight in hazardous weather conditions, and controlled flight into terrain. The initial strategy includes increased deployment of distance measuring equipment and visual approach aids to reduce controlled flight into terrain.

The second mitigation strategy is to develop and deploy safety risk management processes throughout the FAA. Safety risk management is a method proven to reduce accidents and mishaps. This method is based on the principle that most if not all hazards to an operation or system can be found and controlled before the operation starts. The Office of Research and Acquisitions (ARA) is developing and deploying these tools in the acquisition of new systems. This is intended to ensure that the new system is:

- Designed according to requirements derived from data driven safety risk assessments,
- Integrated with the NAS and that the subsystems composing the system are integrated with each other,
- Designed by making data driven choices using safety risk as a metric in the decision, and

- Fielded knowing what the hazards are and having mitigation's designed into the system from the beginning and safety risk management of the system continuing throughout the lifecycle.

These safety risk methods are being applied to newly started programs to define requirements and risk management strategies.

In addition, the FAA Flight Standards Service is developing processes and tools that use safety risk management principles to identify and assess hazards in flight operations. This process will enable Flight Standards to focus their aviation inspector resources on the highest risk hazards.

Communications

Improving Quality and Reliability through Integrated Digital Communications

How old are the NAS communication systems?

- ✈ 50,000 very high frequency (VHF)/ ultra high frequency (UHF) radios, 20 years
- ✈ 701 remote communications air/ground (RCAG) facilities, 23 years
- ✈ 1,285 remote transmitter/ receiver (RTR) facilities, 18 years

Air traffic management depends on timely and accurate transmission of information during flight planning, in flight, and for airport operations. With the projected growth in air traffic, today's communication systems must be modernized to handle the additional demand and the need for faster and clear transmission. Controller-pilot communication is currently limited by channel availability. The FAA is encountering non-availability of Very-High Frequency (VHF) spectrum needed to provide new services such as the automated weather observation system (AWOS) broadcasts to pilots at several airports. The number of locations needing additional VHF spectrum is increasing. This puts a premium on converting to digital communications to recover needed VHF spectrum.

Radio Spectrum a Limiting Resource

Available spectrum is the limiting resource for growth in air transportation. Lack of VHF spectrum will begin restricting services in 2002. Increasing pressure on available spectrum requires the FAA to invest in digital technology to recover spectrum for further use.

The transition to digital air/ground communications requires significant capital investment for both the FAA and the users. The Administrator has requested an advisory committee to evaluate the business case for transition.

The next generation air-ground communications (NEXCOM) program began in 1998. The FAA has submitted international standards for digital VHF communications to the International Civil Aviation Organization (ICAO) Air Navigation Commission for approval in November 2001. A draft system specification has been developed. A test bed is being used to evaluate prototypes, define system interfaces, and conduct operational capability testing. This CIP supports production following the award of a NEXCOM multi-mode digital radio production contract in 2001. The radio will be capable of operating in either the digital mode or the analog mode. Initially, the radio will be deployed and used in the analog mode. A NEXCOM system prototype and demonstration validation effort will be conducted beginning in 2002, leading up to a NEXCOM system development contract award in 2005. The NEXCOM radios will operate in analog mode until 2008 when high altitude airspace will be converted to digital communications, provided all the aircraft using the airspace are equipped with a compatible digital radio. This conversion to digital radios will free up VHF spectrum to meet other analog air-ground service requirements. The existing analog air-ground communications system will be maintained and augmented as necessary while NEXCOM radio implementation proceeds.

The Backup Emergency Communication (BUEC) network provides backup for the primary radio communications between the en route controllers and aircraft. Four of the 20 required centers have been equipped with BUEC thus far. This CIP enables the remaining centers to be completed by 2005.

The FAA has begun transitioning voice communications to data link communications as a means to reduce congestion on voice channels. Data link communications between ground facilities and aircraft will include air traffic control, weather, and aeronautical information. The first data link system, known as the Tower Data Link System, provides flight plan route clearances to suitably equipped aircraft at 57 airports. The FAA plans to implement an operational Controller/Pilot Data Link Communications (CPDLC) Build 1 capability at the Miami Center in FY 2002. CPDLC Build 1 will implement the message services required to perform transfer of communications, initial contact with the controller, altimeter settings, and pre-defined text messages. These messages will be sent via a service provider's VHF digital radio. This CIP funds the single site deployment of CPDLC Build 1 at Miami, including an expansion to 9 messages in Build 1A with deployment to all centers. CPDLC Build 2 increases message content to enhance benefits by reducing communications workload.

En Route and Terminal Communication Improvements

The Voice Switching and Control System (VSCS) has been congressionally directed, in FY2001, to address problems found in FAA voice switches. The FAA intends to address the audio clipping, automatic gain control, and tone notching problems found in the FAA voice switches. In addition, a study will be conducted to evaluate wider applications of potential commercial-off-the-shelf (COTS) solutions to respond to the problems faced by all the voice switch systems as mentioned within the FY2001 Conference Report.

Navigation/Landing

Navigation Limited by Fixed Ground Locations

The FAA, the Department of Defense, and nonfederal agencies operate more than 4,300 ground-based electronic navigational aids that broadcast navigation signals within a limited area. This network of navaids enables users with suitable avionics to navigate en route and safely fly non-precision (course guidance only) and precision approaches (course and glide path guidance) in most meteorological conditions. When weather reduces visibility, runways without instrument approaches cannot be used for arrivals, resulting in a reduction in airport capacity.

The FAA also provides a variety of approach lighting systems that enhance pilot transition from instrument reference to visual reference for landing. The instrument approach procedure published for a particular runway dictates how sophisticated the approach lighting system needs to be for that runway. A precision landing procedure to a 200-foot decision height with ¼ mile visibility requires a more complex approach lighting system than a procedure with a 400-foot minimum descent altitude and 1 mile visibility.

The FAA and the user community are transitioning to satellite navigation to enhance safety, expand capacity and improve efficiency. With augmentation by WAAS and LAAS, the GPS system is expected to deliver en route/terminal navigation and all-weather precision approaches throughout the Nation's airspace. During the transition to satellite navigation, existing ground-based navigation aids will be sustained, allowing users time to equip with suitable GPS-based avionics. Some new instrument landing systems (ILS) that have already been purchased will be installed and additional units will be procured for new runway applications.

Increase the Accuracy and Availability of Position Information to the Pilots

Wide Area Augmentation System
Ground stations and communications satellites that provide wide area coverage and deliver information on accuracy, integrity, and improvements on availability for the global positioning system.

Satellite-based navigation, augmented by WAAS and LAAS systems, will meet the demand for additional navigation and landing capabilities and improve safety while avoiding the cost of replacing, expanding, and maintaining many of today's ground-based navaids. The development of WAAS and LAAS systems will provide the basis for NAS-wide direct routing, provide guidance signals for precision approaches to most runways in the NAS, and reduce the variety of navigation avionics required aboard aircraft. Operational efficiency and safety will be improved by adding thousands of precision and non-precision approaches at many airports lacking such capabilities today. This increased availability of instrument approaches will alleviate one of the major safety concerns - controlled flight into terrain.

The first phase of WAAS will provide the Lateral Navigation/Vertical Navigation (LNAV/VNAV) approach and landing as an initial operational capability (IOC). This capability will be sustained and enhanced to achieve a final operational capability (FOC). Additional WAAS Master Stations, WAAS Reference Stations, Geo-stationary Satellite (GEO) Uplink System, and GEO Satellite Transponders will become operational, increasing the service volume provided by Phase 1. The hardware installed earlier in the program will be upgraded to the current standard. The final system is designed to satisfy en route through Category I precision approach Required Navigational Performance (RNP) requirements for using GPS/WAAS as the only radio-navigation aid. WAAS FOC includes the addition of information security (INFOSEC), improved ionospheric monitoring algorithms, hardware, operations and maintenance upgrades.

In FY 2000, several significant milestones were accomplished, including three Signal-in-Space demonstrations, the WAAS Satellite Lease versus Buy study, a new Satellite Navigation Investment Analysis and WAAS Acquisition Program Baseline, operator and maintenance training material, and the system maintainability demonstration. The FAA exercised an option for a five-year follow-on effort for geostationary satellite communications services.

In FY 2001, system software development and integration will continue by focusing on the LNAV/VNAV integrity efforts. Funds are also used to operate and maintain the WAAS nationwide network infrastructure required for development; non-integrity related user services; and for programmatic, technical, and engineering support. NAS implementation efforts include dual frequency avionics standards development, certification, associated flight

testing, and data collection activities; flight standards support; execution of World Geodetic System aeronautical surveys to support GPS and WAAS procedure development. NAS implementation funds also support the development of an aeronautical GPS navigation database for private pilots and deployment of mobile ground and airborne interference detection and localization equipment. Additionally, satellite and terrestrial communications requirements associated with WAAS development and implementation will be funded. Non-recurring engineering and technical activities will begin in support of the acquisition strategy for additional GEO satellites.

The user community has formed a Satellite Navigation Users Group (SNUG) that is working in conjunction with the FAA to define the transition to satellite navigation. The SNUG is defining the transition from ground-based navigational aids to the global positioning system. The users are supporting the implementation of WAAS and LAAS and will make recommendations to the FAA on the transition strategy.

The Institute for Defense Analysis reviewed the WAAS technology issues and results of the independent review and recommendations were delivered in February. These recommendations are under review and coordination. The Institute stated that WAAS will achieve its design objectives for navigation and landing and that the benefits of WAAS are currently understated. Further, the review emphasized that WAAS should be put into service as quickly as possible and will require a third geostationary communications satellite as soon as possible to achieve benefits. A reassessment of funding needs for WAAS may follow.

Local area augmentation system (LAAS) provides precise correction data to airborne and surface receivers that will result in navigation accuracy of less than 40 inches to distances of 20 miles or more from the airport. Such accuracy is beneficial for instrument landings in all weather conditions.

LAAS will be deployed at approximately 160 airports. LAAS will provide precision instrument approach capability to all suitably equipped runways and aircraft. The LAAS is intended to complement the WAAS and function together to supply users of the NAS with seamless satellite-based navigation for all phases of flight. In practical terms, this means at locations where the WAAS is unable to meet existing navigation and landing requirements (such as availability), the LAAS will be used to fulfill those requirements. In addition, the LAAS will meet the more stringent Category II/III requirements that exist at selected locations throughout the U.S. The LAAS will also provide the user with a navigation signal that can be used for an all weather surface navigation system and as input for surface surveillance system(s).

FY 2001 funding allows the FAA to continue support of LAAS Category I precision approach system development, initiate development of the Category II/III specification, and develop the acquisition for Category I system procurement. FY 2002 funding will enable a contract award for 60 LAAS Category I systems and partial systems development support beginning in 2002, with delivery starting in 2003. The Category II/III systems will begin development in 2003 and will be purchased beginning in 2005. Previously acquired Category I systems will be upgraded to Category III.

Safe Flight 21 and Capstone Deliver New Cockpit Technology

SF- 21 – Ohio Valley
- ADS-B testing in Ohio Valley
- Operational Evaluation of free flight capabilities
- Air carrier avionics
- Efficiency focused

SF- 21 – Capstone
- GPS approaches
- Weather in the cockpit
- ADS-B testing
- GPS routes
- Automated weather reporting
- Data link
- WAAS
- Safety focused

Safe Flight 21 (SF-21) is a government/industry initiative to evaluate and validate the capabilities of advanced communication, navigation, and surveillance technologies by means of operational demonstrations. Associated air traffic control and pilot procedures will be developed at the same time. SF-21 demonstrations and evaluations will involve validation of the following free flight operational enhancements:

- Delivery of weather and other information to the cockpit,
- Cost effective methods for reducing controlled flight into terrain,
- Improved terminal operations in low visibility,
- Enhanced see-and-avoid between pilots,
- Enhanced en route air-to-air operations,
- Improved surface surveillance and navigation for the pilot,
- Enhanced airport surface surveillance for the controller,
- ADS-B for surveillance in non-radar controlled airspace, and
- ADS-B improvements in surveillance in radar controlled airspace

The SF-21 program is also focusing on avionics technology like the Cockpit Display of Traffic Information (CDTI) that enables the pilot to electronically "see and avoid" other aircraft. Using ADS-B, the aircraft emits signals that tell its position to other ADS-B equipped aircraft in the area. This information is visually depicted on a CDTI display in the cockpit.

The first operational demonstration and evaluation of SF-21 applications was successfully conducted in the Ohio River Valley in July 1999. Link evaluation testing and data collection also began in 1999. FY 2001 funding is being used to continue these demonstrations, complete safety studies, and select a preferred ADS-B link technology in 2001. The second operational evaluation was successfully completed in Louisville in October 2000, while a third is scheduled for Memphis in May 2001. Work on Traffic Information Service-Broadcast (TIS-B) development will begin, and safety studies related to conflict, detection and resolution will be performed.

The Alaskan Region's Capstone Program is an accelerated effort to improve aviation safety and efficiency through a series of operational demonstrations and evaluations by installing government-furnished GPS-based avionics and data link communications in commercial aircraft. In addition to the avionics, Capstone will deploy a ground infrastructure to improve safety, enable eventual implementation of new procedures, and validate Free Flight operational enhancements. These operational demonstrations began in the Yukon-Kuskokwim Delta area in 2000, and will expand to southeast Alaska starting in 2001. Use of ADS-B in a non-radar environment for separation became operational in January for air traffic control of Capstone-equipped aircraft.

Continue to Improve Airborne and Ground Safety and Efficiency - Provide Common Situational Awareness

Integrated terminal weather system (ITWS) integrates all relevant weather data available in the terminal area, including data down-linked from the aircraft, to automatically provide the current weather situation and accurate forecasts approximately 30 minutes into the future. Products generated by ITWS include windshear and microburst prediction, storm cell and lightning information, terminal area winds aloft, runway winds, ceiling and visibility predictions.

By sharing more detailed en route and terminal weather between controllers, airlines, and pilots, better utilization of existing runways is possible.

Terminal Doppler radar systems at the larger airports and weather sensor capability at other airports provides weather information to air traffic controllers. Terminal Doppler radar information is available on a separate weather display, not directly on the controller's display. The forecast from ITWS will improve safety by providing advance notice on severe weather, as well as improving efficiency in terminal operations.

The ITWS prototypes continue to be used in an operational setting. Operational test and evaluation for ITWS national deployment will be conducted during FY 2001. Infrastructure costs are provided to prolong the support of the ITWS prototypes until full implementation in FY 2002. Product improvements begin in FY 2003.

This CIP provides for en route weather improvements by continuing the development of WARP Stages 1 and 2. WARP is currently undergoing testing at its first operational site. Stage 3 FY 2000 activities were delayed to allow Stage 3 funds to offset Stage 1 and 2 telecommunication costs. Stage 3 will be completed in FY 2003. Stage 3 is necessary to provide national deployment of icing and turbulence forecasts, more cost-effective distribution of weather products from the National Weather Service (NWS), improved weather products to the FFP1 tools, and to implement interface upgrades to remain compatible with NEXRAD weather radar upgrades.

Continue to Improve Safety on the Ground - Reduce Runway Incursions

One of the FAA's key safety initiatives is the reduction of runway incursions. This is any occurrence at an airport involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in loss of separation with an aircraft taking off, intending to take off, landing, or intending to land. The FAA is working with the aviation community to identify various educational programs and technological advances through which incursions can be reduced.

Airport Surface Detection Equipment (ASDE-3) provides air traffic controllers with a video display of all vehicles and aircraft on runways and taxiways.

In FY2001, as part of the ASDE-3 CIP, the FAA plans to conduct testing to evaluate a prototype improvement based on roll ring technology; at the conclusion of the evaluation a report will be submitted to the Congress. The agency is also initiating efforts to relocate the Washington Reagan National Airport ASDE-3 in order to resolve coverage anomalies and will submit a congressionally directed report addressing the proposed solution and schedule.

Airport movement area safety system (AMASS) receives airborne aircraft target information from the airport surveillance radar, flight plan information from the ASDE-3 surface radar. AMASS determines if there are existing or potential conflicts between aircraft taking off and landing and other aircraft on the surface and provides a conflict alert to the controllers.

AMASS combines information from airport terminal and surface surveillance systems to predict conflicts between arriving and departing aircraft and vehicles/aircraft on the airport surface. Audible and visual alerts of runway incursions are provided to assist controllers in taking actions to prevent an accident. AMASS will be deployed at approximately 34 high-activity airports. With production delays due to modifications stemming from development and operational testing, human factors concerns, and requirements for life cycle support, the commissioning of the first system is now scheduled for June 2001; the last system commissioning is scheduled for November 2002. In FY 2001 through 2003 a third phase of human factors work begins that adds system improvements.

As airports become increasingly congested, the FAA and the entire aviation community must pay closer attention to the safety of ground operations. The complexity of today's operations increases the potential for creating unsafe conditions, especially where aircraft and vehicles may find themselves on active runways in direct conflict with arriving and departing aircraft. Some of these past runway incursion incidents resulted in tragic fatalities, heightening both public and congressional awareness of the criticality of runway safety.

The runway environment has become more complex and challenging to both pilot and controller. Higher traffic volumes and pressure for increased capacity and less delay will require low visibility operations and full utilization of runways and taxiways. To meet this challenge, new technologies must enhance controller and pilot situational awareness while assuring a safe, efficient runway environment.

Multilateration
By measuring the time of arrival of radio signals emitted by aircraft and received by multiple receivers around the airport, aircraft position can be determined.

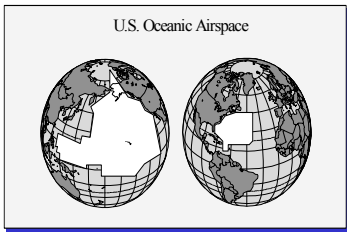
The ASDE-x consists of a primarily commercial-off-the-shelf acquisition, with some development for the surveillance fusion device for 29 ASDE-x systems. Following a full technology demonstration at the Dallas Fort Worth International Airport in November 1999, it was determined that an ASDE-x system would be defined as a surface movement radar, an ADS-B and multilateration sensor, a processor, and displays. Conflict alert capability will be incorporated at a later date to parallel the performance of AMASS after some operational experience with AMASS is obtained.

The production contract for ASDE-x was awarded in October 2000. Development and testing of the first system will occur from 2001 to 2003 and be operationally ready at that time. System enhancement, testing, and deployment will take place from 2003 to 2005.

Domain Capacity and Demand

En Route/Oceanic

The U.S. currently manages and controls 80 percent of the world's controlled oceanic airspace.



En Route and Oceanic Automation programs provide the hardware, software, and interconnecting networks required to process and display the data used by en route and oceanic controllers to ensure safe separation of aircraft during the cruise phase of flight.

En Route and Oceanic services control aircraft after they have left the terminal airspace and begun the cruise phase of flight. The 20 en route centers provide air traffic control services for aircraft flying in airspace over domestic airspace. The United States provides oceanic control at three oceanic centers (New York, Oakland, and Anchorage).

In the domestic airspace, the air traffic controller relies on radar for position information. Aircraft fly either direct routes or follow a fixed route structure. The fixed route may prevent pilots from flying the most advantageous wind-aided route. Within the fixed route structure, there are merge points where major traffic flows cross or converge. Controllers use these merge points as references to maintain separation and manage the arrival flows to major airports. The merge points are also the airspace areas where traffic volume may cause traffic congestion.

Air traffic control over the ocean is substantially different from that provided over land. There are few surveillance systems available with which to determine the position of aircraft in oceanic airspace. Pilots are not in direct radio contact with oceanic controllers. Pilot radio position reports (derived from on-board aircraft navigational systems) are periodically relayed to oceanic controllers through a private service provider. Due to the relative uncertainty in position, overseas flights are assigned to "tracks," and large procedural separation margins are used to ensure safety. These large separations cause some flights to be assigned less than optimum altitude. Furthermore, the lack of real-time surveillance data and the large separation criteria does not allow controllers much leeway to adjust altitudes to conserve fuel.

The implementation of improved aircraft navigational performance, automatic dependent surveillance in oceanic airspace, data link communications, and better automation tools are designed to overcome the current limitations in the Oceanic domain.

Old Technology Will Not Support Future Traffic Demands

The evolution towards increased efficiency and flexibility under instrument flight rules requires significant improvements in en route and oceanic automation systems and controller decision support tools. Major steps have been completed towards the replacement of aging automation hardware infrastructure. En Route centers have a new Host/Oceanic Computer System Replacement and have had all displays replaced. But before new applications and improved services can be provided, the remaining hardware must be replaced and significant software changes are required. En route automation will accomplish this with a phased approach leading to modern software before the next hardware replacement cycle in 2008. Oceanic automation will use an integrated approach relying on existing commercial products. The size and scope of the specific automation systems dictate the different approaches.

En route Automation - Sustaining Infrastructure While Developing Future Software Architecture

The en route centers' NAS operational software provides the flight data processing (FDP) for filing, updating and processing flight plans. FSSs, terminal, and tower automation systems all obtain flight plan data from the en route centers' HOCSR automation system. The HOCSR also provides the radar data processing (RDP) that feeds the controller displays in the 20 en route centers. The Direct Access Radar Channel (DARC) system provides RDP back up for the en route controllers, but there is no back up for FDP.

During the past several years, significant progress has been made in modernizing the primary en route automation hardware system. The HOCSR program re-hosted the existing en route NAS operational software onto new processors. This hardware replacement was recently completed in just 18 months due to the Year 2000 (Y2K) problems by hosting existing software applications on newer platforms with Y2K compliant code. New controller displays are fully operational at all 20 en route centers in the continental U.S.

Even with all this progress, numerous studies have shown that current en route ATC capabilities are failing to keep pace with the growth in en route traffic and the resulting congestion. Although the primary en route automation hardware was replaced, other key components of the primary and back-up systems still require immediate replacement. These requirements are supported in this CIP.

While the FAA has completed replacing en route displays, computers, and other hardware, the NAS en route operational software is 1970's vintage. The replacement of the en route software with maintainable, highly reliable computer code requires significant requirement definition and funding. Recent software failures point to the need to work both a sustainment and replacement strategy.

A strategy for en route automation software modernization (eRAM) is currently under development and engineering work is funded in FY 2001 to define requirements for the software replacement. Replacement of all the en route software will require significant planning and time. The program has a targeted completion date of 2008 with software upgrades designed to deliver early improvements as incremental deliverables. That is the time frame where critical supportability concerns for the current software and hardware merge. New software can be installed on new hardware in conjunction with the hardware replacement cycle. Because of the complexity of this task, the funding profile listed in this plan (en route automation budget line item 2A01) has been adjusted based on best current estimates. Some engineering work during FY 2001 will define requirements for dynamic sector changes to help balance workload.

This is a new concept that will require human-in-the-loop simulations to better manage density and airspace structure. The challenge is in removing current functions from the HOCSR to increase its software supportability, and defining performance of new functionality necessary to meet growing demand.

Service Issues Exist in Oceanic Airspace

The pressing oceanic issues raised by the users are somewhat different in the Atlantic and Pacific oceanic airspace, but the need for modernization is clear in both domains.

In the Atlantic, capacity is the immediate focus. Air traffic routes are primarily in non-U.S. airspace. As previously mentioned, the absence of a real time surveillance and controller-pilot communication restricts capacity and flexibility.

Because of more modern fleet avionics equipage and the length of flights (14 to 20 hours) in the Pacific, user benefits on the order of 500 gallons of fuel savings per flight and reduction of over 11 minutes in ground delay before departure are possible. These benefits occur through equipping the oceanic air traffic control system with automatic dependent surveillance and data link communications capabilities. These capabilities will enable the FAA oceanic control system to take full advantage of modern avionics, reduce aircraft separation, and frequently provide optimum cruise altitudes and routes. Without modernization, as oceanic traffic grows, oceanic air carrier and other operations will become more and more constrained.

The FAA is in the process of acquiring a replacement automation system to be implemented at the Oakland, New York, and Anchorage ARTCCs. This system is currently identified as the Advanced Technologies and Oceanic Procedures product. Based on the degree of customization/integration the successful system requires, the first ATOP system implementation could occur in 2002. It is anticipated that all three sites will be completed early in 2005.

Need to Move More Aircraft through Selected Airspace

Free Flight is defined as a safe and efficient operating capability under instrument flight rules in which the operators have the freedom to select their path and speed in real time. Air traffic restrictions are only imposed to ensure separation, to preclude exceeding airport capacity, to prevent unauthorized flight through special use airspace, and to ensure safety of flight. Restrictions are limited in extent and duration to correct the identified problem. Any activity which removes restrictions represents a move towards free flight."

From the RTCA Government/Industry Free Flight Action Plan, August 1996

Increasing efficiency during cruise is accomplished by:

- Reducing bottlenecks at merge points, i.e., improving transition between en route and terminal airspace,
- Creating new sector airspace structures at airspace choke points,
- Improving ability to safely accommodate aircraft-requested flight plan changes,
- Working changes in flight routes to avoid significant weather events,
- Improving prediction of growth and decay for convective weather events, and
- Improving availability of weather information.

The en route design consists of numerous routes published on aeronautical charts that cover all the principal travel destinations. Pilots planning to use FAA air traffic services file flight plans that follow the published routes. The future NAS concept of operation known as “Free Flight” proposes that pilots also be allowed to choose and fly any course between departure and destination. To safely implement Free Flight in high-density airspace, new automation tools will be needed to help controllers deal with the additional complexity associated with the more variable mix of routes and crossing points. These tools are included in Free Flight Phase 1.

Free Flight Phase 1 provides for the limited deployment of five initial core capabilities (User Request Evaluation Tool (URET), Traffic Management Advisor (TMA), passive Final Approach Spacing Tool (pFAST), Collaborative Decision Making (CDM), Surface Movement Advisor (SMA)) to manage risk while incrementally providing early benefits to users. For more information, visit the website at http://ffp1.faa.gov

URET provides an automated conflict probe tool that will enable en route controllers to manage user requests for route and altitude changes by alerting controllers of potential traffic conflicts up to 20 minutes ahead. It also checks for conflicts between routes and special use airspace boundaries.

TMA provides controllers with the capability to develop arrival sequence plans for selected airports, including assignments to the runway that best utilizes available airport capacity. TMA computes the aircraft's estimated arrival time at key arrival points to ensure aircraft meet flow constraints established by terminal management coordinators.

FFP2 will provide for geographical expansion of selected capabilities and benefits provided by FFP1. Enhancements of some of the FFP1 capabilities and the implementation of CPDLC and Collaborative Routing and Coordination Tool (CRCT) will add benefits. FFP2 will also facilitate selected prioritized Free Flight related research activities.

En route controller productivity, in terms of the amount of traffic that individual controllers can safely handle, must increase. Improved decision support tools, such as conflict probe and Traffic Management Advisor (TMA), are being added to improve productivity. The tools are being added by means of distributed hardware architecture, external to the existing FDP.

These tools are short-term solutions designed to address specific problems and provide user benefits. The long-term solution requires fundamental changes in the underlying en route software architecture to provide the necessary foundation for increased system-wide capacity, allowing controllers to work more aircraft in the airspace. URET's core capabilities at the initial seven en route centers to continue as planned, with the final system installed in 2002. TMA's basic functions at the initial seven en route center/airport pairs to continue as planned, with the final system installed in 2002.

Free Flight Phase 1 has significant but limited objectives. Resources will have to be managed to sustain the tools deployed to the FFP1 sites while expanding to additional sites agreed to by the FAA and the user community under Free Flight Phase 2. The Congress provided $15 million in FY 2001 for FFP2 to continue high-value work in traffic management and collaborative decision-making, and to start work needed to increase the number of locations where the tools would be used. FY 2002-2006 funding continues tool deployment. The FAA is requesting a significant increase over FY 2001 funding because the results of FFP1 will be available and deployment can begin at other locations. The URET, TMA, Surface Movement Advisor, and the collaborative decision making tools are producing benefits and are expected to expand to additional locations.

Under FFP2, deployment of URET to 9 of the remaining 13 en route centers will begin in FY 2003 and be completed during FY 2004. Deployment of TMA single-center to 4 of the remaining 13 en route centers is planned to begin in FY 2003 and completed during FY 2005. The FAA has reached an agreement with National Aeronautics and Space Administration (NASA) to field a fifth TMA system, this one a TMA – Multi Center (TMA–MC) at Boston Center (adapted to develop arrival programs for Philadelphia Airport) as part of the NASA TMA – MC research demonstration. At an appropriate time, Boston will also be adapted to include arrival programs for Logan Airport.

Additionally, FFP2 will support nine research activities beneficial to free flight. Implementation of these research projects will be within the FY 2003 – 2005 time frame:

- Direct-To is a capability that will notify the en route controllers when an aircraft's time en route can be reduced by flying "direct to" a downstream point closer to the destination point.

- TMA Multi-Center is a capability that will provide for the metering of aircraft operating in one center to an airport in another center.

- Surface Management System (SMS) is a capability that enables better surface movement decision making by providing accurate departure demand predictions up to 30 minutes in advance of scheduled departure.

- Equitable Allocation of Limited Resources is a procedure to ensure that no single user bears a disproportionate share of delays as a result of CDM.

- Problem Analysis Resolution and Ranking (PARR) is a set of tools that will assist the en route D-position controller in the management of flight data derived URET. It will also assist the controller in the development of strategic resolution for aircraft-to-aircraft and aircraft-to-airspace conflicts, in responding to hazardous weather conditions, and for complying with Traffic Flow Management (TFM) metering times and flow instructions.

FFP2 will monitor the following initiatives that are less mature in their research for possible future use:

- Expedite Departure Path is a capability to assist controllers accommodate unrestricted climbs and merge aircraft by providing active advisories for speed, heading and altitude.

- Advanced Vortex Spacing System is a capability to predict the existence of aircraft wake vortices and to reduce separation requirements.

- En route/Descent Advisor (DA) is a capability that provides for fuel-efficient descents from en route to terminal airspace.

- Active FAST is a capability that assists terminal controllers in accurately sequencing aircraft by providing vector and speed advisories.

Increase the Accuracy and Availability of Position Information

How old are the NAS beacon systems?

243 ATCBIs with an average age of 23 years

Air Traffic Control Beacon Interrogator (ATCBI-6) is the new secondary surveillance radar that can selectively interrogate individual aircraft, and provide more precise tracking information to the en route automation system.

The current en route air traffic control beacon interrogator (ATCBI) radars will be replaced with new digital radar, the ATCBI-6. A study on ATCBI-4/5 obsolescence determined that approximately 70 percent of the circuit boards in those systems already contained obsolete parts. The funding profile completes commissioning of ATCBI-6 radars by 2006.

Airlines and FAA Working Jointly to Resolve Congestion throughout the NAS

Air traffic management (ATM) encompasses traffic flow management (TFM) and air traffic control capabilities and is designed to minimize air traffic delays and congestion while maximizing overall NAS throughput, flexibility, predictability, and safety.

Traffic flow management is the strategic planning and management of air traffic demand to ensure safe and efficient traffic flow through the FAA-controlled airspace. To support this mission, traffic management personnel use a

Collaborative decision-making is the set of tools providing decision support services to the FAA and the aviation industry as they work together to resolve NAS congestion conditions.

CDM enables the FAA and the industry to assess and consider congestion resolution impacts prior to implementation. This will allow industry to improve service to their customers.

The airlines are investing their own development funds to support and participate in CDM.

combination of automation systems and procedures. Modernizing traffic flow decision support includes new capabilities that will provide:

- More timely and precise data exchange between traffic managers and airline operation centers,
- Enhanced analytical and display capabilities to facilitate FAA and industry collaboration in response to temporarily reduced NAS capabilities,
- More precise tools to analyze flow control data, performance, and decision making,
- Improved awareness of the status of NAS resources, and
- Maximized common situational awareness by improving information exchange, implementing common display mechanisms, and upgrading the communication infrastructure.

While core Enhanced Traffic Management System (ETMS) operations are sustained, development and deployment of additional CDM tools will continue. Areas of improvement will include:

- Increasing data items and airports from which NAS status information is collected and shared with the aviation community, and
- Enhancing the ground delay and en route congestion management program to increase focus on ensuring equitable allocation of limited resources to balance demand density across the NAS.

The general focus on CDM tools is expansion of common situational awareness between the FAA and aviation community. Implementation of these additional functions begins in FY 2001 and continues beyond FY 2006 as new tools are developed and integrated into ETMS.

FAA Shares Arrival information with Airlines to Expedite Gate Turn-around Time

SMA collects and shares ground movement information on the airport surface with the FAA, airline ramp control operations, and airport management. This will allow users to better coordinate ground support operations, allocating resources such as ramp and airport services in a more efficient manner.

In general, the use of information sharing improves the efficiency of surface operations. FFP1 completed the implementation of the SMA at 7 airports. SMA provides information about an aircraft's location while in terminal airspace. This information is used to plan for airline gate assignment and aircraft servicing requirements. The resulting increased situational awareness is helping airlines avoid 3-5 costly diversions per week during inclement weather at Philadelphia and Detroit airports. FFP2 will continue research and development leading to implementation of a SMS that will provide shared information in a decision support environment enabling greater flexibility, predictability and efficiency in airport surface operations. An initial SMS capability that may be sufficiently matured for implementation during FFP2 will provide accurate departure demand predictions up to 30 minutes in advance. This information will enable better decision-making for gate and taxiway

management, runway assignment and sequence, airport acceptance rate and airport operating configurations.

Arrival/Departure

The greatest single cause of delay is lack of capacity at selected airports. There are measures the FAA is taking to reduce arrival variability and improve handling of departures, but it is the terminal airspace, procedures and the airport runway throughput that are the controlling factors that contribute to delay.

Service Approach for Terminal Improvements

The FAA has examined the difficult problem of integrating complex schedules for deployment of a wide variety of terminal and airport related equipment. When viewed from delivery of the services in the domain, the complex interdependencies must be managed through a different managerial approach. Clearer lines of accountability are needed and emphasis needs to be around service delivery, not delivery of technology. In examining the challenges with STARS and the necessary ASR-11 surveillance, and adding communications and facility needs, the terminal improvements are the most complex integration challenge the FAA faces.

The FAA has established a terminal services team responsible for provision of services to improve terminal throughput. This shift in accountability and efficiency is directed at delivery of automation and relating support activities in a timely manner. This service team combines leadership for integrated product teams as well as field and headquarters units responsible for delivery of terminal air traffic control and management services.

Automated Radar Terminal System (ARTS) currently provides automation support for the terminal controller

- 131 ARTS IIA/E initially deployed in the early 1980s
- 59 ARTS IIIA/E initially deployed beginning in 1970
- 5 micro EARTS initially deployed in the late 1970s

Standard Terminal Automation Replacement System (STARS) provides new color displays, new computer workstations, and new commercially-based software, customized to incorporate human factors requirements, allowing the FAA to move to a uniform system at all terminal facilities. STARS, in its early display configuration, became operational at El Paso, Texas and Syracuse, New York for initial key site testing. Initial operational capability was achieved in FY2000.

Gaining Efficiencies from Existing Runways

Arriving and departing aircraft are sequenced in and out of the airport by air traffic controllers at the terminal radar approach control facility. Maintaining a steady arrival/departure flow of aircraft, particularly during peak periods, can be improved by providing controllers with tools for sequencing and spacing aircraft more precisely. The objective is to reduce variability in arrival timing and optimize use of airspace to squeeze out any remaining capacity from available runways.

Tower controllers manage and control the airspace within approximately 5 miles of an airport. They control ground operations on airport taxiways and runways and take-off and landing traffic. Tower controllers receive flight planning information from the en route computer and weather information from the weather processing and distribution communication network. Many towers also have surveillance displays connected to the TRACON automation system. These enable controllers to be aware of traffic under TRACON control.

TRACON facilities provide air traffic control services for airspace around an airport, usually up to 10,000 feet above the ground. Terminal controllers establish and maintain the sequence and separation of aircraft approaching and departing the airport, and/or flying through the terminal airspace. TRACON automation show controllers the position of aircraft in terminal airspace. TRACON automation and communication systems are connected with local

towers and overlaying air route traffic control centers. Selected terminal facilities are connected to traffic flow management systems at the Air Traffic System Command Center (ATCSCC). Weather information is available from the weather processing and distribution communication network.

Old Technology Will Not Support Future Traffic Demand

The FAA and the Department of Defense will replace all terminal automation systems in the NAS with STARS. This is an all-digital system based on open-system architecture, with modern color displays and distributed processing networks. STARS will replace systems at 173 FAA and 102 Department of Defense radar approach control facilities and associated towers. The STARS installation schedule drives the schedules for installation of the ASR-11digital radar and TRACON facility upgrades. These must be completed for STARS to become operational. The current FAA and military automation equipment will be decommissioned. FAA is conducting detailed site implementation surveys and anticipates a need for additional funding to support the deployment of STARS and will incorporate it in the FAA FY2003 submission.
STARS pre-planned product improvements will incrementally provide new functionality and enhancements, including the addition of pFAST from FFP1.

Accommodating Increased Demand for Flights with Better Ways to Use Existing Runways

pFAST is an automated tool that assists terminal controllers in sequencing aircraft that are approaching the airport from different directions and balancing aircraft flows to multiple runways. pFAST presents a recommended order for aircraft on arrival. In later developments, FAST becomes more "active" by using real-time aircraft performance data to generate speed and handling advisories to refine the recommended spacing and sequence.

Deployment and integration of the pFAST tool provides controllers with runway assignments and sequence numbers. This information allows controllers to assign runways according to user preference and local airport constraints. With this tool, controllers are able to reduce the number and duration of in-flight delays caused by congestion at busy airports. pFAST and TMA tools, used in conjunction with airspace redesign and new procedures, increase the effective capacity of airports that have multiple runways.

This CIP provides for the deployment of pFAST to the initial five airports as planned in FFP1, with the final pFAST FFP1 system installed in FY 2002. To avoid a gap in support, additional funds will be allocated to provide maintenance support at these five initial sites. Funding for additional deployments and development of additional functionality will begin in FY 2005, after STARS is installed at subsequent additional locations for pFAST.
The high cost and extensive site adaptation work in pFAST precludes an interim deployment and then conversion when STARS is in place.

Increase the Accuracy and Availability of Position Information

How old are the terminal radar systems?

- 31 ASR-7s are beyond useful life
- 64 ASR-8s are over 20 years old
- 134 ASR-9 are less than 15 years old

Three models of airport surveillance radar (ASR-7, -8, and -9) are in use to provide surveillance coverage of the terminal airspace. The analog ASR-7 and -8 radars, which have been in service since the 1970s, are incompatible with STARS and have reached the end of their useful lives. The ASR-7 and -8 radars are paired with ATCBI-4 and -5 secondary surveillance radars. The ASR-7 and -8 radar and their associated ATCBIs will be replaced with new ASR-11 radars beginning in 2002. The ASR-11 production decision was made in July 2000. The ASR-11 and STARS deployment schedules have been coordinated by

ASR-11 which consists of a primary radar paired with a ATCBI radar, will provide improved aircraft and weather detection and aircraft tracking compared with the ASR-7/-8 and ATCBI-4/-5 radars it replaces, in a digital format needed for STARS.

location so that the ASR-11s can arrive and be commissioned before STARS is commissioned. The schedule, and required funding, is necessary to minimize technical and further cost risks to both the ASR-11 and STARS programs. Early ASR-11 deliveries are targeted toward replacement of the older ASR-7 radar systems.

The previous CIP called for the first ASR-11 to be commissioned in October 2002. This date has been revised to April 2003. Two pre-production systems have been installed. Two production systems were procured with prior year funding. Ten systems were to be procured in FY 2000. Eight ASR-11s are to be procured in FY 2001.

Security

Security Goals:
- Improve Detection of explosives and weapons
- Improve airport access control
- Improve FAA infrastructure security and information security

To maintain a consistently high level of security throughout the aviation system, the FAA has identified short-term and long-term goals, and has established explicit program objectives to meet these goals. The capital investments are tied to rulemaking, issuing a final Computer Assisted Passenger Pre-screening (CAPPS) rule requiring screening of checked baggage or conduct passenger-to-bag matching for scheduled passenger operations within the U.S. on aircraft with more than 60 seats. This means that by 2004, explosive detection systems (EDS) will be installed and threat image projection (TIP) x-ray systems will begin deployment. In 2002, acquisition begins on small, lower cost EDS (called ARGUS) for deployment at security Category II, III, and IV airports. By 2004, airports will support screening of all CAPPS selected checked bags using EDS, or equivalent technology or procedures.

Security Oversight of:
- 454 U.S. Airports
- 242 international airports
- 650 million passengers
- 78 million regional carrier passengers
- 97 U.S. air carriers
- 2,880 U.S. air carrier stations
- 151 foreign air carriers
- 774 foreign air carrier stations
- 75,000 cargo shippers
- 10,000 freight forwarders
- 3,600 air carrier freight shipping stations
- 75 screening companies
- 20,000 screeners
- 1,200 screening locations

Baggage growth has increased pressure on screening. Domestic checked baggage is growing from 972 million bags in 1999 to an estimated 1.5 billion bags in 2011. Domestic carry-on was 1.3 billion and will grow to over 2 billion by 2011.

Physical security of FAA facilities is necessary to protect FAA employees and reduce damage from possible security events to sustain safety services. Funding for facility risk management increases over the FY 2001 level to $20.4M in FY 2002 and continues to grow through 2005 until security measures are in place consistent with Department of Justice standards for protection of federal facilities. Presidential Decision Directive 63 also considers aviation facilities as critical national infrastructure.

Information system security, prevention of unauthorized access to FAA systems, increases in difficulty as the FAA continues NAS modernization. This is because the complex, proprietary system protocols used in the development of legacy systems are being replaced with systems based on commercial off the shelf technology (COTS) and use of Internet Protocols. Without appropriate protective measures in place, vulnerabilities will increase because intruders know commercial systems well. In FY 2000 the FAA issued the information security policy and version 1.1 of the Information Security Architecture. The policy provides direction for new capital programs to meet information security requirements and include these costs in their baselines. Legacy systems and those systems already under development need funding to add protective

measures. FY 2002 funding of $28.6M is recommended. As the NAS modernizes and threats change, there will be a continuing need to support protection countermeasures.

NAS Sustainment and Enhancements

Ensuring Existing Services Remain Available while Accommodating Aviation Growth

How are NAS enhancements determined?

The FAA and the aviation community have jointly developed a concept of how the NAS should operate in the future. Actions required to satisfy the operational concept have been defined. These actions include technology, facilities, procedures, rule changes, and people. The NAS Architecture documents these actions and ensures they are considered in the FAA budget.

There are two aspects of NAS modernization. The first is the core infrastructure that provides reliable and safe ATC services. The core infrastructure includes existing and replacement:

- Communications, navigation/landing, and surveillance systems,
- Weather detection and reporting systems,
- ATC computers and displays for oceanic, en route, terminal, and tower controllers,
- Facilities, power generation, and back-up systems, and
- Flight inspection aircraft.

NAS Infrastructure Defined: The capital assets and resources necessary to deliver current services and capabilities. New assets associated with the provision of new capabilities become part of the infrastructure upon deployment.

The second aspect includes providing new systems with enhanced capabilities to benefit the aviation community including:

- Increased accuracy and availability of position information to the pilot,
- Improved resolution of congestion throughout the NAS,
- Automation tools to help controllers manage traffic growth,
- Improved collaboration between the FAA and the users based on a common and shared situational awareness, and improved weather information for general aviation pilots, the airlines, and controllers.

Based on OMB budget guidance and aviation community input, a considerable portion of FAA's capital is being invested in new capabilities, services, and technologies. A proper balance must be established to sustain the existing capital investment in infrastructure. The NAS Architecture identified the need to increase investment in "brick and mortar." This work includes power, grounding, bonding and shielding, heating, air conditioning, and ventilation, replacement of roofs, and facility upgrades. The FY 2002 budget increases the investment in infrastructure; however, as facilities and equipment continue to age, additional increases are needed. Generally, the timeline for upgrades to facilities and equipment is much longer than industry practices. The age of the NAS equipment presents a significant maintainability problem due to expiring warranties, lack of available spares and parts, and no manufacturer support for some of the products.

Service failure risk increases as systems age. Thus far, high redundancy in the NAS and the elimination of most single points of failure through backup systems has kept system reliability high, but the risk of a major outage is always present. The aviation system is highly interdependent and any major outage will have a ripple effect across the country. Recent system failures have significantly affected entire regions of the U.S., causing delays, increased separation between aircraft, or diversion to neighboring airports. These stopgap measures ensure that safety is always maintained.

Without the physical structures, the FAA would be unable to provide the services necessary to support air traffic operations. Currently, the agency operates more than 14,000 physical plants, both leased and owned by the FAA, throughout the NAS. Capital investment represents a very significant commitment to ensure that these facilities are maintained and operate appropriately, not only the buildings themselves, but also the supporting infrastructure and the roads and grounds they reside on. For power systems alone, the FAA will reinvest $53.8M in FY 2002 and the commitment to power systems will grow throughout the 5 years of this plan to replace the most vulnerable aspect of our system, backup power to increasingly less dependent commercial power.

FAA's engine generators are used when commercial power is interrupted. Ninety three percent of them have exceeded their 15-year economic service lives. The trend of the last 10 years shows a correlation between the number of standby backup power outages and the age of the generators. The average age of an uninterruptable power supply is 15 years.

How old are the towers and TRACONs?

- 464 Towers (269 FAA operated /195 contract towers) with an average age of 26.4 years
- 172 TRACONs with an average age of 22.2 years

The ARTCCs, TRACONs and towers represent major capital investments to the Government. The physical plant value of FAA control towers and TRACONs is estimated at over $7Billion. Sustainment backlogs are expected to grow, and as such, funding increases substantially in FY 2005 and 2006. The FAA has begun examining the value of these capital assets in terms of services provided in order to shape the proper level of infrastructure capitalization beyond FY 2002.

Provide Flight Planning Support to the General Aviation Community

Operational and supportability implementation system (OASIS) is the improved automated flight service station system that integrates flight data processing with new weather graphics and interactive briefings. The modular design of OASIS will allow growth to support future requirements.

FAA Flight Service Specialists at 61 automated locations provide flight planning and weather briefing services to the general aviation community. The current Flight Services Automation System (FSAS) system must be replaced to resolve an increasingly difficult logistic supportability problem and to provide improved weather information to the general aviation community.

Studies on hardware supportability and spare parts availability have shown that several key FSAS components are becoming unavailable and unsupportable. Suppliers who designed and built many of these components have left the business and there are limited replacement supply sources.

The OASIS program has been restructured, delaying completion of software development, extending the deployment schedule, reducing the level of technical support, and the funding profile has been adjusted accordingly. In FY 2000 the first OASIS system was deployed and is available for initial use by the specialists. In FY 2001 three systems will be procured, installed, and

tested, with the first operating capability in FY 2002 and the last is planned for FY 2005.

NAS has a total of 13,485 unmanned facilities

- Navigation Facilities - 9,126
- Communication Facilities - 3,877
- Weather Facilities - 115
- Surveillance Facilities - 367

Unmanned Facilities Also Need Sustainment

Unmanned buildings and structures house critical communication, surveillance, and navigation equipment. These facilities and buildings are deteriorating, resulting in equipment reliability problems due to out-of-tolerance building temperatures. In FY 2000 $4M was identified for unmanned facility sustainment. In FY 2001 this increased to $10M, with modest growth through FY 2006.

Maintain Airborne Mission Capabilities

A fleet of sophisticated flight inspection aircraft must be properly equipped to perform approximately 9,800 annual inspections of navaids, instrument approach procedure, and communications to ensure the integrity of the NAS. These sorties consist of approximately 800 commissionings, 400 reconfigurations, 6,500 periodic inspections, and 2,100 special inspections. The aircraft must also perform flight inspection missions worldwide to fulfill commitments to 45 foreign governments on all continents under State Department agreements. Six of the nine international flight inspection aircraft have an emergency support role for the Department of Defense to support military deployments and operations.

The FAA maintains research aircraft to conduct airborne testing and evaluation to support advanced aviation technologies, NAS modernization, procedural development, and human performance. General aviation aircraft are also maintained to provide Aviation Safety Inspection pilots with currency/proficiency training required for regulation and certification of the general aviation community and associated aircraft operations. These aircraft are also used to enable members of National Transportation Safety Board and the Federal Emergency Management Agency to respond quickly to transportation safety events and national disasters.

NAS Management & Aeronautical Information

Efficient Planning by the FAA and Airlines Requires Improved Data and a Greater Quantity of Shared Information

The NAS is a complex, highly interactive "system of systems" involving a large number of subsystems and components on the ground and in the aircraft, including facilities, equipment, and computer hardware and software as well as the people who enable hundreds of thousands of users to fly safely every day. The NAS must continue to evolve towards a more integrated information sharing system to support the collaborative decision process required for both tactical and strategic operations.

NAS infrastructure management has two key objectives:

- Improving airway facilities system maintenance services for NAS customers while reducing cost; and

- Increasing the productivity of operations and systems for the users.

These goals will be achieved by enhancing Airway Facilities capabilities to manage services, as well as the systems and resources that comprise the NAS infrastructure. New technological tools will enable more effective utilization of people and resources that will contribute to increasing productivity.

The NAS Infrastructure Management Systems (NIMS) program is a phased approach that provides the means to migrate the FAA's equipment maintenance approach to a service management. NIMS will be an integrated information system that consists of distributed computers, integrated software and database applications, remote monitoring and control capabilities, automated tools for Airway Facilities specialists, and the telecommunications needed to collect and deliver NAS information. NIMS will initially incorporate both new and legacy technologies, until it achieves full transition to an integrated system. Airway Facilities specialists will manage the NAS infrastructure by utilizing NIMS to monitor and improve services, optimize the productivity of people and resources, provide timely response to customer needs, ensure continuing improvement in services and work processes, reduce risk through predictive practices and promote satisfaction.

Conclusion

The FAA and the aviation industry are collaborating on plans to modernize the NAS within fiscal guidelines. This CIP and the NAS Architecture are the documents that project the 5-year funding profile, with the NAS Architecture providing a long-term projection through 2015.

The NAS Architecture is on-line at http://www.nas-architecture.faa.gov/cats/. The value of the architecture as a planning tool will be significantly improved in FY 2001 with the addition of costs and timing for the operational evolution of NAS capabilities.

While the FAA's goals focus on safety, security, and improved efficiency, the core infrastructure utilized to deliver existing services must be sustained. The operations cost of the NAS is growing, driven by increased telecommunications, more hardware and software to maintain, and the expansion of service delivery. As congestion increases, airspace sectors are being added to maintain safety while handling an overall increase in demand. Systems are being retained longer in the NAS, with many exceeding their service life. The consequence of continued operation of some of these systems is higher operations costs until the system can be replaced. Some investments, like FFP1 and FFP2 add operating costs due to the complexity of the software and the need for continuing site adaptation as airspace or procedures change.

Since the NAS Architecture represents the longer overall view of NAS modernization, the architecture will continue to be the primary means of maintaining consensus on NAS modernization, preparing capital budgets,

tracking requirements, and measuring progress in modernization. It will be updated and used to drive decisions affecting delivery of services and capabilities in accordance with the Administration's priorities. With the addition of information from the operational evolution planning, and better estimating tools for operating costs, the NAS Architecture will be able to project forward these operating costs to provide a better representation of future costs of services and delivery of capabilities.

The balance of the document includes the following appendices:

- Appendix A contains the 5-year funding plan for capital investment by budget line item.
- Appendix B links capital programs to agency goals based on the funding reflected in Appendix A.
- Appendix C is an acronym and abbreviation list for this CIP.

Appendix A

5-Year Budget Spreadsheet

FAA future budget projections are not released to the public due to the requirement for the FAA budget to be approved by OST and OMB, and submitted as part of the President's budget to Congress.

Appendix B
Goal Matrix

This appendix contains program goals for capital programs. The FAA strategic goals of safety, security and system efficiency are defined separately, along with the supporting goals of environment and organizational excellence. These FAA goals are laid out to show their relationship to the DOT goals. Programs are listed by budget line item(s) with associated goals identified. Many programs address multiple goals. For example, weather programs contribute both to safety and system efficiency, and are identified within the matrix. Program goals are expressed in terms of program accomplishments and status in fiscal year (FY) 2000, program plan in FY 2001 and FY 2002, and key events occurring between FY2003 and 2006. The program descriptions and budget line items are provided as a cross-reference to Appendix A.

In the Matrix, **Program Accomplishments FY 2000** represents the activities completed and status of outstanding goals. **Program Plan FY 2001** represents the activities to be completed for the funding provided by the Congress in this fiscal year. **Program Plan FY 2002** is dependent upon funding at least to the level of the Administration's capital budget request. **Key events between FY2003 and FY2006** assume the FY2002 funding level and the out-year profiles in Appendix A.

Appendix B Format Legend

1A04/2A05 **Goal(s): 1.1/1.14; 2.1/2.1.1**

Program Description	FY2000 Program Accomplishments/Status
Aeronautical Data Link Applications En Route Controller Pilot Data Link Communications (CPDLC) provides a two-way digital exchange of Aeronautical Telecommunication Network compliant air traffic control messages between ground and air	• Contract award for CPDLC Build 1 Data Link Applications Processor (DLAP) System Development • CPDLC Build- 1A contract award • CPDLC Build 1 DLAP CDR

Program Title and Description **FY 2000 Accomplishments**

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• CPDLC Build 1A Host CDR • Complete CPDLC Build I DLAP system development	• Implement CPDLC Build I service at Miami Center • Complete CPDLC Build I IOT&E Assessment • Complete Build 1 OT&E of integrated HOST and DLAP components • CPDLC Build 1A Host Formal Test complete • CPDLC Build 1A DLAP CDR	• Build 1A DLAP Formal Test complete 2003 • Deployment of DLAP between 2003 and 2005 • Key site implementation for CPDLC Build II in 2006 • Complete Build 1A OT&E of integrated HOST and DLAP components in 2003

Ongoing Activities **Planned 2002 Activities** **Key Events Based on Expected FY 2002 Funding**

1. **DOT Goal: Safety -** Promote the public health and safety by working toward the elimination of transportation-related deaths and injuries.

1.1. **FAA Goal: Safety** – Reduce fatal aviation accident rates by 80 percent in ten years.

Strategies to achieve FAA Goals:

Accident Prevention: Prevent accidents before they happen through appropriate, targeted, systematic interventions in the aviation system.
Safety Information Sharing and Analysis: Develop partnerships with the aviation community to share data and information supporting safe, secure aviation.
Certification and Surveillance: Develop new approaches to working with others on certification, inspection, and surveillance and target FAA resources.

FAA Annual Performance Goals:

1.1.1. **Air Carrier Fatal Aircraft Rate –** Reduce the fatal aviation accident rate for commercial air carriers from a 1994-1996 baseline of 0.051 fatal accidents per 100,000 departures. The FY 2001 target is 0.043 per 100,000 departures– with the reduction to be achieved in 6 key areas outlined in the Safer Skies Agenda.
1.1.2. **Fatal Aircraft Accident Rate –** By 2007, reduce the U.S. commercial aviation fatal accident rate per aircraft departure, as measured by the three-year moving average, by 80 percent from the three-year average for 1994-1996.
1.1.3. **General Aviation Fatal Aircraft Rate** – By 2007, reduce the general aviation fatal accidents by an amount that results in a 20-percent improvement from the projected total for that year. Assuming a 1.6-percent annual growth in activity, the annual number of general aviation fatal accidents is projected to grow from the 3-year baseline of 379 for 1996 to 1998 to be 437 in 2007. The 2001 target is 379.
1.1.4. **Operational Errors** – Maintain an operational rate of 0.5 or fewer operational errors per 100,000 activities for FY 2001.
1.1.5. **Runway Incursions –** Number of runway incursions. FY 2001 goal is no more than 243 runway incursions.

2. **DOT Goal: Mobility –** Shape an accessible, affordable, reliable transportation system for all people, goods, and regions

2.1. **FAA Goal: System Efficiency –** Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Strategies to achieve FAA Goals:

Free Flight: Within safety and environmental considerations, work toward giving aircraft the opportunity to fly in a way that gives them the most benefit as they define it
NAS Modernization: Using the NAS Architecture as the guideline, continually refine and update the NAS to achieve efficient aerospace systems and operations
Systems Integration: Integrate airport and commercial space requirements into NAS planning and architecture

FAA Annual Performance Goals:

2.1.1. **Flight Route Flexibility** – Increase airport capacity and en route direct routings due to effects of the Free Flight program by:

- Increasing capacity 3% during peak periods at the Minneapolis-St. Paul and Los Angeles airports in FY 2001.

- Increasing direct routings 15% above pre-URET 2-way Host installation levels at the Memphis and Indianapolis En-route Centers in FY 2001.

2.1.2. **Aviation Delays –** Reduce aviation delays in FY2001 to no more than 171 per 100,000 activities.

2.1.3. **Runway Pavement Condition –** Keep at least 93 percent of runways in good or fair condition (commercial service, reliever, and selected general aviation airports).

2.1.4. **All Weather Access to Airports –** Increase the number of runways that are accessible in low visibility conditions to at least 1191 in FY 2001

3. **DOT Goal: Economic Growth –** Support a transportation system that sustains America's economic growth.

3.1. **FAA Goal: Economic Growth –** FAA also supports this DOT goal through its System Efficiency goal that ensures a safe, secure aerospace system that is efficient for users.

FAA Annual Performance Goals:

3.1.1. See FAA System Efficiency Goals

4. **DOT Goal: Human and Natural Environment –** Protect and enhance communities and the natural environment affected by transportation

4.1. **FAA Goal: Human and Natural Environment –** Maintain the number of people exposed to aircraft noise at current levels despite increasing operations.

Strategies to achieve FAA Goals:

Understanding Aerospace Environmental Impacts: FAA will participate in research to understand more fully the effect of aerospace on the atmosphere and the degree of regulation necessary to minimize those impacts.

Reducing Aerospace Environmental Impacts: FAA uses combinations of regulations, research, technology, and procedures to reduce and mitigate adverse impacts from aerospace.

Quantify and Mitigate Environmental Impacts of FAA activities: FAA will assess compliance with environmental regulations; honor the mandates to clean up contamination in accordance with existing agreements; reduce the use of hazardous materials at its facilities; and promote recycling.

FAA Annual Performance Goals:

4.1.1. **Aircraft Noise Exposure –** Reduce the number of people in the U.S. exposed to significant aircraft noise by at least 64 percent from the 1995 baseline of 1.7 million. The FY 2001 target is at or below 600,000.

5. **DOT Goal: National Security** – Ensuring the security of the transportation system for the movement of people and goods, and support the National Security Strategy.

5.1. **FAA Goal: National Security –** Prevent security incidents in the aviation system

Strategies to achieve FAA Goals:

Security Baseline: Continue to improve the baseline security system for civil aviation and address vulnerabilities that may remain

Information Security: Develop and implement a comprehensive information system security program and security activities to protect the national airspace and mission support systems.

FAA Annual Performance Goals:

5.1.1. **Explosive Device and Weapons Detection** – Increase the detection rate for explosive devices and weapons that may be brought aboard aircraft.

6. **DOT Goal: Organizational Excellence** – Advance the Department's ability to manage for results and innovation.

6.1 **FAA Goal: People** - Prepare the workforce for the demands of the 21st century.
Reform - Become more businesslike while increasing customer responsiveness.

Strategies to achieve FAA Goals:

People: Implement a Model Work Environment, a productive and hospitable work environment where all employees can develop to their potential and contribute fully to the organization; contributions of all employees are supported and encouraged; discrimination and harassment have been eliminated; and the nation's diversity is reflected.
Acquisition Reform: Reform acquisition processes to make them faster, simpler and more mission-based.
Personnel Reform: Reform our personnel systems to provide increased flexibility in hiring, pay and placement; protect employee rights; increase productivity; promote high standards of accountability; enhance the agency's intellectual capital; and create incentives for change.
Financial Reform: Reform our financial systems to enable a more performance-based management approach.

FAA Annual Performance Goals:

6.1.1. **Customer satisfaction:** Gain positive feedback from stakeholders
6.1.2. **People:** Continue to build a Model Work Environment
6.1.3. **Financial Responsibility:** Achieve a clean audit and further improve agency accountability by implementing core financial systems

Contributions of CIP Programs to Goals

The CIP is made up of three sets of programs that contribute to the NAS. One set includes those projects that contribute to Department of Transportation and Federal Aviation Administration goals. The second set is made up of line items in the budget focused on sustaining the existing infrastructure to provide continuing NAS services. Some of these initiatives contribute to safety goals, but are primarily focused on replacing existing capabilities. The third set is those support activities like leases, support contractors, and services the FAA supports to sustain and improve the NAS. For programs that support agency goals, these contributions can be described in terms of products, capabilities or services provided. Many of the CIP budget lines contribute to multiple goals. In this section, the FAA Performance Goal is listed and then the CIP program is listed. Where this program contributes to multiple goals, it is repeated by the program acronym. There is not a one-for-one mapping of programs to the goals. This section of Appendix B provides the relationship between direct program contributions and goals. The rest of Appendix B focuses on all three sets of line items and linking performance goals.

FAA Goal: Safety – Reduce fatal aviation accident rates by 80 percent in ten years.

Air Carrier Fatal Aircraft Rate – Reduce the fatal aviation accident rate for commercial air carriers from a 1994-1996 baseline of 0.051 fatal accidents per 100,000 departures.

- Next Generation VHF Air/Ground Communications System (NEXCOM) - Spectrum recovery to expand available channels, adds safety functions to deal with stuck microphones, provides digital voice and data supporting safety and capacity operations

- Local Area Augmentation System (LAAS) for GPS - Provides differential corrections and integrity for GPS signal for use in precision approaches. Provides vertical guidance on approach in replacement for ILS's, adds landing runways with vertical guidance to reduce controlled flight into terrain. Provides necessary precision to support cockpit moving maps and low-visibility procedures to reduce runway incursions. Supports Category I/II and III precision approaches

- Wide Area Augmentation System (WAAS) for GPS - Provides differential corrections and integrity for GPS signals for use in en route and instrument approach and departure procedures, adds 4,000 instrument approaches that have vertical guidance for reduction of controlled flight into terrain. Provides precision missed approached to reduce approach minima. Provides necessary precision to support cockpit moving maps to reduce runway incursions.

- Weather and Radar Processor (WARP) - Delivers weather products to the air traffic controller and automation systems for use in safe operation of the NAS.

- Aviation Weather Services Improvements – Integrated Terminal Weather System (ITWS) - Delivers improved terminal weather products covering 45 airports with significant convective weather. This system integrates weather information and provides information to the controller, airports, and airlines and includes windshear, short-term forecasting of storm front movement, and supports tactical planning for runway changes caused by weather. Aids controllers in managing recovery of operations after a severe weather event.

- Weather Systems Processor (WSP) - Completes deployment and commissioning of 37 systems to provide severe weather information in the terminal airspace to improve safety.

- Instrument Landing System (ILS) – Establish/Upgrade - Installs precision approach systems to runways increasing all-weather operations and reducing dependence on non-precision approaches.

- Low-level Windshear Alert System (LLWAS) - Completes deployment of LLWAS systems that detect hazardous wind shears around airports.

- Approach Lighting System Improvement Program (ALSIP) - Installs approach lighting systems to improve landing safety.

Fatal Aircraft Accident Rate – By 2007, reduce the U.S. commercial aviation fatal accident rate per aircraft departure, as measured by the three-year moving average, by 80 percent from the three-year average for 1994-1996.

- ATDP – Automatic Dependent Surveillance Broadcast (ADS-B) - Develops standards for avionics and application of the technology that improves pilot situational awareness and air/ground surveillance to both improve safety and capacity.

- Safe Flight 21 - Continues demonstrations and evaluation of safety and free flight initiatives focused on controlled flight into terrain, satellite-based navigation, improved weather products in the cockpit, surface movement safety, and techniques for improving operational safety. Development and implementation of capacity improvements leverage the ADS-B technologies to implement new capabilities to increase airport throughput and provide improved command and control.

General Aviation Fatal Aircraft Rate – By 2007, reduce the general aviation fatal accidents by an amount that results in a 20-percent improvement from the projected total for that year.

- WAAS, LAAS, Safe Flight 21, ILS, WARP, LLWAS, ADS-B

- Automated Surface Observing System (ASOS) - Automates surface weather observations and distributes information to controllers and pilots. This mix of sensors, automation, and communications supports safety by providing ceiling and visibility information, wind and pressure data, and precipitation.

- Aeronautical Data Link Applications – Flight Information Services – Provides uplink of graphical and text weather and NAS status information to pilots to reduce weather related incidents and improve access to information about Notices to Airmen.

- ATDP - General Aviation/Vertical Flight Technology - The program conducts research to support the advanced of vertical flight aircraft in the following areas: terminal airspace rotorcraft air routes, avionics and cockpit technology and low altitude communications, navigation, and surveillance infrastructure.

- FSAS Operational and Supportability Implementation System (OASIS) – Flight service station automation provides improved safety services through provision of weather, airspace status, NOTAMs, flight planning and flight following services.

Operational Errors – Maintain an operational rate of 0.5 or fewer operational errors per 100,000 activities for FY 2001.

- NEXCOM

- Aeronautical Data Link Applications – En Route Controller Pilot Data Link Communications (CPDLC) - Reduces communications workload, reduces communication errors, provides reduction in voice channel congestion.

- Airport Movement Safety Area Safety System (AMASS) - Provides tracking of aircraft and vehicles on the airport and on the approach to the runway(s) at 34 high-activity airports and alerting controllers to prevent runway accidents from runway incursions and other hazards.

- Airport Surface Detection Equipment – Model X (ASDE-X) - Introduces surface surveillance to the next tier of airports to increase controller situational awareness and reduce runway incursions. Provides equivalent services as ASDE-3/AMASS safety functions and advances surveillance technology through use of multilateration with the capability to expand surveillance to include ADS-B.

- Gulf of Mexico Offshore Program - Provides VHF communications in the Gulf of Mexico for air carrier operations through satellite relay of communications from buoys and extended range radios in Mexico.

Runway Incursions – Reduce the number of runway incursions.

- WAAS, LAAS, ADS-B, Safe Flight 21, ASDE-3/AMASS, ASDE-x

- Advanced Technology Development and Prototyping (ATDP) – Runway Safety Program - Initiates promotes and manages initiatives and demonstrations of technologies to prevent runway incursions and continuing research in surface movement safety.

FAA Goal: System Efficiency – Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Flight Route Flexibility – Increase airport capacity and en route direct routings due to effects of the Free Flight program.

- LAAS, WAAS, ADS-B, Safe Flight 21, CPDLC, WARP, ITWS, NEXCOM

- Free Flight Phase 1 (FFP1) - The program incrementally deploys controller decision support tools to improve flexibility and predictability of air traffic management. Increases airport and en route throughput to increase capacity and reduce delay. FFP1 is a limited deployment capability. Airport throughput is increased at FFP1 sites and en route performance is improved through deployment of conflict probe capabilities. Collaboration with the airlines is increased in managing demand.

- Free Flight Phase 2 (FFP2) - FFP2 provides the necessary engineering to begin deployment of FFP1 capabilities to more locations beginning in FY 2002 through FY 2005. In addition, maturing research activities are deployed. Airport throughput is increased at FFP1 sites and en route performance is improved through deployment of conflict probe capabilities. Collaboration with the airlines is increased in managing demand.

- Terminal Automation Program – Standard Terminal Automation Replacement System (STARS) - Replaces current terminal automation with a digital system, new workstations with color displays and commercially based software to provide a common automation platform with a uniform configuration. This will allow subsequent decision support tools and improved surveillance (ADS-B) to be added that will improve terminal throughput.

- Advanced Technology Development and Prototyping (ATDP) – Separation Standards – (RVSM) - Introduces reduced vertical separation minimums in the WATRS airspace supporting off-shore East Coast flights in 2002 and supports reduction in domestic vertical separation at FL 290 and above by 2004 to increase airspace utilization and reduce delays.

- Oceanic Automation System – Advanced Technologies & Oceanic Procedures (ATOP) - Deploys first system to modernize the oceanic air traffic control operations

- En Route Automation Program - Continues to support en route automation to sustain services and begins reengineering of the en route software to realize free flight benefits and gain efficiencies through improved controller tools.

- Aeronautical Data Link Applications – Tower Data Link Services (TDLS) - This is a technical refresh program that replaces existing data link services to deliver clearances to pilots.

- Advanced Technology Development and Prototyping (ATDP) – System Capacity, Planning, and Improvements - Supports demonstrations and analyses targeted at specific procedures and airspace changes improving airport throughput, measure performance improvements, and support capacity planning.

- Advanced Technology Development and Prototyping (ATDP) – Operations Concept Validation - Validates FAA and user concepts to produce system requirements. Emphasis is on the tasks necessary to implement the joint FAA/industry concept of operations and modeling of tradeoffs for capacity expansion and delay reduction.

- Advanced Technology Development and Prototyping (ATDP) – Airspace Management Lab - Modeling and simulation of airspace changes to remove delay choke points, streamline use of airspace to gain arrival and departure throughput, and modifications to balance workloads.

- Air Traffic Management (ATM) - Supports strategic management of demand to increase efficiency and maintain safety. Traffic flow management activities at 80 air traffic control facilities are supported with decision support tools and communications for collaboration.

- Precision Runway Monitors (PRM) - Provides increased throughput at J.F. Kennedy International Airport and Atlanta International Airport by using high update rate radar to monitor the approaches and sustain an independent arrival stream to multiple runways as weather deteriorates.

- Instrument Approach Procedures Automation (IAPA) - Supports automation sustainment to design and approve instrument approach and departure procedures. A significant new workload is development of RNAV approaches to accommodate GPS and flight management system approaches.

Aviation Delays – Reduce aviation delays.

- LAAS, WAAS, ADS-B, Safe Flight 21, CPDLC, WARP, ITWS,

- Advanced Technology Development and Prototyping (ATDP) – ATC/ATM Decision Support Tools - Provides tools to expand capacity and increase collaboration to reduce delay.

- Potomac TRACON - Commissioned in FY 2002 to provide consolidated terminal services for Dulles, Reagan National, Baltimore-Washington airports and Andrews AFB.

- Air Traffic Management (ATM) Initiatives – Management tools to improve collaboration and manage demand.

- Infrastructure Sustainment Programs – Replaces or sustains buildings, power, heating and cooling, and associated infrastructure like radar service-life extensions to reduce the likelihood of delays caused by system or facility outages.

- NAS Information Management System (NIMS) - Increase FAA maintenance and operations efficiency and provides users with improved status of NAS performance for strategic management of flights and collaborative decision-making. Supports remote maintenance and control activities.

- Frequency and Spectrum Engineering - A significant capacity constraint is the availability of air/ground communications spectrum. This funding supports analyses for reallocation of radio spectrum, changing frequencies, and modifying coverage. This frees up a channel(s) to support new services in congested airspace.

All Weather Access to Airports – Increase the number of runways that are accessible in low visibility conditions.

- LAAS, WAAS, ILS, ITWS

- Advanced Technology Development and Prototyping (ATDP) – System Capacity, Planning, and Improvements - Supports demonstrations and analyses targeted at specific procedures and airspace changes to improve airport throughput, measure performance improvements and support planning to expand capacity.

- Advanced Technology Development and Prototyping (ATDP) – Operations Concept Validation - Validates FAA and user concepts to produce system requirements. Emphasis is on the tasks necessary to implement the joint FAA/industry concept of operations and modeling of tradeoffs for capacity expansion and delay reduction.

- Very High Frequency Omni-directional Radio Range (VOR) with Distance Measuring Equipment (DME) - Sustains ground-based navigational aids, including TACAN for the military and provides navigation services for en route and terminal operations.

- Instrument Approach Procedures Automation (IAPA) - Supports automation sustainment to design and approve instrument approach and departure procedures. A significant new workload is development of RNAV approaches to accommodate GPS and flight management system approaches.

- Distance Measuring Equipment (DME) Sustain – Installs DME equipment at selected locations to improve situational awareness.

- Non Directional Beacon (NDB) Facilities – Sustain – Supports NDB locations for use as marker beacons for ILS approaches and for non-precision approaches.

    - Visual Navaids - Establish/Expand – Provides visual navaids for landing runways.

    - Visual Approach Slope Indicator (VASI) – Replace with Precision Approach Path Indicator (PAPI) – Upgrades aging VASI lighting systems with PAPI lighting systems. These lights help pilots maintain an appropriate approach angle during the final visual portion of an instrument approach.

FAA Goal: National Security – Prevent security incidents in the aviation system

Explosive Device and Weapons Detection – Increase the detection rate for explosive devices and weapons that may be brought aboard aircraft.

- Facility Security Risk Management - Continues upgrading and accrediting NAS facilities and procures additional security systems to enhance protection of FAA employees, facilities, and assets.

- Explosive Detection Technology - Acquires and installs FAA-certified explosive detection systems and other screening devices to screen checked baggage, carry-on baggage, passengers, and electronic systems at security checkpoints in the nation's major airports. Increases the levels of protection afforded the traveling public in support of United States national security interests.

- Information Security - Mitigates security risks in existing systems, designs and builds security into future systems, and develops and deploys technology to meet new cyber attack threats, resulting in a secure, modernized NAS.

The FAA goal on *Human and Natural Environment* is focused on noise; however, many CIP programs support environmental cleanup and management of hazardous materials. The FAA goal on *People* prepares the workforce for the demands of the 21st century. Many programs have training aspects, provide for improved business processes, and develop system requirements around our workforce. In the FAA goal on Reform focuses on improved business processes and practices to become more businesslike while increasing customer responsiveness. A subset of the overall CIP includes initiatives imbedded within programs to address these goals.

1A01/2A16 Goal(s): 2.1/2.1.1; 3.1/3.1.1

Program Description	FY2000 Program Accomplishments/Status
Oceanic Automation System - Advanced Technologies & Oceanic Procedures (ATOP) – new acquisition to address long term Oceanic automation requirements. This acquisition will provided new hardware and software with related National Airspace System (NAS) benefits, and provide the best value for the government. Oceanic modernization program will also provide improved controller pilot data link communications (CPDLC), Air Traffic Services Interfacility Communications (AIDC), automatic dependent surveillance addressable (ADS-A) and enhanced controller tools.	• Completed Advanced Oceanic Automation System with the completion of Multi-Sector Oceanic Data Link (MSODL) New York Initial Operating Capability (IOC) and system available for operational use • Screening Information Request (SIR) 1 & 2 released • Completed SIR 1 "Show-Me" demonstration • Initiated SIR 2 ATOP vendor evaluations

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete SIR 2 vendor evaluations • Award ATOP contract • Perform Air Traffic Control (ATC) facility oceanic modifications to New York, Oakland, and Anchorage	• Deploy the first system (dependent on degree of final customization requirements) • Continue FAA controller and quality/assurance training • Continue key site operational testing and customization - if required	• Deploy ATOP to remaining sites (New York, Oakland and Anchorage) • Complete remaining operational testing • Complete customization - if required • Provide ATOP and AIDC services • Enhance controller tools and add ADS-A

1A02/2A14 Goal(s): 1.1/1.1.4

Program Description	FY2000 Program Accomplishments/Status
Next Generation Very High Frequency (VHF) Air/Ground Communications System (NEXCOM) – provide a new Air/Ground (A/G) communications system to satisfy requirements that cannot be met using the current voice communications system	• Integrated program plan completed • Multi-mode digital radio (MDR) specification completed • Final SIR released

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Award NEXCOM MDR contract	• Complete NEXCOM MDR Operational Test and Evaluation (OT&E) • Complete MDR Independent Operational Test and Evaluation (IOT&E) • Commence deployment of NEXCOM MDR • Commence NEXCOM system prototype effort	• Conduct NEXCOM system demonstration validation • NEXCOM system contract award in 2005

1A03/2A01 Goal(s): 2.1/2.1.2

Program Description	FY2000 Program Accomplishments/Status
En Route Automation Program – replace en route automation infrastructure to increase system capacity, reduce equipment-related delays, and accommodate increased functionality in support of Free Flight, NAS Architecture 4.0, and Air Traffic Services (ATS) future operational concepts.	• Display System Replacement (DSR) government acceptance at final site on schedule and under budget • DSR Operational Readiness Demonstration (ORD) completed at final 12 sites • Implemented Host Oceanic Computer System Replacement (HOCSR) Phase 2 at 16 en route sites • Development and testing of HOCSR Phase 2 for Oceanic sites • Perform IOT&E assessment of HOCSR Phase 2 En Route • Continued DSR Computer Human Interface (CHI) improvements for Air Traffic (AT) and Airways Facilities (AF) • Installed Flight Data Input/Output (FDIO) hardware at 80 terminal facilities • Development of Direct Access Radar Channel (DARC) Display Processor (DP) emulators

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete transition of DSR In-Service Management activities to operations organization • Develop hardware/software for an En route Communications Gateway (ECG) to replace Peripheral Adapter Module Replacement Item (PAMRI) functionality • Begin replacement of HOCSR Direct Access Storage Devices (DASD) at Air Route Traffic Control Centers (ARTCCs) • Continue en route software development support and implement upgrades approved by the En Route Configuration Control Board (CCB) • Engineering studies and prototyping activities to support En Route Automation Modernization (eRAM) Requirements Document • Continue support and integration of CHI development and function upgrades from the Air Traffic DSR Evolution Team (ATDET) • Initiate and support Chokepoint expansion	• Continue replacement of HOCSR DASDs to operational sites • Procure ECG hardware/ software and conduct system integration activities • Begin design development of En Route software re-engineering for eRAM • Continue efforts to sustain fielded En Route automation systems including support and technology refresh activities for DSR, development and deployment activities associated with DARC CP emulators, Host, and HID/NAS LAN • Continue CHI development and functional upgrades for DSR ATDET • Continue Chokepoint expansion efforts • Maintain En Route software development support and implement upgrades approved by the En Route CCB • Continue to procure and install FDIO replacement hardware	• System deployment of ECG to En Route Centers • Deployment of HOCSR peripherals to En Route sites, including completion of DASD replacement • Prototype development and evaluation of information and display, simulation and training, Flight Data Processing (FDP), and Surveillance Data Processing (SDP) under eRAM • Implementation of software and architecture, and national deployment of eRAM products • Continue efforts to sustain and restore En Route automation systems • Continue CHI development and functional upgrades for DSR ATDET • Continue En Route software development support and upgrades approved by the En Route CCB.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
efforts • Continue efforts to sustain fielded en route automation systems including support and technology refresh planning for DSR, deployment of DARC DP emulators and development of Control Processor (CP) Emulators, Host, and Host Interface Device /NAS Local Area Network (HID/NAS LAN) • Continue to procure and install FDIO replacement hardware		

1A04/2A05a Goal(s): 1.1/1.1.4; 2.1/2.1.1

Program Description	FY2000 Program Accomplishments/Status
Aeronautical Data Link Applications **- En Route Controller Pilot Data Link Communications (CPDLC)** – provides a two-way digital exchange of Aeronautical Telecommunication Network (ATN) compliant ATC messages between ground and air.	• Contract award for CPDLC Build I Data Link Applications Processor (DLAP) system development • CPDLC Build IA contract award • CPDLC Build I DLAP Critical Design Review (CDR)

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• CPDLC Build IA Host CDR • Complete CPDLC Build I DLAP system development	• Implement CPDLC Build I service at Miami Center • Complete CPDLC Build I IOT&E assessment • Complete Build I OT&E of integrated Host and DLAP components • CPDLC Build IA Host formal test complete • CPDLC Build IA DLAP CDR	• Build IA DLAP formal test complete 2003 • Deployment of DLAP between 2003 and 2005 • Complete Build IA OT&E of integrated Host and DLAP components in 2003

1A04/2A05c Goal(s): 1.1/1.1.3

Program Description	FY2000 Program Accomplishments/Status
Aeronautical Data Link Applications **- Flight Informational Services Data Link (FISDL)** formerly Graphical Weather Service (GWS) – provides graphics and text weather products and other flight information services (FIS) data throughout the NAS through FAA/Industry agreements with no FAA investment in infrastructure.	• Achieved FISDL IOC through private service provider. • Published cockpit workload study on pilot decision-making with FISDL products. • Published revision to Aeronautical Information Manual describing FISDL services.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Achieve FISDL IOC – Honeywell, Inc. • Publish RTCA FIS-Broadcast (FIS-B) MASPS • Complete initial review to determine government/industry roles in implementing General Aviation (GA) Automet Electronic Pilot Report (E-PIREP) capability	• FISDL final site delivery in 2002 • Expand FISDL coverage throughout the NAS • FISDL Testbed Very High Frequency Data Link Mode 3 (VDL-3) delivery • Deployment planning for national GA Automet (E-PIREP)	• Deploy national GA Automet (E-PIREP) system • Transition planning from FISDL services to VDL-3 or other alternative NAS supported data link communications.

1A04/2A05b Goal(s): 2.1/2.1.1

Program Description	FY2000 Program Accomplishments/Status
Aeronautical Data Link Applications **- Tower Data link Services (TDLS)** – provides data link capabilities and associated benefits to 58 high density Airport Traffic Control Towers (ATCTs).	• TDLS technology refreshment CDR • Memorandum of Agreement (MOA) executed with Port Authority of New York and New Jersey for TDLS system at Teterboro Airport **Unmet FY2000 Goals:** • TDLS Technology Refresh Final Design Review (FDR)

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Tech Refresh FDR OT&E at one new site (Teterboro) and one existing site (Philadelphia) • National deployment of the TDLS tech refresh platform at 7 sites	• National deployment of tech refresh platform to existing sites at a limited rate • Assume maintenance support for tech refresh platforms as deployed	• Complete full FAA maintenance support of TDLS in 2003 • Complete deployment of TDLS tech refresh platforms in 2003

1A05 Goal(s): 2.1/2.1.1/2.1.2; 3.1

Program Description	FY2000 Program Accomplishments/Status
Free Flight Phase 1 (FFP1) – a program that will incrementally deploy computer-based decision support tools by December 2002. The 5 core capabilities in FFP1 are: Surface Movement Advisor (SMA), Collaborative	• Delivered final 4 SMA systems • Procured and delivered 5 of 7 TMA systems • TMA first Planned Capability Available (PCA)

Decision Making (CDM), User Request Evaluation Tool (URET) Core Capability Limited Deployment (CCLD), passive Final Approach Spacing Tool (pFAST), and Traffic Management Advisor (TMA) Single-Center.	• Procured and delivered 5 pFAST systems • pFAST first PCA • Implemented TMA to Minneapolis and Denver Centers and achieved Initial Daily Use (IDU) • Conducted IOT&E for TMA • Added military Special Use Airspace (SUA) information to CDM • Initial CDM functionality integrated into Enhanced Traffic Management System (ETMS)

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete URET CCLD Build 1 software • Deliver 3 of 7 URET CCLD systems • TMA IDU at 4 locations • pFAST IDU at 3 locations • Procure and deliver CDM NAS status information bandwidth and communication enhancements • Deploy Runway Visual Range (RVR) information access to NAS Users • Operate and maintain 6 SMA sites and Atlanta prototype	• Extend shared situational awareness portion of CDM • Implement airport departure information for enhanced throughput management • Enhance CDM performance analysis component • Deploy URET CCLD to last 4 of 7 sites • Deliver URET CCLD Build 2 software • URET CCLD PCA in August 2002 • pFAST - 2 PCA's • TMA – 4 PCA's • pFAST – 1 IDU	• Maintenance of FFP1 tools

1A06 Goal(s): 2.1/2.1.1; 2.1.2; 3.1

Program Description	FY2000 Program Accomplishments/Status
Free Flight Phase 2 (FFP2) – provides for the geographical expansion and enhancements of the following FFP1 capabilities: CDM, URET, and TMA Single Center. FFP2 also includes implementation of CPDLC. FFP2 will also support selected research efforts.	• FFP2 has no Funding in 2000

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete development of initial increment of Collaborative Routing and Coordination Tools (CRCT) functionality • Flow constrained area information available for use on ETMS and common constrained	• Implement En Route congestion management and routing analysis tools • Complete development of second increment of CRCT functionality • Initiate software development and adaptation	• Improve sharing of data with industry for improved collaborative decision making • Initial Daily Use (IDU) of 9 URET sites by 2004 • IDU for TMA a 4 locations

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
Situation Display (SD) for strategic planning purposes • Requirements analysis of TMA for geographic expansion • Requirements analysis of URET expansion	of TMA • Begin adaptation efforts for TMA implementations • Continue software development spiral for URET	• Planned Capability Available (PCA) for TMA at 4 locations

1B01/2B02 Goal(s): 2.1/2.1.1

Program Description	FY2000 Program Accomplishments/Status
Terminal Automation Program **- Standard Terminal Automation Replacement System (STARS)** – a new system to replace Automated Radar Terminal System (ARTS). It will provide a digital capable system to meet expanding ATC needs beyond the year 2000. The STARS system will provide new computer workstations with high-resolution color displays and commercially based software to allow the FAA to move toward uniform configuration at all terminal facilities.	• Achieved IOC of Early Display Configuration (EDC) at 2 key sites • Procured 3 ARTS IIIEs • Delivered 254 of 294 ARTS color displays (ACDs) • Achieved Department of Defense (DoD) Full Service Level Initial System Capability

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• In service decision for EDC • Achieve ORD of EDC at 2 key sites • Perform IOT&E assessment for EDC • Procure 9 of 173 STARS systems • Deliver 5 STARS systems • Complete Full STARS 1 (FS-1) software development • Complete FS-1 System Acceptance Test (SAT) • Complete FS-2 software development & SAT • Deliver remaining 40 (294 total) ACDs • Achieve ARTS IIIE/ACD Operational Readiness at Atlanta Center Terminal Radar Approach Control (TRACON)	• Procure 18 of 173 STARS systems • Deliver 11 STARS systems • Achieve IOC for FS-1 at 2 key sites • Achieve ARTS IIIE IOC at Potomac Center TRACON and Northern California TRACON • Initiate Interim Tower Display procurement	• Achieve IOC for FS-2 at 2 key sites • Perform IOT&E assessment for full STARS • Achieve IOC for FS-3 at 2 key sites • Procure 141 of 173 STARS systems • Deliver 152 of 173 STARS systems • STARS deployment waterfall under refinement • Deploy Interim Tower Displays

1D01/2D12 Goal(s): 1.1/1.1.1/1.1.2/1.1.3/1.1.4; 2.1/2.1.4; 3.1

Program Description	FY2000 Program Accomplishments/Status
Local Area Augmentation System (LAAS) for Global Positioning System (GPS) – provide a navigation and landing capability to make GPS fully usable for all phases of flight for Category (CAT) I/II/III requirements. Procure 160 LAAS systems to include 46 CAT I LAAS and 114 CAT III LAAS.	• Concept of Operations completed and approved by Satellite Operational Implementation Team (SOIT) Steering Committee • Completed RTCA Minimum Operational Performance Standard (MOPS) and Interface Control Document • International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPS) for LAAS equivalent (Ground Based Augmentation System) was validated by Global Navigation Satellite System (GNSS) Panel • Prototype Ground Facility installed at the University of Oklahoma to support CAT A and B terminal instrument procedures (TERPS) • First frequency approval for VHF Data Broadcast given for Chicago O'Hare International Airport • Established LAAS Siting Group • Flight Test performed by FAA to validate airport pseudolite reception on a Wide Body Aircraft • Initial Government Industry Partnership Part 171 LAAS CAT I (Visual Flight Rules (VFR) only) prototype installation completed • Draft Flight Inspection Criteria completed • Completed Draft CAT I TERPs Criteria • "Red Label" Multi-Mode Receiver acquired and installed in FAA Technical Center aircraft

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Develop LAAS Acquisition Strategy to transition from Government Industry Partnership contract to FAA procurement • CAT II/III Specification development • CAT II/III MOPS development • Complete airport pseudolite integration and technical requirements for LAAS • TERPS data collection/ evaluation for LAAS CAT I • Complex procedure evaluation	• CAT I LAAS acquisition and fielding • Continue the development of the CAT II/III Specification • Continue CAT II/III MOPS validation • Develop proposal for CAT II/III Full Scale Development (FSD) • Continue with NAS Implementation of CAT I systems • Operational approval of Part 171 LAAS CAT I systems • Contract award to procure 20 of 60 CAT I LAAS	• Complete and validate CAT II/III Specification • Complete CAT II/III MOPS validation • Contract for CAT II/III FSD • TERPS data collection/ evaluation for LAAS CAT II/III • NAS Implementation of CAT II/III systems • CAT II/III LAAS production and fielding • Finalize LAAS siting documentation • Procure remaining CAT I LAAS in FY2003-FY2006 (quantities to be determined)

1D02/2D08 Goal(s): 1.1/1.1.1/1.1.2/1.1.3; 2.1/2.1.1/2.1.4; 3.1

Program Description	FY2000 Program Accomplishments/Status
Wide Area Augmentation System (WAAS) for GPS – provide navigation and landing capability to make GPS fully usable for all phases of flight. Adds instrument approaches including vertical guidance for safety at general aviation airports and vertical guidance for safety.	• Completed 7 of 8 formal system tests • Completed WAAS Satellite Lease vs Buy Study • WAAS achieved FAA integrated capability maturity model (iCMM) maturity level 2 • 21-Day Stability Test completed successfully on June 30th • Phase I Human Factors Assessment completed • Announced the immediate availability of WAAS capability for a broad range of non-safety applications (aviation to non-aviation) • WAAS Minimum Operational Performance Standards (MOPS) (DO-229A) validation testing complete • Implemented 57 Area Navigation (RNAV) GPS routes to support Atlantic Southeast Airlines • Implemented 33 RNAV GPS routes to support flights between Atlanta, GA and 7 major Florida airports

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete WAAS Lateral Navigation/Vertical Navigation (LNAV/VNAV) technical solution, including Algorithm Description Documents • Definitize WAAS contract schedule modification for LNAV/VNAV • Develop roadmap to GNSS Landing System (GLS) capability Instrument Landing System – Equivalent (ILS-Equivalent) • Perform data collection and analyses using the National Satellite Test Bed (NSTB) to further develop WAAS performance-assessment capabilities	• Complete a 60-day stability regression test • Complete contractor acceptance inspection • Complete test, evaluation, and acceptance milestones of the WAAS LNAV/VNAV capability	• Commission WAAS IOC for LNAV/VNAV • Develop and implement GLS capability • Acquire additional redundant geo-stationary satellite services • Continue to develop GPS approach procedures to serve all Instrument Flight Rules (IFR) runway ends • Develop LNAV/VNAV and GLS procedures for all runway ends • Develop Electromagnetic Interference detection and location capability

1E01 Goal(s): 6.1/6.1.1/6.1.3

Program Description	FY2000 Program Accomplishments/Status
NAS Improvement of System Support Laboratory -	• Sustain and support FAA Technical Center laboratories and test facilities

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Sustain and support FAA Technical Center laboratories and test facilities	• Sustain and support FAA Technical Center laboratories and test facilities	• Sustain and support FAA Technical Center laboratories and test facilities

1E02 Goal(s): 6.1/6.1.1/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Technical Center Facilities	• Sustain and support FAA Technical Center laboratories and test facilities

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Sustain and support FAA Technical Center laboratories and test facilities	• Sustain and support FAA Technical Center laboratories and test facilities	• Sustain and support FAA Technical Center laboratories and test facilities

1E03 Goal(s): 6.1/6.1.1/6.1.3

Program Description	FY2000 Program Accomplishments/Status
William J. Hughes Technical Center Infrastructure Sustainment	• Sustain and support FAA Technical Center laboratories and test facilities

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Sustain and support FAA Technical Center laboratories and test facilities	• Sustain and support FAA Technical Center laboratories and test facilities	• Sustain and support FAA Technical Center laboratories and test facilities

1F01a Goal(s): 2.1/2.1.1/2.1.2

Program Description	FY2000 Program Accomplishments/Status
Advanced Technology Development and Prototyping (ATDP) **- Separation Standards - Reduced Vertical Separation Minimum (RVSM) -** The Separation Standards Program analyzes changes in ATC system separation standards – or minimum required spacing in the horizontal and vertical planes between pairs of aircraft. These changes improve NAS capacity and efficiency but cannot be accomplished without adequate safety analysis, procedural changes and rulemaking.	• Introduction of RVSM into all Pacific international flight information regions (Feb-00)

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Safety oversight of Pacific RVSM • Preparation for RVSM implementation in West Atlantic Route System (WATRS) • Preparation for horizontal-plane separation minima reductions and RVSM introduction in Gulf of Mexico • Preparation for RVSM implementation in South China Sea • Support to NAS RVSM implementation team in domestic airspace analysis	• Introduction of RVSM into WATRS • Introduction of reduced horizontal-plane separation minima into Gulf of Mexico • Introduction of RVSM into South China Sea • Support to NAS RVSM implementation team developing domestic RVSM	• NAS RVSM 2004 • Gulf of Mexico RVSM • Caribbean/South American Region RVSM and horizontal-plane separation minima reductions

1F01b Goal(s): 1.1/1.1.5

Program Description	FY2000 Program Accomplishments/Status
Advanced Technology Development and Prototyping (ATDP) **- Runway Safety Program** (formerly Runway Incursion Reduction Program) - initiates, promotes, and manages initiatives that prevent incidents and accidents attributable to runway incursions	• Completed initial multilateration/ Automatic Dependent Surveillance-Broadcast (ADS-B), data fusion, loop technology at Dallas, TX • Completed Phase II of loop technology system at Long Beach, CA • Developed procedures, education and training, and airport improvements

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue evaluation of data fusion technology • Conduct loop technology operational assessment (Phase III) at Long Beach, California • Develop final Requirements Document and select test site for runway status lights • Initiate Broad Agency Announcement (BAA), awarding 10 to 15 contracts to vendors to demonstrate new and existing surface technologies • Initiate demonstrations resulting from BAA and draft reports that relate applications to the surface technology roadmap • Develop procedures, education and training, and airport improvements	• Continue BAA demonstration efforts in preparation for sponsor decision • Conduct runway status lights operational demonstration • Continue to develop procedures, education and training, and airport improvements	• Continue research on potential technology solutions for low-level airports including ADS-B and vehicle operations for investment decision in FY2003 • Continue to develop procedures, education and training, and airport improvements

1F01c Goal(s): 2.1/2.1.2/2.1.4; 6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
Advanced Technology Development and Prototyping (ATDP) **- System Capacity, Planning, and Improvements -** This program provides analysis necessary to develop a FAA strategy to enhance system capacity. This includes both terminal and en route airport and airspace assessment of procedures and capacity related technologies to develop capacity enhancement solutions. It also includes developing an ATS performance measurement system to measure progress toward customer expectations.	• Completed airspace review for relocation of the Honolulu Center Radar Approach Control (CERAP) • Complete Albuquerque ARTCC Airspace Capacity Analysis. • Completed Newark and Tampa Airport Design Studies. • Completed NAS integration studies at twelve major airports. • Completed analyses of Los Angeles International Airport /Santa Barbara high-speed rail (One Department of Transportation (DOT) initiative). • Identified operational impact and developed initial set of solutions to the planned introduction of New Large Aircraft (NLA) in the NAS. • Participated in the development of Simultaneous Offset Instrument Approach (SOIA) procedures for operations at San Francisco and initial assessments at Newark Airport.

	• Initiate the installation of NAS performance measurement analysis equipment at ATC System Command Center (ATCSCC) and Air Traffic Western Pacific Region. • Completed the 1999 Aviation Capacity Enhancement (ACE) Plan

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Conduct demonstration of Aviation System Capacity Improvement (ASCI) program at Houston and Memphis Airports. • Complete Anchorage Airport Design study. • Complete Phoenix Airport Ground movement analysis. • Initiate Seattle Airport Ground movement analysis. • Complete NAS integration study of regional jets at LaGuardia and Dallas Ft. Worth. • Complete NAS integration studies at six major airports. • Complete capacity analysis for Runway 14/32 at Boston International Airport. • Initiate Airport Design studies at Portland, Pittsburgh, and Boston. • Continue solution development for introduction of NLA into the NAS. • Complete analysis of the obstacle free zone – flight deck model for accommodation of NLA into the NAS. • Conduct wake turbulence separation standards reduction research at San Francisco and Boston. • Participate in the development of SOIA procedures at San Francisco, Newark and St. Louis Airports. • Facilitate the development of Along Track Separation procedures for operations at St. Louis and Minneapolis St. Paul Airports. • Support development of domestic and international Required Navigation Performance (RNP) operational standards and procedures.	• Conduct demonstration of ASCI program at Atlanta, Philadelphia, Cleveland and Detroit Airports. • Support the development of parallel runway wake turbulence separation standards. • Support fast and real time simulation of SOIA for site specific airports. • Complete SOIA procedure development at San Francisco Airport. • Continue development of SOIA procedures at Newark, St. Louis, and initiate programs to support the development of procedures for operations at Cleveland and Boston Airports. • Finalize the Along Track Separation recommendations for implementation at St. Louis, Minneapolis St. Paul, and initiate development of procedures for operations at Newark, Atlanta and Los Angeles Airports. • Support the completion of converging approach standards and departure procedures at Dulles and Dallas Ft. Worth Airports. • Support efforts to analyze wake turbulence spacing at Seattle. • Complete the installation and development of NAS performance measurement analysis capability for Air Traffic's Western Pacific and Southwest Regions. • Initiate NAS performance measurement analysis capability at Air Traffic Northwest Mountain and Central Region's. • Initiate AF NAS Performance measurement analysis capability and metrics development. • Continue Along Track Separation Cost and	• Identify and develop new wake turbulence standards and procedures NAS wide. • Initiate demonstration program to establish lateral separation criteria for multiple runway configurations. • Continue procedural implementation of SOIA and other technologies at site specific airports. • Conduct risk assessments of closely spaced operations at Seattle, Cleveland, Charlotte and other sites as requested. • Conduct analysis of runway shoulders, aircraft taxi operational guidance, engine thrust/jet blast analysis and satellite-based ground navigation for NLA. • Conduct SATS demonstration program. • Conduct capacity impact analysis of new NAS Architecture capabilities. • Conduct Along Track Separation Cost & Performance benchmarking and causal analysis. • Expand facility level metrics program to include all regions. • Continue NAS integration and airport analysis and development studies. • Conduct Domestic RVSM capacity analysis and safety risk. • Continue ACE Plan development.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Support the development of enhanced departure and arrival procedures at Chicago O'Hare and Midway Airports. • Support the development of triple approach procedures to new runways at Atlanta and Detroit. • Complete the installation of NAS performance measurement analysis equipment at ATCSCC and Air Traffic Western Pacific Region and begin analysis. • Expand facility level metrics analysis capability to Air Traffic Southwest Region. • Identify facilities level metrics program requirements for Airway Facilities. • Develop En Route Balance Scorecard and conduct cost performance benchmarking and causal analysis. • Complete 2000 ACE plan.	Performance benchmarking and causal analysis. • Continue analysis of new and/or additional performance measures for Along Track Separation. • Initiate and complete a NAS integration study of new NAS technology. • Complete Airport Design Studies at Portland, Pittsburgh and Boston Airports. • Initiate Airport Design Studies at Cincinnati, Memphis, and Los Angeles Airports. • Complete Aircraft Ground Movement Analysis at Seattle Airport. • Initiate Charlotte New Runway Ground Movement Analysis and multi-lateration experiments. • Complete 2001 ACE Plan. • Initiate capacity impact analysis of equipment location priorities in the NAS architecture. • Initiate capacity impact analysis of selected NAS architecture capabilities. • Initiate and complete study of airport design for accommodation of NLA into the NAS by FY2006. • Identify the impact and develop solutions to National Aeronautical and Space Administration's (NASA) Small Aircraft Transportation System (SATS) Demonstration Program planned for FY2003 implementation.	

1F01d Goal(s): 2.1/2.1.2; 6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
Advanced Technology Development and Prototyping (ATDP) **- Operations Concept Validation**	• Service Framework for Architecture • NAS Performance Framework for future improvements • Analysis of Separation Procedures in support of Separation Standard Rationalization • Established ICAO Global Concept structure • Collaborated on FAA/NASA Air-Ground Integration Experiment • Test-bed for Modernization

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• System Wide Information Management (SWIM) Concept • Flight Intent Concept and Information Design • Validate Airspace Reference System • Investigate workload coordination issues with shared separation responsibility • Develop Dynamic Density measure to support airspace management and strategic flow for En Route congestion	• SWIM proof of concept demonstrations • Closed-loop control model of airspace/airport/ customer demand dynamics to answer concrete versus airspace questions • Integrated surveillance/navigation concept • Validation Data Repository – global institution with Eurocontrol	• Unlimited Dynamic Resectorization Concept and Experiment • Multi-sector planning concept and experiment • Information flow modeling for concept integrated with Architecture

1F01e Goal(s): 2.1;6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
Advanced Technology Development and Prototyping (ATDP) **- Software Engineering Research Center (SERC) -** This budget line item supports the development, prototyping and validation of technology and systems that support advanced AT related adaptation data management services. This includes software certification research for safety critical airborne and ground based applications and the development/validation of a Software Life Cycle model for Commercial Off-the Shelf/Non-Development Item (COTS/NDI) products. The SERC will coordinate these projects.	• Evaluated and validated improved software processes, methods and engineering tools • Brought together recognized experts and FAA personnel to solve software problems • Increased the technical competency of the FAA workforce • Researched techniques for streamlining the certification process without affecting safety • Investigated, identified, and developed better ways of estimating and predicting lifecycle costs of COTS-intensive systems

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Investigate methods by which a COTS software product can be certified • Conduct analyses in software adaptation and implement to reduce costs and the time required	• Streamline procedures for certifying avionics and ground-based safety-critical software • Evaluate/validate improve software processes, methods, and engineering tools	• Evaluate/validate improve software processes, methods, and engineering tools • Bring together recognized experts and FAA personnel to solve software problems as

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
to deploy software-intensive systems • Streamline procedures for certifying avionics and ground-based safety-critical software • Evaluate/validate improved software processes, methods, and engineering tools • Bring together recognized experts and FAA personnel to solve software problems as needed • Investigate better and cheaper ways of ensuring that NAS hardware and software is safe, secure and efficient through research and prototyping. • Provide better estimates for total cost of ownership of COTS-intensive systems	• Bring together recognized experts and FAA personnel to solve software problems as needed • Investigate/validate various approaches for performing safety assessments and certification of integrated air-ground systems of the NAS. • Develop guidelines for secure software systems • Develop, test and evaluate analytical models • Develop, test and evaluate NAS simulations • Develop standards and guidelines for COTS/NDI software/system assurance • Develop standards, guidelines for COTS/NDI software system cost estimation • Develop standards and guidelines for certification of safety critical software-intensive systems • Develop standards and guidelines for end-to-end test of air/ground software-intensive systems	needed • Develop guidelines for secure software systems • Develop, test and evaluate analytical models • Develop, test and evaluate NAS simulations • Develop standards and guidelines for COTS/NDI software/system assurance • Develop standards, guidelines for COTS/NDI software system cost estimation • Develop standards and guidelines for certification of safety critical software-intensive systems • Develop standards and guidelines for end-to-end test of air/ground software-intensive systems

1F01f Goal(s): 1.1/1.1.1/1.1.2/1.1.3; 2.1/2.1.1/2.1.4; 3.1

Program Description	FY2000 Program Accomplishments/Status
Advanced Technology Development and Prototyping (ATDP) **- Wide Area Augmentation System (WAAS)** – provide navigation and landing capability to make GPS fully usable for all phases of flight. Adds instrument approaches at general aviation airports and vertical guidance for safety.	• Performed data collection/ analyses using the NSTB to further develop WAAS performance-assessment capabilities • Conducted ionospheric data collection/analysis to define WAAS final operational capabilities • Supported implementation efforts of the Caribbean/ South American Test Bed (CSTB)

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Perform data collection and statistical analyses of initial WAAS performance capabilities • Continue to conduct ionospheric data collection and analysis to define WAAS final operational capabilities	• Continue WAAS performance monitoring and assessment • Develop real-time time distribution system • Continue SBAS interoperability efforts • Authoritative characterization of the	• Develop prototype time distribution system • Continue SBAS interoperability efforts • Increase interference detection and mitigation techniques • Continue characterization of the ionosphere

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue to support the implementation efforts of the CSTB	ionospheric during the Solar Peak • Establish research database and analysis capability	• Establish a prototype ionospheric database and analysis capability • Define Satellite Navigation (SATNAV) architecture for Alaska

1F01g Goal(s): 1.1/1.1.1/1.1.2/1.1.3/1.1.4; 2.1/2.1.4; 3.1

Program Description	FY2000 Program Accomplishments/Status
Advanced Technology Development and Prototyping (ATDP) **- Local Area Augmentation System (LAAS) –** provide a navigation and landing capability to make GPS fully usable for all phases of flight for CAT I/II/III requirements. Procure 160 LAAS systems to include 46 CAT I LAAS and 114 CAT III LAAS.	• Completed LAAS CAT I specification validation efforts • First frequency approval for VHF Data Broadcast was given for Chicago O'Hare International Airport • Flight Test performed by the FAA to validate airport pseudolite reception on a wide body aircraft

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue investigational studies and analysis for surface movement, helicopter operations, and advanced use of pseudolites • Continued installing and testing LAAS prototype systems to ensure that the systems will validate the functional CAT III specification in particularly difficult sites • Initiate CAT II/III Specification/Validation • Initiate CAT II/III MOPS validation	• Complete and validate CAT II/III Specification • Complete CAT II/III MOPS validation • Continue CAT II/III implementation and testing • Continue CAT II/III algorithm development • Complete airport pseudolite integration and technical requirements for LAAS	• CAT II/III advanced procedure development • Develop improved signal quality monitoring CAT II/III • Develop integrity algorithms CAT II/III • Complete CAT II/III implementation and testing

1F01h Goal(s): 1.1/1.1.2/1.1.3/1.1.5; 2.1/2.1.1/2.1.2/2.1.4; 3.1

Program Description	FY2000 Program Accomplishments/Status
Advanced Technology Development and Prototyping (ATDP) **- Automatic Dependent Surveillance Broadcast (ADS-B**) - a surveillance system that will enable free flight capabilities, minimize runway incursions, increase runway safety and provide coverage in existing non-radar areas	• Developed ADS-B procedures and technology for enabling paired approach to closely spaced parallel runways, and RTCA and international ADS-B standards, for use in surveillance • Obtained supplemental-type certificate (STC) to install ADS-B in aircraft participating in Alaska Capstone Program • Completed development of Universal Access Transceiver (UAT) Minimum Aviation System Performance Standards (MASPS)

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Begin UAT MOPS • Develop application description for four ADS-	• Continue standards development for UAT MOPS, 1090 MOPS and Airborne	• Complete UAT MOPS development in 2003

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
B procedures: approach spacing, departure spacing, airport surface situational awareness, and runway and final approach occupancy awareness • Complete 1090 MOPS, Version 1 • Complete Traffic Information Service Broadcast (TIS-B) MASPS	Surveillance and Separation Assurance (ASSA) MOPS (processor) • Develop standards for applications involving TIS-B	

1F01i Goal(s): 2.1/2.1.1; 6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
Advanced Technology Development and Prototyping (ATDP) **- Airspace Management Lab -** The mission of the Air Traffic Airspace Management Program Office (ATA) is to ensure that the sectorization and routes are designed for the safest and most efficient use by operators, while maintaining diligent consideration for local and national environmental policy, to meet the demand for air transportation. The Laboratory serves to support that mission by providing detailed, quality information through the creation of databases, simulation modeling for the anlaysis and reporting or presentation aids for ATA and Region management and specialists • The purpose of this CIP Program is to fund the development of applications for data management and additional COTS simulation model acquisitions, and • Develop applications in support of other FAA lines of business dependent on extensive operational data such as overflight "fee for service" assessments and obstacle awareness (OE/AAA) and evaluation.	• Tracker Replacement, Aeronautical Information Exchange Model vs. Standard ICAO Conceptual Information Model, High Level Architecture, Multi-Center Total Airspace and Airport Modeler, Sector Design and Analysis Tool Enhancements Fee-for-Service Process Development, Foreign Over flights Notification System, Surface Movement Advisor & New York Enhancements, FFP1 Metric Development, Noise Integrated Routing System Application Development

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006

• Continued installation of capabilities for data management:
  • Additional COTS simulation model acquisition including additional software for summary analysis of the ETMS data structures,
  • Additional ARTS data for additional airports, Aeronautical Information Service data integration (ATA-100) into overall scheme and operation for redesign/air traffic activity,
	• Continued activities leading to the creation capabilities for data management;
	  • Additional COTS simulation model acquisition and capability discovery including additional software for summary analysis of the ETMS data structures,
	  • Maintain/refresh Information Technology (IT) for ARTS data for additional airports,
	  • Aeronautical Information Service data integration (ATA-100) into overall
		• Continued activities leading to the creation capabilities for data management;
		  • Additional COTS simulation model acquisition and capability discovery including additional software for summary analysis of the ETMS data structures,
		  • Maintain/refresh IT for ARTS data for additional airports,
		  • Maintain/refresh IT for FDAT, POET interface, and maturation of Free Flight metrics.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Additional deployments of the FDAT, • Post Operational Evaluation Tool (POET) interface, maturation of FFP1 metrics and simulation model metrics normalization, • Test and evaluate Dynamic Sector and Gridding concepts for integration into future year redesign analysis tools, • OEAAA and Fee For Service integration into redesign planning schemes to operate as components rather than stand alone (not good for Performance Based Organizations (PBO) Operations), and • Other Concept of Operations (CONOPS) in support of Integrated Product Team's (IPT).	scheme and operation for redesign/air traffic activity, • Maintain/refresh IT for FDAT, POET interface, and maturation of FFP1 metrics. • Continued test and evaluate Dynamic Sector and Gridding concepts for integration into future year redesign analysis tools, OEAAA and Fee For Service integration into redesign planning to operate as components rather than stand alone (not good for PBO operations), and other CONOPS in support of IPT's	• Continued test and evaluate Dynamic Sector and Gridding concepts for integration into future year redesign analysis tools, and CONOPS in support of IPT's.

1F01j Goal(s): 2.1/2.1.1; 6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
Advanced Technology Development and Prototyping (ATDP) **- ATC/ATM Decision Support Tools -**	• New program for FY2001

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Build Test scenario for TMA Multi-Center • Data collection in Problem Analysis, Resolution, and Ranking (PARR) Concept Demonstration • Assessment of Surface Automation Concept alternatives • Simulations Support	• Support of NASA TMA Multi-Center concept exploration prototypes • Built test scenario for PARR concept validation • Model impact of sensor technology on Surface Management System (SMS) performance • Simulations Support	• Operational evaluation of future NASA and Mitre Center for Advanced Aviation System Development (CAASD) ATC controller decision support concept development products to include En-route Descent Advisor, Dynamic Resectorization and Common Trajectory Modeler

1F01k Goal(s): 2.1; 6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
Advanced Technology Development and Prototyping (ATDP) **- NAS Requirements Development** - support mission analysis and NAS requirements development efforts. Fund studies and other efforts to prepare and validate strategies and proposals designed to increase overall NAS efficiency.	• New program for FY2001

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Develop En Route requirements input for NAS Design Tool – prepare and validate an integrated set of future ATS en route domain requirements • Maximize value of En Route investment – define investment packages and prepare an en route strategy paper • Evaluate use of Collaborative Convective Forecast Product (CCFP) within CDM – develop the CCFP into a 24-hour-per-day program; evaluate CCFP during previous poor weather sessions; develop real-time verification statistics for CCFP • Support requirements definition and development of research demonstration program for Traffic Management Unit (TMU) – develop, coordinate, and provide oversight of research demonstration programs required by TMU's	• Provide additional support to requirements development	• Provide additional support to requirements development

1F01l Goal(s): 1.1/1.1.3; 2.1/2.1.4

Program Description	FY2000 Program Accomplishments/Status
Advanced Technology Development and Prototyping (ATDP) **- General Aviation/Vertical Flight Technology (GA/VF)** – supports GA demand for Communication, Navigation, and Surveillance (CNS) technologies through applied R&D. These technologies support cost-effective ATS, improve safety and expand NAS capacity and efficiency. Additionally, the GA/VF program conducts research to support the advanced of vertical flight aircraft in the following areas: terminal airspace rotorcraft air routes, avionics and cockpit technology and low altitude CNS infrastructure.	• Completed CONOPS document • Develop Strategic Plan for using advanced technologies • Develop VF SATNAV Road Map

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Vertical Flight Simultaneous Non-Interfering (SNI) Operations • Law Enforcement/Emergency Medical Service Demonstration(s) • VF Aircraft Capabilities/Approach Criteria Matrix • Rotorcraft advanced technology applications/standards • ADS-B locating and surveillance applications	• Conduct SNI research • Support the development of TERPS criteria for rotorcraft approaches	• Develop technical data for SNI standards • Initiate research for low visibility compound angle instrument approaches at a Heliport/Vertiport • Gulf of Mexico Offshore Weather Improvements • VF NAS planning and architecture • Conduct research to enhance GA safety

1F02 Goal(s): 1.1/1.1.2/1.1.3; 2.1/2.1.1/2.1.2/2.1.4

Program Description	FY2000 Program Accomplishments/Status

Safe Flight 21 (SF-21) - a government/industry cooperative effort to develop and demonstrate a set of enhancements that facilitate free flight capabilities, minimize runway incursions, and provide coverage in existing non-radar areas	• Completed the Link Evaluation data analysis final report
	• Installed Bethel, Alaska, ground stations
	• Modified Micro-EARTS to display ADS-B with radar data
	• Developed ATC procedures using ADS-B.
	• Installed avionics in over 70 aircraft to include:
	  • GPS for enhanced visual navigation
	  • ADS-B for enhanced visual acquisition of other ADS-B aircraft, TIS-B, and weather information
	  • Multifunction display of above information and a terrain database for use in avoiding controlled flight into terrain
	• Installed Automated Weather Observation Systems (AWOS) and developed GPS approaches to provide non-precision access to airports in southwest Alaska

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Alaska Region certification of Micro-EARTS for use with ADS-B. • Certified Micro-EARTS to provide radar-like service using ADS-B in non-radar airspace. • Demonstrate, validate, and analyze in a real world environment the SF-21 capabilities in Ohio Valley • Continue air traffic procedure development for terminal and en route use.	• Develop and demonstrate a set of operational enhancements that facilitate free flight capabilities and use of ADS-B data link • Begin Alaska statewide limited deployment of ADS-B ground broadcast transceivers and other ground infrastructure to enhance safety, e.g., AWOS, runway incursion prevention systems, WAAS.	• Continue to validate SF-21 applications. • JRC decision for NAS-wide deployment of ADS-B in FY 2003. • Harden ground infrastructure for limited deployment in FY2003. • Complete installation of ground infrastructure beyond FY2005 • Site delivery for Ohio River Valley and Alaska in FY2005. • Continue Alaska statewide limited deployment

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Joint Resources Council (JRC) decision for limited deployment. • Begin TIS-B development. • Conduct Safety studies • Complete ADS-B installation in remaining Capstone participating aircraft. • Demonstrate incorporation of WAAS with Capstone avionics in southeast Alaska. • JRC decision for Alaska statewide limited deployment.		of ADS-B ground broadcast transceivers and other ground infrastructure to enhance safety, e.g., AWOS, runway incursion prevention systems, WAAS

2A02 Goal(s): 1.1/1.1.1/1.1.2/1.1.3; 2.1/2.1.1/2.1.2

Program Description	FY2000 Program Accomplishments/Status
Next Generation Weather Radar (NEXRAD) – Provide - national network of weather radars currently in use that detects, processes, distributes, and displays hazardous and routine weather information	• Commenced development, test, production and delivery of weather software and radar hardware upgrades

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• The new rotary uninterruptible power systems (UPS) will be installed at 5 NEXRAD sites	• The first 2 FAA NEXRAD sites with the Open Radar Products Generator (ORPG) upgrade will be available for operational use • The rotary UPS will be installed at the remaining 5 FAA NEXRAD sites	• The last FAA NEXRAD site with the ORPG upgrades will be available for operational use by 2005

2A03 Goal(s): 6.1/6.1.1/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Air Traffic Operations Management System (ATOMS) - a personal based computer operational environment consisting of local area networks, data receivers, and/or personal computers at over 500 field sites for use in managing Air Traffic operations	

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Develop tools to simplify the collection and analysis of operational data • Create an Operational Data Warehouse that can be accessed by both field and headquarters personnel for aeronautical information		

2A04 Goal(s): 1.1/1.1.1/1.1.2/1.1.3; 2.1/2.1.1/2.1.2

Program Description	FY2000 Program Accomplishments/Status
Weather and Radar Processor (WARP) - automated system that collects, processes, and disseminates NEXRAD data and other weather data to ARTCC controllers, traffic management specialists, and ARTCC weather service unit meteorologists. WARP provides the most timely and accurate weather forecast products to other NAS systems.	• Complete WARP Stage 1 and 2 system testing at the Fort Worth ARTCC • Complete system requirements and design review for WARP Stage 3 weather information network server (WINS) to support FFP1

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Deployment of WARP Stage 1 and 2 systems • Implement WARP Stage 3 WINS to support FFP1 at 7 sites • Continue development of other WARP Stage 3 critical operational changes, upgrades, and new interfaces	• Complete development of Stage 1 and 2 systems • Interface with National Weather Service Aviation Weather Information system for pilots by 2002 • Continue Stage 3 activities to develop critical NAS interfaces • Complete Telecommunications infrastructure necessary to support Stage 1 and 2 and continue Stage 3 changes	• Continue Stage 3 activities to develop critical NAS interfaces (e.g., ITWS, OASIS, ETMS)

2A06 Goal(s): 2.1/2.1.1/2.1.2; 6.1/6.1.1/6.1.2/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Air Route Traffic Control Center (ARTCC) Building Improvements/Plant Improvements – implement modernization projects at the facilities to accommodate the scheduled implementation of NAS equipment and meet building code requirements	• Funded Chiller replacement project at 3 sites. • Funded Direct Digital Control Panel upgrades at 4 sites. • Funded Fire Alarms upgrades at 17 sites. • Completed Phase I construction of the Honolulu CERAP. **Unmet FY2000 Goals:** • One chiller site replacement deferred to FY2001 due to loss of carryover FY98 and FY99 funds

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Rehabilitate and expand Administration Wing at Miami ARTCC. • Modernize Telecommunication Management & Operation (TM&O) area to facilitate the FAA Telecommunications Infrastructure (FTI) requirements.	• Modernize Control Wing Basement at 3 sites. • Rehabilitate and expand one Administration Wing. • Replace chiller at 1 site. • Sustain projects at various locations. • Complete Phase II of Honolulu CERAP	FY2003: • Modernize Control Wing basement at 6 sites. • Rehabilitate and expand one Administration Wing. • Sustain projects at various locations.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Replace chillers at 4 sites. • Seismic upgrades at 2 sites. • Initiate sustain projects at various locations. • Begin Phase II construction of the Honolulu CERAP & demolition of the Diamond Head Facility.	construction and demolition of the Diamond Head Facility.	FY2004: • Modernize Control Wing basement at 2 sites. • Rehabilitate and expand one Administration Wing. • Modernize Control Wing 1st Floor M-1 area at 1 site. • Sustain projects at various locations. FY2005: • Rehabilitate and expand one Administration Wing. • Modernize Control Wing 1st Floor M-1 area at 3 sites. • Sustain projects at various locations. FY2006: • Modernize Control Wing basement at 6 sites. • Rehabilitate and expand one Administration Wing. • Modernize Control Wing 1st Floor M-1 area at 1 site. • Sustain projects at various locations.

2A07 Goal(s): 2.1/2.1.2; 3.1; 6.1/6.1.1/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Air Traffic Management (ATM) – maintain and upgrade the existing Traffic Flow Management (TFM) infrastructure to continue mission critical TFM operations in 80 ATC facilities	• Funded the 2nd year of a 3 year nation wide lease and maintenance for hardware and communication equipment • Installed ETMS in new North Georgia TRACON • Integrated initial CDM functionality on TFM infrastructure • Achieved Year 2000 (Y2K) compliant system **Unmet FY2000 Goals:** • Did not achieve ORD of ETMS in new North Georgia TRACON (installed only)

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Fund the 3rd year of a 3 year nation wide lease and maintenance for hardware and communication equipment • Finalize communication upgrade to support	• Continue operation of Departure Spacing Planner (DSP) prototypes • Implement additional international sites for access to TFM.	• Begin infrastructure modernization • Install ETMS in new Potomac and St Louis TRACONs

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
current requirement and new FFP1 functionality • Implement engineering changes to upgrade system for new applications • Install ETMS at new Northern California TRACON		

2A08 Goal(s): 2.1; 5.1; 6.1/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Critical Communications Support - Critical Telecommunications Support (CTS) - enables the FAA to nationally manage programmed, unprogrammed, and emergency telecommunication network requirements	• Accomplished critical "pop-up" adds, moves, and changes and restored telecommunications services. • Purchased telecommunications equipment, added circuit capability, and expanded circuit capacity in support of critical telecom services • Performed circuit cutovers, and rearranged terminal equipment

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Replace 10 ATC tower operational switches. Number of additional sites dependent on Regional priorities and cost estimates. • Upgrade outdated telecommunications equipment interfaces	• Upgrade outdated equipment interfaces in as many as 13 ARTCC's. • Relocate and add operational services such as interphone, communication services. • Replace ATC tower operational switches. • Respond to "pop-up" needs from Air Traffic	• Continue upgrading outdated telecommunications equipment interfaces in ARTCC's. • Continue responding to "pop-up" requirements from Air Traffic.

2A09 Goal(s): 2.1; 3.1

Program Description	FY2000 Program Accomplishments/Status
Air Traffic Control Beacon Interrogator (ATCBI) - Replacement, Model 6 – replaces existing surveillance ATCBI - 4/5 equipment that have reached the end of their life cycles	• Installed 2 pre-production systems and completed OT&E • Conducted site surveys for 13 sites • Procured 50 ATCBI-6 production systems • Established Interim Contractor Depot Level Support (ICDLS) contract • Commenced Remote Maintenance Monitoring (RMM) interfaces development for NAS Infrastructure Management System (NIMS) • Procured and install antenna, rotary joint, and mounting kits • Commenced grounding, bonding and lightning upgrades at beacon only sites • Assisted the United Statues Air Force (USAF) in the evaluation of alternatives and development of the production contract for the replacement of OX-60 Beacon Systems in Alaska

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Procure 50 additional ATBCI-6 production systems and site and depot spares • Commission first system at key site, Tinker Air Force Base (AFB) • Initiate interface development for General Purpose interface Bus (GPIB) and Air Route Surveillance Radar (ARSR) model-4/ Mode 4 • Deliver 6 production systems • Initiate ARSR-3 interface development • Conduct additional site surveys for 38 sites • Procure Monopulse Beacon Test Sets • Complete GPIB interface develop and test • Complete grounding, bonding, and lightning upgrades at 50 beacon only sites • Complete NIMS interface, procure NIMS equipment, and begin installation at 32 sites • Provide engineering and program management support to USAF for the production of first article system replacing the OX-60 system • Execute Interagency Agreement for the 12 USAF OX-60 Beacon systems in Alaska	• Procure 25 additional ATCBI-6 production systems and site spares • Deliver 47 ATCBI-6 production systems • Commission first production system, Putnam, OK • Provide support to the USAF for the delivery, installation, and commissioning of 7 replacement beacon systems in Alaska • Conduct additional 36 site surveys per year • Continue flight inspections and disposal of ATCBI-4/5 • Complete ARSR-3 interface development. • Initiate installation of GPIB interface • Continue ARSR-4/ Mode 4 interface development and test • Commence the relocation of 25 Mode S systems to Airport Surveillance Radar (ASR) - 9 sites	• Conduct remaining site surveys in 2003-2004 • Continue flight inspections and disposal of ATCBI-4/5 in 2003-2004 • Continue to relocate 25 Mode-S systems to ASR-9 sites in 2003-2006 • Complete test and installation of ARSR-3 interface in 2003 • Complete ARSR-4/Mode 4 interface development in 2003/2004 • Provide support to the USAF for the delivery, installation, and commissioning of 5 replacement beacon systems in Alaska • Complete ARSR-4/Mode 4 interface test in 2004/2005 • Continue system delivery and installation at ATCBI-6 sites from 2003-2006 • Complete GICB interface • Last system commissioning in 2006

2A10 Goal(s): 2.1; 3.1

Program Description	FY2000 Program Accomplishments/Status
FAA Telecommunications Infrastructure (FTI) – replace the existing telecommunications services that support critical air traffic operations	• Request For Information (RFI) released • Final SIR released **Unmet FY2000 Goals:** • Initiate Proposal Evaluation

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Proposal Evaluation • Capability Assessment Demonstration • Initiate ARTCC Modernization effort • Award FTI contract	• Contractor establishes telecommunications infrastructure to begin the transition to FTI services for the inter ATC Center telecommunications backbone at 22 en route facilities • Initiate implementation and transition	• Complete transition to FTI service for ADTN, and FTS-2001 in 2003 • Initiate transition to FTI service for FAA Telecommunication Satellite (FAATSAT) in 2003 • Initiate transition to FTI service for Hawaiian

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
	activities for Leased Interfacility NAS Communications System (LINCS), Federal Telecommunications Service (FTS)-2001, Administrative Data Telecommunications Network (ADTN), Data Multiplexing Network (DMN), and national airspace data interchange network (NADIN) in 2002	LINCS in 2004 • Complete implementation and transition activities for NADIN in 2004 • Initiate transition to FTI service for Bandwidth Manager in 2004 • Complete transition to FTI service for FAATSAT and Hawaiian LINCS in 2005 • Complete transition to FTI service for DMN and LINCS in 2006

2A11 Goal(s): 2.1; 3.1

Program Description	FY2000 Program Accomplishments/Status
Air/Ground Communications Infrastructure – planned improvements to the air/ground (A/G) communications infrastructure that include replacement of aging and increasingly unreliable equipment, associates site and facility improvements, including the establishment of new facilities intended to broaden communications coverage	• Procured and installed Radio Frequency Interference (RFI) Elimination equipment at remote communications facilities (RCFs) • Continued Back-Up Emergency Communications (BUEC) systems integration, site preparation, and installation of 60 channels at 4 ARTCCs (completed 2 of 21 ARTCCs) • Procured radio control equipment for new requirements, continue software upgrades, and installed 300 channels • Procured equipment racks, antennas, and towers • Conduct site preparation and installation at over 24 sites

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• The Limited Radio Replacement program will procure 375 replacement radios, equipment racks, antennas, and towers • Complete regional A/G comm projects at 8 sites • Procure and install RFI equipment to maintain existing communications infrastructure • Continue BUEC systems integration, site prep and installation of 100 channels at 3 ARTCCs (completing 4 of 21 ARTCCs). • Support new requirements, continue software upgrades, and install 200 channels	• The Limited Radio Replacement will procure 375 replacement radios, equipment racks, antennas, and towers • Complete regional A/G communications projects at 16-32 sites • Procure and install RFI equipment to maintain existing communications infrastructure • Procure Ultra High Frequency (UHF) replacement radios • Continue BUEC systems integration, site prep and installation at 5 ARTCCs (completing 7 of 21 ARTCCs) • Support new requirements, continue software upgrades, and install 200 channels	• The Limited Radio Replacement will procure 250 replacement radios, equipment racks, antennas, and towers • Continue regional A/G communications projects • Procure UHF replacement radios • Procure and install RFI equipment to maintain existing communications infrastructure • Complete BUEC systems at 14 sites (all 21 ARTCCs completed)

2A12 Goal(s): 1.1/1.1.1/1.1.2/1.1.3; 2.1/2.1.2

Program Description	FY2000 Program Accomplishments/Status
Aviation Weather Services Improvements **- Integrated Terminal Weather System (ITWS)** - improves the detection, forecasting, processing, and delivery of aviation weather information to pilots, airline operations centers and controllers. The ITWS provides terminal aviation weather data and integrated products from other sensors including terminal Doppler weather radar (TDWR), NEXRAD, Low Level Windshear Alert System (LLWAS) and Automated Surface Observing System (ASOS). ITWS will cover 45 high-activity airports that have significant convective weather.	• Conducted ITWS Test Readiness Review • Completed FY00 goal by completing algorithm testing

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Deliver First Article (FA) systems • Complete FA Systems factory and site acceptance testing	• Begin full scale production • Initiate procurement and delivery of 37 production systems • First production system ORD	• ITWS last production system ORD in 2003 • Beginning in 2003, develop and integrate new algorithms and/or upgrades such as dry microburst prediction/detection and terminal forecast products based on a maturing aviation weather research

2A13 Goal(s): 2.1; 3.1

Program Description	FY2000 Program Accomplishments/Status
Voice Switching and Control System (VSCS) – VSCS provides ARTCC A/G and Ground to Ground (G/G) voice communication with a software controlled switching system. Voice switching and control system training and backup switches (VTABS) was developed to meet AT requirements for a separate standalone VSCS Backup and Training System. It provides the ability to control air traffic in the event of VSCS failure, hardware and software maintenance or power loss. The Tandem computers are used for the VSCS control subsystem (VCSU). Due to increased cost of the licensing fees and parts obsolesce a replacement for the Tandem is needed.	• Completed installation and ORD of VTABS • Completed removal activities of all residual VSCS equipment from the M-1 control rooms and returned to Harris as part of Facilities and Equipment (F&E) inventory

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete development and testing of VCSU and delivery to Seattle Center for key site testing • Support agency priority initiative "Choke Point" • Develop plan for supporting expansion of	• Complete installation and Contractor Acceptance Inspection (CAI) of VCSU at the FAA Technical Center, Aeronautical Center, and 12 operational ARTCCs • Replace VTABS Control Sub-system Laser Printer and Cut-over Switch Personnel	• Complete VCSU installation and CAI at remaining 9 ARTCCs. • Continue technology refresh replacement/ upgrade activities to include VSCS console equipment power supplies, power supplies, workstation upgrade, and 20/20 switch

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
VTABS capability both at operational sites and Aeronautical Center • Implement fixes to address audio clipping, automatic gain control and tone notching problems found in FAA voice switches • Conduct study to evaluate wider applications of potential COTS solutions	Computers	upgrade

2A15 Goal(s): 2.1/2.1.1/2.1.2; 6.1/6.1.1/6.1.2/6.1.3

Program Description	FY2000 Program Accomplishments/Status
ARTCC Building Improvements/Plant Improvements **- Guam Center Radar Approach Control (CERAP) Relocation** - to Agana International Airport Base Operations Building	• No funding in FY2000

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• No funding in FY2001	• Construction and refurbishment of the existing base building at Guam International Airport at Agana.	• FY2003: Procure and install power system • FY2004: Procurement of equipment; i.e. MicroEARTS, Voice Switch.

2A17 Goal(s): 2.1; 3.1

Program Description	FY2000 Program Accomplishments/Status
Air Traffic Control En Route Radar Facilities Improvements – a refurbishment program for aging, obsolete facilities and systems	• Removed surplus radar equipment and existing towers that may restrict coverage of the newly installed ARSR-4 radar • Commenced facility infrastructure upgrades • Performed en route radar in-service engineering

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Perform facility infrastructure upgrades at 20 en route long-range radar facilities. Upgrades include the refurbishment or replacement of Heating, Ventilation, and Air-Conditioning (HVAC) system and power panels, improvements to grounding systems, and replacement of equipment shelters, where necessary • Perform en route radar in-service engineering	• Perform facility infrastructure upgrades at 20 en route long-range radar facilities. Upgrades include the refurbishment or replacement of HVAC system and power panels, improvements to grounding systems, and replacement of equipment shelters, where necessary • Perform en route radar in-service engineering	• Perform facility infrastructure upgrades at 73 en route long-range radar facilities. Upgrades include the refurbishment or replacement of HVAC system and power panels, improvements to grounding systems, and replacement of equipment shelters, where necessary in 2003-2006 • Perform en route radar in-service engineering in 2003-2006

2A18 Goal(s): 2.1; 3.1

Program Description	FY2000 Program Accomplishments/Status
En route Communications and Control Facilities Improvements – collection of improvement projects required to keep the national airspace system facilities efficient and up-to-date	• Funded Phase II Equipment Room modernization **Unmet FY2000 Goals:** The following projects were deferred due to FY2000 funding cut: • Security Improvements. • Equipment Room Phase IV modernization. • Fire alarm system replacement

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete modernization of San Juan CERAP Operations Wing 1st Floor • Security improvements. • Modernize Equipment Room - Phase IV. • Fire alarm system replacement	• Reconfigure the Operations room /Replacement of the M-1 Console. • Construction of the Mechanical Mezzanine	• FY2003: Refurbish building exterior, replace shop building. • Improve site drainage. • FY2004: Modernize the administration building.

2B01 Goal(s): 1.1/1.1.1/1.1.2/1.1.3; 2.1/2.1.4

Program Description	FY2000 Program Accomplishments/Status
Terminal Doppler Weather Radar (TDWR) – Provide - detects windshear events such as microbursts, gust fronts, and related hazardous wind shear in the vicinity of airport approach and departure corridors for pilots and controllers.	• Completed 45th system, available for operational use • Commenced Pre-Planned Product Improvements

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete installation of last 2 of 47 systems (Midway and New York systems)	• Complete deployment of the Radar Products Generator Rehost upgrade at all sites	• Implement remaining technology upgrades, including the new ribbon displays and slip-rings by 2003

2B03 Goal(s): 1.1/1.1.5

Program Description	FY2000 Program Accomplishments/Status
Airport Surface Detection Equipment (ASDE) Model -3 - radar system installed at 34 high-activity airports that detects and displays aircraft and vehicle movement on the airport surface, allowing controllers to effectively manage airport surface operations during low-visibility conditions such as rain, fog, and night operation**s.**	• Completed installations for 39 of 40 systems • Completed delivery of 40th system • Completed the procurement of the transmitter modification

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Begin service life extension program to upgrade microprocessors • Compete last system available for operational use • Initiate Congressionally directed roll ring/slip ring evaluation • Commence activities to resolve Ronald Regan Washington National Airport coverage anomalies and submit congressionally requested report.	• Continue service life extension program • Submit Congressionally requested roll ring/slip ring report	• Continue service life extension program through 2004

2B04 Goal(s): 1,.1/1.1.4/1.1.5

Program Description	FY2000 Program Accomplishments/Status
Airport Movement Area Safety System (AMASS) - enhances the function of the ASDE-3 radars installed at 34 high-activity airports by providing automated visual and aural alarm alerts and warnings to aid in the prevention of accidents from runway incursions and other hazards	• Completed development, and operational testing • Commenced IOT&E • Completed delivery of the 38th of 40 systems

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete delivery of the 39th system • First system available for operational use	• Last system available for operational use • Commence Pre-Planned Product Improvements • Continue Human Factors Phase III	• All systems fully operational in 2003 • Continue Pre-Planned Product Improvements

2B05 Goal(s): 2.1/2.1.4; 6.1/6.1.1/6.1.2/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Terminal Air Traffic Control Facilities - Replace – a program to replace candidate ATCT and TRACONs that cannot meet the needs of present day airport operational requirements.	• Commissioned 7 ATCT/TRACONs in FY 2000

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Begin activities to replace 5 ATCT/TRACONs • Procure equipment for 7 sites per year • Commission 4 sites • Start construction for 6 sites	• Start activities to replace 5 ATCT/TRACONs in 2002 • Procure equipment for 15 sites • Commission 2 sites • Start construction for 6 sites	• Procure equipment for 29 sites • Start activities to replace 20 ATCT/TRACONs • Commission 30 sites • Start construction for 24 sites between 2003 - 2004

2B06 Goal(s): 2.1/2.1.4; 6.1/6.1.1/6.1.2/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Airport Traffic Control Tower (ATCT) /Terminal Radar Approach Control (TRACON) Facilities - Improve – upgrade and improve various terminal facilities and equipment to meet current and future operational requirements	• Initiated, continued or completed modernization efforts at 26 terminal facilities

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Improve, repair and sustain 58 sites that are not candidates for relocation or consolidation • Add radar positions at 4 ATCT/TRACON facilities • Add Data Display Systems to 10 ATCT/TRACON facilities • Replace, improve heating air conditioning systems at 3 ATCT/TRACON facilities • Provide regional improvements to 21 ATCT/TRACON facilities	• Improve upper and sustain 55 sites that are not candidates for relocation or consolidation • Add operating positions at 2 ATCT/TRACON facilities • Add Data Display Systems to 3 ATCT/TRACON facilities • Replace improve heating, air conditioning systems at 4 ATCT/TRACON facilities • Provide regional improvements to 12 ATCT/ • TRACON facilities	• Continue facility sustain and modernize activities. Number of sites dependent on Regional priorities and cost estimates

2B07 Goal(s): 2.1; 3.1

Program Description	FY2000 Program Accomplishments/Status
Terminal Voice Switch Replacement (TVSR) – procures modern COTS/NDI airport traffic voice switches to replace Electro-mechanical and aging electronic switches at ATCTs and TRACON facilities, and provides voice switching equipment to support new terminal and TRACON establishments	• Procured and delivered 26 of 241 Enhanced Terminal Voice Switch (ETVS) systems

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Procure and deliver 27 of 241 ETVS systems	• Procure and deliver 10 of 241 ETVS systems	• Procure 10 of 241 ETVS systems in 2004 • Procure 25 of 241 ETVS systems in 2005

2B08 Goal(s): 4.1; 6.1/6.1.1/6.1.2/6.1.3

Program Description	FY2000 Program Accomplishments/Status
NAS Facilities Occupational Safety and Health Administration (OSHA) and Environmental Standards Compliance – implements programs for OSHA and Environmental Compliance, Fire Life Safety and Energy Conservation	• Implemented OSHA/environmental plans, actions and activities including fire life safety upgrades and training **Unmet FY2000 Goals:** • Twelve ATCT fire life safety upgrades not accomplished due to decrease in funding levels

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Implement a Lockout/Tagout program to protect FAA employees from injury or death • Standardize required Occupational Safety and Health (OSH) and environmental training courses, and fire life safety upgrades at towers	• Support the FAA equipment and facilities decommissioning program	• Provide OSH and environmental training courses, and implement fire life safety upgrades for towers • Implement energy efficient/conservation efforts

2B09 Goal(s): 2.1/2.1.2/2.1.4; 3.1; 6.1/6.1.1/6.1.2/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Potomac TRACON – consolidation of the Dulles, Reagan National, Baltimore-Washington and Andrews Air force Base TRACONs into a single control facility to modify the associated airspace	• Conduct equipment installations.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete equipment installations and telecomm circuit activation. • Equipment and system integration testing. • Continue to sustain Potomac TRACON.	• Commission Potomac TRACON	

2B10 Goal(s): 2.1/2.1.2/2.1.4; 3.1; 6.1/6.1.1/6.1.2/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Northern California TRACON – consolidation and integration of the approach control functions of Bay, Sacramento, Stockton, and Monterey TRACONs, as well as some Oakland ARTCC airspace	• Extensive site prep and infrastructure work at Northern California TRACON and its remote sites. • Equipment installations: Digital Voice Recorder System (DVSR), FDIO, telecomm, Emergency Communication System, and rapid deployment voice switch (RDVS)

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
	• Northern California TRACON Facility Commissioned	

2B12 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Voice Recorder Replacement Program (VRRP) – provide reliable legal recording services, while reducing maintenance staffing requirements and logistics support	• Procured and delivered 36 of 513 DVRS systems

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Procure and deliver 29 of 513 DVRS systems	• Procure and deliver 52 of 513 DVRS systems	• Procure and deliver remaining 101 DVRS systems

2B13 Goal(s): 2.1/2.1.2; 6.1/6.1.1/6.1.2/6.1.3

Program Description	FY2000 Program Accomplishments/Status
NAS Infrastructure Management System (NIMS) – establish a National Operations Control Center (NOCC) and 3 strategically located Operations Control Centers (OCCs) to centralize information and technical expertise. COTS based information system will be utilized that consist of distributed computers integrated software and database application, remote monitoring and control capabilities. NIMS will provide the necessary tools to FAA maintenance personnel to support an advanced Performance Based Management System	• Procure and deliver first half of NIMS Initial Hardware Suites for OCCs **Unmet FY2000 Goals:** • Did not open three OCCs with a standard set of NIMS tools and procedures (Not completed due to an agreement between the FAA and PASS Union)

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Begin NIMS Phase 2 • Procure and deliver remaining NIMS Initial Hardware Suites for OCCs • Procure an Enterprise Management (EM) tool	• Deploy a COTS/NDI based EM Tool • Complete deployment of at En Route SOC • Complete deployment of MOM at OCCs for Element Managers	• Complete cutover to new RM; retire legacy MMS/Inscribe DB/Expand Peer System • Complete interface of RM to Logistics System • Complete development of MASS/MCE

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
and Integration service and test an EM baseline environment to be deployed to OCCs • Initiate deployment of EM En Route Sector Operations Center (SOC) • Initial deployment of Manager of Managers (MOM) at OCCs for Element Manager • Initiate migration to new Resource Manager (RM) database-deployment of RM interface and Peer System interface • Upgrade portable maintenance terminals with NIMS functionality (Tech-Refresh)	• Complete migration to new RM database-deployment of RM interface and Peer Systems interface • Initiate cutover to new RM: retire legacy Maintenance Monitoring System (MMS)/ Inscribe Data Base (DB)/Expand Peer System • Initiate interface of RM to Logistics System • Initiate development of Maintenance Automation System Software (MASS)/Maintenance Control Facility (MCF) replacement and retire MCF and maintenance processor subsystem (MPS) • Upgrade portable maintenance terminals to ensure compatibility with NIMS functionality (Tech-Refresh)	replacing aging systems • Expand functionality of RM - include cost metrics and performance metrics processing • Upgrade portable maintenance terminals to ensure compatibility with NIMS functionality • Initiate planning for Phase 3 of NIMS Program

2B14 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Terminal Digital Radar - Airport Surveillance Radar (ASR-11) – a digital radar system with an integrated monopulse Secondary Surveillance Radar Self-organizing Time Division Multiple Access beacon system acquired to replace aging ASR-7 and 8 units	• Production Decision made in July 2000 • Procure 10 of 112 production systems and test equipment • Perform 8 site surveys and 12 site designs

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Procure 8 of 112 production systems, test equipment, and initial depot spares/repair parts with site preparation, facilities and construction • Perform 18 site surveys and 24 site designs	• Procure 24 of 112 production systems, test equipment, and depot spares/repair parts with site preparation, facilities and construction • Perform 18 site surveys and 24 site designs	• Procure 66 additional production systems • ASR-11 first system operational use in 2003

2B15 Goal(s): 1.1/1.1.1/1.1.2/1.1.3; 2.1/2.1.2

Program Description	FY2000 Program Accomplishments/Status
Weather Systems Processor (WSP) – establishes terminal aviation weather capability at ASR equipped airports which do not receive the terminal Doppler weather radar, have high exposure to wind shear, and conduct medium to high amounts of air traffic operations	• Delivered 5 first article systems and commenced testing • Awarded the production option for 32 systems

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Commence deployment and commissioning of 1st of 32 systems	• Complete deployment and commissioning of all 37 systems by 2002	

2B16 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Department of Defense (DoD)/FAA Facilities Transfer – designates selected approach controls to be transferred from the DoD to the FAA	• Operated the Fort Sill, OK Army Radar Approach Control. • Modernized facilities at DoD transferred locations: Vandenburg, CA; Patrick, FL; Camp Kohler; El Toro; and Glenview.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• FAA will modernize facilities at DoD transferred locations: McClellan/Camp Kohler; El Toro; Agana, Guam; K.I. Sawyer; and Vandenburg, CA.	• FAA will acquire approach control services from the Naval Air Station at Point Mugu, CA. • FAA will install two ASR-11's to meet new requirements set by DOD.	• Continue to modernize DoD facilities transferred to the FAA.

2B17 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Airport Surveillance Radar (ASR-9) – procure UPS and engine generators for specific ASR-9 facilities to reduce outages	• Completed 2 ASR-9 upgrades

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Implement power conditioning systems at ASR-9 locations • Complete 2 ASR-9 upgrades • Start replacement of receiver protectors that have exceeded their service life • Procure a transportable ASR-9 system for Palm Springs Regional Airport • Continue St. Louis ASR-9 relocate activities	• Continue service life extension program	• Complete service life extension program

2B18 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Mode Select (Mode-S) – Provide – installation of hardware circuit card assembly's and software to deploy Traffic Information Systems, and Dynamic Reflectors	• Commissioned 5 Mode-S systems

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Deploy 68040 Boards • Deploy Beacon Video Reconstituer	• Complete Mode-S National Upgrade • Last ORD for full Mode-S system	• Last Mode-S system available for operational use in 2005

2B19 Goal(s): 2.1; 6.1/6.1.1/6.1.2/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Terminal Applied Engineering – provides up front planning and will determine how best to integrate the modernization of 40 ATC systems at over 400 terminal facilities into the NAS by the year 2007.	• Identified candidate locations for receiving Government Transition Evaluations (GTEs). • Developed guidelines and processes for the National Terminal Area Transition Plans (TATPs); updated Data Design Handbook • Formulated plans to provide guidance to on the GTE process and formulation of TATPs. • Identified Configuration Management (CM) processes for facilities once TATP was completed.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Evaluate approximately 38 TRACONs and their associated towers to identify specific requirements for new equipment transition and integration into the NAS. • Generate facility-specific transition plans TATPs for GTE locations. This includes baselining the facility, placing it under strict CM control, and establishing target-year design documentation.	• Evaluate approximately 39 TRACONs and their associated towers to identify specific requirements for new equipment transition and integration into the NAS. • Generate facility-specific transition plans TATPs for GTE locations. This includes baselining the facility, placing it under strict CM control, and establishing target-year design documentation. • Sites evaluated in prior year(s) should be re-evaluated for changes.	• Evaluate approximately 95 TRACONs and their associated towers to identify specific requirements for new equipment transition and integration into the NAS. • Generate facility-specific transition plans TATPs for GTE locations. This includes baselining the facility, placing it under strict CM control, and establishing target-year design documentation. • Sites evaluated in prior year(s) should be re-evaluated for changes.

2B20 Goal(s): 2.1/2.1.2/2.1.4

Program Description	FY2000 Program Accomplishments/Status
Precision Runway Monitors (PRM) – provide capability to conduct simultaneous independent IFR approaches to parallel runways spaced less than 4300 ft. apart, thus returning lost capacity, reducing delays, and improving fuel savings	• Initiated installation at John F. Kennedy Airport • Delivered and installed system at Philadelphia Airport • Commenced reflection processing improvement study • Implemented lightning and grounding system improvements

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete Philadelphia system testing • Commission Philadelphia system • Procure additional system spares • Complete ARTS IIIE development • Commence STARS interface development • Complete reflection processing study	• Complete John F. Kennedy Airport site construction • Commence site installation activities in Atlanta • Complete STARS interface development	• Award contract to install Atlanta PRM system in 2003 • Commence construction activities at Atlanta in 2003 • Complete Atlanta installation activities in 2004 • Commission Atlanta system in 2004

2B21 Goal(s): 1.1/1.1.4/1.1.5

Program Description	FY2000 Program Accomplishments/Status
Airport Surface Detection Equipment – Model X (ASDE-x) – A modular surface surveillance system capable of processing radar, multilateration, and ADS-B sensor data which provides seamless airport surface surveillance of air traffic controllers. ASDE-x was designed for the 2nd tier airports that are not covered by the ASDE-3 AMASS program. The ASDE-x system will increase situational awareness for air traffic controllers during inclement weather conditions by depicting aircraft vehicle position and identification information overlaid on a color map showing the surface movement area and arrival corridors.	• Completed Requirements Analysis • Completed draft specifications • Completed draft Statement of Work • Released the Request for Offer SIR • Received Technical Response • Preliminary Hazard Analysis briefing to the System Engineering Council • Preliminary Hazard Analysis Report completed • Conducted Investment Analysis and JRC gave approval to proceed • Memorandum of understanding signed with NATCA **Unmet FY2000 Goals:** • Contract award delayed from planned September 28th, 2000, date due to Contractor protest. [Contract awarded on October 11th, 2000]

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Contract awarded (Oct 2000) • Conduct Integrated Baseline Review • Hold Integrated Logistics Support Conference • Complete Pre-site surveys • Preliminary and Critical Design Review	• Factory Acceptance Test • System install & checkout • Site Acceptance Test • Make production buy decision for up to 25 systems	• Perform OT&E • Conduct IOT&E • First Article ORD • Incorporate required system modifications • Exercise contract options for remaining systems • Develop system enhancements

2B22 Goal(s): 2.1/2.1.2/2.1.4; 3.1; 6.1/6.1.1/6.1.2/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Houston Area Air Traffic System – Provides expansion of three city-owned airports to expand capacity. Includes deployment of navaids for new runways, lighting systems, reconstruction at Houston Hobby and a new TRACON servicing the airports. TRACON expansion to support new runway at George Bush Intercontinental Airport, followed by replacement of TRACON with fourth runway construction.	

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• New Start • Acquires navigation aids for 3 airports • Support design and engineering for terminal expansion	• Communications for TRACON expansion • Construction and equipage of 3 new positions in TRACON and local control in the tower	• Construct new TRACON and commission prior to 4th runway scheduled for 2006

2B23 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Terminal Radar (ASR) Improve – provides incremental improvements to terminal radars that are used to determine aircraft positions approaching, departing, and passing through terminal areas	

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Provide digital charting • Replace obsolete solid state video mapper with modern equipment at Anchorage Tower and Fairbanks Tower Alaska • Provide video feed from Richmond ASR-9 capable of switching between Richmond, Norfolk, and Elizabeth City ASRs • Install ATCBI-5 system at Nellis AFB • Procure Micro-EARTS display at Anchorage TRACON • Provide mobile ATCT for FY 02 Olympic games	• Continue incremental improvements	• Continue incremental improvements

2B24 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Terminal Communications Improve – regional improvement projects to modify and sustain systems	• Continuing level of effort work

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Provide 4 additional VTABS at Seattle, WA ARTCC • Provide a Systems Atlanta Information Display System (SAIDS) data display system at Fairbanks tower and Flight Service Station		

2C01 Goal(s): 2.1; 6.1/6.1.1/6.1.2/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Flight Service Station (FSS) Modernization – procurement of power conditioning systems for the Automated Flight Service Station (AFSS) to alleviate power problems and accommodate any new load requirements from future systems. Upgrade and sustain leased and owned FSSs.	•

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• UPS installation at 9 sites • HVAC upgrades at 3 sites • Minor infrastructure improvements at 10 sites. Includes roof, fire life safety, and upgrades to OSHA standards.	• UPS installation at 9 sites • HVAC upgrades at 3 sites • Minor infrastructure improvements at 10 sites. Includes roof, fire life safety, and upgrades to OSHA standards.	• UPS installation at 20 sites by 2003 • HVAC upgrades at 28 sites by 2005 • Major rehabilitation at 30 sites. Includes roof, fire life safety and upgrades to OSHA standards

2C02 Goal(s): 1.1/1.1.1/1.1.2/1.1.3; 2.1/2.1.4

Program Description	FY2000 Program Accomplishments/Status
Automated Surface Observing System **- Automated Surface Observing System Network (ASWON)** – The purpose of ASWON is to support FAA and National Weather Service (NWS) modernization by automating the surface weather observations for pilots, operators, and air traffic personnel. ASWON includes the AWOS, ASOS, Automated Weather Sensors Systems (AWSS), Stand Alone Weather Sensors (SAWS), and ASOS Controller Equipment Information Display System (ACE-IDS).	• Deployed 61 ASOS AWSS • Deployed 1 of 8 ACE-IDS • Deployed 1 developmental and test Automated Observation for Visibility, Cloud Height and Cloud Coverage (AOVCC) system • Delivered 1st Stand Alone Weather Sensors (SAWS) to key site **Unmet FY2000 Goals:** • Did not deploy 7 ACE-IDS

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Deploy remaining 23 ASOS automated weather sensor systems • Deploy remaining 7 ACE-IDS • Implement product improvements and upgrades to ASOS • Deliver 36 SAWS systems • Commission 47 ASOS	• Implement product improvements and upgrades to the base ASOS system • Deliver 54 SAWS systems • Deploy remaining 8 AWSS • Commission 28 ASOS	• Procure and implement New IDS, up to 400 sites • Implement product improvements and upgrades to the base ASOS systems • Deliver 180 SAWS systems

2C03 Goal(s): 2.1; 6.1/6.1.1/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Flight Service Automation System (FSAS) Operational and Supportability Implementation system (OASIS) – The initial acquisition strategy was for a COTS/NDI based leased service. The current acquisition is a modified COTS/NDI based solution. Additional software development was necessary to meet operational suitability requirements. The OASIS program replaces all FSAS hardware and Software, enhances the current FSAS operational capabilities, incorporates the Interim Graphic Weather Display System (IGWDS) and Direct User Access Terminal functionality, and provides new equipment consoles.	• Conducted system test and evaluation at Seattle • Completed training at Seattle • Seattle AFSS went operational in September • Completed new console installation at Seattle and Miami

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue software development and testing	• Procure 15 and install 2 systems • Complete IOT&E • Receive In Service Decision at Seattle • OASIS lease service first system available for operational use	• Procure and deliver remaining 57 OASIS systems • OASIS lease service last system available for operational use - 2005

2C04 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Weather Message Switching Center Replacement (WMSCR) – collects, stores, and distributes weather data and notices to airmen (NOTAM) data.	• Sustained WMSCR hardware and software adding interfaces and modifying structure to accommodate expanding data needs

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Sustain WMSCR hardware and software through 2005	• Sustain WMSCR hardware and software through 2005	• Sustain WMSCR hardware and software through 2005

2C05 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Flight Service Station Switch Modernization – replaces electronic voice switching systems at selected stand alone flight service stations and automated FSSs	• Initiated system engineering and support activities

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Release SIR in February 2001 • Perform Operational Capability Testing • Procure and deliver between 4 – 8 Small Tower Voice Switch (STVS) systems to Alaskan region FSSs	• Award contract in December 2001	• Procure and deliver 32 of 65 AFSS Voice Switches between 2003 and 2006

2C06 Goal(s): 2.1; 6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
Flight Service Facilities Improvement – upgrade and improve flight service facilities	

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Provide a new FSS building in Cold Bay, AK • Replace carpet throughout the AFSS at Ranch Murieta, CA • Replace raised floor carpet tiles at Great Falls AFSS	• Continue facility upgrade at various locations	• Continue facility upgrade at various locations

2D01 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Very High Frequency Omni-directional Radio Range (VOR) with Distance Measuring Equipment (DME) – establish VOR/DME facilities improvements for en route and terminal air navigation facilities to provide safe and efficient flights and landings	

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Procure and deliver 203 of 203 Tactical Air Navigation System (TACAN) antenna retrofit kits • Perform field installation of TACAN antenna retrofit kits at 36 field locations	• Perform field installation of TACAN antenna retrofit kits at 36 field locations	• Install all remaining TACAN antenna retrofit kits • Continue Doppler conversions and VOR relocates as funding permits

2D02 Goal(s): 1.1/1.1.1/1.1.2/1.1.3; 2.1/2.1.2/2.1.4

Program Description	FY2000 Program Accomplishments/Status
Instrument Landing System (ILS) – Establish/Upgrade – establish new, partial and full Category I/II/III ILS and associated equipment (DME, RVR, Approach Lighting System With Sequence Flasher 2 (ALSF-2), Medium Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR))	• Delivered last 9 of 150 ILS CAT I systems • Delivered last 3 of 22 ILS CAT III systems • Delivered last 12 of 20 ALSF-2 systems • Delivered last 3 of 52 DME systems

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Deploy 5 ILS systems • Deploy 1 ALSF-2 system • Deploy 4 MALSR systems • Award CAT 2/3 ILS contract • Acquire additional MALSR, ALSF-2 & ILS systems per Congressional direction • Conduct site surveys on Congressionally directed locations • Determine best method for installation of equipment for Congressionally directed locations • Begin installation and construction activities at Congressionally directed locations	• Perform regional installations at ILS, MALSR, and ALSF-2 locations	• Begin procurement and installation of ILS equipment to support the Minimal Operating Network (MON), replacing those units that will be retained

2D03 Goal(s): 1.1/1.1.4; 2.1/2.1.1

Program Description	FY2000 Program Accomplishments/Status
Gulf of Mexico Off Shore Program – Provide enhanced communications to support air traffic operations and services in the Gulf of Mexico airspace. Currently, aircraft traversing the Gulf of Mexico airspace operate under ICAO rules. Providing the necessary improvements to the communication infrastructure, which will support improved navigation, surveillance, and weather services, will rectify system shortfalls.	• Received production approval • Completed construction of second prototype buoy • Demonstrated 100% buoy reliability at proposed operational location 300nm in Gulf • Completed certification capability testing of 2 Mexican VHF Extended Range (VERN) • Completed Interim Notification of VERN Certification

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Award production contract • Begin buoy #3 construction • Continue to support VERN and satellite telecommunications • Complete prototype and reliability testing for second buoy • Begin operator and maintenance training • Complete VERN certification and initial operational capability • Complete Investment Analysis for Phase II • Refurbishment of buoy #1	• Complete buoy #3 refurbishment • Deliver first operational buoy • Complete operational test and evaluation • Transfer VERN to Operational Control of Houston Center • Procure 1 fixed platform with power supply, retrofitted with navigation, surveillance, weather, and automation equipment	• Begin development and production of buoy Communication System operational enhancements • Expand surveillance and communications infrastructure to reduce offshore separations

2D04 Goal(s): 1.1/1.1.1/1.1.2/1.1.3

Program Description	FY2000 Program Accomplishments/Status
Low Level Windshear Alert System (LLWAS) – Upgrade - Phase II – provide flight safety by measuring wind speed and direction at remote sensors located on and around airports, determining whether hazardous wind shear is present, and displaying this information to air traffic controllers who, forward warnings to pilots. LLWAS sustainment provides replacement systems for 39 stand-alone LLWAS-2 sites that will not have TDWRs or WSPs.	• Commissioned 9 LLWAS Network Expansion sites • Completed the radio buy supporting Development, Test, and Evaluation

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Install 3 LLWAS support systems	• Deliver, install and commission 39 LLWAS Sustainment systems • Upgrade 9 LLWAS Network Expansion sites • Commission Daytona Beach LLWAS	• Continue network expansion efforts

2D05 Goal(s): 1.1/1.1.1/1.1.2/1.1.3; 2.1/2.1.4

Program Description	FY2000 Program Accomplishments/Status
Approach Lighting System Improvement Program (ALSIP) – procures and installs frangible approach lighting equipment, including approach lighting system with sequenced flashing lights (ALSF-2) and medium-intensity approach lighting system with runway alignment indicator lights (MALSR) lighting	• Procured 12 of 80 ALSF-2 systems • Delivered 11 of 80 ALSF-2 systems • Delivered 17 of 292 MALSR systems

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Procured 12 of 80 ALSF-2 systems • Conduct site surveys on Congressionally	• Perform regional installations at 3 MALSR and 1 ALSF-2 locations	• Perform regional installations for 3 MALSR and 2 ALSF-2 locations in 2003

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
directed locations • Determine best method for installation of equipment for congressionally directed locations • Begin installation and construction activities at Congressionally directed locations		• Perform regional installations for 5 MALSR and 2 ALSF-2 locations in 2004 • Perform regional installations for 5 MALSR and 2 ALSF-2 locations in 2005 • Perform regional installations for 5 MALSR and 3 ALSF-2 locations in 2006

2D06 Goal(s): 1.1/1.1.1/1.1.2/1.1.3; 2.1/2.1.4

Program Description	FY2000 Program Accomplishments/Status
Runway Visual Range (RVR) Establish – provides a standardized, instantaneous, and accurate method of measuring actual meteorological visibility on precision approach equipped runways	• Procured 20 of 604 visibility sensors • Procured 40 of 581 sensor interface cards

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Deliver 5 RVR systems in the field • Acquire additional systems per Congressional direction • Conduct site surveys on Congressionally directed locations • Determine best method for installation of equipment for Congressionally directed locations • Begin installation and construction activities at Congressionally directed locations	• Install 12 of 264 RVR systems	• Install 13 of 264 RVR systems in 2003

2D07 Goal(s): 1.1; 2.1

Program Description	FY2000 Program Accomplishments/Status
Distance Measuring Equipment (DME) Sustain – provides for procurement and installation of DME systems	• DME contract awarded • Procured 15 of 225 DME systems

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Procure approximately 14 of 225 DME systems • Deploy 10 DME systems in the field • Conduct site survey, procure and install equipment at Newark Airport.	• Procure, deliver, and install approximately 18 DME systems	• Procure and deliver remaining 178 DME systems between 2003 and 2006

2D09 Goal(s): 1.1; 2.1

Program Description	FY2000 Program Accomplishments/Status
Non Directional Beacon (NDB) Facilities – Sustain - components of the ground based navigation system	• Procured and installed NDB equipment at Alaskan site locations

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue to procure and install NDB equipment	• Continue to procure and install NDB equipment	• Continue to procure and install NDB equipment between 2003 and 2006

2D10 Goal(s): 1.1/1.1.3; 2.1

Program Description	FY2000 Program Accomplishments/Status
Visual Navigation Aids (Navaids) - Establish/Expand – procures and installs visual navaids including Precision Approach Path Indicators (PAPIs) and Runway End Identification Lights (REILs) to enhance landing capabilities at designated airports.	

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Award new PAPI contract • Deploy 5 PAPI systems in the field • Provide installation funding for 4 previously procured PAPI systems • Begin installations of 24 previously procured REIL	• Install previously procured PAPI systems	• Install previously procured PAPI systems with 13 systems in 2003, 21 in 2004, 26 in 2005, and 36 in 2006

2D11 Goal(s): 1.1/1.1.3; 2.1

Program Description	FY2000 Program Accomplishments/Status
Visual Approach Slope Indicator (VASI) – Replace with Precision Approach Path Indicator (PAPI) - procures and installs PAPIs replacing VASIs to enhance landing capabilities at designated airports.	

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Procure Safer Skies identified systems • Acquire additional systems per Congressional direction • Conduct site survey, procure and install equipment at Congressionally directed location (Cleveland Hopkins)	• Procure Safer Skies identified systems • Continue procurement and installation of PAPI systems to replace VASI systems	• Continue procurement and installation of PAPI systems to replace VASI systems

2D13 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Long-Range Navigation -C (LORAN-C) – Upgrades/Modernization - provides navigation and timing signals to a variety of users including maritime and aviation communities	• Continue to upgrade and modernize LORAN-C navigation equipment

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue to upgrade and modernize LORAN-C navigation equipment	• Continue to upgrade and modernize LORAN-C navigation equipment	

2D14 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Instrument Approach Procedures Automation (IAPA) - Pilots use instrument approach procedures to land at airfields during IFR conditions. The FAA's National Flight Procedures Office develops and maintains all United States Civil Standard Instrument Approach Procedures (SIAP) as well as those operated by DOD. The FAA's requirement for developing and maintaining new procedures increases as new navigation technologies are implemented in the NAS. This program provides automated tools that allow FAA specialists to develop more timely and accurate SIAP's and standard instrument departures.	• Tape Drives purchased for maps to regional offices • Servers purchased for maps and additional obstruction data • Digital maps in 1:24,000 scale purchased • Feasibility study for porting IAPA to a Personnel Computers platform being conducted • WAAS precision, LNAV/VNAV and LNAV delivered to users, excluding Missed Approach segments • New Precipitous Terrain criteria programmed and operational testing started • Departure tool delivered to users **Unmet FY2000 Goals:** • Replacement of printers to support the IAPA system • Software to enable the users to draw the instrument approach plate

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete programming for RNP, missed approach segments, precipitous terrain, use of terrain data for all segments • Develop Fly-ability tool for delivery to users • Complete feasibility of porting IAPA to Personnel Computer platform and purchase prototype equipment and begin the porting process • Maintain the current production system including numerous new criteria changes • Configure new servers and complete delivery	• Complete porting software to a new platform • Begin testing and certification process • Purchase new IAPA workstations • Maintain the current production system including changes to criteria • Develop, certify and deliver fly-ability tool and other "suite of tools" required to support the Commercial Aviation Safety Team (CAST) plan	• Certify and deploy new IAPA systems • Continue to develop all approach types and segments • Continue to develop suite of tools to deploy to the regions in support of CAST plan • Continue to maintain established programming and keep pace with criteria changes

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
of 1:24,000 maps • Purchase replacement printers • Purchase necessary software to provide drawing capabilities		

2D15 Goal(s): 1.1/1.1.3; 2.1

Program Description	FY2000 Program Accomplishments/Status
Navigation and Landing Aids – Service Life Extension - procures and installs visual navaid approach lighting systems including ALSF-2 and MALSR as well as other ground-based navigation and landing aids like PAPIs and REILs that are needed to maintain landing capabilities.	

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
•	• New Start for installation of 1 ALSF 2 and planning for program expansion	• Expands installation to 8-10 runways per year with approach lighting and other associated visual aids

2D16 Goal(s): 1.1; 2.1

Program Description	FY2000 Program Accomplishments/Status
Navigational and Landing Aids Improve – provide NAVAID, ILS, and glide slope improvements	

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• In Chantilly, VA, move monitoring and control of ILS and ancillary equipment from TRACON to the tower • In Clarksburg, WVA, remove obstructions in area surrounding the VOR • Replace outer markers with state of the art systems in 7 locations • Procure and install self-supporting galvanized steel tower in Hyannis, MA • Install remote maintenance monitoring (RMM) system at Parksburg, WVA, • Relocate glide slope at Spokane, WA	• Continue to sustain and upgrade projects	•

2E01 Goal(s): 1.1/1.1.3; 2.1

Program Description	FY2000 Program Accomplishments/Status
Alaskan NAS Interfacility Communications System (ANICS) – establishes an FAA-owned communications system within the Alaskan region that uses two satellites and two earth station configurations based on circuit critically	• 52 Phase I systems already operational • Phase II design at 100%, first site built • Six Phase II sites on order • One Phase II site operational

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete JRC approval for remaining 12 of 18 Phase II sites • Obtain and deliver 10 ANICS Phase II sites • 10 sites cut over • Order 6 sites	• Order remaining 2 sites • Procure and deliver 8 Phase II sites, completing a total of 70 ANICS systems • Cut over 6 sites	• Complete cutover of sites built in 2002 in 2003 • Correct any joint acceptance inspection discrepancies

2E02 Goal(s): 4.1

Program Description	FY2000 Program Accomplishments/Status
Fuel Storage Tank Replacement and Monitoring – sustain Fuel Storage Tank (FST) systems in its operational inventory to support continued operation of mission-critical activities	• Developed compliance assessment process for follow-up monitoring of Regional FST systems • Supported FST cleanup activities in Alaskan region • Participated in FST Product Team workshops and initiatives

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Provide life/cycle replacement/sustainment of approximately 3000 FST systems • Provide support efforts on estimated 850 decommissioned Civil Aeronautic Authority beacon sites	• Provide FST life/cycle replacement, compliance assessments for Regional systems, and support for beacon sites	• Conduct compliance assessment follow-up monitoring of Regional FST systems • Provide life/cycle replacement/sustainment of FST systems • Continue remediation efforts after FST system replacements

2E03 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
FAA Buildings and Equipment – provide facility replacements and upgrades to reduce maintenance requirements associated with an aging infrastructure	• Repaired/replaced cable, access roads, grounds, and roof at the most critical VORs • Repaired/replace electrical systems, flooring, and plant equipment at the most critical ARSRs • Established/improved lightning, grounding, bonding, and shielding at limited remote transmitter/receiver locations

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Replace/upgrade outdated radio communication link equipment, HVAC systems • Repair or replace the most dilapidated shelters for VOR equipment, radar, radar microwave links, ILS, engine generators and communications outlets • Repair/improve facility access roads	• Repair/replace aging shelters	• Continue funding for the most in-need/critical facilities • Continue funding and repair and upgrade of buildings for compliance with laws and directives with the objective to reduce the decline in facility infrastructure condition.

2E04 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Electrical Power Systems – Sustain/Support - replace existing non-supportable engine/generators, obsolete distribution systems, and upgrade inadequate lightning protection and grounding systems	• Maintained integrated cost/Schedule database(s) for the facility and power system programs in compliance with Acquisition Management System • Developed multi-year schedules for facility sustain program to assist management in prioritizing requirement and identifying system deficiencie • Updated standard design for Environmental systems • Installed power systems at Three locations • Finalized and distributed the Critical Power Distribution System (CPDS) national Standard designs • Developed a process that ensures interaction between the NAS Infrastructure Power Product Team and other teams • Sustained or modernized 10 Power systems.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Improve power at 5 ATCT and TRACON facilities in advance of STARS, 5 ARTCC facilities, and 7 other facilities • Commission power systems at four (4) Large TRACONs • Install CPDS at St. Louis Gateway • Power Policy Document Review And update.	• Improve power at 10 ATCT and TRACON facilities in advance of STARS, 10 ARTCC facilities, and 14 other facilities • Install Power System at Chicago ATCT.	• Completion of Training Facility at Oklahoma City.

2E05 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Air Navigation Aids and ATC Facilities (Local Projects) - A program to handle Expeditiously unforeseen circumstances of various local emergencies in the course of daily operations	• Respond to unplanned emergencies that demand immediate action and provide minor site specific adjustments.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Respond to unplanned emergencies that demand immediate action and provide minor site-specific adjustments.	• Respond to unplanned emergencies that demand immediate action and provide minor site specific adjustments.	• Respond to unplanned emergencies that demand immediate action and provide minor site specific adjustments

2E06 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Computer Aided Engineering and Graphics (CAEG) Modernization – The Computer Aided Engineering Graphics (CAEG) program provides for Computer Aided Design and Drafting (CADD) technology, training and equipment for the creation or modification of airport designs and the management of the designs and specifications. The National CAEG Facility provides the functionality of a library as the repository to store all National Standard Facility Drawings. CAEG also provides guidance and procedures on how drawings are to be prepared, submitted, and retrieved through the facility.	• Awarded the Engineering Document Management System (eDMS) with pilot effort underway at 2 sites • Completed development of the Part 77 Analysis Tool prototype • Alpha Tested Radio Coverage Analysis System (RCAS) v10.2.1 • Developed web-based Aeronautical Information Interrogation Tool • Obtained FAA approval of FAA-STD-002e (Engineering Drawing Management Preparation and Technical Support) • Procured 178 CADD • Procured 86 Specialized COTS CADD applications • Procured 4 replacement servers and upgraded to 3 servers • Procured 3 high production plotters (replacements) and 9 medium production plotters (new sites) • Procured 146 CADD fundamentals training seats, conduct 30 specialized CADD training seats and 6 developmental training seats • Procured 2 replacement Drawing Backup Systems • Provided MicroStation transition assistance support for 8 major sites • Completed various drawing conversions of National Washington Standard Facility Drawings for field offices • Completed draft Order “National Standard Facility Drawing Procedure”

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete eDMS implementation at 6 major implementation sites (13 sites total) • Complete Part 77 Analysis tool Alpha and Beta testing, deploy and provide national training	• Complete eDMS implementation at remaining 7 sites • Develop and prototype test RCAS v11 (port to Windows NT, On-the-Fly Graphics, Database	• Integrate the Automated Frequency Management tool with RCAS • Replace 15 high production plotters and 24 medium production plotters

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Deploy v10.2.1 of RCAS Software • Obtain bargaining Unit Approval of FAA-STD-002e • Customize Micro-Station CADD Engine to comply with FAA-STD-002e • Customize AutoCAD CADD Engine to comply with FAA-STD-002e • Procure and field 10 medium production plotters • Procure and field 12 workstations • Procure a minimum of 75 CADD licenses (42 replacement and 33 expansion) • Complete SAT and in-house operational testing of the National CAEG facility eDMS	Enhancements) • Procure and field 12 Medium Production Plotters • Procure and field 13 Servers to replace aging Unix Workstations • Procure 133 licenses (100 replacement and 33 expansion) • Release Airports System v2	• Replace 12 eDMS servers • Release Airports System v3

2E07a Goal(s): 1.1, 2.1

Program Description	FY2000 Program Accomplishments/Status
Aircraft Related Equipment Program – Provides major upgrades to Agency-owned aircraft, aircraft systems and flight simulators to support four flight program missions: Flight Inspection (33 aircraft), R&D (6 aircraft); Training (six training aircraft and one flight simulator); and Support (8 aircraft).	• Exercised contract options to acquire VOR/ILS receivers for flight inspection aircraft. • Incorporated WAAS inspection capability in the Automatic Flight Inspection System (AFIS). • Developed and began implementation of a flight inspection system upgrade to the 6 BAe 800 aircraft. • Developed and incorporated new AFIS data base capability from the AIRNAV system. • Developed new flight inspection system interface control display unit • Incorporated Low Light Level Television Positioning System (LLLTVPS) capability in 6 Lear 60 Flight Inspection aircraft. • Developed and fielded autonomous GPS monitoring system in all fleet aircraft • Implemented mission use of Computerized flight Monitoring and Scheduling System (CFMSS) dispatch and Daily Flight Log functions. • Integrated CFMSS with the AIRNAV system. • Developed and incorporated minimum safe altitude warning (MSAW)/ Associate Program Manager support into the scheduling system. • Commenced installation of Frequency Modulation (FM) immunity and 8.33 Khz VHF channel spacing on flight inspection aircraft.

	• Contract awarded to acquire RVSM capability for BAe-800
	Unmet FY2000 Goals:
	• Incorporation of full data-link capability between Flight Inspection Central Operations and aircraft for Daily Flight Log and Work Accomplishment Record transmission.
	• Develop and field automated flight inspection reports program.
	• Develop and field an on board digital facility data sheet capability.
	• Capability for processing of External Daily Flight Log / Work Accomplishment Record data to the CFMSS
	• Develop AIRNAV/GPS subsystems:
	  • GPS Point in Space
	  • Transponder Landing System (TLS)
	  • Precision Approach Radar
	  • Precision Runway Monitor (PRM)
	  • Precision GPS/WAAS
	  • Automate survey download process

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Commence installation of VOR/ILS receivers on flight inspection aircraft • Develop LAAS flight inspection capability for LEAR 60 aircraft. • Complete BAe 800 modification for RVSM • Complete installation of LLLTVPS system in Canadair 601 aircraft. • Complete technology upgrade for flight inspection display unit in all fleet aircraft. • Develop and field RNAV flight inspection capability • Conversion of CFMSS to fully Web based system. • Integration of GPS and RNAV processes into CFMSS. • CFMSS software enhancements to improve system performance. • Complete installation of FM Immunity and 8.33 KHz Channel Spacing on Flight Inspection aircraft.	• Complete the installation of VOR/ILS receivers on all flight inspection aircraft. • Develop real time flight inspection data reporting capability in fleet aircraft. • Complete LAAS capability in remaining aircraft. • Upgrade CFMSS hardware to increase performance and incorporate new technology advances. • Develop increased remote data capability. • Incorporate support for scheduling and reporting. • Upgrade CFMSS COTS software to incorporate greater system flexibility and efficiency. • Exercise contract option for 15 additional Mark VII TAWS units and 14 Mark V units; complete installation on all FAA aircraft. • Award contract to purchase certified LAAS flight inspection receivers for 33 flight	• Award contract for WAAS flight inspection receivers for 33 flight inspection aircraft and WAAS navigation receivers for 5 R&D and 8 Support aircraft. • Install WAAS/LAAS receivers in agency aircraft. • Complete interim modernization of AFIS. • Complete CFMSS integration • Acquire and install Low Earth Orbit Satellite Communications system to provide worldwide communications for flight inspection fleet and 1 international R&D and 1 Support aircraft. • Enhance Automated Procedures Tracking System • Enhance Flight Program Tracking • Obtain voice/data hardware and software • Acquire and install Aircraft Collision Avoidance System II in Flight Inspection and international R&D aircraft. • Acquire and install new flight data and cockpit

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Complete RVSM Service Bulletin to ensure all BAe-800's are in compliance • Award Contract for a partial order (24 Mark VII Terrain Awareness Warning System (TAWS) units) for all Agency aircraft. • Develop WAAS/LAAS software integration with flight inspection aircraft flight management systems	inspection aircraft and LAAS navigation receivers for 5 R&D and 8 Support aircraft. • Implement total AIRNAV/GPS subsystems.	voice recorders in all Agency aircraft. • Acquire and install CPDLC in all Agency aircraft. • Acquire and install radio frequency interference direction finding equipment in all flight inspection aircraft. • Acquire and install digital equipment to replace analog equipment for Tech Refresh for all flight inspection aircraft. • Acquire and install ADS-B equipment in all Agency aircraft. • Acquire and install new generation visual system for flight simulator. • Acquire/implement maximum gross weight service bulletins for the Gulf stream G-IV support aircraft.

2E07b Goal(s): 1.1; 6.1/6.1.1/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Aircraft Related Equipment Program **-Replace flight simulator -**	• Investment analysis conducted; awaiting final approval.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Approval of Investment Analysis. • Investment decision by JRC.	• Issue Screening information request • Award Contract • Deploy New Simulator	Continue operation of simulator

2E08 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Airport Cable Loop Systems - Sustained Support – provides a redundant communication path using a fiber optic transmission system	• Not funded in FY2000

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Purchase fiber optic installation equipment • Complete fiber optic installations at one or two	• Continue to replace airport system communication cabling system where airport	• Continue to replace airport system communication cabling system where airport

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
large airports • Begin fiber optic installations at one or two large airports • Provide FAA Academy-based training	construction or system installations occur	construction or system installations occur

2E09 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Information Technology Integration - This budget line item supports the FAA Chief Information Officer initiatives designed to improve the way the agency manages Information Technology (IT) investment. This effort supports the development and implementation of FAA's IT Strategy to improve processes and optimize IT investments; and to architect, acquire, develop and maintain high quality, mission critical systems within established targets of cost, schedule and risk. It also entails the streamlining of certification processes for airborne and ground systems and continued work toward the implementation of an agency-wide data management program.	• 11 programs achieved iCMM Maturity Level 2 and continued work to improve selected FAA programs to iCMM Maturity Level 3. • Supported the RTCA Select Committee on Certification in implementing near term improvements in certification processes. • Implemented selected training and development programs for FAA software engineers in an effort to improve agency engineering competency. • Expanded the executive level FAA Integrated Process Engineering Group to set policy and determine direction for process improvement. **Unmet FY2000 Goals:** • Sustain metrics program • Extend FAA-iCCM to add information security/safety engineering • Apply Evolutionary Spiral Process, Enterprise Architecture Planning, and Rapid Application Development • Establish a comprehensive training and development program for FAA software engineers in an effort to improve agency engineering competency • Provide core infrastructure support for SERC • Support Chief Scientist Technical advisor role

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue work to improve selected FAA programs to iCMM Level 3 and expand process improvement effort to include additional programs to reach maturity level 2. • Continue to integrate improved processes for certifying software aspects of airborne and ground systems to ensure safety • Develop and implement a FAA IT investment Analysis and Prioritization Plan to ensure the	• Continue to integrate improved processes for certifying software aspects of airborne and ground systems to ensure safety • Broaden process improvement to include more acquisition programs • Enhance of the FAA metadata repository from a limited initial operating capability to a COTS solution with expanded capability • Develop of the agency's Business Planning	• Continue to integrate improved processes for certifying software aspects of airborne and ground systems to ensure safety • Broaden the process improvement effort to include more acquisition programs and accelerate the benefits realized in programs that have already been applying process improvement. • Implement the initiatives of the agency's data

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
optimal investment of resources for IT • Update the FAA IT Strategy to reflect changes in policy, priorities and technology • Implement key aspects of the FAA IT Strategy • Continue limited training and development programs for FAA software engineers in an effort to improve agency engineering competency • Implement an agency data management	and Portfolio Management initiatives	management • Implement the initiatives of the agency's Business Planning and Portfolio Management initiatives

2E10 Goal(s): 1.1, 2.1

Program Description	FY2000 Program Accomplishments/Status
Aircraft Fleet Modernization - B-727 Aircraft Replacement – Acquires aircraft to replace those which no longer can perform mission requirements because of aging, airworthiness and/or economic factors.	• Investment Analysis conducted; Awaiting final approval **Unmet FY2000 Goals:** • Approval of investment analysis

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Approval of Investment Analysis • Investment decision by JRC	• Issue screening information request • Evaluate SIR response	• Award Contract • Deploy New Aircraft

3A01 Goal(s): 6.1/6.1.1/6.1.3

Program Description	FY2000 Program Accomplishments/Status
NAS Management Automation Program (NASMAP) – integrates NAS data and information, thereby matching data from legacy and emerging systems to provide consistent information	• Procured and delivered 100 hardware/software systems for data translation

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Procure and deliver an additional 100 of 2646 hardware/software systems for data translation	• Procure and deliver an additional 60 of 2646 hardware/software systems for data translation	• Procure and deliver an additional 50 of 2646 hardware/software systems for data translation in 2003 • Procure and deliver an additional 50 of 2646 hardware/software systems for data translation in 2004 • Procure and deliver last 50 of 2646 hardware/software systems for data translation in 2005

3A02 Goal(s): 4.1

Program Description	FY2000 Program Accomplishments/Status
Hazardous Materials (HAZMAT) Management - ensures compliance with statutory mandates and identifies appropriate procedures for proactively managing hazardous materials to prevent future environmental contamination and notices of violations	• Performed site investigations, hazardous materials management, drilling of monitoring wells, remediation of groundwater contamination, and physical removal of contaminated soils

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Identify undiscovered environmentally contaminated waste sites resulting from FAA operations	• Initiate remedial actions for environmentally contaminated waste sites	• Perform remediation of environmentally contaminated sites through 2006

3A03 Goal(s): 2.1; 5.1

Program Description	FY2000 Program Accomplishments/Status
NAS Recovery Communications (RCOM) – Procures new emergency communications equipment to replace current regional networks	• Completed 12 RCOM I High Frequency (HF)/ Single Side Band upgrades **Unmet FY2000 Goals:** • RCOM I (HF Upgrade) last system available for operational use (Delayed 6 months due to technical issues, will be completed by 11/00) • RCOM II VHF radio systems contract award • Procure 28 RCOM II systems (Delayed due to budget cuts and Mission Need Revalidation)

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Procure and deliver 148 Defense Messaging Systems (DMS) • Procure and deliver 100 secure telephone unit-third generation with secure telephone equipment (STU-III/STE), 14 secure facsimiles, 235 satellite telephones, and 15 automated notification systems • Revalidate Mission Need Statement for the VHF/FM network • Investment Analysis of VHF/FM Network • Award contract for VHF/FM network • Procure and deliver 1 secure conference system	• Procure and deliver 8 DMS • Procure and deliver 160 STU-III/STE • Procure and deliver 26 secure facsimiles • Procure and deliver 1,518 VHF/FM hand-helds • Procure and deliver 78 satellite telephones	• Procure and deliver 158 STU-III/STE • Procure and deliver 1,518 VHF/FM hand-helds • Next Generation HF replacement at 22 ARTCCs and 15 Regional Offices

3A04 Goal(s): 6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
Aviation Safety Analysis System (ASAS) – provides FAA safely and security workforce with automated tools that integrate safely related information in a common database linked to the FAA's business process	• Completed the Flight Standards Service (AFS) Enterprise-wide asset and resource baseline, definition and transformation strategy; and implement budget and resource configuration tracking and change management process

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Begin automation integration activities and create Decision Support Databases		• Deliver AFS information services

3A05 Goal(s): 6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
Operational Data Management System (ODMS) - includes the National Airspace System Resources (NASR) portion of the database which is the official Aeronautical Information Service data, and the Notice to Airman System (NOTAMs)	• Operational implementation of Obstruction Evaluation /Airport Airspace Analysis • Improved web-based NOTAMS for the DoD by providing local NOTAM capability and Bird hazard notices • Successful Y2K system roll-over

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006

• Provide Geographical Information System algorithms and referential checks
• Provide Web-based access to the NOTAMSs system for FAA, Commercial, and GA
• Establish NASR interfaces with the FAA's Airport Airspace Analysis activities, instrument approach procedure automation program, and Obstruction Evaluation/National Airspace Redesign programs
  • Establish and improve the NASR interface with the FAA Host computer
  • Begin development of NASR interfaces with Datalink, OASIS, STARs, and TDWR
	• Link NASR with the NOTAMS system
	• Begin the rehost of the Central NOTAM database from an obsolete to new open-standards systems.
	• Begin development of NASR 2000 (NASR Follow-on)
		• Complete the rehost Central NOTAM database from obsolete to new open-standards systems platform.
		• Implement NASR 2000

3A06 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Logistics Support Systems and Facilities (LSSF) - data repository for real-time asset identification, status inquiry, life-cycle cost and performance analysis, and budget management and investment decision support. This program will now be referred to as Asset Supply Chain Management (ASCM).	• Improved interfaces between Logistics Inventory System and legacy property management and financial systems. • Restoration of requisitioning status through the use of bar coding. • Bar coding of new production systems. • Continued work on investment analysis, initial Requirements Document, Investment Analysis Report, Final Requirements Document, Acquisition Program Baseline.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Award ASCM/LCSS development project implementation contract • Begin business process re-engineering analysis pursuant to program solution. • Continue bar coding of new production systems. • Continue work on Inventory, Order Entry, and Shipping and Receiving software	• Complete business process re-engineering analysis. • Begin ASCM/LCSS baseline solution implementation including acquiring hardware and software requirements. • Begin developing training for ASCM. Continue bar coding of new and legacy systems. • Begin work on cataloging, storage management software to reduce warehouse cycle time.	• Complete ASCM/LCSS baseline solution implementation including tailoring of solution to meet FAA unique operational and administrative requirements. • Conduct ASCM Operational Test and Evaluation. Begin nationwide implementation/site implementation of ASCM. • Continue nationwide site implementation and field training of ASCM. • Continue bar coding and tracking initiative including updating inventory tracking, as applicable. • Develop Materiel Requirements Planning software.

3A07 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Test Equipment – Maintenance Support for Replacement – acquires replacement test equipment for field technicians. Provide funding for the Automated Test System at the FAA Logistic Center to do component diagnostics, testing, and quality control of various printed circuit boards used within all NAS equipment.	• Phase 1 allotment of 3 completed for the procurement and distribution of the Communications Service Monitors. Phase 2 of 2 to replace obsolete Portable ILS's were procured and distributed to the field. The Automated Test System effort on quality control and repair on printed circuit boards totaled 4200 printed circuit boards for FY00.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Procure Phase 2 allotment of 3 for the Communication Service Monitors. Provide funding for the Automated Test System for diagnostics, testing and quality control of	• Provide funding for Phase 3 of 3 for the procurement of Communication Service Monitors. Oscilloscopes are the next priority item to be replaced. Provide funding for the	• Continue test equipment upgrades for sustainment

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
printed circuit boards. Procure replacement multi-meters and electronic counters	Automated Test System to repair of defective circuit boards.	

3A08 Goal(s): 6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
Integrated Flight Quality Assurance (IFQA) - develop capability for collecting and analyzing digital data from flight data recorders	• Completed system specifications and requirements. • Designed initial standards for data naming and descriptions and data sharing protocols and methods • Designed information system security countermeasures and control mechanisms • Demonstrated prototype distributed data repository infrastructure for virtual data pool including tools for user querying, reporting and analysis based on a common web-browser interface.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue development of standards for data naming and descriptions and data sharing protocols and methods • Implement and deploy initial system, including information system security mechanisms • Design and implement on-line user assistance tools and training modules • Generate initial system and user documentation	• Conduct operational test and evaluation of system • Refine and expand data sharing protocols and methods • Establish fully operational capability for distributed data system	• Continue technical infrastructure maintenance, support, and training • Continue evolution of technical infrastructure including standard and protocols and user aids. • Continue development of information security mechanisms to deal with new threats.

3A09 Goal(s): 6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
Safety Performance Analysis System (SPAS) – provides an automated capability to analyze safety-critical areas, using performance indicators designed for the needs of Aviation Safety Inspectors	• Complete initial SPAS II training and deployment

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Begin development of SPAS II software enhancements to support a larger inspector user population through a distributed client/server design and enhanced functionality	• Analysis and Development of Upgrades and Enhancements SPAS releases and training	• SPAS to become part of System Approach for Safety Oversight • Decision support for inspection workforce • System Approach General Aviation, Air Transportation Oversight System and Certification Standardization Evaluation Team

3A10 Goal(s): 6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
Performance Enhancements System (PENS) - – mobile electronic tools (hardware and software) for Aviation Safety Inspectors	• Hardware: 1200 notebooks delivered • Software: Interface applications

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Hardware: 312 laptops delivered • Software: Interface applications	• Initiate development of software migration into palm computing applications	

3A11 Goal(s): 5.1

Program Description	FY2000 Program Accomplishments/Status
Facility Security Risk Management - upgrade FAA staffed facilities in accordance with security standards	• Awarded Security Systems Integration contract, which include closed circuit television, intrusion detection devices, and other systems • Accredited 85 facilities • Assessed 451 Level I and II facilities

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Upgrade and accreditation of 75 facilities • Procure X-ray machines	• Upgrade and accreditation of 200 facilities	• Continue upgrades and accreditation of 674 Level I, II, III, and IV facilities

3A12 Goal(s): 6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
National Aviation Safety Data Analysis Center (NASDAC) - computer analysis system that integrates data from regulatory Aviation Safety Analysis System (ASAS) databases and from air traffic, airport, airway facilities and other government data sources for safety research	• Accomplished joint development with NASA a model international data registry • Completed engineering support and migrate NASDAC services to FAA lines of business • Implemented Aviation Safety Data Encyclopedia System and alpha test

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Standardize critical aviation safety data elements • Expand data and information sharing agreements to other U.S. agencies and research community • Prototype application of advanced analysis tools • Implement Aviation Safety Data Encyclopedia System Internet-wide • Prototype Extranet access to NASDAC to facilitate data sharing	• Provide widespread availability and use of safety event precursor analysis tools • Prototype web-based application for the delivery of new analysis tools	• Expand data and information sharing agreements to international governmental agencies and some domestic aviation industry entities

3A13 Goal(s): 5.1

Program Description	FY2000 Program Accomplishments/Status

Information Security - Information Systems Security (ISS) - This budget line item supports efforts to protect the National Airspace System's (NAS) critical infrastructure from the threat of attacks by terrorists, hackers or other malicious activities by unauthorized personnel. In addition to national security, disruption of the modernized NAS would pose significant threats to safety, and could have considerable impact on the national economy. FAA must address issues associated with information systems security to ensure that its computer and communications systems will continue to support the FAA mission.	• Certified and authorized mission critical systems as secure against unauthorized access and cyber-attacks.
	• Expanded the Computer Security Incident Response Capability (CSIRC)
	• Increased security engineering efforts
	• Published Version 1 of the ISS architecture
	• Increased ISS skill base through training
	• Conducted independent security testing
	Unmet FY2000 Goals:
	• Because the FAA funding request was reduced by $2.8M, the following initiatives were deferred:
	  • work to ensure the security of nine additional systems scheduled for completion in FY00 will be delayed until FY-01; and
	  • ISS engineering and independent testing activities were deferred to FY01.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue to certify and authorize additional FAA mission critical systems against unauthorized access and cyber-attacks • Continue to provide ISS engineering support to various lines of business • Continue independent testing of mission critical systems • Continue investment analysis for security measures • Continue CSIRC activities • Implement cost-effective countermeasures based on risk assessments and intrusion detection analysis • Revise and implement the NAS ISS architecture • Acquire ISS hardware and software required for intrusion detection efforts	• Continue to certify and authorize FAA mission critical systems against unauthorized access and cyber-attacks • Continue to provide ISS engineering support to various lines of business • Continue independent testing of mission critical systems • Continue CSIRC activities • Continue NAS ISS architecture activities • Acquire ISS hardware and software	• Continue to authorize and certify FAA mission critical systems against unauthorized access and cyber-attacks • Continue to provide ISS engineering support to various lines of business • Continue independent testing of mission critical systems • Continue investment analysis for security measures • Continue CSIRC activities • Continue NAS ISS architecture activities • Acquire ISS hardware and software

3A14 Goal(s): 5.1/5.1.1

Program Description	FY2000 Program Accomplishments/Status
Explosive Detection Technology - The scope of the Security Equipment Integrated Product Team (SEIPT) deployment effort includes Explosives Detection Systems (EDS), Explosives Trace Detection (ETD) devices, and Threat Image Projection (TIP) ready checkpoint x-ray screening units (TRX). The effort also includes deployment of mission support elements including screener assist technologies and computer based training aids.	• 24 EDS Installed and Operational • 100 ETD Installed and Operational

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• 24 EDS Installed and Operational • 100 ETD Installed and Operational • 193 TRX Installed and Operational • Firm funding requirements and deployment goals established with JRC baseline in 3rd quarter of FY 2001	• 24 EDS Installed and Operational • 100 ETD Installed and Operational • 193 TRX Installed and Operational	• The SEIPT is in an Investment Analysis effort and Strategic Deployment Plan revision prior to the establishment of an FAA JRC approved baseline.

3B01 Goal(s): 6.1/6.1.1/6.1.2/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Distance Learning – Provides the FAA with state-of-the-art, quality course delivery to geographically dispersed students with a reduced dependency on travel to centralized facilities	• None (Zero funded)

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Partial replacement of old Computer Based Instruction (CBI) equipment and infrastructure with Digital Versatile Disc (DVD) technology • Course translation to DVD • Provide technology upgrade of interactive video tele-training satellite and voice response systems	• Complete replacement of CBI equipment & infrastructure w/ current technology. • Continue course conversions.	• Complete replacement of CBI equipment & infrastructure w/ current technology. • Continue course conversions.

3B02 Goal(s): 2.1; 6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
National Airspace System (NAS) Training Facilities – Acquire and install classroom/ laboratory upgrades at the FAA Academy	• None (Zero funded)

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Replace the Academy's Enhanced Debrief Stations for terminal training • Update AF labs and simulation capabilities • Integrate/standardize AF training management systems	• Enhance/update first of two Tower Operator Training System bays • Initiate upgrade of Academy's AF classrooms • Initiate AF course translation to play in digital environment • Integrate/simplify existing AF training application infrastructure	• Enhance/update final Tower Operator Training System bay • Initiate upgrade of Office of Regulation and Certification related classrooms • Continue upgrade of AF Classrooms • Initiate upgrade of AT generic classrooms • Complete upgrade of AT Interactive Instructional Delivery System classrooms • Complete upgrade of airports classroom/lab • Complete AF course translation to play in digital environment • Integrate/simplify existing AF training hardware systems • Broaden training information services provided to AF field technicians

3B03 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Aeronautical Center Infrastructure Modernization – a multi-year program to provide adequate space, facilities and corresponding infrastructure at the Aeronautical Center to house training, logistics, supply support, engineering, and other functions supporting the NAS.	• Completed construction of the Technical Support Facility (TSF).

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Move Technical Shops to the TSF. • Complete Design of Logistics Support Facility (LSF) Structural Upgrade. • Award construction contract for the first phase of LSF Structural Upgrade. • Complete the first phase of telecommunications infrastructure modernization.	• Complete construction of the first phase of the LSF Structural Upgrade. • Award contract for the second phase. • Complete design for the renovation of the Civil Aeromedical Institute building. • Complete second phase of telecommunications infrastructure modernization.	• Complete LSF structural renovation project. • Substantially complete renovation of the Civil Aeromedical Institute building. • Complete design and first two phases of the Systems Training Building renovation. • Complete substantial telecommunications infrastructure upgrades.

4A01 Goal(s): 6.1/6.1.1/6.1.3

Program Description	FY2000 Program Accomplishments/Status
System Engineering and Development Support - Procure the necessary critical technical expertise to support the improved safety, security and efficiency of the NAS through Lifecycle Acquisition Management. Technical	• Continued support in the acquisition of NAS program products and development of the NAS Architecture as well as support systems engineering, investment analysis, operation research, F&E and R,E&D

expertise supports the acquisition of NAS program products, development of the NAS Architecture, systems engineering, investment analysis, operation research, F&E and R,E&D budget planning and development, configuration management and program evaluation.	budget planning and development, configuration management and program evaluation.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue to provide technical expertise in system engineering and integration for the NAS and its architecture as well as support systems engineering, investment analysis, operation research, F&E and R,E&D budget planning and development, configuration management and program evaluation.	• Continue to provide technical expertise in system engineering and integration for the NAS and its architecture as well as support systems engineering, investment analysis, operation research, F&E and R,E&D budget planning and development, configuration management and program evaluation.	• Continue to provide technical expertise in system engineering and integration for the NAS and its architecture as well as support systems engineering, investment analysis, operation research, F&E and R,E&D budget planning and development, configuration management and program evaluation.

4A02 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Program Support Leases - provides for the payments of land and space leases for operational facilities	• Funded 4,000 existing operational leases

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Fund 4,000 existing operational leases	• Fund 4,000 existing operational leases	• Fund 4,000 existing operational leases

4A03 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Logistics Support Services (LSS) - Provide acquisition, real estate, and material management services to Regions and centers. Compile and maintain adequate documentation, suitable for independent audit, to establish the capital cost of facilities throughout the FAA.	• Provided approximately 126 staff years of contract support to perform real property acquisition, material management and contracting activities

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Provide approximately 126 staff years to perform real property acquisition, material management and contracting activities	• Provide approximately 126 staff years to perform real property acquisition, material management and contracting activities	• Provide approximately 126 staff years to perform real property acquisition, material management and contracting activities

4A04 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Mike Monroney Aeronautical Center (MMAC) - Leases – Provides facilities for training, logistics, aeromedical research, engineering, maintenance, administrative, and other support services for the FAA.	• Continued Aeronautical Center leases

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue MMAC lease with Oklahoma City Airport Trust and other commercial lease requirements.	• Continue MMAC lease with Oklahoma City Airport Trust and other commercial lease requirements.	• Continue MMAC lease with Oklahoma City Airport Trust and other commercial lease requirements. • Reduce lease payments through bond retirement.

4A05 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
In-Plant NAS Contract Support Services - encompasses furnishing contracting officers and program managers with expertise to monitor progress, compliance, and problems of FAA contractors.	• Continue contracting support services for CIP and CIP related programs

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue contracting support services for CIP and CIP related programs	• Continue contracting support services for CIP and CIP related programs	• Continue contracting support services for CIP and CIP related programs

4A06 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Transition Engineering Support – NAS Implementation Support Contract provides contractor support services in planning, engineering, specialized automation, and project management to over 80 NAS modernization project.	Provided key support to: • En Route Automation • STARS • ATCT/TRACON • Free Flight Program • Capstone Project • Information Security and NIMS **Unmet FY2000 Goals:** • FAA requirements for planning and engineering support for $11.3M in work resulted in lower priority work not being met and deferred to later years or canceled.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue contracting support services for CIP and CIP related programs	• Continue contracting support services for CIP and CIP related programs	• Continue contracting support services for CIP and CIP related programs

4A07 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status
Frequency and Spectrum Engineering – provides frequency engineering, radio frequency interference (RFI) investigation and resolution, and spectrum analysis support throughout the NAS	• Completed installation of airborne RFI direction finding (DF) systems in 7 flight inspection aircraft • Completed 7 RFI resolution training courses • Completed spectrum transition plan for NEXCOM • Completed ADS-B spectrum support plan including UAT • Successfully supported U.S. GPS protection and modernization efforts at WRC-2000

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Install GPS RFI DF systems on 2 flight inspection aircraft • Support FAA LAAS spectrum requirements • Support FAA Capstone spectrum requirements • Increase available VHF air-ground communication channels for ATC to address spectrum congestion • Provide engineering data to develop international standards for (NEXCOM) VDL-3 frequency engineering criteria	• Support ADS-B spectrum requirements • Support LAAS spectrum requirements • Support required spectrum studies for WRC-2003 • Complete test program for national fixed DF systems	• Support WRC-2003 and preparations/support for WRC-2006 • Develop next generation RFI van design • Complete development of NEXCOM frequency assignment model • Develop next generation automated frequency management system

4A08 Goal(s): 6.1/6.1.2

Program Description	FY2000 Program Accomplishments/Status
Permanent Change of Station (PCS) Moves - consolidation and commissioning of the identified TRACONs and facilities will require permanent change of station moves for both Airway Facilities and Air Traffic personnel	

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Supports relocation of personnel	• Supports relocation of personnel	• Supports relocation of personnel

4A09 Goal(s): 6.1/6.1.1/6.1.2/6.1.3

Program Description	FY2000 Program Accomplishments/Status
FAA Corporate Systems Architecture - refinement and implementation of a FAA Corporate Information Technology Strategy	• Upgrade to the Metropolitan Area Network (3COMM to Cisco) • Upgrade to Firewall software • Upgrade to proxy and SMTP gate ways

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Develop and sustain FAA's Information Technology Strategy • Secure electronic data exchange and electronic signature capabilities • Implement anti-virus software for IT infrastructure • Bandwidth increase 10 to 40 Mega bits • Extranet firewall (Users using intranet outside the FAA) • Multi-media study (Carrying voice, data and video conferencing)	• Technology refresh of servers, LAN equipment and Personnel Computers. • Continue with Multi-media study (Carrying voice, data and video conferencing) • Redesign of Intranet web page and replacement of servers • Redesign of the information security demarcation zone • Thin client initiative	• Conduct upgrade enhancement per FTI. • Technology refresh of servers/LANS/ Personnel Computers and IT infrastructure equipment • Initiate desktop video conferencing support. • Initiate Public key infrastructure • Initiate directory service and electronic commerce and electronic data support

4A10 Goal(s): 2.1

Program Description	FY2000 Program Accomplishments/Status

Technical Support Services Contract (TSSC) – As large F&E programs move from the acceptance to the field delivery phases, TSSC resources are needed to perform site surveys and preparation and equipment installation for them. TSSC is an enabling vehicle and expands and contracts with work requirements and available F&E funds.	• Approximate breakout of TSSC work hours supporting:
	  • En Route 255,675
	  • Terminal 722,626
	  • Flight Service 94,162
	Unmet FY2000 Goals:
	• FAA requirements for TSSC work far exceeded available TSSC contract, labor, and travel funding in FY2000. The approximately $27M shortfall meant that about 500 lower priority F&E projects to install/modernize CIP equipment were deferred to later years or cancelled.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006

• Approximate breakout of TSSC work hours to be delivered during FY01 supporting:
  • En Route 287,947
  • Terminal 813,837
  • Flight Service 106,048
	• During FY02, TSSC Program will be awarding a follow-on contract (T3), which will require a T2 to T3 transition period and a period of supporting two simultaneous TSSC vendors, in order to avoid a gap in services.	• T3 contract continues

4A11 Goal(s): 6.1/6.1.1/6.1.2/6.1.3

Program Description	FY2000 Program Accomplishments/Status
Resource Tracking Program (RTP) – provides a diverse set of tools to support F&E project management: ▪ Supports daily needs of regions in conducting F&E business for management system for F&E projects. ▪ Provides AF's National Work Plan. ▪ AF official system for project requirement identification, planning, resource estimating, and scheduling. ▪ Used to identify TSSC resource requirements. ▪ Supports capitalization efforts ▪ Used to measure F&E performance.	• Reprogrammed Labor Distribution Reports system into Oracle. • Developed and deployed the Project Requirements System to replace the Budget Formulation Module (unplanned initiative) **Unmet FY2000 Goals:** • Acquisition and deployment of new project management software COTS • Consolidation of the RTP databases. • Upgrade RTP to Oracle 8i.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Procure a COTS project management tool and incorporate into RTP. • Centralize RTP databases. • Upgrading to Oracle 8i. • Deploy upgraded Labor Distribution Reports System	• Integrate RTP to eDMS to support the Management and Engineering Tool Set (METS) functions. • Provide user ad hoc reporting capability. • Update RTP Graphical User Interface • Provide remaining METS engineering functions.	

4A12 Goal(s): 6.1/6.1.1

Program Description	FY2000 Program Accomplishments/Status
Center for Advanced Aviation System Development - Continue the sponsorship of the FAA's Center for Advanced Aviation System Development (CAASD). Research assignments are included in the annual Product Based Work Plan and are approved by the FFRDC Executive Board.	• In FY 2000, CAASD performed work in support of Free Flight Phase 1; communications, navigation and surveillance operational capability; navigation architecture; NAS architecture implementation; near-term procedural enhancements; airspace design; user performance, planning and research; NAS integration; and NAS infrastructure management.

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue to develop Free Flight Phase 1 and Phase 2 enhancements. • Continue research in Airspace Design and Analysis. • Continue to support improvements in Communications, Navigation and Broadcast Services.	• The FAA will continue to require expertise in: (a) the NAS Architecture and planned and related improvements in the 21st century; (b) specific Air Traffic Management (ATM) modernization efforts in the fields of communications, navigation, surveillance, and major ATM automation (tower, terminal,	• CAASD work is expected to span all phases of flight, operational domains, FAA organizations, industry organizations, technologies, areas of engineering expertise (e.g. systems engineering, research and development, human factors, benefits analysis, acquisition, program management, analytical

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Continue to conduct studies in the area of ATM Modernization.	oceanic and en route); (c) ATM functionality and operational concepts and procedures; (d) operational and experimental test and evaluation of ATM systems capabilities; (e) performance analysis and assessment of ATM systems; (f) ATM prototype development; and (g) economic analysis of impacts on system users.	decision making, aviation Operations and Maintenance including transition, certification and regulation, airspace design, rulemaking, etc.), stakeholders, and the seamless, global ATM system operation.

5A01 Goal(s): 6.1/6.1.2

Program Description	FY2000 Program Accomplishments/Status
Personnel and Related Expenses - fund the personnel, travel and related expenses of the FAA F&E workforce.	

Program Plan FY2001	Program Plan FY2002	Key Events FY2003-2006
• Fund personnel related expenses	• Fund personnel related expenses, adds positions to support safety and certification of NAS modernization efforts necessary to deliver new capabilities	• Fund personnel related expenses

Appendix C
List of Acronyms and Abbreviations

A

A/G	air-to-ground
ACD	ARTS color display
ACE	Aviation Capacity Enhancement Plan
ACE-IDS	ASOS controller equipment information display system
ADS	automatic dependent surveillance
ADS-A	automatic dependent surveillance-address
ADS-B	automatic dependent surveillance-broadcast
ADTN	aeronautical data telecommunications network
AF	Airways Facilities
AFB	Air Force Base
AFIS	automated flight iInspection system
AFS	FAA Flight Standards Service
AFSS	automated flight service station
AIDC	air traffic services interfacility communication
AIM	Aeronautical Information Manual
AIS	Aeronautical Information Service
ALSF-2	approach lighting system with sequence flasher 2
ALSIP	approach lighting system improvement program
AMASS	airport movement area safety system
AMS	acquisition management system
ANICS	Alaskan national airspace system interfacility communications system
AOVCC	automated observation visibility and cloud cover
ARA	Office of Research and Acquisition
AIR-21	Wendell H. Ford Aviation Investment Reform Act
ARS	Office of Air Traffic System Requirements Service
ARSR	air route surveillance radar
ARTCC	air route traffic control center
ARTS	automated radar terminal system
ASAS	aviation safety analysis system
ASCI	aviation system capacity improvement
ASCM	asset supply chain management
ASDE	airport surface detection equipment
ASOS	automated surface observing system
ASR	airport surveillance radar
ASR-WSP	airport surveillance radar-weather system processor
ASWON	aviation surface weather observation network
AT	air traffic
ATA	Air Traffic Airspace Management Program Office
ATC	air traffic control
ATCBI	air traffic control beacon interrogator
ATCSCC	air traffic control system command center
ATCT	air traffic control tower
ATDET	Air Traffic DSR Evaluation Team
ATDP	advanced technology development prototyping
ATM	air traffic management
ATN	aeronautical telecommunications network
ATOMS	air traffic operational management system

ATOP	advanced technologies and oceanic procedures
ATS	Air Traffic Services
AWOS	automated weather observing system
AWSS	automatic weather sensor systems

B

B	billion
BAA	broad agency announcement
BAe	British Aerospace
BUEC	backup emergency communications
BVR	beacon video reconstituer
BWM	bandwidth manager

C

CAASD	Center for Advanced Aviation System Development
CADD	computer-aided design and drafting
CAEG	computer aided engineering graphics
CAI	contract acceptance inspection
CAMI	Civil Aeromedical Institute
CAPPS	computer assisted passenger pre-screening
CAS	cost accounting system
Cat I/II/III	category I/II/III (aircraft approaches)
CAT	category
CBI	computer-based instruction
CCB	configuration control board
CCFP	Collaborative Convective Forecast Product
CCLD	core capability limited deployment
CDM	collaborative decision-making
CDR	critical design review
CDTI	cockpit display of traffic information
CERAP	center radar approach control
CHI	computer-human interface
CIP	Capital Investment Plan
CNS	communication, navigation, and surveillance
CNS/ATM	communication, navigation, and surveillance/air traffic management
CONOPS	concept of operations
COTS	commercial-off-the-shelf
CP	conflict probe
CPDLC	controller-pilot data link communication
CPDS	critical power distribution system
CRCT	collaborative routing and coordination tools
CSET	Certification Standardization Evaluation Team
CSIRC	computer security incident response capability
CSTB	Caribbean South American Test Bed
CTAS	center TRACON (terminal radar approach control) automation system
CTS	critical telecommunications support

D

DA	descent advisor
DARC	direct access radar channel
DASD	direct access storage devices

DB	database
DBMS	database management system
DF	directional finding
DFW	Dallas-Ft Worth Airport
DLAP	data link applications processor
DME	distance measuring equipment
DMN	data multiplexing network
DMS	defense messaging system
DOD	Department of Defense
DOT	Department of Transportation
DP	display processor
DSP	departures sequencing planner
DSR	display system replacement
DVD	digital versatile disc
DVRS	digital voice recording system

E

EARTS	en route automated radar-tracking system
ECG	en route communications gateway
ECS	emergency communication system
EDC	early display configuration
eDMS	electronic document management system
EDS	explosive detection system
EM	enterprise management
EMI	electromagnetic interference
EMRS	energy management reporting system
E-PIREP	Electronic Pilot Report
eRAM	en-route automation modernization
ERDI	en route domain infrastructure
ETD	explosive trace detections
ETMS	enhanced traffic management system
ETVS	enhanced terminal voice switch

F

F&E	facilities and equipment
FA	first article
FAA	Federal Aviation Administration
FAATSAT	Federal Aviation Administration telecommunication satellite
FANS	future air navigation system
FAST	final approach spacing tool
FAT	first article testing
FDIO	flight data input and output
FDP	flight data processor
FDR	final design review
FEMA	Federal Emergency Management Agency
FFP1	Free Flight Phase 1
FFP2	Free Flight Phase 2
FIS	flight information services
FIS-B	flight information services-broadcast
FM	frequency modulation
FOC	full operational capability

FS-1	Full STARS -1
FSAS	flight service automation system
FSD	full-scale development
FSRM	facility security risk management
FSS	flight service station
FST	fuel storage tank
FTI	future telecommunications infrastructure
FTS	federal telecommunications service
FY	fiscal year

G

GA	general aviation
GEO	geostationary
G/G	ground-to-ground
GHz	gigaHertz
GIP	Government Industry Partnership
GLS	GNSS landing system
GNSS	global navigation satellite system
GPIB	general purpose interface bus
GPS	global positioning system
GTE	Government Transition Evaluations
GWS	graphic weather service

H

HAZMAT	hazardous materials
HF	high frequency
HID/NAS LAN	host interface device/National Airspace System local area network
HOCSR	host/oceanic computer system replacement
HVAC	heating, ventilation, and air-conditioning

I

IAPA	instrument approach procedures automation
IBR	integrated baseline review
ICAO	International Civil Aviation Organization
ICDLS	interim contractor depot level support
iCMM	integrated capability maturity model
IDS	information display system
IDU	interactive display unit
IFR	instrument flight rules
IGWDS	interim graphic weather display system
ILS	instrument landing system
INFOSEC	information security
IOC	initial operating capability
IOT&E	independent operational test and evaluation
IPDS	integrated product development system
IPP	integrated product plan
IPT	integrated product team
IRD	interface requirements document
ISS	information systems security
IT	information technology
ITWS	integrated terminal weather system

J

JRC	Joint Resources Council

L

LAAS	local area augmentation system
LAN	local area network
LEO SATCOM	low earth satellite communications
LINCS	leased interfacility NAS communications system
LLL TVPS	low light level television position system
LLWAS	low-level windshear alert system
LNAV/VNAV	lateral navigation/vertical navigation
LOB	line of business
LORAN-C	long-range navigation – C system
LSF	logistics support facility
LSS	logistics support services
LSSF	logistics support systems and facilities

M

M	million
MALSR	medium intensity approach light system with runway alignment indictor lights
MASPS	minimum aviation system performance standards
MASS	maintenance automation system software
MCF	maintenance control facility
MDR	multi-mode digital radio
METS	management and engineering tool set
Micro-EARTS	micro-en route automated radar tracking system
MMAC	Mike Monroney Aeronautical Center
MMS	maintenance monitoring system
MNS	mission need statement
MOA	memorandum of agreement
Mode C	Mode C beacon response function
Mode S	mode-select (secondary radar discretely addressable mode with data link)
MOM	Manager of Manager
MON	minimal operating network
MOPS	minimum operational performance standard
MSAW	minimum safe altitude warning
MSODL	multi-sector oceanic data link
MSSR	monopulse secondary surveillance radar

N

NADIN	national airspace data interchange network
NAS	National Airspace System
NASA	National Aeronautics and Space Administration
NASDAC	national aviation safety data analysis center
NASMAP	national airspace system management automation program
NASR	national airspace system resources subsystem
Navaid	navigation aid
NDB	non-directional beacon
NDI	non-developmental item
NEXCOM	next-generation air/ground communications system

NEXRAD	next-generation weather radar
NIMS	national airspace system infrastructure management system
NOCC	NIMS Operational Control Center
NOTAM	notices to airmen
NLA	new large aircraft
NPF	NAS premier facility
NSTB	National Satellite Test Bed
NTSB	National Transportation Safety Board
NWS	National Weather Service

O

OASIS	operational and supportability implementation system
OCC	operational control center
ODL	oceanic data link
ODMS	operational data management system
OE/AAA	obstruction evaluation/airport and airspace analysis
OMB	Office of Management and Budget
ORD	operational readiness demonstration
ORPG	open radar products generator
OSH	occupational safety and health
OSHA	Occupational Safety and Health Administration
OT&E	operational test & evaluation

P

P^3I	preplanned product improvement
PAPI	precision approach path indicator
PARR	problem analysis, resolution, and ranking
PAMRI	peripheral adapter module replacement item
PBO	performance-based organization
PCA	planned capability available
PCS	permanent change of station
PENS	performance enhancements system
pFAST	passive final approach spacing tool
POET	post operations evaluation tool
PRM	precision runway monitor

R

RCAS	radio coverage analysis system
RCF	remove communication facilities
RCOM	recovery communications
R&D	research and development
RDP	radar data processing
RDVS	rapid deployment voice switch
REIL	runway end identifier lights
RFI	radio frequency interference
RFI	request for information
RM	resource manager
RMM	remote maintenance monitoring
RNAV	area navigation
RNP	required navigation performance
RTCA	RTCA, Incorporated

RTP	resource tracking program
RVR	runway visual range
RVSM	reduced vertical separation minimum

S

SAIDS	Systems Atlanta information display system
SARPs	standards and recommended practices
SAT	system acceptance test
SATNAV	satellite navigation
SATS	Small Aircraft Transportation System
SAWS	stand alone weather sensors
SBAS	satellite-based augmentation system
SD	situation display
SDP	surveillance data processor
SEIPT	Security Equipment Integrated Product Team
SERC	Software Engineering Research Center
SF-21	Safe Flight-21
SIAP	standard instrument approach procedure
SIR	screening information report
SLEP	service life extension program
SMA	surface movement advisor
SMS	surface management system
SNI	simultaneous non-interfering
SNUG	Satellite Navigation Users Group
SOC	service operations center
SOIA	simultaneous offset instrument approach
SOIT	satellite operational implementation team
SPAS	safety performance analysis system
STARS	standard terminal automation replacement system
STC	supplemental-type certificate
STDMA	self-organizing time division multiple access
STL	Lambert/St. Louis International Airport
STVS	small tower voice switch
SUA	special use airspace
SWIM	System Wide Information Management

T

TACAN	tactical air navigation
TATP	terminal area transition plans
TAWS	terrain awareness warning system
TDLS	tower data link services
TDWR	terminal Doppler weather radar
TFM	traffic flow management
TIP	threat image projection
TIS	traffic information service
TIS-B	Traffic Information Service Broadcast
TLS	transponder landing system
TMA	traffic management advisor
TMA/MC	traffic management advisor multi center
TMA/SC	traffic management advisor single center
TM&O	Telecommunications Management & Operations

TMU	traffic management unit
TRACON	terminal radar approach control
TRX	TIP ready checkpoint x-ray screening units
TSF	technical support facility
TSSC	technical support services contract
TVSR	terminal voice switch replacement

U

U.S.	United States
UAT	universal access transceiver
UHF	ultra-high frequency
UPS	uninterruptable power supply
URET	user request evaluation tool
USAF	United Statues Air Force

V

VASI	visual approach slop indicator
VDB	VHF data broadcast
VDL	VHF data link
VERN	very high frequency extended range network
VF	vertical flight
VFR	visual flight rules
VHF	very high frequency
VOR	very high frequency omnidirectional range
VOR/DME	very high frequency omnidirectional range with distance measuring equipment
VRRP	voice recorder replacement program
VSCS	voice switching and control system
VSCU	VSCS control subsystem
VTABS	voice switching and control system training and backup switches

W

WAAS	wide area augmentation system
WARP	weather and radar processor
WATRS	West Atlantic Route System
WINS	weather information network server
WJHTC	William J. Hughes Technical Center
WMSCR	weather messaging switching center replacement
WSP	weather systems processor
WX	weather

Y

Y2K	Year 2000