1993 Federal Aviation Administration Aviation System Capital Investment Plan

US Department of Transportation
Federal Aviation Administration

December 1993
800 Independence Ave., SW
Washington, DC 20591

Report of the Federal Aviation Administration to the United States Congress pursuant to Section 504(b)(1) of the Airport and Airway Improvement Act of 1982 (Title V, P.L. 97-248).

U.S. Department of Transportation
Federal Aviation Administration

Office of the Administrator

800 Independence Ave., S.W.
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The aviation industry is undergoing substantial changes and facing new challenges that could not have been predicted just a few years ago.

Aviation is a complex, dynamic enterprise where "maintaining the status quo" is an unacceptable way to do business. Therefore, the Federal Aviation Administration (FAA) must also be dynamic and innovative in addressing problems in the National Airspace System (NAS) so our customers in every segment of the aviation community can meet the challenges the future holds.

The 1993 Capital Investment Plan (CIP) describes the FAA's efforts to address critical issues and improve the NAS by investing in infrastructure modernization. The NAS is not a single turnkey system that can be developed and implemented to meet aviation's needs for the next 50 years. The NAS is a highly complex conglomeration of integrated systems that must be updated through a phased approach based on sound system engineering principles. Therefore, by necessity, the CIP is an evolutionary, living document that provides incremental improvements to the NAS and is responsive to changing requirements from users inside and outside the FAA.

In this context, the 1993 CIP reflects two new policy directions for the NAS that merit added emphasis: first, an accelerated commitment to a satellite-based navigation system that uses the global positioning system (GPS) as its foundation; and second, a commitment to limited terminal radar approach control (TRACON) consolidation. The FAA will establish metroplex control facilities in a limited number of very large metropolitan areas instead of consolidating all TRACON operations into Area Control Facilities. Approximately 170 TRACON's will be modernized but will remain as stand-alone facilities. This will enable the FAA to create a simpler, more efficient local airspace management structure.

It is important to remember that the CIP must be integrated with other plans to ensure a total systems approach to the CIP's infrastructure investments. For example, the CIP uses successful Research, Engineering and Development Plan projects to incorporate the latest technology into the NAS.

The FAA is committed to building a robust aviation infrastructure in cooperation with our NAS users and operators so that the United States can maintain its leadership in global aviation.

David Hinson

David R. Hinson
Administrator

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EXECUTIVE SUMMARY

This is the Federal Aviation Administration's (FAA) third Aviation System Capital Investment Plan (CIP). It describes the Facilities and Equipment (F&E) programs that the FAA will pursue in addressing key concerns of the national airspace system (NAS), such as safety, efficiency, traffic demands, equipment and facilities, and airspace use. The CIP creates a plan for evolution of the existing NAS through use of these technologies and development of new products obtained from continuing research.

Extensive advances in automation, communication, and satellite services being researched and developed will facilitate more automated control concepts, remove fixed-routing constraints, provide high levels of civil aviation system safety, and facilitate operation of future generations of aircraft. A sound planning process provides the flexibility to capture the opportunities that new technologies will provide for achieving the FAA's mission.

This CIP supports the FAA's Strategic Plan, and has been coordinated with several related plans, including the FAA Plan for Research, Engineering and Development.

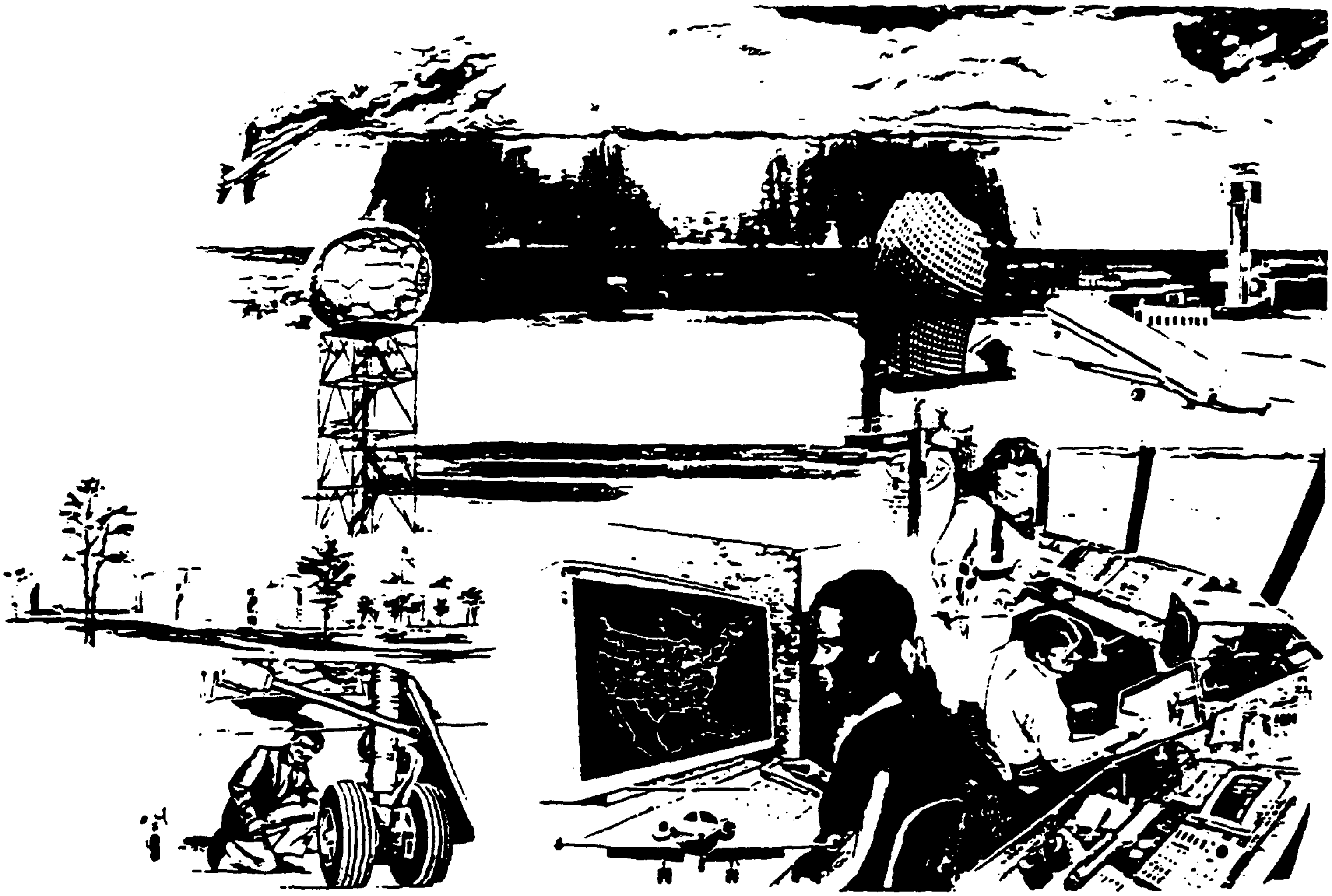
The CIP focuses on the dynamic process of supporting and upgrading nearly 25,000 NAS facilities. This is a continuing process rather than one which will eventually evolve into a final end-state system Most of the projects in the CIP represent logical extensions of ongoing projects or address today's needs. Future requirements of the air traffic control system are being formulated with all users in the aviation community. As the requirements are determined, new projects will be created, submitted for validation and funding, added to the CIP, entered into the approval cycle, and processed to completion.

The CIP is organized into six chapters. The **Introduction** provides an overview of the Plan, NAS goals and national priorities, the national air transportation system, a crosswalk to other plans, return on investment, recent changes, and document organization. A key goal of the Secretary of Transportation's National Transportation Policy is the completion of the NAS Plan. To meet and document this goal, the **Original NAS Plan** chapter presents all remaining original projects. The **Growth** chapter describes those requirements that expand, relocate, or consolidate existing facilities/equipment The **Infrastructure Replenishment** chapter covers additional items identified since development of the original NAS Plan. This chapter presents projects that refurbish structures, replace obsolete equipment, or relocate facilities to maintain service, improve effectiveness, or reduce cost. The **Supportability** chapter describes projects that support logistics, provide for personnel training, and manage the information and human resource aspects of NAS modernization. The last chapter, **New Capabilities**, addresses projects which, if implemented, are expected to add significant new capabilities to the NAS.

Implementation of the projects described in this CIP will provide the near-term improvements and far-term capabilities that will ensure the FAA meets its goal of providing for the safe and efficient use of the Nation's airspace.

Chapter 1: Introduction

The Introduction chapter provides a summary of the overall Plan, including national priorities and NAS goals, return on investment, and recent changes.



CHAPTER 1
INTRODUCTION

Overview

The national airspace system (NAS) is the largest, busiest, most complex, and most technologically advanced aviation operation in the world. The Federal Aviation Administration (FAA) has the principal responsibility for providing the NAS infrastructure to support all air operations within the United States and certain oceanic areas. This responsibility extends from air traffic control (ATC) to system security and from safety to international coordination; it must be met 24 hours a day, 365 days a year, with a requirement for excellence that is unmatched in virtually any other undertaking. The FAA is committed to carrying out these tasks in an efficient, cost–effective manner.

Through the cooperative and dedicated efforts of the FAA and the aviation community, the NAS has compiled an outstanding record of operational safety and efficiency. To maintain the current record in the face of growing demand, the FAA has instituted a capital investment planning process based on mission needs and future concepts. This plan for systematically improving and expanding the current system will be augmented by new technologies and procedures, and will make the most effective use of available resources. The Aviation System Capital Investment Plan (CIP) is the result of this planning effort.

Based on a total system approach, the CIP relates user community needs to technical opportunities, human factors, and operational considerations. The systematic implementation of the projects defined in this CIP will result in improved safety and efficiency, while accommodating spiraling demands at constrained cost. It supports a more complex system and creates a foundation for continued evolution that uses modern technologies and capabilities. The CIP also recognizes that continuing upgrades and enhancements are necessary to meet evolving NAS user needs. It includes: **Original NAS Plan (Chapter 2)** – Preservation of the original NAS Plan projects; **Growth (Chapter 3)** – Projects that expand, relocate, or consolidate existing facilities/capabilities in response to changing demand on the system. Each potential metroplex control facility (MCF) is identified in this chapter; **Infrastructure Replenishment (Chapter 4)** – Projects identified since the original NAS Plan that refurbish structures, replace obsolete equipment, or relocate facilities to maintain service, improve effectiveness, and/or reduce cost; **Supportability (Chapter 5)** – Capital improvement projects that support logistics, provide spares, train personnel, and manage the human resource aspect of modernizing the NAS; and **New Capabilities (Chapter 6)** – Projects identified since the original NAS Plan which, if implemented, are expected to add significant new capabilities to the system. The new TRACON Automation System project is contained in this chapter.

Demand on the System

The continuing growth in aircraft operations, diversity of operations, number of aircraft, and sophistication of aircraft will place unprecedented demands on the NAS through the turn of the century. The CIP has been developed to prepare for these increasing demands. Safe and efficient operation of the NAS will require improved services, new facilities for system expansion, orderly replacement of aging facilities, and adequate airport capacity. Table 1-1 summarizes the major air traffic control facilities supporting NAS aviation operations.

Table 1-1. Current Major Air Traffic Control Facilities

Air Route Traffic Control Center (ARTCC)	21
Airport Traffic Control Tower (ATCT)	462
Automated Radar Terminal System (ARTS)	181
Flight Service Station (FSS)	174
Airport Surveillance Radar (ASR) – Terminal	211
Air Route Surveillance Radar (ARSR) – En Route	115
Remote Center Air-Ground (RCAG) Facility	655
Remote Communications Outlet (RCO)	1,718
Direction Finder (DF) Equipment	229

Forecasts indicate that demand in aviation activity will increase in the next two decades. Aviation and the national airspace system will be international in scope in the 21st century. To meet worldwide air traffic demands, fundamental technologies and procedures of the future system must be global. Satellite technology, for example, will become an increasingly attractive option for providing regional and worldwide services. For this reason, the evolutionary system design must be compatible with international acceptance and interoperability. This includes implementation at various levels of sophistication, with the ability to provide service tailored to specific applications.

The future NAS must evolve compatibly with the global coordination plan being developed by the International Civil Aviation Organization (ICAO). This will assure progressive and orderly implementation of worldwide capabilities in a timely and cost–beneficial manner.

Modernizing the NAS is an aviation community undertaking, and all community members have a stake in the outcome. Aviation community categories include general aviation aircraft, sophisticated business aircraft, helicopters, and a range of commercial and military aircraft.

Table 1-2 summarizes the operational diversity of total NAS activity for 1992, as well as anticipated demand for 1997, 2002, and 2007.

Table 1-2. Total National Airspace System Activity

	1992	1997	2002	2007	Percent Growth 1992-2007
NPIAS Airports*	3320	3530	3734	3938	18.6
Airport Operations (millions)					
Aircraft Operations	134.2	162.8	187.0	207.5	54.6
Itinerant Operations	95.6	111.0	125.4	140.8	47.3
Towered Airport Operations	62.4	70.0	76.0	81.7	30.9
Military Airport Operations	28.1	25.7	27.1	27.1	(3.6)
ARTCC Operations (millions)					
IFR Aircraft Handled	37.3	41.9	46.1	49.5	32.7
MCF Operations (millions)					
IFR Aircraft Handled	46.1	52.5	57.5	61.9	34.3
FSS Service (millions)					
Flight Plans, Radio Contacts, Briefings	38.2	40.0	41.1	42.0	9.9
Hours Flown (millions)					
Air Carrier	10.5	12.8	15.3	17.3	64.8
General Aviation	35.6	38.1	40.0	42.0	18.0
Military	6.2	5.6	5.8	5.7	(8.1)
Domestic Enplanements (Revenue Passenger) (millions)					
Air Carrier	423.1	516.4	617.4	728.4	72.2
Commuter	40.9	57.6	77.3	100.7	146.2
Aircraft Fleet (thousands)					
Air Carrier	4.2	5.0	5.8	6.4	52.4
Commuter**	1.9	2.2	2.3	2.6	36.8
Total General Aviation	210.5	217.4	224.2	229.2	8.9
Civil Helicopter **	7.8	8.9	10.5	12.4	59.0
Total Military	19.2	17.5	17.7	17.2	(10.4)
Military Helicopter **	7.2	6.7	6.6	6.6	(8.3)
Pilots (thousands)					
Instrument Rated	300.6	321.3	340.4	352.8	17.4
Total Pilots	714.8	768.6	804.5	834.1	16.7

* Aircraft operations forecasts are based on the existing airports included in the National Plan of Integrated Airport Systems (NPIAS).

** Civil helicopter and commuter fleets are included in the total general aviation fleet. The military helicopter fleet is included in total military fleet.

This document summarizes capital investment planning activity by project. The reality of such a massive modernization program is that changing from one major system to another is impractical in time frames of less than several years duration. Moreover, both requirements and available technology change over time. For this reason, the FAA has characterized change in the system as evolutionary. Improvement over time is well understood, manageable, cost effective, and keeps pace with user needs (safety, capacity, efficiency) and the environmental demands of the 21st century.

Developing a CIP project is a multistep process that begins with the development of a mission need statement (MNS). The MNS describes a NAS deficiency, alternatives for satisfying the deficiency, and an approximate cost. Requirements offices throughout the FAA submit proposed MNSs as soon as a deficiency is identified and understood.

All MNSs are validated through a review process that results in the best possible mix of projects that meet authorization levels and reflect management priorities. As the projects mature, NAS requirements and technology both evolve. In response, the CIP projects change to reflect the changing environment. This is accomplished by regular revalidation of mission needs and continuous project oversight.

This year's plan reflects a major shift in policy regarding consolidation of air traffic control facilities. Instead of consolidating all terminal radar approach control (TRACON) facilities into area control facilities, the FAA will establish metroplex control facilities (MCFs) in a limited number of very large metropolitan areas. These MCFs will collocate a small number of TRACONs that serve closely spaced large airports in a dense, highly complex, interactive air space environment. They will include automation systems already planned for the advanced automation system (AAS). Remaining TRACONs will be stand-alone facilities with a new automation system. This limited ATC facility consolidation strategy has many benefits. It reduces the operational risk of catastrophic facility failure and associated problems with facility backup in case of failure; it enables the FAA to upgrade the performance of terminal operations several years earlier than would be possible under the previous approach; it requires less capital and operating outlays than other alternative approaches; and it offers the greatest flexibility with respect to future system architecture.

Another major shift is the focus on satellite navigational systems, using the global positioning system (GPS) as a nucleus. Recent GPS studies, conducted by FAA Technical Center (GPS Flight Test Report, Phase 1 – April 1992; and GPS for Precision Approaches, Flight Test Results – June 1993), indicate an augmented positioning system may meet most future civil aviation navigational requirements.

National Priorities and NAS Goals

The FAA's infrastructure improvements described in this plan contribute to the five national priorities: safety and security; technological leadership and competitiveness; economic health and productivity; environmental protection; and fostering intermodalism. For example, new controller automation and navigation/landing aids will help to increase NAS capacity and decrease delays, enabling the aviation system to keep pace with and foster economic growth while reducing fuel consumption. Reduced fuel consumption contributes to both energy conservation and environmental protection. Improved weather information will increase aviation safety. Facility replacement and modernization will prepare facilities to support new equipment and growth, while making those changes necessary to ensure a safe and environmentally sound workplace. The FAA's NAS modernization program will help to ensure that the United States maintains its position as the world leader in aviation technology.

In response to the challenges faced in today's air transportation system, the FAA is developing a set of ambitious goals for the NAS. These goals are being designed to support the overall FAA mission and provide a clear direction for improving NAS operations. It must be emphasized that *these are* NAS goals *and not* CIP goals. This distinction is important because other FAA plans (such as the Research, Engineering and Development Plan and the Airport Improvement Program) contribute to achieving the NAS goals along with the CIP.

In developing NAS goals that are specific, measurable, and attainable, the FAA is seeking to achieve safety, capacity, and efficiency for NAS users. See Figure 1-1. These goals will be continually refined through a validation process to ensure they fully address mission needs, meet customer requirements, and can be supported at minimal risk with available technology.

- Reduce civil aviation fatality rate by at least 10 percent by 2000.
- Reduce the number of accidents attributable to weather by 20 percent by 2000.
- Reduce weather-related delays by 15 percent by 2005.
- Ensure that system capacity will meet demand.
- Provide more user-preferred routes and altitudes to minimize aircraft operating costs.
- Reduce airport runway incursions by 80 percent by 2000.
- Accommodate a projected doubling of oceanic air traffic demand by 2010.

Figure 1-1. NAS Goals

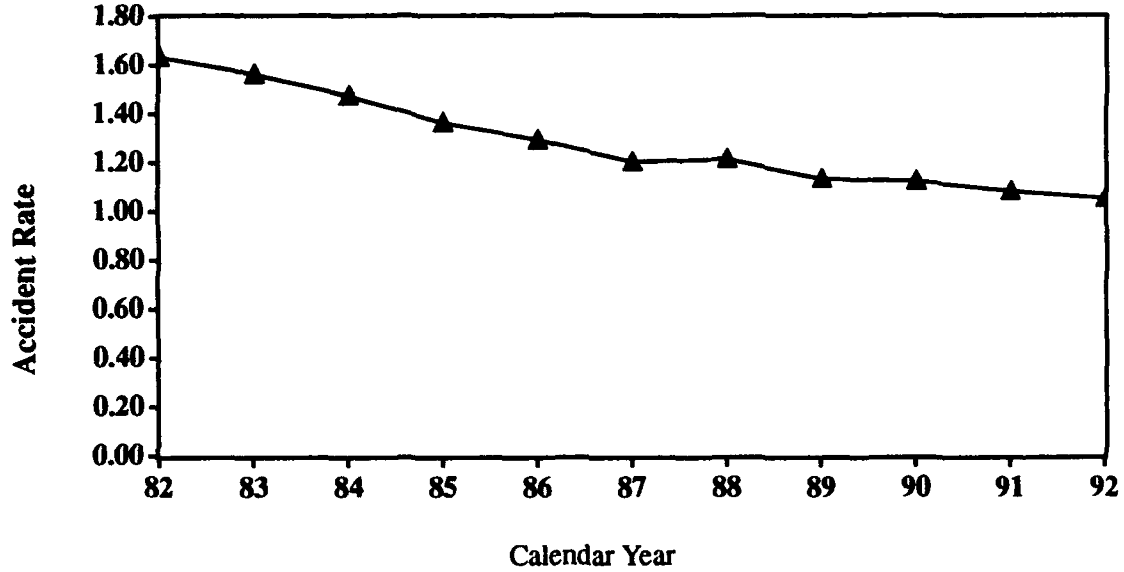
United States Air Transportation System

CIP investments are based on a continuing assessment of the needs of the United States air transportation system. NAS infrastructure improvements are financed jointly by private and public sectors, with the private sector paying user fees through the Aviation Trust Fund. The FAA, with DOD support, supplies and operates the ATC and management system, the air navigation system, and their supporting systems.

While the Aviation Trust Fund provides capital each year for airport improvements, airport financing is still predominantly a state and local government responsibility. Financing needs are met through a mix of revenue bonds, trust fund grants, and passenger facility charges.

Safety and Capacity Issues

The United States air transportation system is the world's safest and most efficient. CIP investments slated for aviation safety and capacity improvements are targeted to maintain that superior record. According to Figure 1–2, fatal aviation accidents in the United States have been decreasing steadily during the last 10 years. Figure 1–2 is based on fatal accidents per 100,000 hours flown.



(Source: National Transportation Safety Board)

Figure 1-2. Fatal Accidents per 100,000 Hours Flown

The United States system operates very efficiently through a mix of major carriers, regional airlines, and commuters operating in a predominantly hub–and–spoke configuration. Nonetheless, air transportation delays are a major concern to aviation productivity, especially at the major hub/pacing airports. While over 40 percent of the delays are due to adverse weather, CIP investments can provide increased capacity through more judicious use of air traffic control and management automation systems, in addition to new runways and airports.

As Table 1-3 shows, total delay cost to the industry and passengers has increased 113 percent in the period of rapid growth that occurred after airline deregulation. Looking to the future, aircraft operations are projected to increase an additional 39 percent from 1992 to 2002. Capacity enhancing projects (such as the new Denver airport and the parallel runway monitor program) will help in meeting future public demands.

Table 1-3. Operational Deficiencies

Category	1976	1986	Percent
Delay/Flight (Hour)	.183	.252	38
Total Delay Hours	842,000	1,557,000	85
Total Direct Operating Cost of Delay for All Air Carriers	$976,720,000	$1,815,000,000	86
Total Passenger Delay Cost for All Air Carriers	$1,424,000,000	$3,290,000,000	131
Total Delay Cost	$2,400,720,000	$5,105,000,000	113

Automation

The future traffic flow management process will be based on comprehensive data bases describing current and projected levels of demand and capacity resources. Sophisticated models that accurately predict congestion and delay will be used to formulate effective real–time strategies for coping with excess demand. Users will interface with the traffic flow management process in-flight planning to negotiate trajectories that best satisfy their needs while meeting capacity needs.

The ATC process (which monitors individual aircraft progress and intervenes in flight paths when required) will make extensive use of automation. When a user determines that a flight plan amendment is required, a communication process will be established between the aircraft's flight management computer system and the ground–based automation system to recommend a new trajectory that best meets the user's objective and satisfies air traffic management requirements (e.g., special use airspace restrictions). Similarly, when the ground–based ATC process recognizes a need to intervene in the cleared flight path of an aircraft, the automation computer will communicate with the flight management computer to recommend a modification meeting demands with the least disruption to the user's preferred trajectory. Human operators will exercise management and control authority over these communication processes.

Navigation and Landing

The GPS will be the principal radio navigation aid used by aircraft in oceanic, en route, and terminal airspace, including departure operations. An approach and landing capability close to Category I may be provided by the GPS in combination with ground–based equipment, providing differential corrections to the ranging satellite signals.

Communications

Data–link will be commonplace for air traffic management operations, using Mode S and other high–integrity media for data transfer between the ground and the flight deck. Open systems interconnection techniques (conforming to internationally accepted technical standard), will be fully developed and incorporated into the aviation data–link design to ensure interoperability of satellite, Mode S, very high frequency, and terrestrial data transmission systems.

Surveillance

The ground–based en route surveillance system will evolve to rely more on secondary surveillance radar (SSR) and less on primary radar. For the near future, primary radar will continue to be used in terminal areas to detect aircraft mistakenly entering terminal control areas and as backup. In oceanic areas, automatic dependent surveillance will be used where radar coverage is not feasible.

Weather

Improving weather sensors and integrating weather sensor data to provide comprehensive, timely, and reliable weather phenomena reporting will be a major new feature of the system. New Doppler radar systems, optimized for hazardous weather detection (e.g., microbursts), will be employed at major airports throughout the United States. Real–time weather observations will be transmitted to the ground from appropriately equipped aircraft via data–link. These observations will be integrated with ground–based observations from FAA and National Weather Service sensors to provide a more comprehensive weather picture.

Maintenance and Operation

Most major NAS subsystems will be remotely monitored and controlled. The methods used by technical specialists to monitor and control subsystems (locally and remotely) will include using advanced systems to assist with problem diagnosis and resolution. The technician will be provided with online support at the local, regional, and national levels. Automated maintenance logs will be implemented to reduce human error, support logistics planning, and alleviate paperwork. Finally, the national maintenance control center will be established to monitor system status at a national level and automatically perform trend analysis. The result will be more efficient system maintenance and cost–effective parts inventories.

Cornerstone Projects

Table 1-4 shows projects that provide the primary basis for achieving the goals identified above. Although all projects in the CIP contribute in some way to meeting the goals, those identified in Table 1-4 are the most significant contributors.

Table 1-4. Cornerstone Projects

Project Number	Project Title	Major Contribution to the NAS
21–11	Voice Switching and Control System (VSCS)	• Improves voice communications reliability. • Improves the voice communications system computer/human interface. • Improves communications flexibility.
21–12	Advanced Automation System (AAS)	• Increases traffic-handling capacity. • Improves computer/human interface. • Increases controller effectiveness.
23–05	Aeronautical Data–link	• Reduces communications errors. • Facilitates cockpit/ATC automation integration. • Facilitates a seamless domestic and international data communications service.
24–07	Microwave Landing System (MLS)	• Overcomes inherent limitations of the ILS. • Improves NAS capacity.
24–16	Weather Radar Program	• Enhances en route aviation weather products. • Facilitates safety and fuel savings.
34–13	Terminal Radar Digitizing, Replacement, and Establishment	• Improves weather detection in terminal areas. • Improves position accuracy. • Provides AAS compatibility.
61–23	Oceanic Automation Program (OAP)	• Improves communications and position reporting over the ocean. • Modernizes hardware and software at oceanic centers.
62–20	Terminal ATC Automation (TATCA)	• Provides traffic management advisory tools in terminal area. • Facilitates full use of terminal airspace capacity. • Increases safety and efficiency.
62–21	Airport Surface Traffic Automation (ASTA)	• Optimizes sequencing and scheduling. • Maximizes the use of surface capacity. • Increases controller effectiveness.
63–21	Integrated Terminal Weather System (ITWS)	• Integrates terminal area weather data. • Increases safety in terminal area.
64–05	Augmentations for GPS	• Benefits aviation users. • Envisioned as the navigation system of the future with global application. • Potential for a complete radio navigation service for all phases of flight.

Assumptions

During the analysis leading to this plan, a number of premises were considered to be logical and valid assumptions. For example:

- Most of the aviation growth from 1993 to 1999 will come from commercial activity (the sum of air carrier and commuter/air taxi). It is expected to be strong at new and developing hub airports as the airlines continue to expand into new market areas. This will place unusual demand on particular portions of the system that are not necessarily predictable.

- While domestic air carrier revenue passenger miles increased 3.5 percent from 1987 through 1991, international revenue passenger miles increased 49.3 percent. International service demand is expected to continue growing at a significantly higher rate than domestic demand for the next several years.

- Individual user preferences for routes, runways, approaches, altitudes, etc., should be honored if they will not cause delays to other users or impair the safety of the system.

- Most major airports have limited expansion capability due to physical, environmental, airspace, runway, and/or land limitations. Few new large commercial service airports are anticipated. These factors will continue to impose capacity constraints at many large– and medium–hub airports.

- A limited amount of additional capacity will be achieved, primarily through reduction in separation standards (resulting from technology advances), refinements in air traffic control procedures, and runway, terminal, and access improvements. Solution of wake/vortex problems will reduce delays, but will not eliminate them entirely.

International Priorities

CIP investments encourage global innovation and improvements in the air transportation system by spawning a set of international standards and systems that are deployed by all ICAO member states. The FAA is working with the ICAO Future Air Navigation Subcommittee (FANS) in formulating plans for a worldwide air traffic management system. Recognition of changing operating environments, including opportunities to beneficially use new technologies, has led the ICAO and the FAA to develop new concepts for the future aviation system support infrastructure. These concepts are based on taking advantage of advancing technology, but also incorporate numerous human factors and human/technology interactions.

The FANS impinges on the CIP indirectly as it investigates ways to improve current systems and technologies to enhance worldwide management of air traffic. The focus of these investigations is primarily on the need for improved satellite–based communications, navigation, and surveillance (CNS) technologies to accommodate the projected growth and diversity of civil aviation into the next century.

The increasing use of satellites for navigation and communication, especially in oceanic and less–developed land areas, is under investigation for future application. For instance, differential global positioning system (DGPS) will be able to provide nonprecision approach capability to any runway end in the world, and it may be possible to provide Category I precision landing guidance.

The use of a GPS highlights the increasing international aspect of aviation. However, communications, navigation, surveillance, and controller automation improvements work to provide greater benefits as a whole than the sum of the individual parts. Oceanic automation program (OAP) improvements are being addressed through a series of related areas that will continue to add new capabilities with global interoperability.

Crosswalk to Other Plans

The evolving NAS design and, consequently the elements of this document, support goals set by the FAA Strategic Plan. These goals include fostering an aviation transportation system that is readily available, punctual, safe, and conducted in an environment that is secure and internationally compatible. Beyond that, changing circumstances will affect progress and future objectives.

The FAA's capital investment planning is affected by other FAA plans. Research and development, for example, leads to decisions to invest capital in certain new technologies. Therefore, the relationship between the FAA's Plan for Research, Engineering and Development (R,E&D) and the CIP is unique, and treated separately below.

The National Plan for Integrated Airport Systems (NPIAS) and the Airport Capacity Enhancement Plan generate CIP requirements. While the FAA does not directly build, expand, or enhance airports, it does provide support through construction of airport traffic control towers, radars, and other facilities and equipment, and through a grant program (the Airport Improvement Program). Many projects in this CIP are aimed at increasing airport capacity and efficiency.

The Airport Capacity Enhancement Plan plays a major role in the FAA's effort to increase airport capacity and efficiency without compromising the safety of passengers or the environment. The plan identifies the cause and extent of capacity and delay problems currently associated with our air system, estimates effects of increased air traffic on airport capacity over the next decade, and outlines planned and ongoing FAA projects intended to reduce capacity–related problems.

The CIP supports or provides requirements for various other plans. Among these is the Future National Airspace System Telecommunications Plan, which correlates the telecommunications network requirements with implementation strategies of NAS projects that are major users of telecommunications services. Another is the Human Resources Management (HRM) Plan, which identifies human resources required to achieve the goals of the capital investment projects reflected in the CIP, such as training and preparing FAA employees for new technologies on systems to be activated into the NAS. Agreement on the requirements and schedules required to carry out these various plans is accomplished through the conscientious coordination of planners throughout the FAA.

The National Airspace Integrated Logistics Support (NAILS) Master Plan establishes a formal mechanism to ensure that supportability planning is included in all phases of NAS project development and implementation.

Relationship to R,E&D

During 1961 and 1971, the FAA R,E&D organization developed a variety of innovative programs. These became the foundation in the 1980's for the original NAS Plan for facilities and equipment. Since then, much of this R,E&D organization and personnel expertise has been redirected to develop and implement the NAS Plan and CIP.

Currently, a renewed FAA R,E&D emphasis is underway which seeks to "push the envelope" of modern technology beyond NAS Plan/CIP capability to provide a foundation for an international, 21st century air traffic control system. The FAA intends to accomplish this by revitalizing its research programs, leveraging ongoing industrial, space, and defense research and development, and revamping its acquisition strategy to meet both near-and long-term aviation needs.

The R,E&D organization will accomplish concept exploration and demonstration for new technology initiatives. After prototype systems have proved operationally beneficial and technologically low–risk, the responsibility for actual operational acquisition will move from the R,E&D organization and R,E&D Plan to the NAS Development organization and the CIP. Thus, through the interrelated R,E&D and CIP Plans, the FAA will develop and deliver new technology to achieve operational benefits for the entire aviation community.

Return on Investment

In the NAS of the future, safety will be improved by reducing system errors. Flight paths desired by airspace users will be accepted on a regular basis. The growing demands of flight operations will be accommodated with a minimum of constraints and with the highest practical fuel efficiency. Dynamic flow management will reduce airborne delays.

CIP Benefits

Implementation of the CIP will offset costs required to meet increasing air traffic growth demands on a system that would otherwise be inadequate to handle them. These savings will provide a significant return on investment to the NAS. Users of the system will benefit from improvements in flight services, more efficient routing, reduced delay, and enhanced safety.

Benefits realized and accruing since 1981 total $35 billion in 1992 dollars. These benefits are accruing from completed projects, as well as from ongoing projects funded by the FAA facilities and equipment account. They have been realized in the form of FAA operations and maintenance cost savings, productivity increases, and avoided growth in delays and disruptions to operations from traffic congestion and down–time of old and obsolete equipment. Benefits of completing existing and planned projects in the CIP are estimated to be $285.0 billion in constant 1992 dollars. FAA savings are 12 percent of the total, primarily from a reduction in controller and maintenance workload. Major project contributors to FAA benefits are the traffic management system, AAS, and flight service automation program. Users of the system realize the remaining 88 percent of benefits from delay reduction, increased efficiency, improved safety, and avoided avionics costs. Users will realize a savings of 65 million aircraft flight hours, and over 39 billion gallons of fuel due to reduced delays and improved efficiency. Projects in the AAS, MLS, and central weather processor are the major contributors to user savings.

The present value of future benefits is $96.3 billion, and the present value of future costs is $23.8 billion, resulting in an overall CIP benefit-to-cost ratio of 4.0:1 with a net present value of $72.5 billion. A breakout by percentage of CIP benefits is shown in Figure 1-3.

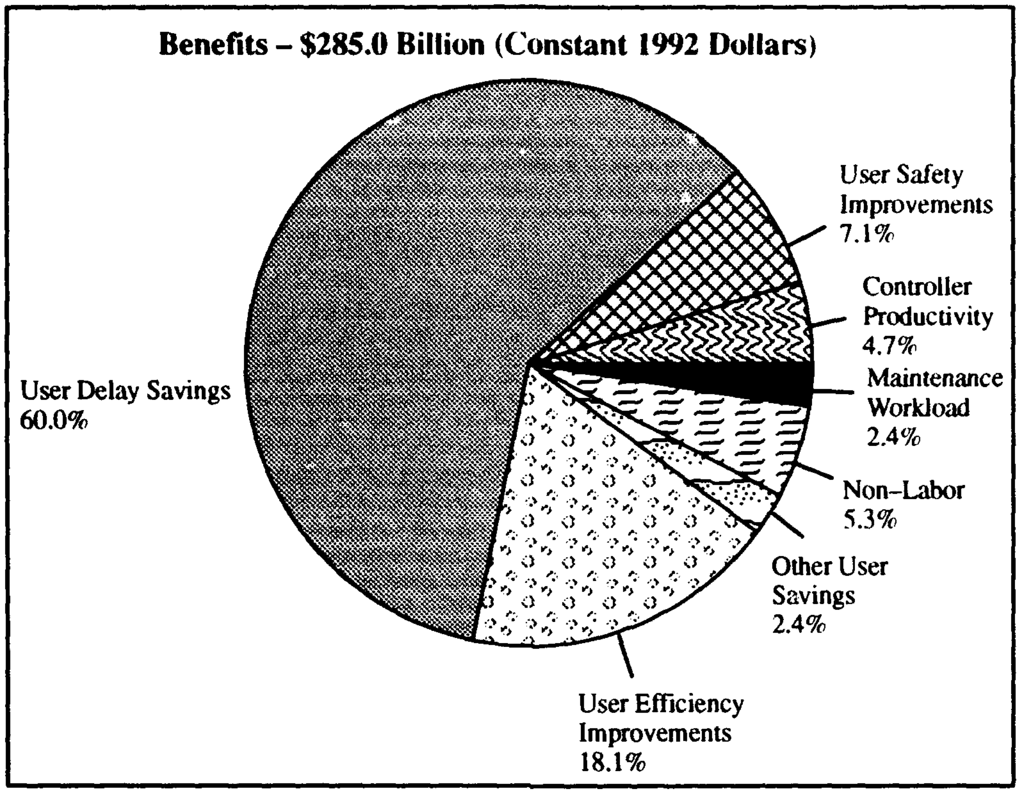


Figure 1-3. Capi*al Investment Plan Benefits by Category

CIP Impact on Gross Domestic Product (GDP)

Modernizing the Nation's air transportation infrastructure is critical not only to the user community but also to the Nation's economic future. The CIP modernization program ensures that the Nation will continue to move goods and services efficiently in an increasingly competitive global economic environment. The air transportation sector has remained relatively consistent with the Nation's economic growth, constituting 6 percent of our Nation's GDP. In 1991, civil aviation provided almost 8.5 million jobs, with total earnings over $200 billion. Economic activity generated by aviation during that same year amounted to nearly $700 billion composed of three major elements -- passenger travel, airlines and general aviation, and aircraft/parts manufacturing. See Figure 1-4. The aerospace industry is the country's leading exporter of manufactured goods. Foreign visitors to the United States, most of whom arrive by air, contribute significantly to the trade balance.

In this respect, the United States air transportation system has major economic impact. Moreover, aviation's role is expected to continue growing throughout the 1990's and into the 21st century. Current estimates project that by 2000, aviation's total economic impact will be over $860 billion in constant 1991 dollars.

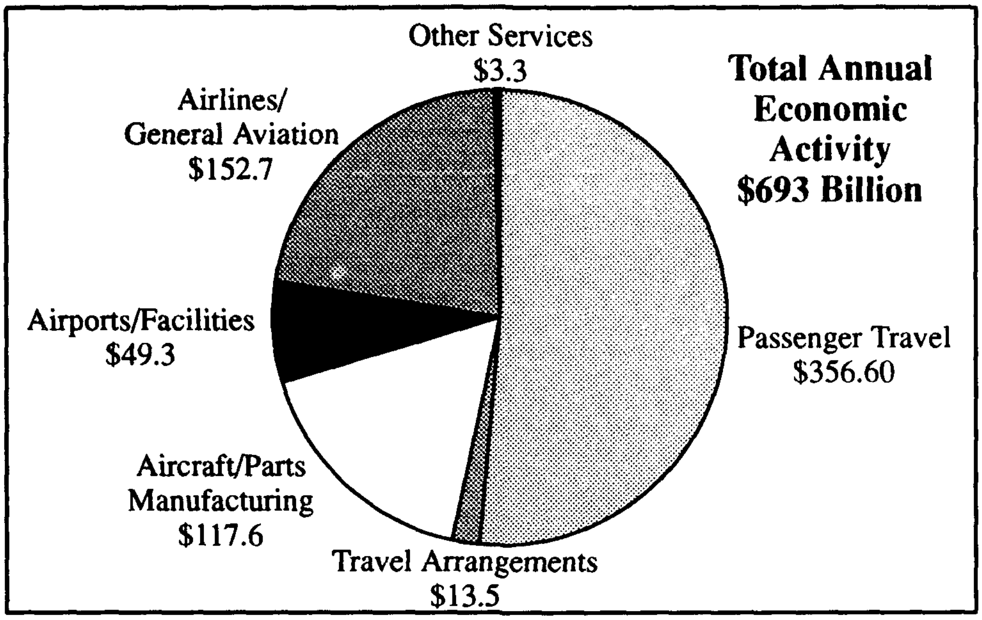


Figure 1-4. Economic Activity Generated by Aviation

Recent Changes

Of the original NAS Plan projects (Chapter 2), only one remains without contract award. Since publication of the last CIP, 14 of the original projects have been completed. Figure 1-5 shows graphically how progress on the original projects has evolved since inception of the NAS Plan in 1981.

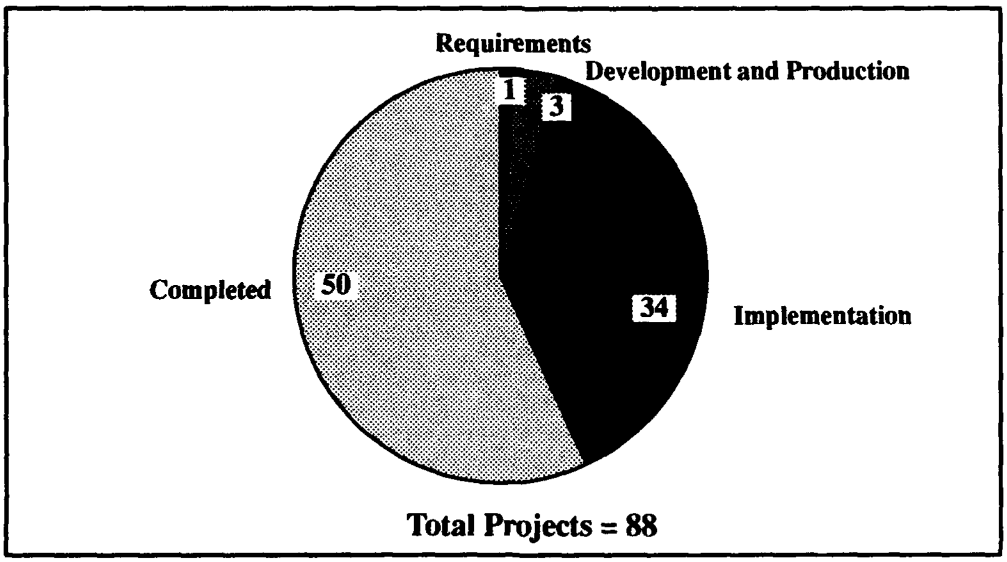


Figure 1-5. Original NAS Plan Project Evolution Progress

Major changes are being proposed in the projects dealing with the instrument landing system (ILS) and the microwave landing system (MLS) based on global navigation satellite system capabilities. Seven projects have been added that are associated with the limited ATC facility consolidation decision. The projects are: 32–34 Potomac Metroplex, 32–36 Northern California Metroplex, 32–38 Atlanta Metroplex, 32–40 Central Florida Metroplex, 32–42 New York Metroplex, 32–44 Advanced Facility Planning, and 62–25 Future TRACON Automation System.

Document Organization

CIP chapter and functional sections are identified in Figure 1-6. All CIP projects are located in the six functional sections in chapters 2 through 6. An active project may be found by looking up the sequential project numbers in the Table of Contents, or reviewing the Alphabetical Listing of Projects in Appendix C.

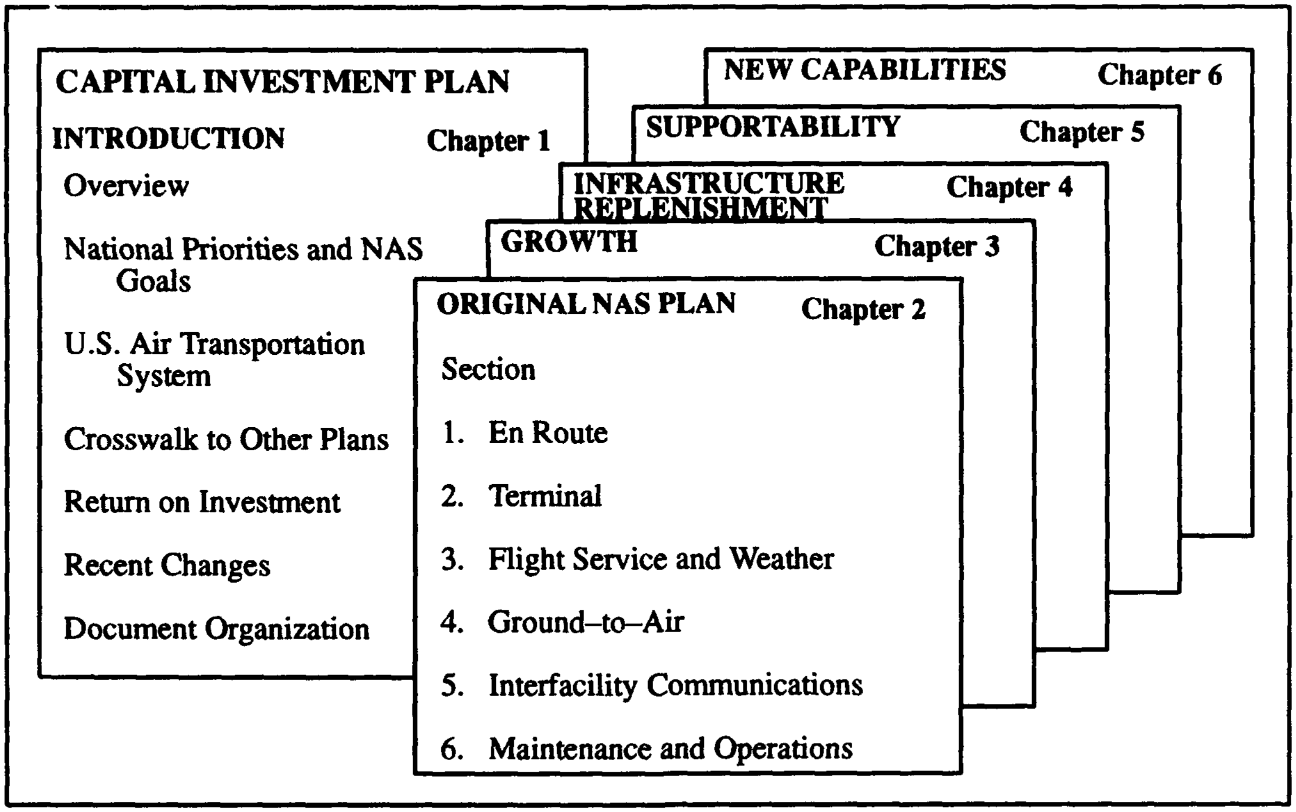


Figure 1-6. CIP Chapter and Section Layout

The first digit of the project number represents chapter location; the second is the functional section, and the third and fourth provide separation within a section. In several cases, corresponding projects in different chapters will have identical second, third, and fourth digits (e.g., 22–12 TVSR and 32–12 ETVS). Page numbering is similar to project numbering. The first digit identifies the chapter; the second indicates the functional section (a zero is for chapter "lead–in" text), and the third and fourth provide the sequential page number within a section.

Completed, combined, and withdrawn projects are listed in Appendix B by project number within the six functional sections. Projects with only a date in the last activity column were completed in the year indicated. All other status is indicated by the terms Withdrawn, Combined, or Renumbered. Inactive projects are removed from the CIP.

Topics included in project text are purpose (why), approach (how), products (what), and related projects/activities (others). A schedule is also included to show key items such as first/last implementation, as noted in Figure 1-7. Although schedules for the original NAS Plan projects in Chapter 2 cover a defined period (from 1981 through 2005), those in subsequent chapters follow a pattern where the first years (grey area) are based on a relatively firm schedule, the next five represent mid–term planning estimates, and the last five are for far–term approximations. To sustain the continual process of upgrading the NAS, schedules in Chapters 3 through 6 will roll forward one year during the CIP publication.

For those projects that are currently in the advanced planning and engineering phase where alternatives and requirements are being considered, only a single milestone "MNS Approval" is listed. As these projects mature, a complete schedule will be provided.

Additional information for mature projects includes such categories as progress/activity completed since last publication, problems resulting in delays (if the schedule slipped), and how such delays will be minimized (recovery plan). The prime and major subcontractors are listed when contracts are in effect and principal deliverables are noted in parentheses for each prime contractor. Subcontractors are indented under the prime.

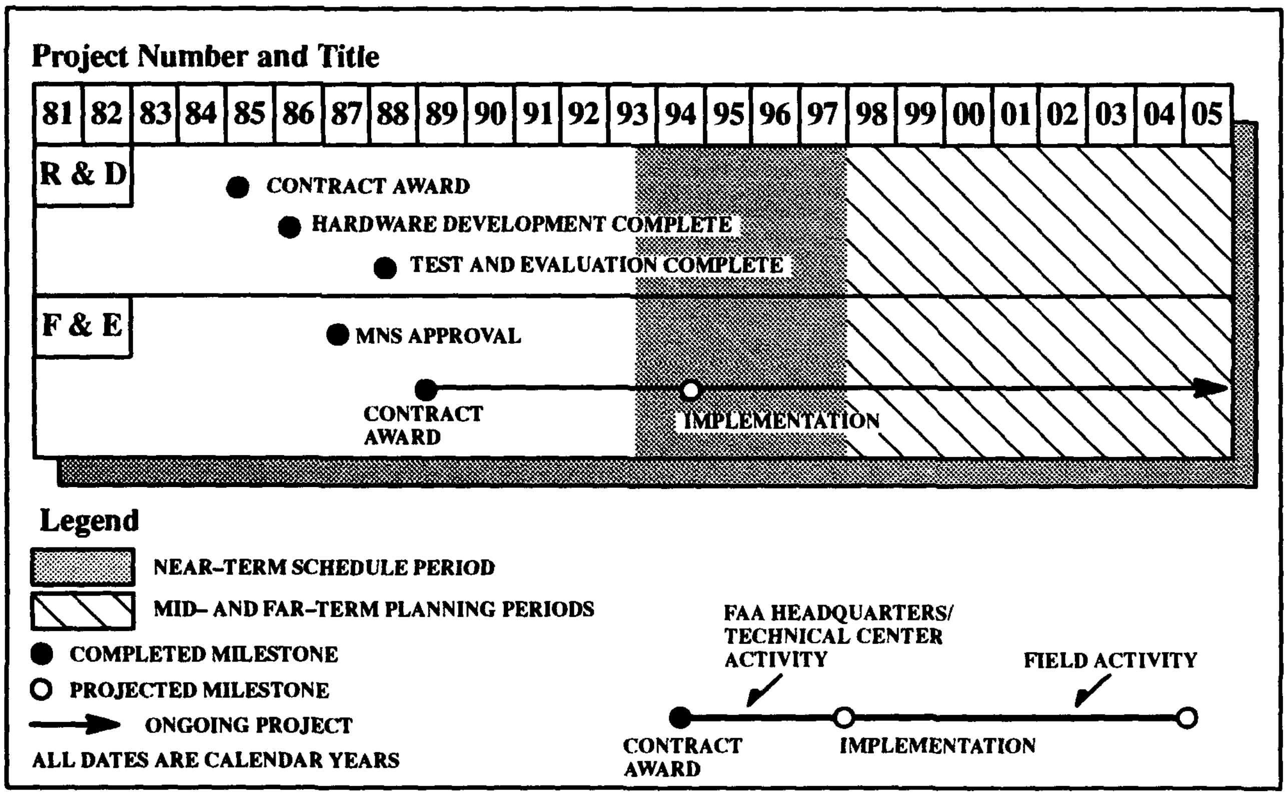
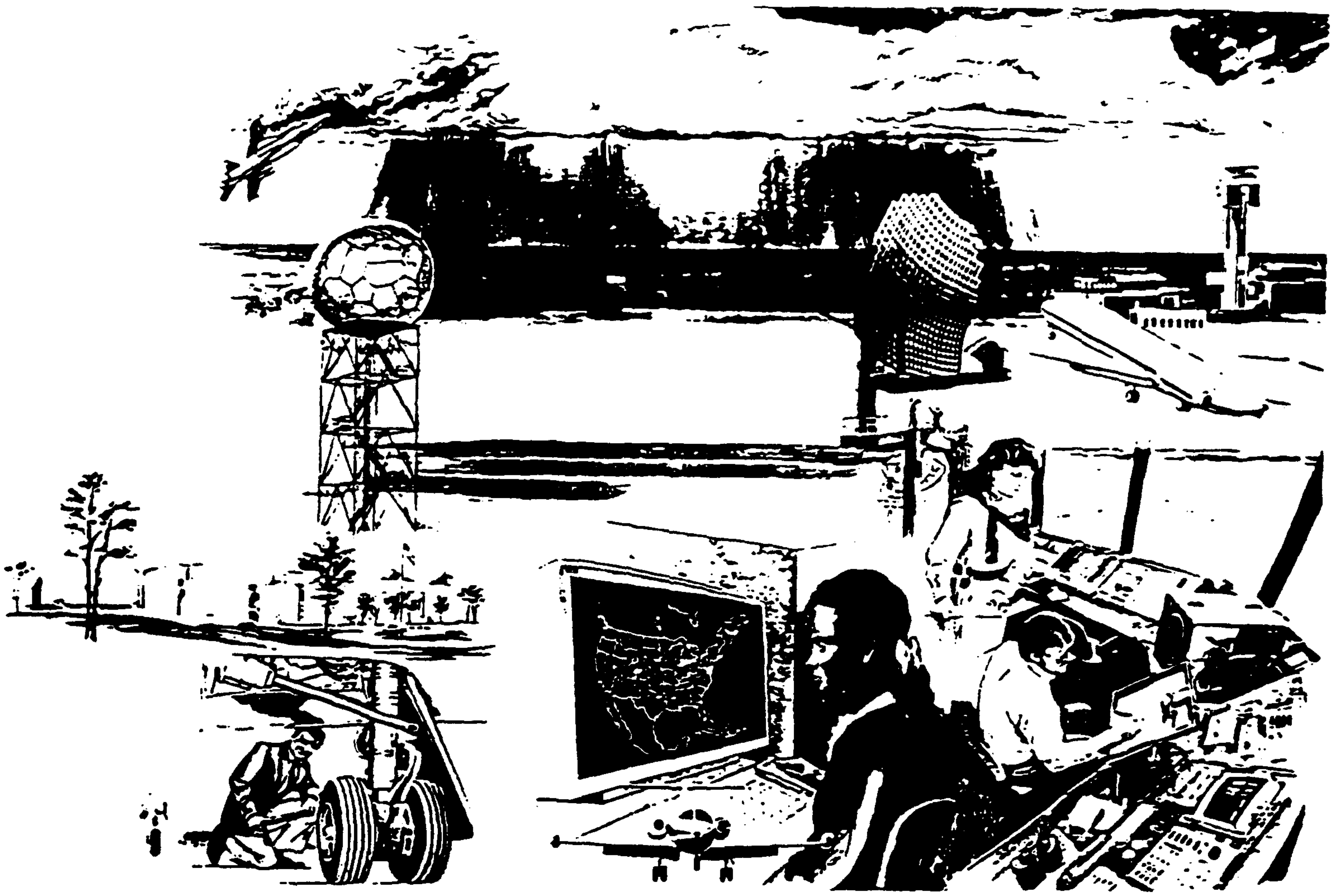


Figure 1-7. Project Schedule Description

Chapter 2: Original NAS Plan

A key goal of the Secretary of Transportation's National Transportation Policy is the completion of the NAS Plan. To meet and document this goal, the Original NAS Plan chapter presents all remaining original projects.



CHAPTER 2
ORIGINAL NAS PLAN

This chapter contains a discussion of the projects from Chapters III through VI of the original NAS Plan as they stand today. The projects are categorized according to the part of the air traffic control system that they were designed to improve. En route projects affect the control of aircraft in flight, between takeoff and landing. Terminal projects affect aircraft approaches, landings, takeoffs, and departures from airports. Flight service and weather projects provide vital information to pilots about conditions and requirements along the route the pilots will follow. Ground–to–air projects provide the facilities and equipment on the ground that support communication, navigation and landing, and surveillance of aircraft in flight. Interfacility communications projects allow FAA facilities on the ground to communicate with one another, while maintenance and operations support projects provide the facilities and equipment needed to ensure that the system is well maintained.

EN ROUTE

The en route activities include projects to support the system existing at the onset of the NAS Plan, to provide interim upgrades, and to implement automation and communication systems capable of supporting advanced functions well into the next century.

The original NAS Plan's en route modernization programs were aimed at replacing existing air traffic control computer systems with modern technology. New software is being implemented to enhance safety, increase productivity, and permit the integration of a number of functions previously performed separately. This program provides for and accommodates future enhancements which best meet the FAA's objectives and, at the same time, greatly benefit the users of the national airspace system.

The advanced automation system (AAS) will:

- Provide more reliable, safer services to the user;
- Accommodate safety enhancements as they are developed;
- Enable reduction of manpower, training, and logistics costs; and
- Be capable of providing both en route and terminal services.

The AAS is being implemented in phases to ensure early realization of benefits and to minimize risk. First, the initial sector suite system (ISSS) will replace the obsolete plan view display (PVD) systems used by en route controllers, and provide electronic flight strips. The next increment, the terminal advanced automation system (TAAS), will enable the implementation of metroplex control facilities (MCFs) with AAS–compatible equipment. Later, the area control computer complex (ACCC) will integrate ISSS and TAAS into a common hardware/software architecture. At that point, the ARTCC will provide en route services and the MCF will provide terminal services within their geographic scope of responsibility (i.e., to operate as an "area control facility" (ACF)) with a greater level of functionality than ISSS or TAAS could provide singularly. Because of operational vulnerability concerns, the present intent is to leave ARTCCs essentially as "en-route–only" facilities.

The AAS acquisition phase contract was awarded in 1988. Under the AAS concept, operations requiring centralized processing will be accomplished in the centralized computers with all remaining functions performed within the individual sector suites. The emergency and reduced capability modes of AAS operation and the sector suite processing capability will ensure that surveillance, flight, and weather data are provided with near 100 percent functional reliability. The AAS acquisition approach minimizes the adverse impact of a major technical and operational transition. Additional safety and productivity functions will be included in the new software.

A typical sector suite will consist of displays that present a plan view of the current situation such as: (1) position of aircraft and real–time weather; (2) electronic display of flight data (eliminating the need for the manual flight strip processing); and (3) the display of planning information and advanced functions such as automated en route air traffic control (AERA). Implementation of the AERA functions will further enhance safety, controller productivity, and fuel savings for the users.

The voice switching and control system (VSCS) will provide automatic switching of communications and resectoring to meet demands. Leased–line and equipment costs will be reduced and eventual integration of voice and data communications will further reduce transmission costs.

The Agency will enhance its flow control capabilities to provide more coverage and prediction features for the NAS. The goal is to couple this traffic management capability with ARTCCs/MCFs for total national flow management.

In summary, the FAA's present en route plans are designed to meet future needs for greater capacity and reliability. With higher levels of automation, present en route plans will enhance safety and improve productivity.

Six projects are underway to provide enhanced capability and growth margin. All have had production contract awards.

The oceanic display and planning system (ODAPS) is relatively short-term in nature and will provide near–term benefits to the pre–AAS system.

The conflict resolution advisory (CRA) function and traffic management system (TMS) projects provide intermediate functional improvements (completion anticipated by 1995) with enhancements to safety and traffic flow.

Long–term projects for en route operations are the AAS and the VSCS. These projects will form the backbone of the future en route/terminal automation and communications systems. The AERA project will add new automation functions to increase capacity and reduce potential delays.

TERMINAL

The three major types of facilities used today in terminal air traffic control are the airport traffic control tower (ATCT), terminal radar approach control (TRACON), and terminal radar approach control in the tower cab (TRACAB).

Located on airports, the ATCTs are the most common facilities, as well as the most visible. Controllers in ATCTs separate aircraft, sequence aircraft in the traffic pattern, expedite arrivals and departures, control ground traffic, and provide clearance and weather information to pilots.

The second most common are the TRACONs that control airspace around airports with moderate–to–high density traffic. TRACON controllers separate and sequence both arriving and departing flights. Normally each TRACON is associated with one ATCT and located within the same building. TRACONs, however, may be remotely located and may serve more than one ATCT.

The third type of facility, the TRACAB, serves a function similar to that of the TRACON.

TRACABs are located within tower cabs of airports with lower density traffic.

The radar control portion of TRACABs and TRACONs may be consolidated into MCFs.

Terminal control facility updates and enhancements in this chapter are concerned with terminal automation equipment, communications, and facilities used for terminal control. ARTS II systems provide alphanumeric display of aircraft identification for aircraft transmitting a discrete beacon code. The ARTS II systems were upgraded to provide ARTS IIA functions which include tracking, display of aircraft identification, conflict alert, minimum safe altitude warning, and data interchange with the overlying ARTCC.

ARTS III systems, already capable of performing the ARTS IIA functions described above, have been upgraded to provide the capability of operating with data from primary radar to improve the tracking function and to provide alphanumeric data display for aircraft not equipped with transponders. Additional terminal automation support already completed includes enhanced terminal conflict alert to reduce nuisance alarms, additional displays for both ARTS II and ARTS III, ARTS III memory, ARTS III support system, and assembler. ARTS IIA systems will soon be upgraded to interface with Mode S/ASR–9 equipment. Underway are activities to replace/establish bright radar indicator tower equipment (BRITE).

Communications switching systems at many terminals have been replaced with integrated communications switching systems (ICSS) (flight service and weather systems project). Future communication upgrade will be provided with the terminal voice switch replacement (TVSR).

Thirteen terminal projects have been completed, one has been withdrawn, and the remainder of the projects are well underway. All projects are scheduled for completion by 1996 with the exception of the TVSR.

FLIGHT SERVICE AND WEATHER

The flight service and weather projects were designed to upgrade the flight service operations by providing automation, and consolidation from over 300 facilities to 61 facilities. The greatly reduced number of facilities will lower the cost of operating the system. Upgraded systems to gather weather data are being provided as are the communications capabilities needed to store and disseminate the weather–related information. A communication system provides voice communications for flight service stations and ATCTs.

Six of the projects in this section have been completed. The remaining seven are expected to be completed by 1997. When complete, an automated weather capability will provide improved weather data inputs, improved dissemination of weather data, and upgraded functionality.

GROUND–TO–AIR

The ground–to–air projects include the air/ground communications, navigation systems based on air/ground signals, ground–based systems which support approach and landing, surveillance systems, and radar–based weather systems.

The major improvements described in this section upgrade ground–to–air systems to solid–state; provide for remote maintenance monitoring; and match the location of navigation, surveillance, approach and landing systems, and communications facilities with the projected demand. New and more capable systems such as the Mode S with data–link, the microwave landing system (MLS), next generation weather radar (NEXRAD), and terminal Doppler weather radar (TDWR) will be placed into operation.

Surveillance systems are undergoing the most radical changes. The addition of Mode S will provide more accurate aircraft positioning information, allow for discrete aircraft identification, and provide the framework for data–link services. Radar surveillance with Mode S or an ATC radar beacon system (ATCRBS) will be provided down to the ground at qualifying airports and down to 12,500 feet altitude above mean sea level in other areas. New airport surveillance radars (ASRs) are replacing obsolete systems that are difficult to maintain, and an expanded number of locations will have radar service. New airport surface detection equipment (ASDE) will replace the present systems and new locations will be established, providing the ground surveillance capability required at our busiest airports. New ASDE will provide controllers with more accurate and reliable information than the older models presently in use and will greatly increase the safety of aircraft ground movement.

Long–range radars, including radars currently installed at FAA/military joint–use locations, are being upgraded to solid–state by modifying existing radars and by the joint procurement of new air route surveillance radars (ARSR–4). The joint use of military radars to supplement existing coverage will be expanded.

New weather radar will provide more reliable and accurate data to aid in forecasts and detection of real–time weather phenomenon. Weather radar coverage will be provided above 10,000 feet and down to the surface at selected airports. The NEXRAD, jointly procured by the FAA and the Departments of Commerce and Defense, will provide a long-range network for Doppler weather radar products. The terminal Doppler weather radar (TDWR) will detect weather phenomena, including hazardous winds, in the terminal area.

The ground–to–air communications system is being improved and modernized by replacing old, obsolete equipment with new, solid–state equipment. Further improvement to operating cost resulted from consolidation of as many facilities as practical. This was done without loss of required service coverage. En route navigation and communication coverages will be available 2,000 feet above the terrain except where there is little air traffic. Direction finder coverage will be expanded as required, emphasizing those areas below radar coverage.

The navigation system is being improved by replacement of maintenance–intensive equipment with solid–state systems and establishment of additional systems to provide coverage where it is required and not available today. In addition to VOR and DME equipment, which is the primary navigational system, Loran–C, with approximately 100,000 users already equipped, has been expanded to provide mid–continent coverage. Loran–C monitors will support nonprecision approaches by providing calibration data and availability information.

The approach and landing systems are being modernized. Obsolete equipment will be replaced and new systems established as dictated by operational requirements. More reliable ILS components have been installed to replace obsolete components. The MLS recently completed a demonstration/evaluation program mandated by Congress to determine the economic and operational benefits. The differential global positioning system (DGPS) potential is being evaluated by a research and development (R&D) program. A decision will be made in 1995 as to deploying MLS and/or DGPS. Procurement will follow determination of favorable benefits. Runway visual range (RVR) systems are providing accurate information for pilots preparing to execute instrument flight rules (IFR) approaches. Additional visual navaids, including new types such as precision approach path indicators (PAPI), are being installed to enhance safety during visual approaches to airports. Approach lighting will provide lighting necessary for various categories of terminal operations.

Four projects have been completed, and full production contracts have been awarded for all remaining projects, except MLS. Some projects will have follow-on production awards.

INTERFACILITY COMMUNICATIONS

Interfacility communications equipment, found at nearly all FAA facilities, provides communication, transmission, switching, and monitoring and control for other NAS elements. Interfacility communication projects upgrade/establish voice and data communication connectivity between NAS facilities and sites. These projects also provide economic advantages over prior systems which were leased/single purpose links.

Transmission provides connectivity between facilities of the NAS. The transmission network consists of combinations of leased lines and FAA-owned media, such as the backbone microwave system (i.e., radio communications links (RCLs)).

The switching service adds operational flexibility between the transmission network and the user. This flexibility is used to reconfigure resources (e.g., combine sectors), reroute service in the event of failure, and reduce costs by sharing circuits among several users.

Seven of these projects have been completed and are providing both operational and economic benefits. The last project is scheduled for completion in 1996. These projects further communications efficiency, reliability, and connectivity improvements.

MAINTENANCE AND OPERATIONS

The maintenance and operations projects discussed in this section were established to provide flight inspection capability, maintenance support, emergency systems, power systems, structures, laboratories, and environmental support facilities.

Maintenance, flight inspection, and system support capabilities are being improved and modernized in support of efforts identified in the previous chapters. Modernization of maintenance and operation support systems allows the NAS to operate more efficiently, enables maximized system performance, and supports the goals of reducing staffing and energy expenditures. The changing technology and the influx of new systems and capabilities, coupled with the need to provide uninterrupted air traffic control and air navigation services, require a planned evolution of supporting capabilities and equipment.

The original maintenance program was developed to address the evolutionary change in system maintenance. It was based on the following: implementation of solid-state technology; introduction of remote monitoring, control, and certification; centralization of the workforce; improved centralized repair facilities; and decentralized training capability. The individual systems specialist will continue to be the most important link in system integrity. Maintenance automation aids, power systems, environmental systems, and structure improvements, in combination with the replacement of all obsolete technology systems, will allow for increased productivity and decreased cost.

The provision of technical support to maintain equipment is complex and may result in the use of contract maintenance. Contract maintenance is being used to support older equipment and permit FAA technicians to train in new technology. New systems are being analyzed case–by–case to determine the viability of the contractor providing maintenance on a nationwide basis as an alternative to ensuring an internal FAA capability for the system lifetime.

Instead of periodic preventive maintenance and frequent site visits, automated aids allow the FAA to monitor system performance continually from maintenance control centers (MCCs). This reduces travel requirements and cost. Also, by using remote monitoring techniques, the FAA can eliminate staffing at many facilities and consolidate maintenance personnel into a relatively small number of centralized work centers without harm to service. Onsite corrective maintenance at remote locations will be limited to replacement of the lowest replaceable units (LRUs). This will minimize both service restoration time and the requirement for costly test equipment at these locations. Due to the increased complexity of high–technology modules, LRU repair will be performed at a high–technology repair facility, which will be equipped with the necessary diagnostic and test equipment and staffed by skilled personnel.

Elimination of staffing at remote facilities depends partly on the replacement of engine generators and removal of other systems that require onsite personnel. Consolidation of additional facilities with remote monitoring, and an increasing use of contractors will allow reductions in FAA–owned housing at facilities in isolated areas.

The FAA's flight inspection program is undergoing a similar evolution. New technology, more fuel efficient aircraft, new system capabilities for automatic flight inspection, past consolidation of the workforce, and policy changes will allow the orderly transition from the old to the new with no decrease in safety and a reduction in operating costs.

The FAA's system support has been geared to support the existing systems while a full–scale effort is underway to produce the capabilities required in the future. Contracts for system engineering, integration, and technical assistance have been awarded to provide management assistance and technical support for project implementation. Contractual support has also been established to provide technical support services and materials to assist regions and centers in accomplishing implementation.

All projects are in the implementation phase, except eleven which have been completed. Many of the maintenance and operations projects depend on the completion of other projects discussed elsewhere in this chapter. Several projects require a decision on whether or not to provide remote monitoring capability. Since some systems provide significant cost benefits through remote monitoring, and others will not provide a payback, each new unit must be analyzed.

Subsequent chapters in this document address infrastructure and support needs which are complementary to the projects discussed in this section.

21–05 Oceanic Display and Planning System (ODAPS)

Purpose: ODAPS provides automation assistance for oceanic ATC. Included is an automated conflict probe which assists controllers in the timely identification and assignment of conflict–free, fuel–efficient routes and altitudes. These fuel savings are realized without adverse impact on the ATC system.

The current use of random tracks, inefficient flight data posting, and unstructured traffic flow in the oceanic flight information regions (FIR) limits aircraft use of fuel–efficient altitudes. Oceanic controllers, confronted with an increasing number of random flight tracks, are faced with increasing complexity in visualizing the spatial relationships of aircraft from data presented on flight progress strips. The maintenance of the strip and plotting board displays, and the methods for transfer of flight data are labor–intensive and antiquated. The major advancement made in the oceanic air traffic control system during the past 30 years has been the automated printing of flight progress strips.

The new system compares the planned tracks and altitudes of different aircraft and informs the controller whether the cruising altitude or route is free from potential conflicts and when transitions can be made. This function allows controllers to honor more flight profile requests and creates a safer and more efficient environment in oceanic airspace.

Approach: Provide oceanic automation systems comprised of situation displays, processors, and interfaces with other ATC systems, including ARINC high frequency (HF) data. The system will be used as the platform for further development and will operate until the advanced automation system is implemented.

Products: The ODAPS contract was awarded in 1984. Two systems have been procured for installation in the Oakland and New York ARTCCs and one system for support services at the FAA Technical Center. Hardware for these systems was delivered in 1989. The basic ODAPS software, without the conflict probe capability, has been installed at Oakland and became operational in 1989. Enhancements to the Oakland software were implemented in late 1991. The enhancements include improvements of conflict probe display function and many improvements to the computer/human interface design. Additional enhancements are completing development and will be implemented at Oakland and New York.

Progress/Activity from December 1991:

- Initial operational capability achieved at New York.

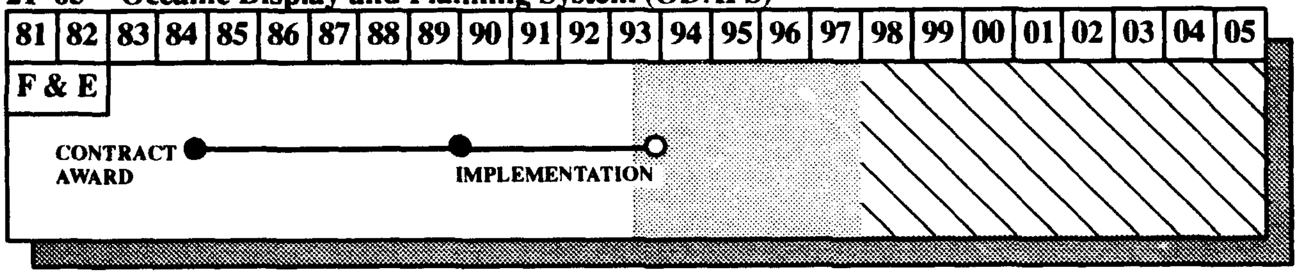
Related Projects/Activities:

- 21–12 AAS includes requirements for oceanic automation.
- 35–07 NADIN II Continuation provides specific communication services.
- 61–22 ATC Applications of ADS and 61-23 OAP.
- Research, Engineering and Development (R,E&D) Plan project 021–150 ATC Applications of ADS.

List of Contractors:

- ST Systems Corporation (STX)
  (three ODAPS)
  Vienna, Virginia
  - IBM Corporation
    Rockville, Maryland

21–05 Oceanic Display and Planning System (ODAPS)



21–06 Traffic Management System (TMS)

Purpose: This project upgrades the present flow control system into an integrated TMS which operates at the national level through the air traffic control system command center (ATCSCC) at FAA headquarters and at the local level through traffic management units (TMUs) in each ARTCC and designated terminals. The upgrading of the TMS improves air traffic system efficiency, minimizes delays, expands services, and is more responsive to user requirements. The TMS functions include: central altitude reservation function (CARF); airport reservation function (ARF); emergency operations facility (EOF); central flow weather service unit (CFWSU); various flow management programs with integrated en route metering (ERM) functions, such as the departure sequencing program (DSP), en route spacing program (ESP), arrival sequencing program (ASP), and the hardware and software necessary to support them.

Approach: The present flow control and altitude reservation system will use a multistep approach. Phase I provided the following enhancements:

- Replacement of central flow control facility (CFCF) 9020A computer system at Jacksonville, Florida, with the 4341 traffic management control computer (TMCC) at the FAA Technical Center.

- Implementation of a data communications system to interface users and Host computers at each ARTCC in a two–way data mode interfacility flow control network (IFCN).

To date Phase II has provided the following enhancements to the TMS:

- Enhanced traffic management system (ETMS) – a modern multiprocessing computer system network which implements the aircraft situation display (ASD) and monitor and alert (MA) functions developed by the advanced traffic management system (ATMS) research and development program.

- TMU automation – new computer and terminal systems with color graphic workstations in the ATCSCC, TMUs, and the FAA Technical Center which interface to the TMCC, the Host computers, and the ETMS computer complex (ETMCC) to provide enhanced information displays and near real–time flight data.

- Initial ERM enhancements to the Host computer.

The continuing Phase II activities are focused on:

- Replacing the TMCC.

- Implementing the MA functions in all en route centers and selected TRACONs.

- Completing implementation of ERM functions.

Products: The TMS provides integrated hardware and software that is highly responsive to existing and projected traffic management situations. It also assists traffic management personnel in evaluating the impact of various alternatives which may be employed for resolving traffic management conflicts.

Progress/Activity from December 1991:

- Established TMUs at Atlanta and Miami TRACONs.

- Decommissioned 4341 TMCC at the FAA Technical Center.

- Rehosted the flight schedule data base in ETMS.

Related Projects/Activities:

- 21–12 AAS will incrementally replace the ARTCC and tower hardware and software being used by the TMUs and will provide improved capabilities. The non–AAS TMS functions (e.g., ATCSCC capabilities) will interface with the AAS to obtain the data needed to support those functions.

- 21–13 AERA is developing controller automation which considers flow management information and will provide information of use to the TMS.

- 23–01 FSAS.

- 23–02 CWP. Weather products will be provided by the center weather service units (CWSUs) via the meteorologist weather processor (MWP) and the central flow meteorologist weather processor (CFMWP) to stand–alone monitors in the TMUs and ATCSCC to support the TMS.

- 23–04 WMSC Replacement will exchange weather products with the traffic management processor.

- 41–21 En Route Software Development, 42–20 Tower Integration Program, 43-02 MWP II, and 45–02 DMN Continuation are related projects.

- 45–21 Satellite Communication Circuits System may support ETMS data transmission needs.

- 61-23 OAP and 62–20 TATCA are related projects.

- 62–21 ASTA is developing airport surveillance and automation techniques that will provide information of use to TMS.

- Data–link services will be able to provide data directly from aircraft to support TMS functions.

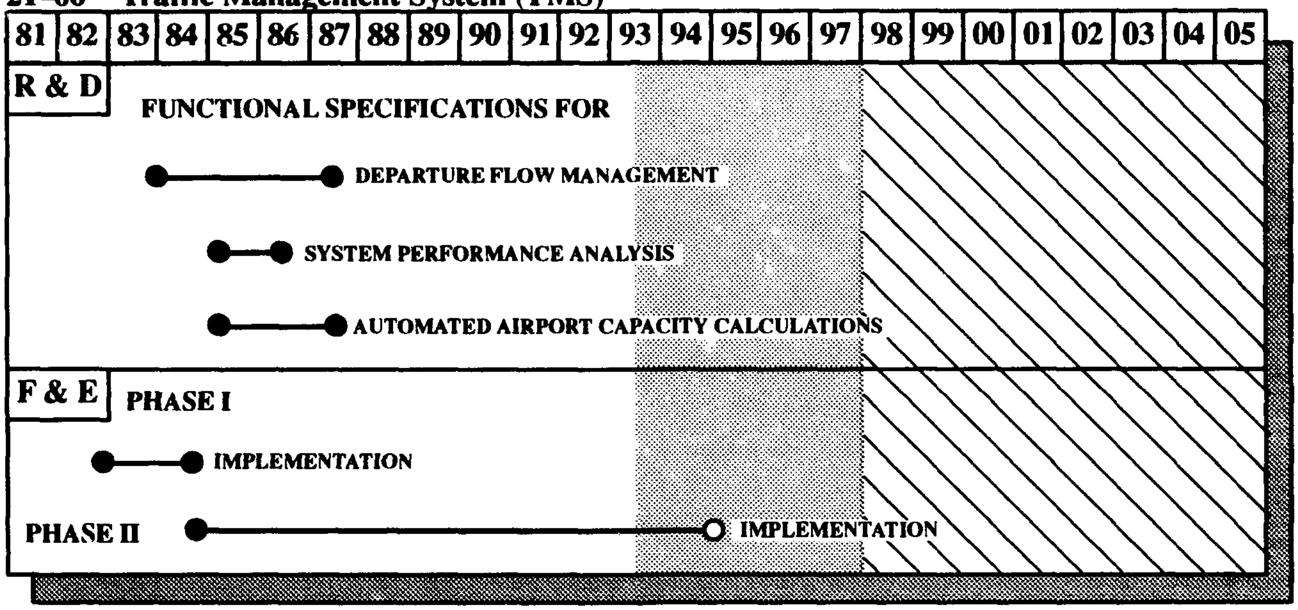
- R,E&D projects 021–180 TATCA, 022–150 Flight Operations and Air Traffic Management Integration, 025–120 Operational Traffic Flow Planning, and 031–130 NAS

Telecommunications for the 21st Century are related projects.

List of Contractors:

- NYMA, Incorporated
  (system integration/software)
  Greenbelt, Maryland
  - Computer Sciences Corporation
    Pomona, New Jersey
- MITRE Corporation
  (requirements and system engineering)
  McLean, Virginia
- Volpe National Transportation Systems Center
  (software and ETMCC support)
  Cambridge, Massachusetts
- Contel Federal Systems
  (telecommunications networking)
  Chantilly, Virginia

21–06 Traffic Management System (TMS)



21–09 Conflict Resolution Advisory (CRA) Function

Purpose: This project will provide automated assistance to en route radar controllers in resolving potential violations of minimum separation standards. The conflict resolution advisory function will provide the radar controller with a display of the optimum resolution to potential conflicts which have been detected by the conflict alert (CA) and Mode C intruder functions. The prime objective of conflict resolution advisories is to assist the radar controller in resolving potential conflicts. This results in reducing the number of operational errors.

Approach: Using functional specifications, a support contractor has designed, programmed, and tested a prototype to incorporate the conflict resolution advisory function into the operational en route computer program. The prototype demonstrated the feasibility of CRA. The operational program is now being developed based on the data obtained from the prototype effort. A contract to cover system design and software development was awarded in 1989. Implementation of the operational CRA program is planned for the A4e1.3 Host software release.

Products: One computer program adaptable for use at 20 Host-equipped ARTCCs.

Progress/Activity from December 1991:

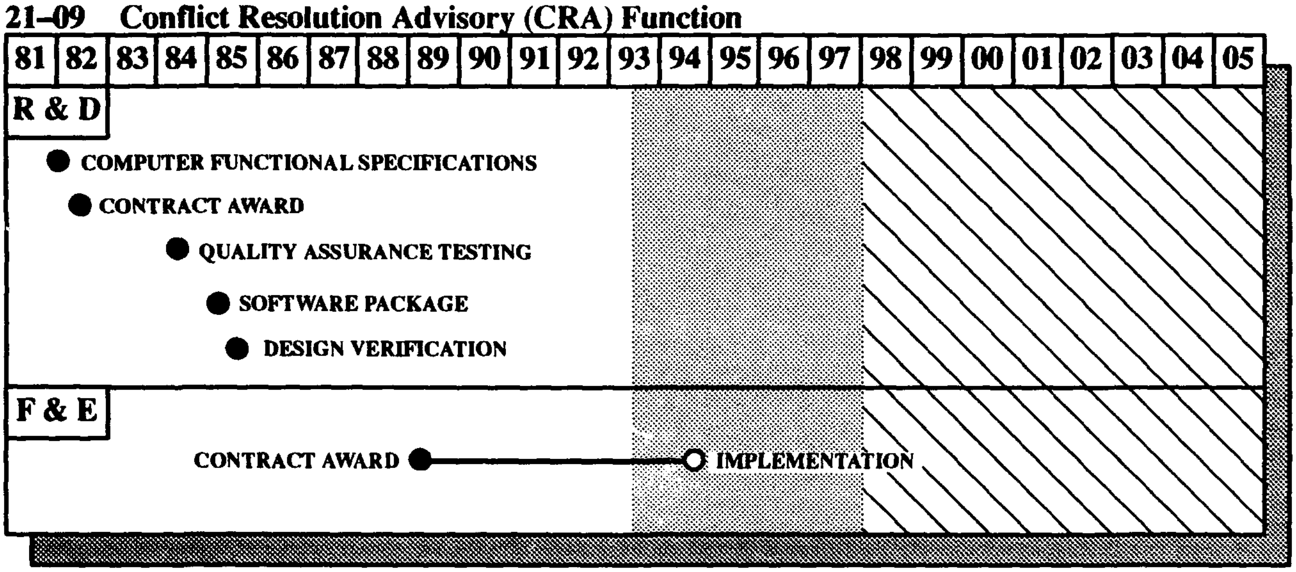
- Implementation of the operational CRA program is being reviewed for Host software release A4e1.3.
- CRA has completed development efforts and has entered operational testing and system integration.

Related Projects/Activities: Conflict alert/Mode C intruder functions to be implemented in the A4e0.4 Host software release are prerequisites for CRA implementation. CRA implementation is a transitional step toward a similar function in 21-12 AAS. 41-21 En Route Software Development is a related project.

List of Contractors:

- Computer Sciences Corporation
  (system design/software)
  Silver Spring, Maryland

21-09 Conflict Resolution Advisory (CRA) Function



21-11 Voice Switching and Control System (VSCS)

Purpose: This project will provide a voice communications system which performs the intercom, interphone, and air/ground voice connectivity and control functions needed for air traffic control operations in an ARTCC/ACF/MCF. The VSCS must satisfy the voice communications reconfiguration, service, quality, and availability needs of the ARTCC/ACF/MCF users. Also, the VSCS will reduce leased costs, increase modularity and growth capability, and increase controller productivity over current VSCS–type services.

Approach: The VSCS will use current technology adapted to meet FAA requirements. Two competing prototype systems were produced and evaluated prior to awarding a contract for the production systems. The winning system was upgraded to production specifications and will remain at the FAA Technical Center. The VSCS contractor will design position equipment compatible with the computer/human interface used today in ARTCCs and TRACONs. The VSCS position equipment will also be compatible with the computer/human interface of the initial sector suite system. The AAS contractor will position the voice communications equipment and display devices in common consoles to best fit the total computer/human interface and console design. An interface is required with the AAS for reconfiguration and status reporting purposes. A set of predetermined reconfiguration maps will be embedded in the VSCS. Capability to modify or create new reconfiguration maps from designated VSCS positions shall be provided. The AAS will be able to direct VSCS reconfigurations.

In FY 1984, VSCS operational requirements were finalized. The VSCS prototype systems contracts were awarded in early FY 1987. A production contract was awarded in FY 1992.

After being upgraded to production specifications, the prototype equipment will be integrated and tested prior to commencing field deliveries. VSCS will be implemented in the existing ARTCC consoles prior to implementation of the initial sector suite system (ISSS).

Products:

- One system per ACF and MCF.
- One system for the FAA Technical Center and one for the FAA Academy.

Progress/Activity from December 1991:

- Production contract awarded.
- Formal prototype testing and controller testing completed.
- Formal prototype upgrade testing and operational test and evaluation commenced.

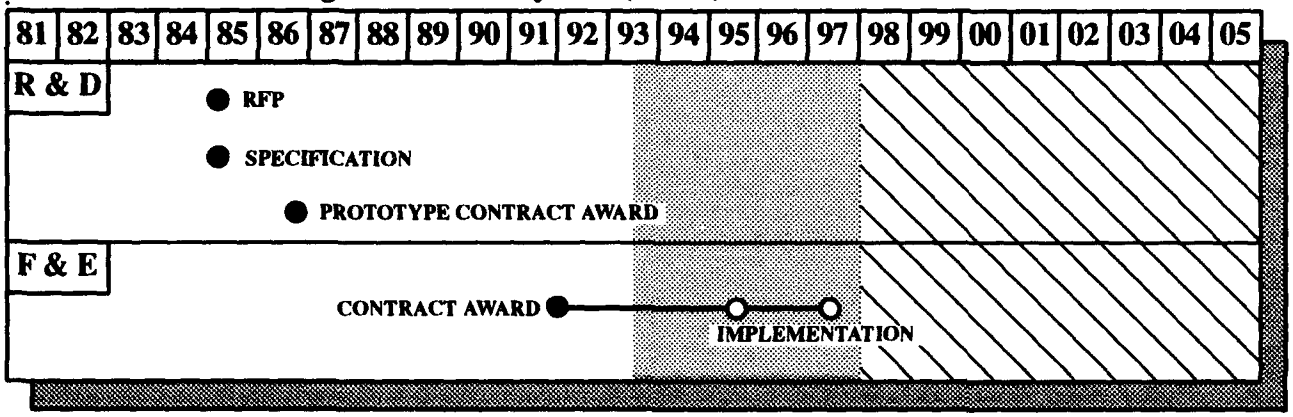
Related Projects/Activities:

- 21–12 AAS interfaces with the VSCS for configuration status and control data. VSCS must be available and installed in existing ARTCC consoles prior to the ISSS implementation.
- 22–11 Multichannel Voice Recorders will store VSCS traffic.
- 25–08 RCE performs the radio channel signaling and control functions to support ground/air voice communications.
- 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–22 Dallas/Fort Worth Metroplex, 32–24 Chicago Metroplex, 32–26 Southern California Metroplex, 32–34 Potomac Metroplex, 32–36 Northern California Metroplex, 32–38 Atlanta Metroplex, 32–40 Central Florida Metroplex, 32–42 New York Metroplex, 32–44 Advanced Facility Planning, 34–23 Communications Facilities Expansion, 44–05 Backup BUEC Replacement, and 45–20 Critical Telecommunications Support.
- This project will require interfacility communications service from the NAS interfacility communications system (NICS).

List of Contractors:

- Harris Corporation
  (25 production units)
  Melbourne, Florida
  - Magnavox
    Fort Wayne, Indiana
  - Tandem Computers, Incorporated
    Cupertino, California

21–11 Voice Switching and Control System (VSCS)



21–12 Advanced Automation System (AAS)

Purpose: The AAS will provide a new automation system that includes improved controller work stations, computer software, and processors. The AAS will provide: the capacity to handle the projected traffic load and the capability to perform the new functions to be introduced into ATC into the 21st century; increased productivity through introduction of new sector suites; a high degree of reliability and availability; and the capability for enhancement to perform other functions subsequently introduced into the system.

Approach: The AAS was designed through a top down, evolutionary, total system approach that began with the Host computer development and deployment. Controller sector suites will consist of common consoles used for both en route and terminal functions. They will incorporate an improved computer/human interface, including the use of color displays and electronic presentation of flight data to enhance controller productivity. The AAS will develop fully compatible equipment for en route and terminal operations in the area control facilities (ACFs) and the metroplex control facilities (MCFs).

The transition to AAS will consist of five steps. In step one, implementation of the peripheral adapter module replacement item (PAMRI) has been completed prior to initial sector suite system (ISSS) equipment delivery. The PAMRI includes replacement of the PAM, data receiving group (DRG), random access plan position indicator (RAPPI), and radar multiplexer (RMUX) equipment. This provides an interface with additional radars, and provides higher data transmission rates for radar site interfaces. PAMRI will provide sufficient redundancy to support ISSS transition and simultaneously support full ATC operations.

In the second step, the ISSS and the coded time source (CTS) will be installed in en route facilities served by the Host computers. Installation requires a sterile environment previously provided by the expansion of ARTCC buildings to accommodate the Host computer. After transition to the ISSS, the old control room will be refurbished to accommodate additional sector suites.

The third step will be implementation of the terminal advanced automation system (TAAS) for TRACON functions. The TAAS system will be deployed to the MCFs.

The fourth step will be the installation of tower control computer complexes (TCCCs) in selected airport traffic control towers. TCCCs will be installed over an extended period, and will be accomplished in two phases.

The fifth step in the evolution to full AAS is the addition of the area control computer complex (ACCC) hardware and software to perform en route, weather graphics, and new interface functions in ACFs, and provide functional upgrades in the MCFs.

The ACCC step is being replanned to develop it incrementally into four implementation packages. These packages include capabilities which are already part of the AAS project in addition to some functions that are part of 21–13 AERA. The incremental capabilities of each package are:

- Capabilities of the Host computer system – replacing the Host hardware and software with new AAS computers and software.
- Introductory AERA services, consisting of AERA 1 functions with AERA 2, excluding automated problem resolution.
- Full AERA services including automated problem resolution plus some currently defined traffic management functions.
- Remainder of traffic management functions, real–time weather processor graphics, and integration of ATC automation functions such as data-link.

An incremental production commitment for each of the above steps will be made only upon completion of FAA acceptance and operational suitability tests at the FAA Technical Center.

Products: The AAS project includes construction and site preparation that is required for the implementation of the AAS at ACFs and MCFs.

- AAS design.
- AAS software for terminal and en route ATC operations.
- AAS computer hardware.
- ISSS (20 CONUS ARTCCs).
- TAAS (up to 9 MCFs).
- ACCC (22 ACFs and functional upgrades at 9 MCFs).
- TCCC (up to 150 towers).
- Support systems at the FAATC and the FAAAC.

Progress/Activity from December 1991:

- PAMRI delivered and commissioned at all sites.
- Continued ISSS software development.
- Replanned ACCC software deliveries to the field.
- Planned the integration of AERA into ACCC software releases.

- Completed ACCC CDR conference for Release 1.

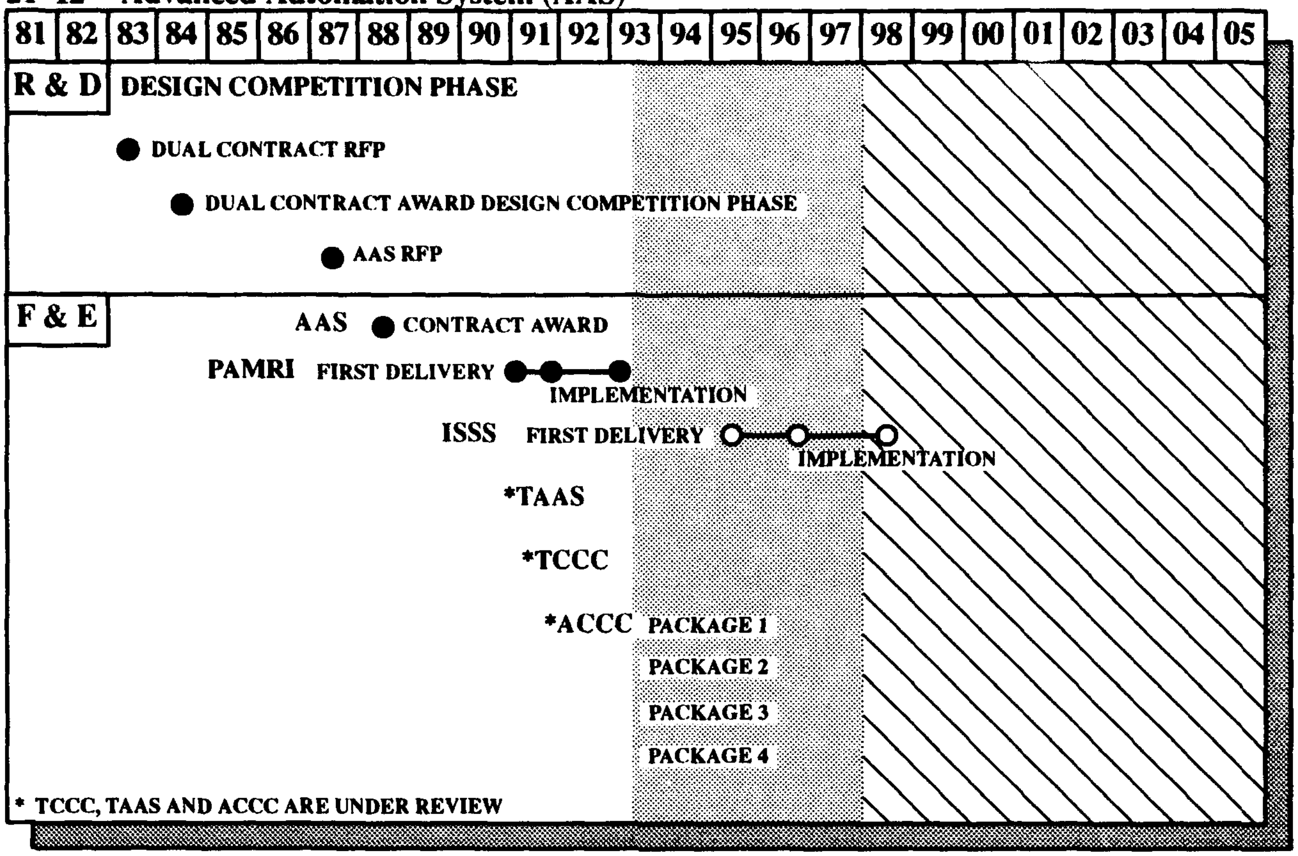
- Refined requirements for phased TCCC development.

Related Projects/Activities: 21-05 ODAPS, 21–06 TMS, and 21–09 CRA Function are related projects. 21–11 VSCS will provide the voice switching and communications necessary for AAS implementation. The AAS en route software will include 21–13 AERA functions. Past development projects provided input to the sector suite and TCCC position console designs. 23–01 FSAS, 23–02 CWP. Data will be processed through 23–05 ADL DLP to appropriate aircraft. 23–12 LLWAS, 24–08 RVR, 24–12 Mode S, 24–15 LRR, 24–18 TDWR. This project will require interfacility communications service from NICS. 26–01 RMMS, 26–09 ARTCC Plant Modernization, 32-12 ETVS, 32–21 New Airport Facilities, Denver Colorado and Denver Metroplex, 32–22 Dallas/Fort Worth Metroplex, 32–24 Chicago Metroplex, 32–26 Southern California Metroplex, 32–27 DOD/FAA ATC Facility Transfer/Modernization, 32–34 Potomac Metroplex, 32–36 Northern California Metroplex, 32–38 Atlanta Metroplex, 32–40 Central Florida Metroplex, 32–42 New York Metroplex, 32–44 Advanced Facility Planning, 34–08 RVR Establishment, 34–13 Terminal Radar Digitizing, Replacement, and Establishment, 34–20 Surveillance System Enhancements, 35-07 NADIN II Continuation, 36–20 ARTCC/ ACF Support Space, 42–20 Tower Integration Program, 43–12 Upgrade LLWAS to Expanded Network Configuration, 44–29 RVR Replacement, 45–06 RCL Backbone RCR, 46–09 Sustain ARTCC/ACF Facilities, 56–29 Onsite Simulation–Based Training Systems, 61-22 ATC Applications of ADS, 61-23 OAP, 62-20 TATCA, 62–25 Future TRACON Automation System, and 63-05 ADL Communications and Applications are related projects. R,E&D Plan projects 021–160 ATC Automation Bridge, 021–180 TATCA, 021–210 TIDS, 041–110 Aviation Weather Analysis and Forecasting, and 082–110 ATC Human Factors.

List of Contractors:

- International Business Machines
  (AAS hardware and software)
  Rockville, Maryland
  - Computer Sciences Corporation
    Silver Spring, Maryland
  - Raytheon Corporation
    Marlboro, Massachusetts
  - Formation, Incorporated
    Mount Laurel, New Jersey

21–12 Advanced Automation System (AAS)



21–13 Automated En Route Air Traffic Control (AERA)

Purpose: This project will provide interactive software for use by the area control facility (ACF) to plan and monitor the 4-dimensional flow of air traffic. Specifically, AERA will: (1) permit most aircraft on IFR flight plans to fly fuel–efficient profiles, (2) increase safety of the system by reducing the potential for operational errors, (3) increase system capacity by integrating en route metering with local and national flow control, and (4) increase controller productivity by increasing the number of aircraft and volume of airspace that a control team can safely manage.

Approach: Development will support:

- Flight plan conflict probe which will predict potential violations of separation standards between aircraft and between aircraft and special use (e.g., restricted) airspace.
- Sector workload analysis which will calculate and display personnel workload measures to supervisors and specialists to assist them in balancing sector staffing levels.
- Trial flight plan function which will allow controllers to evaluate alternative clearances prior to issuing them to aircraft.

- Automated reconformance which will adjust the automation's calculated trajectory to reflect the aircraft's actual flight path and notify the controller of each adjustment to maintain system safety.

- Automated replan which will aid the controller in granting conflict–free user requests at the earliest possible time.

Approximately one year after the implementation of introductory AERA services (IAS), the remaining full AERA services capabilities (originally part of AERA 2) will be implemented. These extend IAS from detecting potential conflicts to providing the controller with suggested resolutions. The automation–generated resolutions will avoid the predicted conflict, not cause additional conflicts, and minimize the deviation from the aircraft's preferred route.

Each AERA development package will undergo a series of rigorous engineering and validation steps consisting of algorithmic development, operational suitability evaluations, computer performance functional specification generation, software design and development, and comprehensive operational test and evaluation.

Products:

- Prototyping computer/human interface for IAS.

Progress/Activity from December 1991:

- Work was started on updating the operational description for the full AERA services to reflect the revised implementation approach. No design work on full AERA services was authorized for FY 1993, pending completion of an FAA review of its overall automation program.

- AAS specifications were revised to reflect the approach to full AERA services implementation.

- AERA design activities under the revised implementation approach continued. Algorithmic and computer/human interface risk reduction demonstrations were conducted.

- Analysis of the extensibility of the detailed ACCC design to IAS was completed. Preliminary extensibility analysis to FAS was also completed.

- An FAA update of strategic plans for its automation programs is in progress. AERA development and integration plans are being reviewed as part of that activity.

- Work on AERA 3 system definition was completed in FY 1992. Further work on AERA 3 has been stopped due to FAA program priorities.

Related Projects/Activities:

- AERA will provide key en route traffic conditions and prediction data to 21–06 TMS. The upgraded traffic management system will be integrated with AERA to keep both short– and long–term traffic planning coordinated.

- 21–12 AAS (ACCC step) has been replanned to include IAS and FAS incremental development.

- Weather products provided by 23–02 CWP will be used by AERA. More accurate wind data will improve AERA performance.

- 23–05 Aeronautical Data–link, interfaced through AAS, will provide automated controller/pilot data and advisory interchange.

- 62–20 TATCA, 62–21 ASTA, and 63–05 ADL Communications and Applications are related projects.

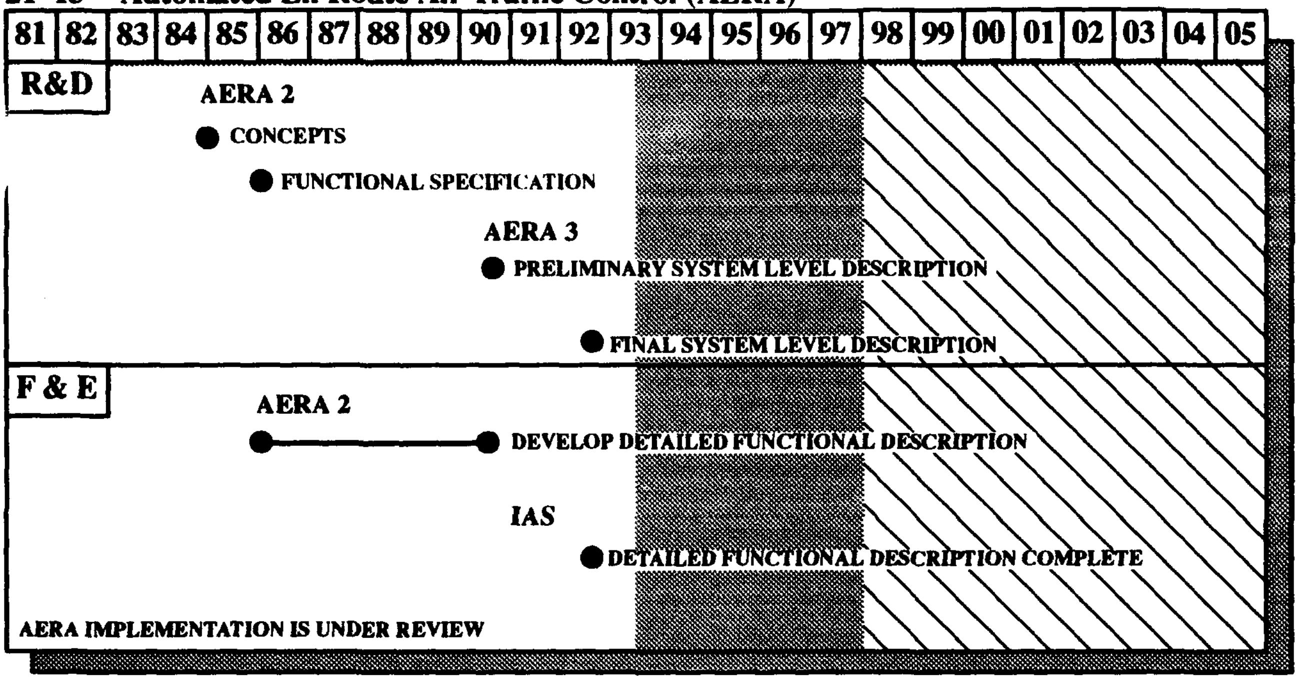
- R,E&D Plan projects 021–180 TATCA, 021–190 ASTA, 022–150 Flight Operations and Air Traffic Management Integration, and 031–130 NAS Telecommunications for the 21st Century.

List of Contractors:

- MITRE Corporation
  (software specification)
  McLean, Virginia

- International Business Machines
  (production software)
  Rockville, Maryland

21–13 Automated En Route Air Traffic Control (AERA)



22–09 ARTS IIA Interface with Mode S/ASR–9

Purpose: This project develops the hardware and software that will allow the ARTS IIA to receive and process digital data from terminal sites equipped with Mode S/ASR–9 surveillance equipment. This interface will allow the ARTS IIA to operate with common digitizer (CD) formatted radar data but will not use the Mode S capability for discrete addressing or data–link communications.

Approach: Develop, test, evaluate, and implement hardware and software modifications so that those ARTS IIAs operating with Mode S/ASR–9 can receive CD–type messages and reformat the data to provide the ATC display required for ARTS operation.

Products: One interface board and upgraded software package for each ARTS IIA site which will interface with Mode S/ASR–9 facilities (75 total: 67 sites plus 8 support systems).

Progress/Activity from December 1991:

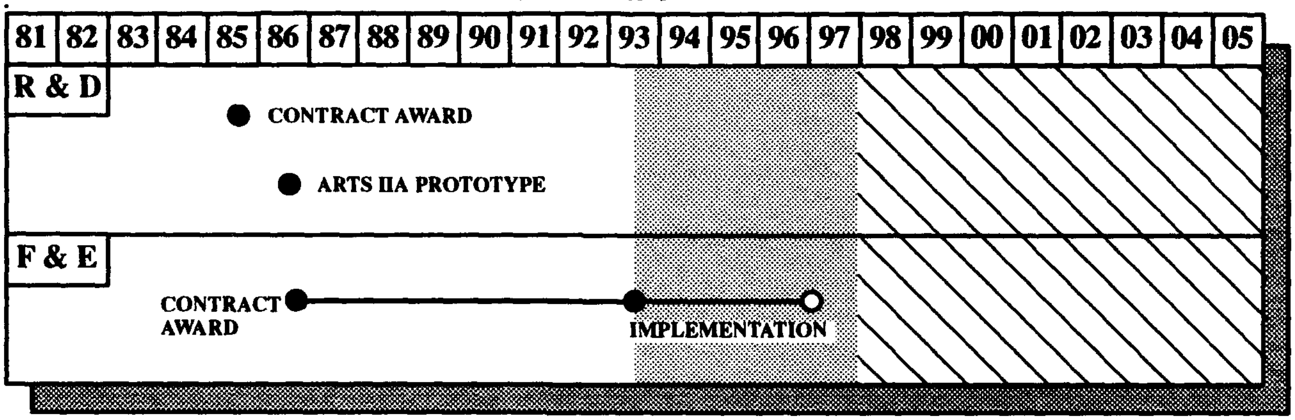
- Acceptance testing successfully completed at the Technical Center for the last iteration software build.
- Key site testing completed successfully at Madison, Wisconsin.

Related Projects/Activities: 24–12 Mode S and 24–13 ASR–9 are to be interfaced to ARTS IIA. Interfacility communications will be provided by NICS.

List of Contractors:

- Unisys Corporation Electronic and Information Systems Group
  (75 interface kits)
  Paoli, Pennsylvania

22–09 ARTS IIA Interface with Mode S/ASR–9



22–11 Multichannel Voice Recorders

Purpose: Multichannel voice recorders record all voice communications between air traffic controllers and pilots. The high–capacity 152–channel recorders presently in use at the ARTCCs do not have sufficient capacity to support the ACF operation. In addition, they are experiencing supply/support problems because their production has been discontinued by the manufacturer.

Approach: 10– and 20– channel recorders were used for replacement of the remaining 5– and 9–channel equipment and for establishment, relocation, and modernization of ATCTs as necessary. Additionally, certain FSSs and AFSSs received the 10– and 20–channel recorder units. High–capacity (60–channel units) recorder systems are being procured for the ARTCCs/ACFs, selected TRACONs, and training/test facilities.

Products:

- 258 10– and 20–channel units for replacement of existing 5– and 9–channel units at ATCTs and FSSs (now complete).
- 150 10– and 20–channel units for new establishments, relocations, and FAA Logistics Center spares (now complete).
- 210 high–capacity units for ARTCCs/ACFs, TRACONs, and training/test facilities.

Progress/Activity from December 1991:

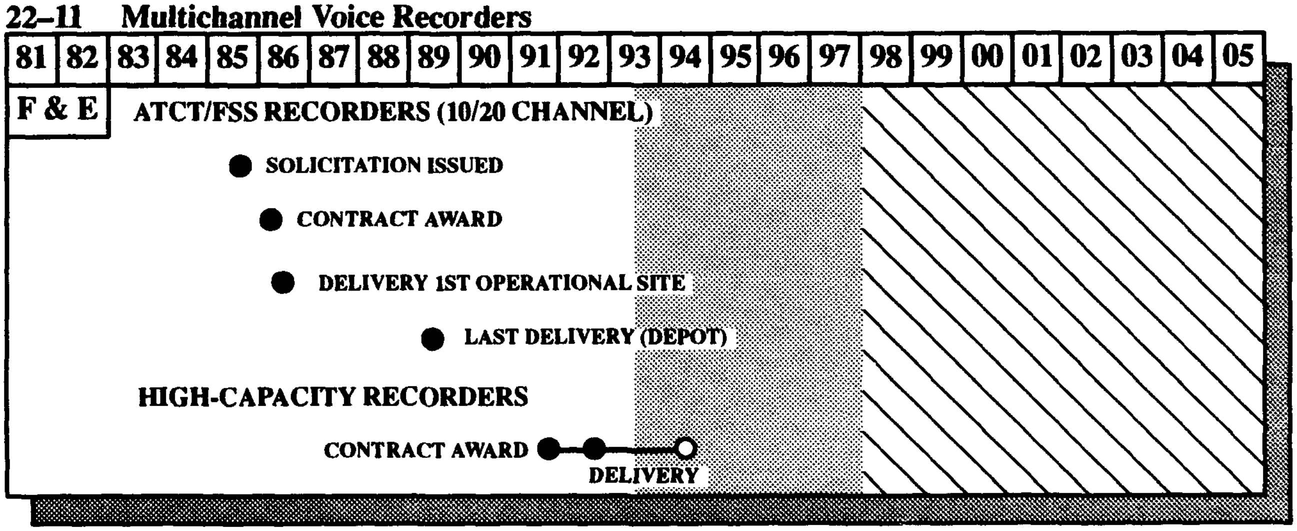
- High-capacity equipment was delivered to all test and training facilities, and to four ARTCC sites.

Related Projects/Activities: All voice communications switching systems at air traffic control facilities such as 21–11 VSCS and 23–13 ICSS will require recording equipment.

List of Contractors:

- Dictaphone
  (408 10–/20–channel units)
  Melbourne, Florida
- Magnasync/Moviola Corporation
  (high capacity recorders)
  Hollywood, California

22–11 Multichannel Voice Recorders



22–12 Terminal Voice Switch Replacement (TVSR)

Purpose: This project was formerly identified as the tower communications system (TCS) project. After a reassessment of the requirements for terminal voice switches, the scope of this project has been redefined.

This project will provide modern voice switching equipment to replace outdated and unsupportable voice switches in air traffic control terminals as the equipment reaches the end of its useful economic life.

Approach: To replace the remaining leased electromechanical switches in the FAA inventory, two procurements are in process. One procurement, identified as integrated communications switching system (ICSS) Phase IB will be used to replace electromechanical switches in TRACON facilities and in ATCTs which require more than four operational positions. A second procurement for small tower voice switches (STVSs) will be used to replace electromechanical switches in small visual flight rules (VFR) ATCTs. These procurements will replace all leased electromechanical switches.

Products: In the near– and mid–term, approximately 247 voice switches will be procured and installed in ATCTs and TRACONs to replace leased electromechanical switches.

Progress/Activity from December 1991:

- Master Test Plan approved for STVS.
- Proposal evaluation completed for ICSS Phase IB and contract awarded.
- Program Implementation Plan approved for STVS and ICSS Phase IB.

Related Projects/Activities:

- 23–13 ICSS. Switches procured through TVSR will replace ICSS ATCT terminal switches.
- 25–08 RCE, 32–12 ETVS, 32–13 ATCT Establishment, 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 34–23 Communications Facilities Expansion, 42–13 ATCT/TRACON Modernization, 42–14 ATCT/TRACON Replacement, 42–20 Tower Integration Program, 43–03 Provide FSAS PCS, 43-21 ODMS, 45–20 Critical Telecommunications Support, and 62–25 Future TRACON Automation System.

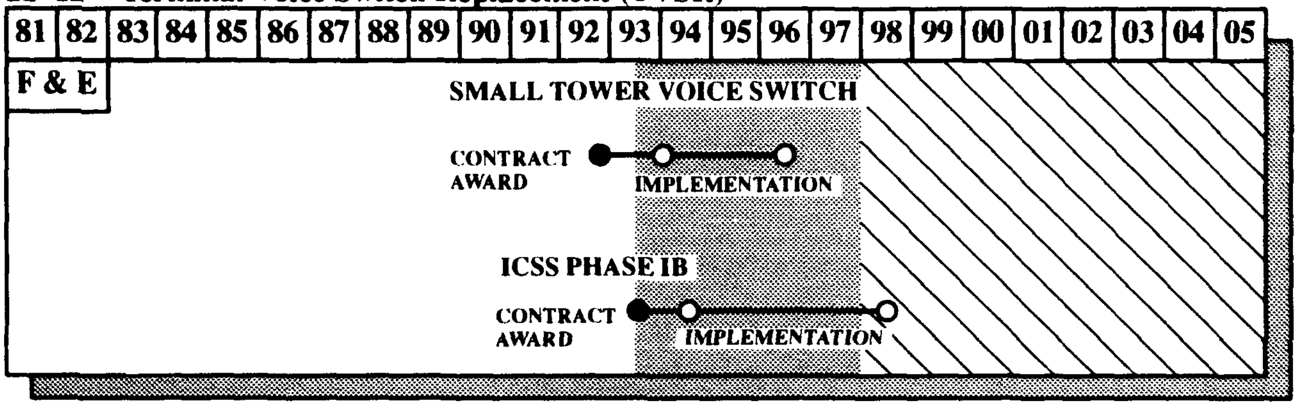
Problems Resulting in Delays: Multiple protests were filed regarding the competitive range decision.

Delays Minimized by: ICSS Phase IB evaluation schedules were revised.

List of Contractors:

- Denro
  (STVS)
  Rockville, Maryland
- Westinghouse Electric
  (ICSS equipment for large ATC terminal facilities)
  Baltimore, Maryland

22–12 Terminal Voice Switch Replacement (TVSR)



22–16 Bright Radar Indicator Tower Equipment (BRITE)

Purpose: This project replaces the BRITE systems which have been in the field since 1967, as they do not provide reliable service with digital scan converter (DBRITE) systems. It will also provide alphanumeric display systems for satellite ATCTs that presently do not have radar. Digital scan converter systems are inherently much more stable and reliable than the plan position indicator (PPI)/TV camera converters in use today. This will result in a maintenance workload reduction of approximately 90 percent.

Approach: DBRITE systems will be procured which take advantage of digital scan converter technology. This project will replace all BRITE and bright alphanumeric and numeric generator conversion equipment with digital (DBRITE) systems. The new system is also being installed at qualifying satellite towers providing radar and automation system display and interface capabilities. This project was initiated as a joint FAA/DOD procurement, with the USAF as the procuring Agency. The FAA assumed contract and program responsibility for close out of the program in 1992, and the FAA will provide life-cycle logistics support for all FAA/DOD DBRITE systems.

Remoting service to provide DBRITE information at 40 satellite towers will be obtained using the most effective and cost–beneficial means. Present alternatives include television microwave links (TMLs) and analog fiber optic communications. Cost–benefit studies will be performed on a site–by–site basis in selecting the most appropriate means.

Products:

- Replace BRITE I/II/IV — 347 systems
- Establish ASR/ATCT — 9 systems
- Establish satellite ATCTs — 40 systems
- System support — 5 systems

Related Projects/Activities: 32–04 Provide ARTS IIIE Upgrades for Selected AT Facilities, 32–16 Establish/Expand DBRITE, 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–22 Dallas/Fort Worth Metroplex, 32–24 Chicago Metroplex, and 32–26 Southern California Metroplex.

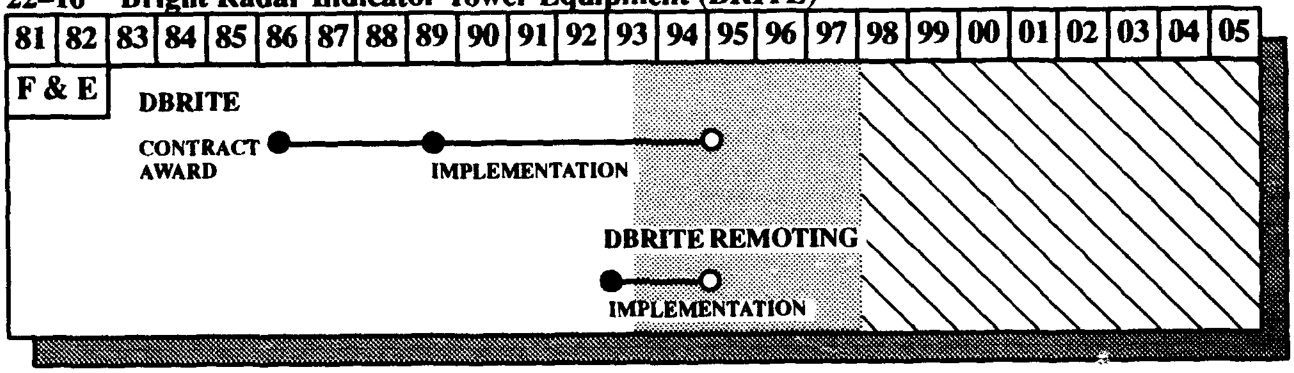
Progress/Activity from December 1991:

- All DBRITE systems have been delivered to the sites.
- Production of DBRITE spares has been initiated.

List of Contractors:

- Unisys Corporation Electronic and Information Systems Group (401 FAA systems and approximately 150 separately funded DOD systems)
  Paoli, Pennsylvania
  - Orwin Associates Incorporated
    Amityville, New York
  - Capital Switch, Incorporated
    Bethel, Connecticut
- Communications International, Incorporated (40 TML systems)
  Norcross, Georgia

22–16 Bright Radar Indicator Tower Equipment (BRITE)



23–01 Flight Service Automation System (FSAS)

Purpose: This project improves pilot access to weather information and NOTAMs, simplifies flight plan filing, and provides a flight service automation system that can handle projected increases in demand for flight services without *proportional increases in staff.*

Approach: The development and implementation of automation for flight service stations have been phased. The first Model 1 system was commissioned in February 1986, and the last Model 1 w? ommissioned in 1987.

The Model 1 full capacity (M1FC) system builds upon the base provided by the Model 1 design. It increases processing capacity by adding hardware (including two aviation weather processors) and more efficient software so that FSS consolidation can be completed. All Model 1 systems will be converted to Model 1 full capacity systems. In addition, M1FC systems will be provided to the remainder of the AFSS and FSDPS facilities.

The direct user access terminal service (DUATS) improves user access to weather information and flight plan filing. This service is leased from commercial vendors.

Products:

- Model 1.
  - 13 flight service data processing systems (at ARTCCs).
  - 39 FSSs equipped with automation position equipment.
- Model 1 Full Capacity.
  - 2 aviation weather processors (AWPs) at NADIN switching centers.
  - 21 operational flight service data processing systems.
  - 61 AFSSs.

Progress/Activity from December 1991:

- Commissioned 12 M1FC FSDPSs and their associated AFSS.
- Completed site surveys for 12 M1FC and 2 AWP facilities.
- Delivered 12 M1FC systems and 2 AWP systems.
- Commissioned 2 AWP sites.
- Updated all Model 1 sites except Seattle and Salt Lake City to M1FC. Model 1 hardware removed from 11 sites.

Related Projects/Activities: 21–06 TMS, 21–12 AAS, 23–04 WMSC Replacement, 23–13 ICSS, 24–11 DF, and the United States NOTAM System will support enhanced flight services. This project will require interfacility communication services. The FSAS will interface with 26–01 RMMS. Space for all of the 61 AFSSs has been acquired by 26–10 Acquisition of Flight Service Facilities on a sponsor–provided, leased basis at selected airports. The 61 new facilities will house FSAS specialist automation positions and the other equipment necessary to satisfy FSS system requirements. 33–20 AFSS Support Space, 43–01 National GWDS, 43–03 Provide FSAS PCS, 43-04 FSAS Computer Replacement, 43–22 FSAS OASIS, 44–31 Replace Type FA9964 DF, and 45–06 RCL Backbone RCR are related projects.

Problems Resulting in Delays:

- The FSS consolidation/relocation was delayed due to a reprogramming of NAS priorities.

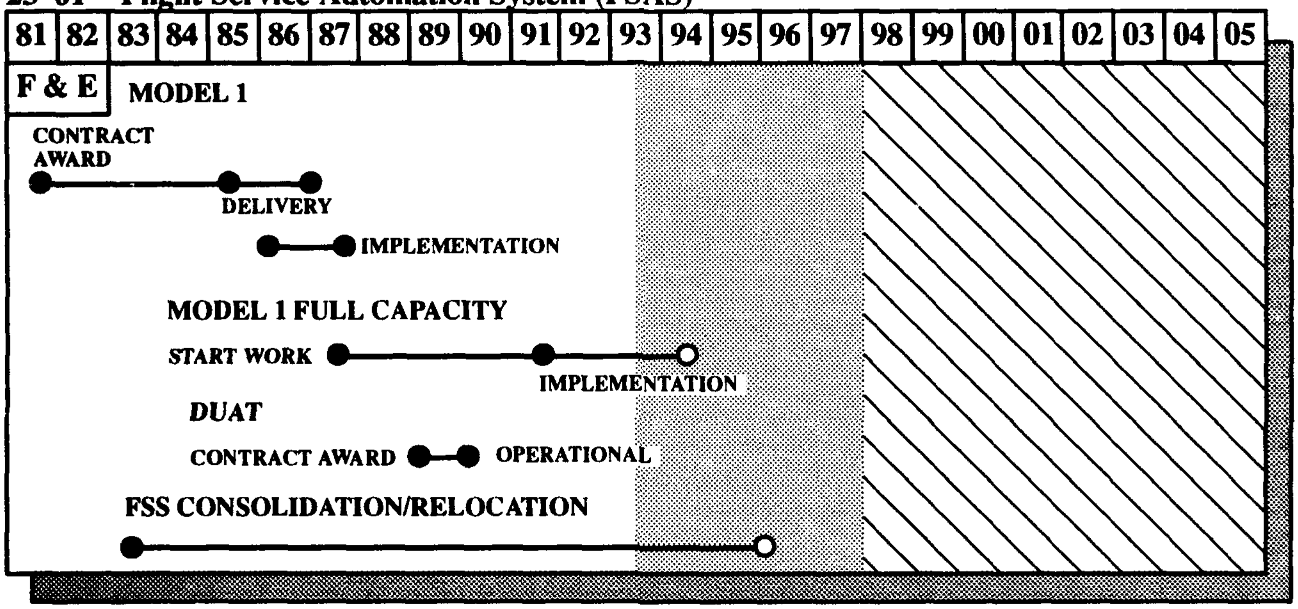
Delays Minimized by:

- The consolidation/relocation project schedule was extended to reflect the revised status.

List of Contractors:

- E–Systems, Incorporated (operating systems for 61 AFSSs, 21 FSDPSs, and 2 AWPs) Garland, Texas

23–01 Flight Service Automation System (FSAS)



23–02 Central Weather Processor (CWP)

Purpose: This project improves the collection, synthesis, and dissemination of weather information throughout the NAS to pilots, controllers, traffic management specialists/coordinators, and meteorologists. This project provides the center weather service unit/central flow weather service unit (CWSU/CFWSU) meteorologists with automated workstations which greatly enhance their ability to analyze rapidly changing, potentially hazardous weather conditions, and ensures that the latest and best information is provided to all system users. It also provides a mosaic display of multiple weather radars to controllers. These improvements are deemed necessary to reduce accidents and air traffic delays directly related to weather.

Approach: The CWP project is composed of two elements. The first is a commercially-available meteorologist weather processor (MWP) procured through a series of leases, the first of which started in 1989 and ends in 1995. The MWP provides modern automation support to the weather analysis and forecasting functions of the CWSU in each ARTCC/ACF. An identical central flow MWP (CFMWP) supports the CFWSU. The follow-on MWP II is described in project 43-02. The second element is a real-time weather processor (RWP) in each ARTCC/ACF which will create unique weather products required by the NAS and provide the NAS unique interfaces.

The RWP will mosaic data from multiple NEXRAD radars and provide these products and other time-critical and operationally significant weather information for use by air traffic controllers via the AAS. The RWP will also transmit a subset of its weather products to the data-link processor (DLP) for uplink to pilots via the Mode S data-link. A contractor will develop operational RWP software on prototype hardware. The prototype RWP will undergo test and evaluation. After approval for production, turnkey systems will be procured. Software developed during the prototype phase will be Government-furnished to the production contractor for field implementation.

Products:

- MWP – The initial lease provides 23 leased MWPs, including intrafacility traffic management and area supervisor briefing terminals (21 MWPs to ARTCCs/ACFs and 2 CFMWPs to the ATCSCC).
- RWP – 24 production RWPs will be provided (22 to ACFs, 1 to the FAA Academy, and 1 to the FAA Technical Center).

Progress/Activity from December 1991:

- Weather requirements have been reevaluated by Air Traffic. Prototype work is complete. RWP project is on hold pending management approval of the revalidated requirements. The recommended acquisition approach will be to combine RWP with MWP II and expedite NEXRAD information to controllers.

Related Projects/Activities:

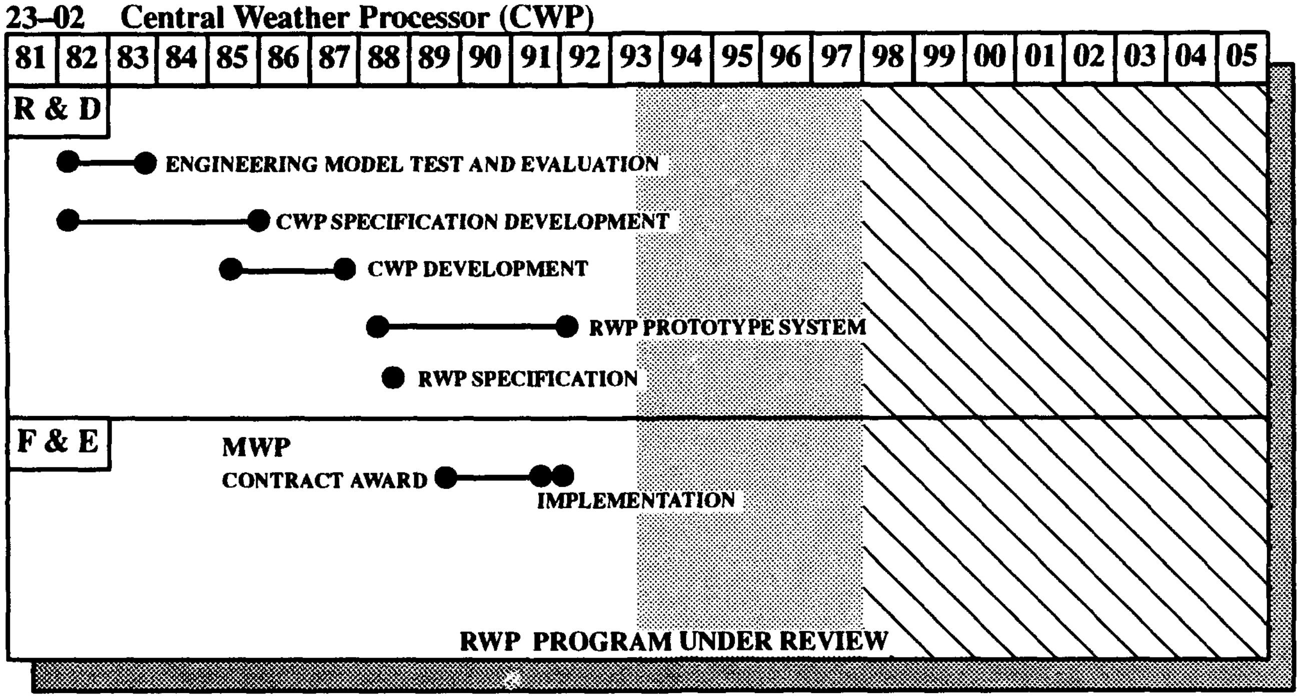
- The CFMWP will provide displays for the 21-06 TMS specialists in the CFCF, and the MWP will provide them for the traffic coordinators in the ACF TMUs.
- The RWP will send weather products to and receive pilot reports (PIREPs) from 21-12 AAS.
- 21-13 AERA will use weather products (wind data).
- The CWP will exchange weather products with 23-04 WMSC Replacement.
- The RWP will send graphic weather products to 23-05 Aeronautical Data-link.
- The RWP will receive 23-09 AWOS/ASOS data via the ADAS.
- The DLP will send PIREPs received via 24-12 Mode S data-link to the RWP.
- The CWP will receive periodic products and request/reply products from 24-16 Weather Radar Program.
- This project will require interfacility communication services from NICS.

- The CWP will interface with 26–01 RMMS for status reporting.
- 32–44 Advanced Facility Planning.
- 43–02 MWP II will extend the current level of service and add new capabilities and enhancements.
- 43–22 FSAS OASIS is a related project.

List of Contractors:

- Jet Propulsion Laboratory
  (one RWP prototype unit)
  Pasadena, California
  - General Electric Company
    Western Systems
    (one RWP prototype test data generator unit)
    San Jose, California
- Harris Corporation
  Government Information Systems Division
  (23 MWPs)
  Melbourne, Florida

23–02 Central Weather Processor (CWP)



23–04 Weather Message Switching Center (WMSC) Replacement

Purpose: This project will replace the WMSC with modern equipment and technology to perform all current data handling functions of the WMSC, and the storage and distribution of NOTAMs. It will rely on the NADIN packet switched network for a majority of communications support. Further, the system functions as the primary FAA gateway to the National

Weather Service Telecommunications Gateway (NWSTG), which will be the source of National Weather Service's products for the NAS.

Approach: The system will be procured for turnkey installation. To provide geographic redundancy, the WMSC replacement will have identical nodes located in the national aviation weather processor (NAWP) facilities in Atlanta, Georgia, and Salt Lake City, Utah, and a NWSTG/WMSC replacement interface device (NWID) located at the Washington ARTCC. Each node will support approximately one–half of the network and continuously exchange data and coordination messages to maintain identical data bases. In the event of a nodal failure, the surviving node will assume responsibility for the entire network. The implementation of the WMSC replacement and consolidated NOTAM system rehost will allow the closing of the National Communications Center (NATCOM). This program includes NATCOM closure.

Products: WMSC replacement nodal processors and related peripherals to be located at each of the two NAWP facilities, and the NWID located at the Washington ARTCC. A third WMSC replacement node will be established at the FAATC for second level hardware/software support.

Progress/Activity from December 1991:

- Computer software configuration item (CSCI) and factory/system acceptance testing completed.

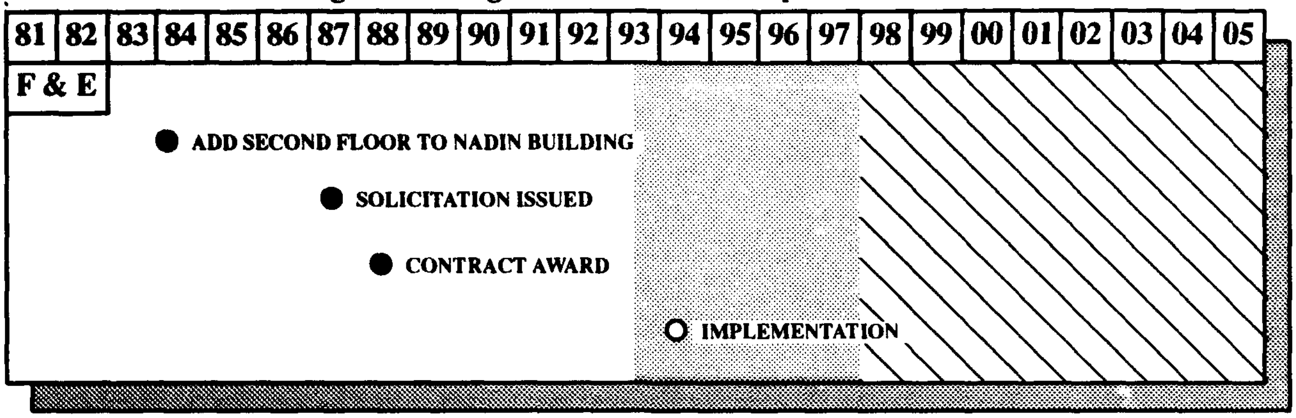
Related Projects/Activities: The WMSC replacement will:

- Exchange weather products with 21–06 TMS traffic management processor.
- Exchange alphanumeric weather data and NOTAMs with the aviation weather processor (AWP) from 23–01 FSAS.
- Exchange weather products with the MWP and RWP from 23–02 CWP and 43–02 MWP II.
- Transmit alphanumeric weather data to 23–05 Aeronautical Data–link.
- Route weather products from 23–09 AWOS data acquisition system (ADAS) to NWSTG and other NAS users.
- Interface with 26–01 RMMS for status reporting.
- Interface with 35–07 NADIN II Continuation packet switch network which will provide the communications between the WMSC replacement and its users.
- The consolidated NOTAM system and the AWOS data collection units (GS 200s) are also related activities.

List of Contractors:

- Harris Corporation
  Government Information Systems Division
  (two WMSC replacement units and
  one NWID)
  Melbourne, Florida

23–04 Weather Message Switching Center (WMSC) Replacement



23–05 Aeronautical Data–link

Purpose: This project will develop a digital telecommunications system to provide a variety of weather and ATC data–link services. Weather products such as surface observations, terminal forecasts, winds aloft forecasts, pilot reports, and hazardous weather advisories will be provided to pilots on a request/reply basis. Specific definition of ATC data–link applications will result from an associated R,E&D effort. The availability of data–link communications will improve air/ground communications and contribute to system safety and capacity by enhancing pilot accessibility to information, relieving congested voice frequencies, and reducing the workload of pilots, specialists, and controllers.

Approach: This project requires the construction of the initial communications architecture (air and ground) and the selection, development, and evaluation of candidate services. The elements involved are development and implementation of the initial data–link processor (DLP) and definition of the tower data–link system (TDLS). The initial DLP (Build–1) will provide Mode S specific communication processing, message routing between application processors and Mode S sensors, and weather application processing and associated end–to–end communication functions. This project includes support to define the aeronautical telecommunications network (ATN) and to demonstrate a TDLS that accepts automated and manually entered weather observations and support information to generate ATIS messages for data–link distribution. Demonstration TDLSs that support the predeparture clearance (PDC) data–link service have been evaluated, and operational TDLSs for PDC service have been implemented at 30 major airports.

Products: 24 DLPs (Build–1) – 22 for ARTCCs/ACFs, 1 to the FAA Academy, and 1 to the FAA Technical Center. TDLS for PDC service at 30 major airports. RTCA minimum operational performance standards (MOPS); FAA advisory circular for data–link certification requirements. ICAO standards and recommended practices for data–link. Note that DLP Build–2, TDLS enhancements, and ATC data–link service developments begun under this project will be completed in project 63–05.

Related Projects/Activities:

- 21–12 AAS, 21–13 AERA, and 23–02 CWP.
- The DLP will obtain weather products from 23–04 WMSC Replacement for data–link weather applications processing.
- The ADAS will send minute–by–minute 23–09 AWOS/ASOS messages to the DLP for storage and dissemination via data–link.
- The DLP will interface with the 24–12 Mode S sensors for the reception and dissemination of Mode S data–link transactions.
- This project will require interfacility communications from NICS.
- The DLP will interface with 26–01 RMMS for status reporting.
- Other related projects are 42–20 Tower Integration Program, 61–22 ATC Applications of ADS, and 61–23 OAP.
- 63–05 Aeronautical Data–link Communication and Applications is a follow–on project.

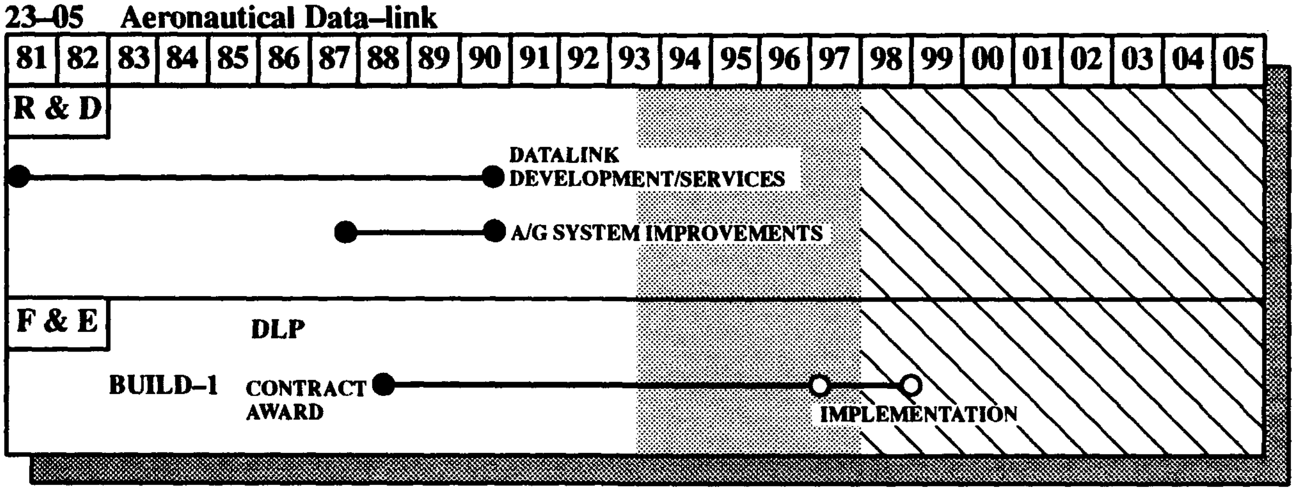
Progress/Activity from December 1991:

- Installation and commissioning of DLP hardware was discontinued pending availability of ATN compatible software.

List of Contractors:

- Arcon Corporation
(DLP Build–1 software)
Waltham, Massachusetts
- Computer Sciences Corporation
(DLP Build–2 software)
Calverton, Maryland
- GTE Contel FS
(DLP Build–1/2 hardware)
Chantilly, Virginia
- Aeronautical Radio Corporation
(TDLS)
Annapolis, Maryland

23–05 Aeronautical Data–link



23–09 Automated Weather Observing System (AWOS)

Purpose: AWOS obtains aviation–critical weather data (e.g., wind velocity, temperature, dew point, altimeter setting, cloud height, visibility, precipitation type, occurrence, and accumulation) through the use of automated sensors. It will process the data and allow dissemination to pilots via computer synthesized voice.

AWOSs located within an ACF will be connected to the AWOS data acquisition system (ADAS). The ADAS will collect and concentrate weather messages from AWOSs and the National Weather Service (NWS) automated surface observing systems (ASOSs) for internal distribution within the ACF and national distribution via the WMSC replacement to the NWS. This configuration will support the closing of the National Communications Center, and it will make weather observation data available to pilots on a timely basis for safety and efficiency.

Approach: A demonstration program for AWOS was successfully completed in 1984. Immediately thereafter, a pilot program contract was awarded for a design of an AWOS for nontowered airports. In 1986, FAA Advisory Circular (AC) 150/5220–16 was published for certification and acquisition of AWOS devices for such users as airport operators, fixed–base operators, and heliport operators. This document is also the basis for systems to be funded and installed under the Airport Improvement Program (AIP).

AWOS equipment is being procured as commercial–off–the–shelf systems (in accordance with the requirements of the advisory circular) to meet immediate needs. The commercial AWOSs will be used primarily as stand–alone units for airports without weather observers. These units are being installed between 1989 and 1994 and will be maintained by the contractor.

NWS will procure, install, and maintain ASOS equipment for the FAA at selected airports. Requirements for 233 nontowered airports and 304 towered airports and FSS locations where the FAA takes surface observations will be met by the NWS procurement.

Products:

- 200 nontowered commercial systems (F&E funded, FAA contract).
- 233 nontowered airports (F&E funded, NWS contract). Options to include an additional 170 systems.
- 304 towered airports and/or closing FSSs (F&E funded – post 1993, NWS contract).
- 25 ADASs – 22 to ACFs; 1 to the FAA Academy; 1 to FAATC; and 1 to New York MCF.

Progress/Activity from December 1991:

- ASOS installations initiated.
- ADAS testing started.

Related Projects/Activities:

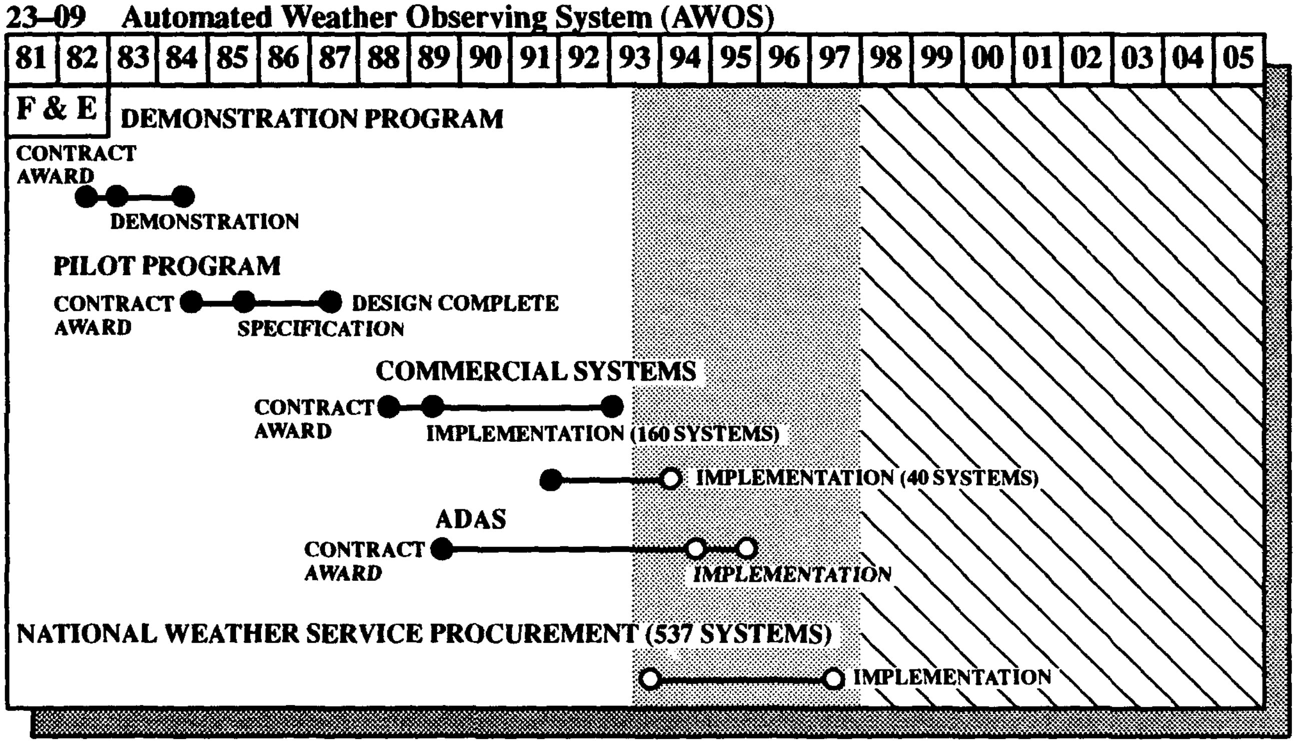
- 23–02 CWP (RWP) will receive the current (minute–by–minute) AWOS and ASOS weather messages from the ADAS via NADIN/LCN for processing.
- 23–04 WMSC Replacement will receive AWOS and ASOS hourly and special weather messages through the ADAS via NADIN/LCN.
- ADAS will provide minute–by–minute AWOS and ASOS data to the 23–05 Aeronautical Data–link via NADIN/LCN to respond to pilot requests via 24–12 Mode S data–link.

- AWOS and ASOS data will be broadcast through 24–03 VORTAC, NDB, or discrete VHF/UHF communications outlets depending on cost–effectiveness and spectrum engineering.
- 24–08 RVR and 24–12 Mode S.
- This project will require interfacility communications service from NICS.
- 34–08 RVR Establishment, 35–07 NADIN II Continuation, 43–02 MWP II, 44–14 Sustain VOR/VORTAC, 44–29 RVR Replacement, 45–02 DMN Continuation, 45–21 Satellite Communication Circuits System, 45–24 Establish ANICS Satellite Network, and 63–21 ITWS.
- ASOS data will be furnished for controller use and to update ATIS weather information.
- AWOS will support the surface weather observation needs of FAA's rotorcraft programs.
- ADAS will translate AWOS weather messages into the NWS standard aviation weather observation format.
- The lightning detection data system will provide lightning data to the AWOS and ASOS via ADAS.
- R,E&D Plan 021–210 TIDS and 041–120 Airborne Meteorological Sensors are related projects.

List of Contractors:

- AAI Corporation (NWS contract)
  (4 ASOS prototype units and 537 production units)
  Hunt Valley, Maryland
- Qualimetrics Corporation
  (200 AWOS units)
  Sacramento, California
- Commpower, Incorporated
  (25 ADAS)
  Camarillo, California

23–09 Automated Weather Observing System (AWOS)



23–12 Low–Level Windshear Alert System (LLWAS)

Purpose: This project provides local controllers and pilots with information on hazardous wind conditions (on or near airports) that create unsafe conditions for aircraft landings or departures.

Approach: Windshear detection equipment is being implemented through an ongoing program for the LLWAS. The basic six–sensor system consists of a wind sensor located at center field, five sensors near the periphery of the airport, and a computer which processes sensor information and displays windshear conditions to air traffic controllers for relay to pilots.

Since the basic six–sensor LLWAS was designed primarily for the detection of frontal shears in the immediate vicinity of the airport, two avenues for improvement are planned.

A completed modification consisted of improving the algorithms associated with the basic six–sensor system to more effectively detect and identify microbursts, incorporate data recorders, and increase the computer capacity. Long–term modifications include: expanding the existing systems by adding more sensors, correcting sensor height to reduce sheltering, developing improved algorithms, providing runway–oriented windshear information, and providing new data/alert displays. These improvements, in addition to increasing the LLWAS capability to detect windshear, will also reduce false alarms and enhance maintenance features. Extensive R,E&D efforts have contributed to LLWAS development. Two enhanced operational LLWAS test beds were installed in New Orleans/Denver to determine the benefits of increasing the number of sensors. Based on the success of these systems (an aircraft saved in 1989), eight enhanced LLWASs will be installed at major airports.

Products:

- Conduct research leading to algorithm development and evaluations.
- Modify 110 systems (six–sensor improvement).
- Expand the six–sensor LLWAS with improved algorithms, additional sensors, and new displays (network expansion).
- Develop interface to TDWR.

Related Projects/Activities:

- 21–12 AAS. In ATCTs, the tower control computer complex (TCCC) will receive and display LLWAS data to the ATCT controller.
- 24–18 TDWR is a related project when installed at the same airports as LLWAS. At these airports LLWAS is to be integrated with TDWR.
- LLWAS will be interfaced to the 26–01 RMMS (MPS) for remote maintenance monitoring.
- 43–12 Upgrade LLWAS to Expanded Network Configuration provides follow–on LLWAS improvements.
- 64–13 ASR Windshear Processor.
- Provide full integrated logistical support capabilities to 110 LLWAS–equipped airports.

List of Contractors:

- Climatronics Corporation
  (51 LLWAS units)
  Bohemia, New York

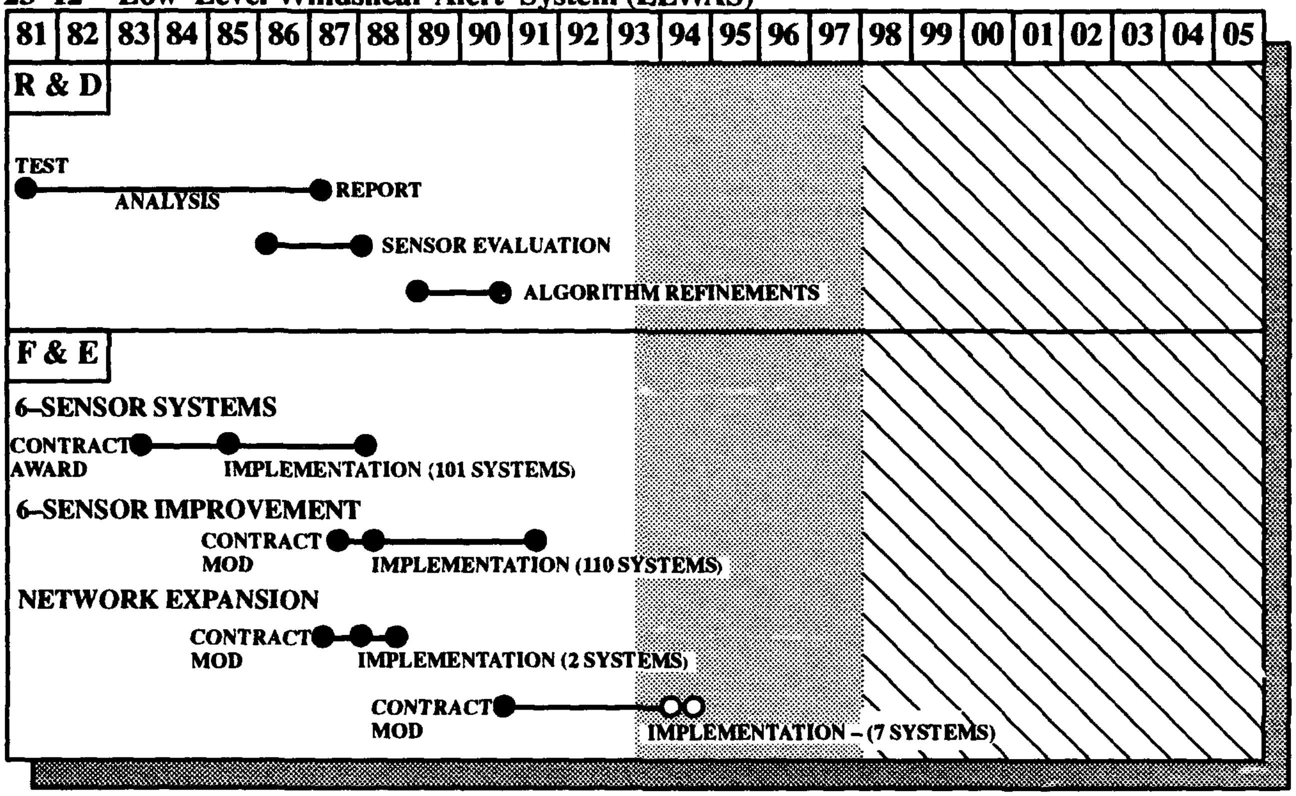
- MIT Lincoln Laboratory
  (algorithm/integration design)
  Lexington, Massachusetts

- International Computers and Telecommunications, Incorporated
  (59 LLWAS units)
  Rockville, Maryland

- LORAL Data Systems Incorporated
  (formerly Fairchild Weston Systems, Inc.)
  (hardware and software updates to 7 LLWAS units)
  Sarasota, Florida

- National Center for Atmospheric Research
  (LLWAS/TDWR integration)
  Boulder, Colorado

23–12 Low–Level Windshear Alert System (LLWAS)



23–13 Integrated Communications Switching System (ICSS)

Purpose: This project provides voice communications switching systems for new, replaced, or modernized automated flight service stations (AFSSs), airport traffic control towers (ATCTs), and terminal radar approach controls (TRACONs) (previously provided with leased communication equipment), and for facilities which have obsolete equipment which can no longer be maintained.

Approach: An initial procurement (Phase I) and one additional reprocurement (Phase IA) are envisioned to implement ICSS. Phase IB is now part of project 22–12 Terminal Voice Switch Replacement (TVSR). In Phase I competitive proposals were solicited for off–the–shelf systems. The requirements were divided into three types:

- Type 1's for ATCTs and TRACONs having up to 15 operator positions. Basic intercom, interphone, and radio communications capabilities were specified as an integrated system.

- Type 2's for TRACONs having 16–80 operator positions. All Type 1 requirements plus rapid automatic reconfiguration of pushbutton terminations, alphanumeric displays of the button functions, and traffic data collection were specified.

- Type 3's for AFSSs. Type 2 requirements plus an automatic call distributor, call transfer, pilots automatic telephone weather answering service (PATWAS), fast file recorders, and a management information system display were specified. PATWAS is being replaced by the telephone information briefing service (TIBS). These systems will continue in use at all AFSS facilities.

Phase I contracts for all three types were awarded in May 1982. Type 1 systems are being obtained from one contractor. Type 2 systems are being obtained from another contractor. Both contractors are supplying Type 3 systems.

Under Phase I, systems are being leased with an option to buy. Systems are being purchased as funds are made available; the option is being exercised on a system–by–system basis.

Phase IA is the reprocurement phase for AFSS requirements. The contract for Phase IA was awarded in December 1988. Under this phase, the remainder of the Type 3 ICSSs for AFSSs will be procured.

Products:

- Phase I:
  - 132 Type 1 systems for ATCTs and small TRACONs.
  - 31 Type 2 systems for larger TRACONs.
  - 45 Type 3 systems for AFSSs.
- Phase IA (Type 3):
  - 16 systems for AFSSs.
  - 1 system for FAA Academy.
  - 1 system for Logistics Center Depot test bed.
  - 1 system for Technical Center testing.
  - 1 system for Southern California Metroplex.
  - 3 optional systems.

Progress/Activity from December 1991:

- Developed, coordinated, and released ICSS Phase I upgrade sole source RFP.

- Accomplished modification to the ICSS Phase IA contract for three systems in the Southern California Metroplex.

- Delivered an 80 position switch to the FAA Technical Center to support AAS common console testing.

Related Projects/Activities:

- 22–11 Multichannel Voice Recorders. Requirements for ICSS Phase IB and STVSs are in 22–12 TVSR.

- 23–01 FSAS. ICSS is the communications equipment of the AFSS facility that will enable the AFSS to establish voice communications with pilots and other operational personnel throughout the ATC system.

- 25–08 RCE, 26–10 Acquisition of Flight Service Facilities, 32–12 ETVS, 32–13 ATCT Establishment, 33–20 AFSS Support Space, 34–23 Communications Facilities Expansion, 42–13 ATCT/TRACON Modernization, 42–14 ATCT/TRACON Replacement, 42–20 Tower Integration Program, 43–04 FSAS Computer Replacement, 43–14 ICSS Logistics Support, 43–22 FSAS OASIS, and 45–20 Critical Telecommunications Support are related projects.

- NICS – Interfacility communication will be provided by NICS.

List of Contractors:

Phase I:

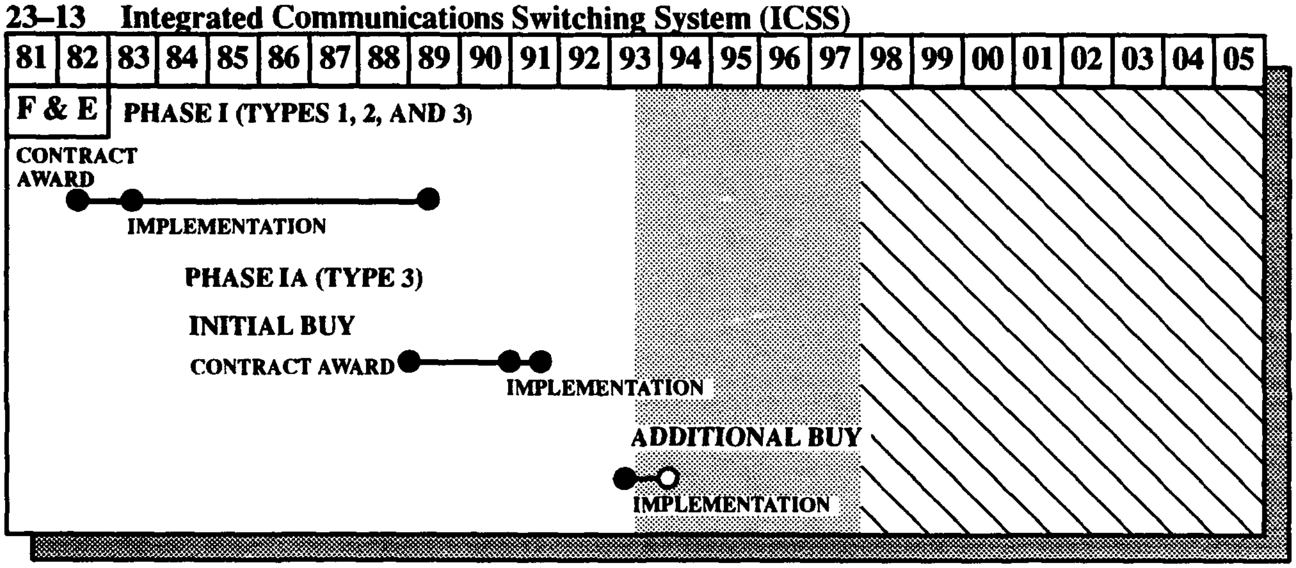
- Litton–AMECOM
  (62 ICSS units)
  College Park, Maryland

- Denro, Incorporated
  (146 ICSS units)
  Gaithersburg, Maryland

Phase IA:

- Denro, Incorporated
  (23 units: 14 basic and 9 optional)
  Gaithersburg, Maryland

23–13 Integrated Communications Switching System (ICSS)



24–03 VORTAC

Purpose: Very high frequency omnidirectional range (VOR) with distance measuring equipment (DME) or tactical air navigation (TACAN) units are en route air navigational and approach aids used by pilots to conduct safe and efficient flights and landings. This project forms a modern, cost–effective national navigation network which provides required coverage through replacement, relocation, conversion, and establishment of VORTAC, VOR/DME, and VHF omnidirectional range test (VOT).

- Replacements. From FY 1982 through FY 1989 the FAA replaced 950 vacuum–tube VOR and VORTAC systems with solid–state equipment. Solid–state equipment also replaced 77 tube–type VOTs.
- Relocations. VOR/DME facilities will be relocated to accommodate route structure changes, real estate considerations, and site suitability.
- Conversions. Conventional VORs are being converted to Doppler VORs to solve siting problems and to obtain required signal coverage.
- Establishments. Operational requirements that arise in various geographic areas require the establishment of VHF navigational aid services. Provisions are being made to establish 70 VOR/DME sites including new VOR/DME equipment at non–Federal takeover locations. As many as 35 VOT sites were established.

Approach: All vacuum–tube VOR/VORTAC equipment has been replaced with solid–state equipment which has embedded remote monitoring and control capabilities. DME service will be provided at all VOR facilities. A network plan has been developed to redistribute VORs to meet operational requirements. Tube–type VOR test (VOT) equipment will be replaced with solid–state equipment. VOR/DME and VOT sites will be established to meet operational requirements.

Products:

	1981–1985 Quantity	1986–1990 Quantity	1991–1995 Quantity
Replace VORTAC	725		
Replace VOR/DME	145		
Replace VOR	80		
Establish VOR/DME			70
Reinstall DME at ILS			47
Convert VOR to DVOR		15	25
Retrofit DVOR with RMM & DSB		50	
Establish VOT		35	
Replace VOT		77	

Progress/Activity from December 1991:

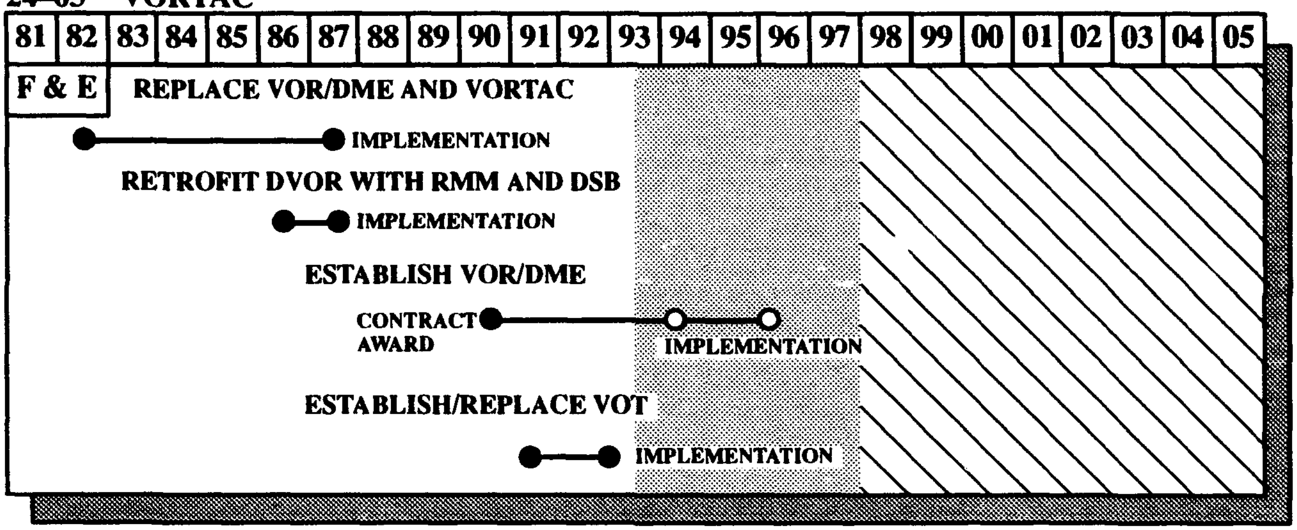
- VOR/DME hardware and software CDRs completed.
- VOTs commissioned at 90 percent of the sites.

Related Projects/Activities: 23–09 AWOS, 24–11 DF, 24–17 Loran–C Systems, 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–22 Dallas/Fort Worth Metroplex, 44–12 Low–Power TACAN Antennas, 44–14 Sustain VOR/VORTAC, and remote communications facilities.

List of Contractors:

- Canadian Marconi Company
  (112 VOT systems)
  Kanata, Ontario, Canada
  - Antenna Products
    Mineral Wells, Texas
- Wilcox Electric, Incorporated
  (70 VOR/DME units)
  Kansas City, Missouri

24–03 VORTAC



24–07 Microwave Landing System (MLS)

Purpose: In 1978 MLS was adopted by the International Civil Aviation Organization (ICAO) as a world standard to replace ILS. MLS consists of azimuth, elevation, and DME/P equipment. It provides precision guidance that will satisfy the full range of operational requirements, both civil and military, for all types of aircraft in all categories of landings. It also will overcome inherent limitations of the ILS. MLS signals are minimally affected by surrounding terrain, structures, and weather effects, thereby providing lower cost installation than ILS in all airport environments. MLS with RMM capabilities will reduce the maintenance manpower requirements associated with ILS. MLS provides a radio signal which allows multiple–curved and segmented approaches and selectable glide slope angles when aircraft are equipped with appropriate MLS avionics.

MLS has the capability to improve NAS capacity. MLS can improve capacity by providing lower IFR minimums; allowing capacity enhancing IMC flight operations; and by providing precision approach and departure services at locations where ILS service is not possible or beneficial. The use of advanced operational procedures to improve capacity is particularly significant in complex multi–airport environments such as metropolitan New York City, Chicago, and San Francisco, and yields benefits unavailable with ILS.

Approach: In 1989 Congress directed the FAA to develop an MLS evaluation program to demonstrate the economic and operational benefits of MLS. This program was completed in 1991 and the results were part of the basis for a decision on whether to proceed with CAT II/III MLS full scale development contracts. Current program implementation strategy is to install 26 additional CAT I systems as part of the demonstration program, proceed with the CAT II/III design and development of first article test systems, and finally to proceed with a full production follow-on CAT II/III procurement.

The MLS program includes, at most locations, a medium–intensity approach lighting system with runway alignment indicator lights (MALSR). MALSRs installed to serve ILS will not be duplicated to serve a subsequent MLS installation on the same runway.

The criteria for the design of new MLS approaches are now in place. These criteria permit the design and use of MLS curved approach procedures. Analyses are being conducted to support ICAO standards for such items as DME/P, auxiliary data words, operational criteria, and procedures.

Products: Approximately 255 Category II/III MLSs are planned to be procured through 2000 for the FAA. The Department of Defense plans to procure up to 363 fixed–base MLSs through the FAA. The current planned FAA deployment includes:

- 167 for international runways to satisfy the United States commitment to ICAO.
- 39 at existing ILS CAT II/III runways.
- 49 at newly qualifying CAT II/III runways.

The exact number of CAT II/III MLSs to be produced for the FAA is still under study. A production quantity decision will be made in 1995, based on international commitments and on the cost, benefit, and capability of satellites to be used for precision approach.

Progress/Activity from December 1991:

- Demonstration program final report submitted to Congress.
- Contracts awarded for design, development, and delivery of first article CAT II/III systems.

Related Projects/Activities: 24–08 RVR will be installed with MLSs where weather conditions meet requirements in Airway Planning Standard Number One (APS No. 1). ILSs will be decommissioned in accordance with the ILS/MLS transition plan that minimizes impacts on users. Under this plan, ILSs will not be decommissioned until a date yet to be established after ILS/MLS parity is reached in the United States. Some MLSs will not have MALSRs (24–10 ALSIP) due to obstructions to the plane of the MALSR light or excessive installation costs due to terrain. 34–06 ILS, 34–09 Establish Visual Navaids for New Qualifiers, 46–05 Airport Cable Loop Systems Sustained Support, and R,E&D project 022–140 Vertical Flight Program.

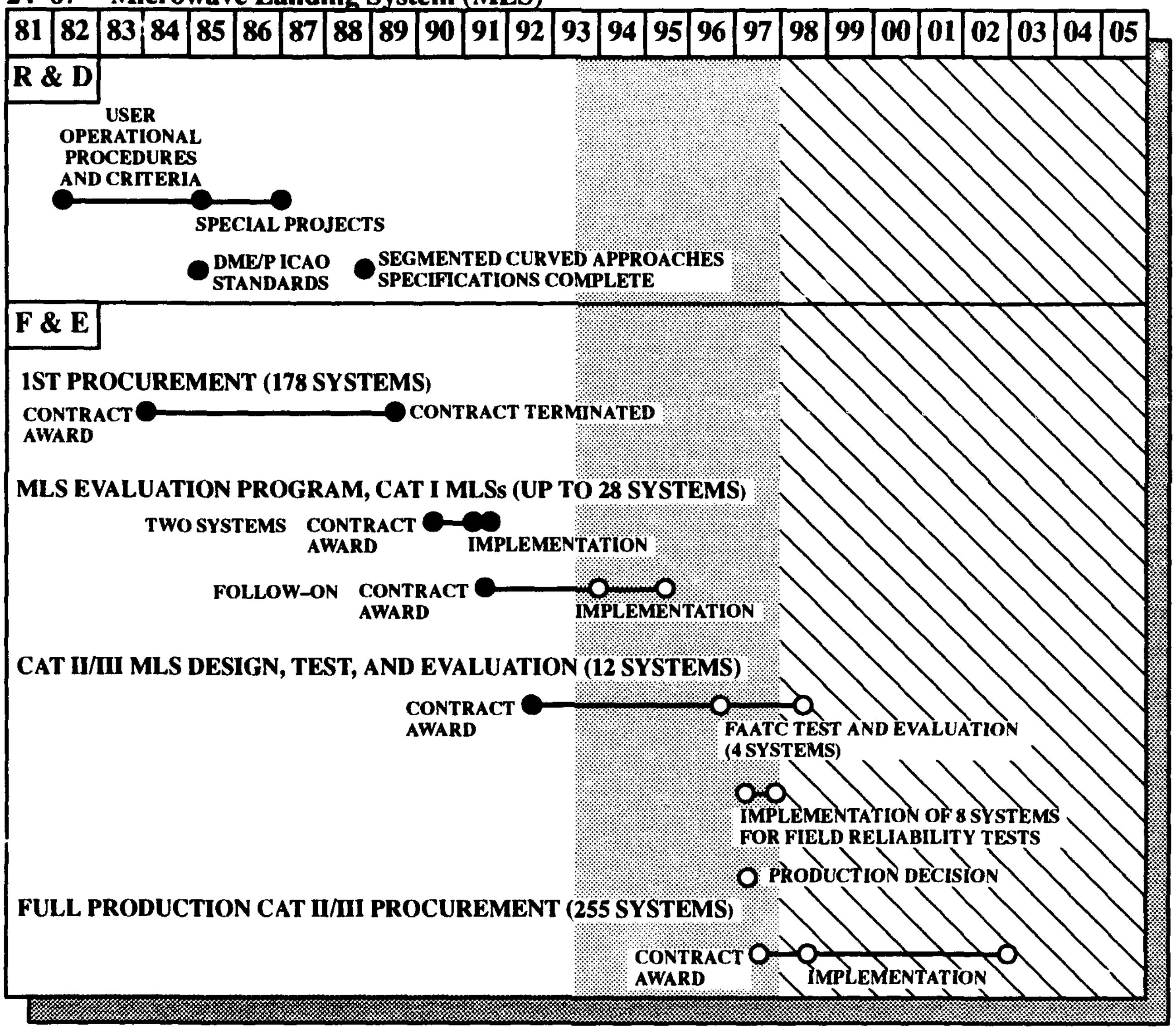
List of Contractors:

- Wilcox Electronics, Incorporated
  (6 CAT II/III MLSs)
  Kansas City, Missouri

- Raytheon Corporation
  (6 CAT II/III MLSs)
  Marlboro, Massachusetts

- Allied–Signal Aerospace Company
  Bendix Communications Division
  (26 CAT I MLSs)
  Baltimore, Maryland

24–07 Microwave Landing System (MLS)



24–08 Runway Visual Range (RVR)

Purpose: This project establishes RVR systems or modernizes existing systems on qualifying Category I, II, and III runways.

There are 450 RVR systems of various generations currently in service in the NAS. Approximately 10 percent of these consist of runway visibility value (RVV) equipment which requires manual computation by the air traffic controller to arrive at RVR data and does not take into account such variables as runway lighting intensity and ambient light conditions.

Approach: A new RVR system, employing current technology, will provide an inherent capability to satisfy CAT I through CAT IIIb requirements. The new RVR system will be fielded to replace all existing RVV and RVR equipment which are maintenance intensive and employ outdated technology. The project will also provide new generation equipment for establishment at qualifying facilities to satisfy instrument landing facility requirements.

Fifteen demonstration systems were deployed nationwide to prove that the specification requirement for mean time between failure has been met. Then new generation equipment will be deployed which will replace existing RVRs. The replaced units will be relocated to additional sites.

Products:

- Replace existing systems 247
- Establish new locations 181

Progress/Activity from December 1991:

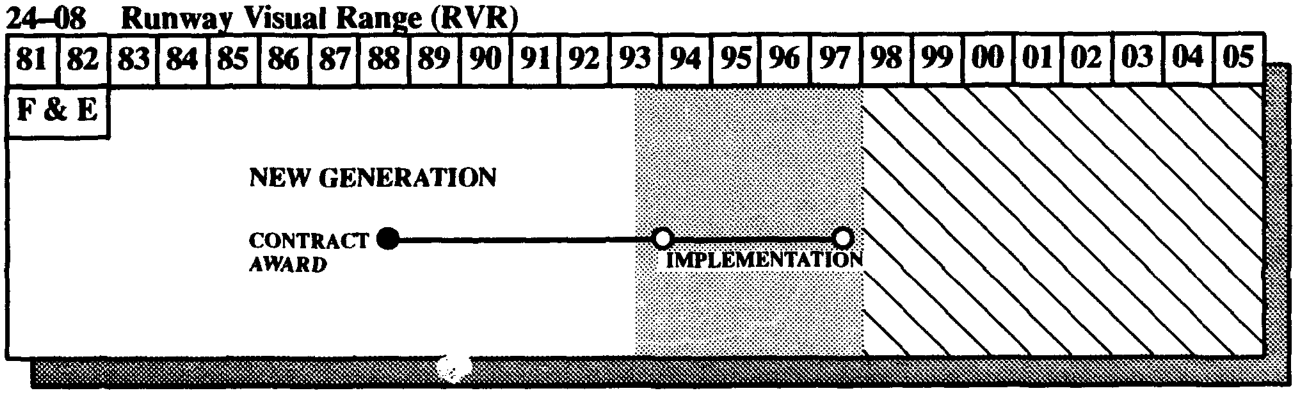
- Completed design readiness review.
- OT&E testing conducted.

Related Projects/Activities: 21–12 AAS, 23–09 AWOS, 24–07 MLS, 26–01 RMMS, 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–22 Dallas/Fort Worth Metroplex, 32–24 Chicago Metroplex, 34–06 ILS, 34–08 RVR Establishment, 44–29 RVR Replacement, and R,E&D Plan project 021–210 TIDS.

List of Contractors:

- Teledyne Controls
  (new generation systems)
  Los Angeles, California

24–08 Runway Visual Range (RVR)



24–09 Visual Navaids

Purpose: This is a multiyear program to provide safety–related facilities and enhancements at airports. The facilities provided are: medium–intensity approach lighting systems with runway alignment indicator lights (MALSR), runway–end identification lights (REIL), visual approach slope indicator (VASI) or precision approach path indicator (PAPI), omnidirectional approach lighting system (ODALS), and high intensity approach lighting system with sequenced flashing lights (ALSF 2) systems.

This program also provides equipment for the replacement or establishment of remote radio control capabilities for visual aids which will meet the operational requirements of air traffic control, and will remove complex, manually activated coding methods. The new system permits single–button control of each visual–aid function.

Approach: Visual aid projects are being installed in conjunction with other related projects where possible. MALSR lights installed to serve an ILS will not be duplicated for a subsequent MLS installation on the same runway.

Products: Quantities vary from year to year depending on the urgency of the requirement, validation of requirements, and availability of funds. The radio control retrofit program will involve 1,348 airports having a total of 3,032 visual aids.

Progress/Activity from December 1991:

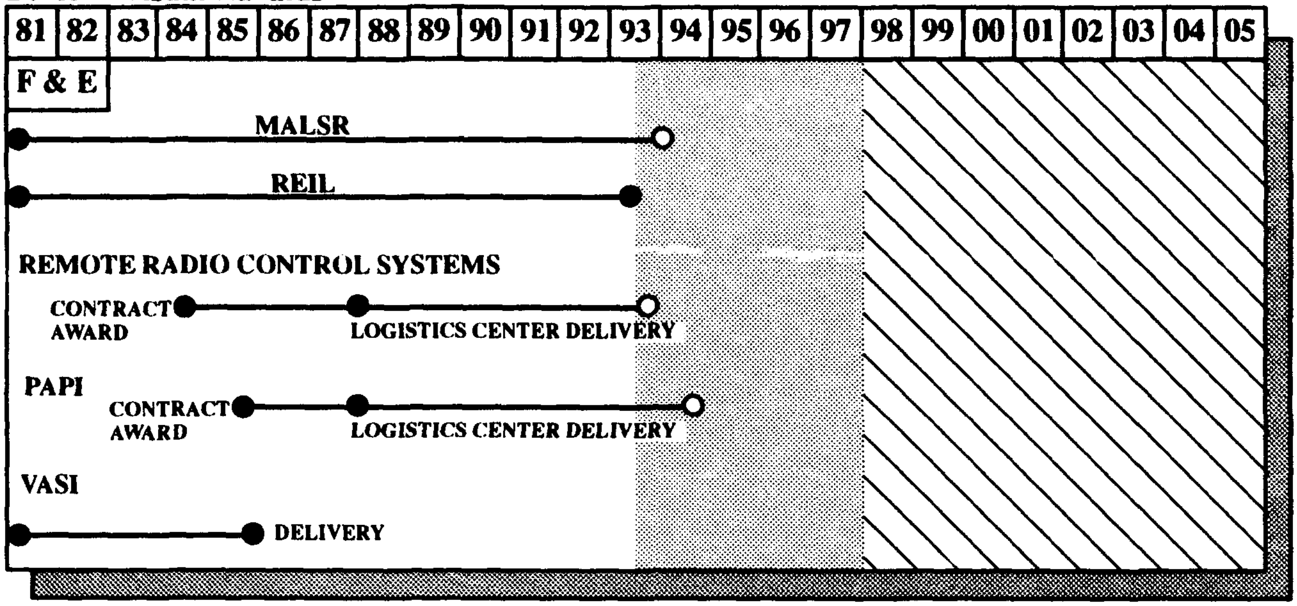
- Awarded contract to New Bedford Panoramex for FY 1994-1995 remote radio control system (RRCS) requirements.

Related Projects/Activities: This project, when combined with 24–10 ALSIP, modernizes the currently installed airport lighting systems. The modernization results in improved safety and increased energy efficiency for both the approach and guidance lighting systems. 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–22 Dallas/Fort Worth Metroplex, 34–06 ILS, 34–09 Establish Visual Navaids for New Qualifiers, and 44–24 ILS and Visual Navaids Engineering and Sparing are also related projects.

List of Contractors:

- DME Corporation
  (REIL)
  Fort Lauderdale, Florida
- New Bedford Panoramex
  (RRCS)
  Upland, California
- AVW Electronic Systems
  (PAPI)
  El Segundo, California
- Sonicraft
  (PAPI and RRCS)
  Chicago, Illinois
- AVW Electronic Systems
  (MALSR)
  El Segundo, California

24–09 Visual Navaids



24–10 Approach Lighting System Improvement Program (ALSIP)

Purpose: This is a multiyear program to retrofit existing airport runway approach lighting systems with low–impact resistant approach light supports and other improvements. The intent is to bring approach lighting systems, built before 1975, up to current standards for new installations.

Replacement of the existing rigid tower structures with light–weight and low–impact resistant structures that collapse or break apart upon impact reduces damage to an aircraft should it strike an approach light tower structure during departure or landing. This should help reduce the severity of approach and landing accidents. This effort was mandated by FAA Order 1811.4, System Requirements Statement/Acquisition Authorization for the Approach Lighting System Program, signed by the Administrator on June 12, 1979, in response to an NTSB recommendation. The program also results in a significant reduction in FAA energy consumption and the replacement of outdated and obsolete equipment.

Federal aviation regulations authorize a pilot to descend below the published minimum descent altitude or decision height, provided that visual references (e.g., approach lights, threshold lights) for the intended runway are distinguishable. The installation of threshold light bars as part of the existing MALSR provides a visual reference to the runway threshold and makes the present system more effective in low–visibility conditions. The modification enhances safety and complies with ICAO minimum requirements.

Approach: In the interest of energy conservation, high–intensity approach lighting systems with sequence flashers at Category II and III runway configurations are to be switchable to the simplified short–approach lighting system with runway alignment indicator lights (SSALR) when visibility conditions permit. The simplified short–approach lighting system configuration uses less than half the lights of the full high–intensity approach lighting system. In addition, the program retrofits nonfrangible high-intensity approach lighting systems on Category I runways with frangible medium-intensity approach lighting systems with sequence flashers. When the program is fully implemented, energy consumption of these systems will have been reduced by 60 percent over FY 1976 base-year requirements, and approach lighting systems will be of two standard types – ALSF 2 and MALSR.

Products:

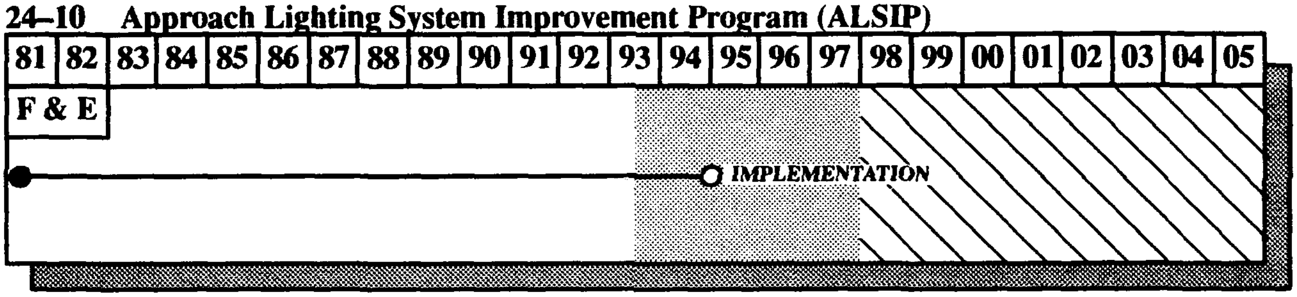
- 250 SSALF, SSALR, and ALSF 1 will be converted to MALSRs and will be placed on low-impact resistant structures.
- 68 ALSF 2s will be provided with low-impact resistant structures and the capability to switch to SSALR configuration.

Related Projects/Activities: This project, when combined with 24-09 Visual Navaids, will modernize the currently installed airport lighting systems. The modernization will result in improved safety and increased energy efficiency for both the approach light and guidance lighting systems. 24-07 MLS is a related project. 44-33 ALSIP Continuation provides continuing support.

List of Contractors:

- Airflo Instrument Company
  (42 ALSF 2 systems)
  Glastonbury, Connecticut

24-10 Approach Lighting System Improvement Program (ALSIP)



24-11 Direction Finder (DF)

Purpose: This project upgrades existing DF systems with solid-state equipment, establishes sites for additional coverage, and provides capabilities for remote maintenance monitoring, control, and certification. Additionally, new indicators will be established within selected FSS or AFSS control facilities to increase operational efficiency.

The replacement of the existing tube-type DF system with solid-state equipment provides cost savings and cost avoidance by reducing power consumption and maintenance requirements.

Approach: The existing tube-type DF equipment will be replaced with new solid-state equipment which has remote maintenance monitoring, control, and certification capabilities.

This project will establish/replace 372 systems. There have been 127 of these systems procured to date. An existing contract is procuring

115 systems. A future procurement of 130 systems is necessary to provide the total complement of 372 systems.

In areas where present DF equipment does not provide complete coverage, new sites will be established and collocated with existing FAA facilities (such as VORTAC). New displays and processing equipment will be located within AFSS facilities interfacing with both existing and new solid–state receiver sites. Multiple DF receivers will be networked to the display equipment.

The regional network studies indicate that the total number of DFs will be 372.

Products:

- 66 new establishments.
- 3 support systems for the FAAAC.

Progress/Activity from December 1991:

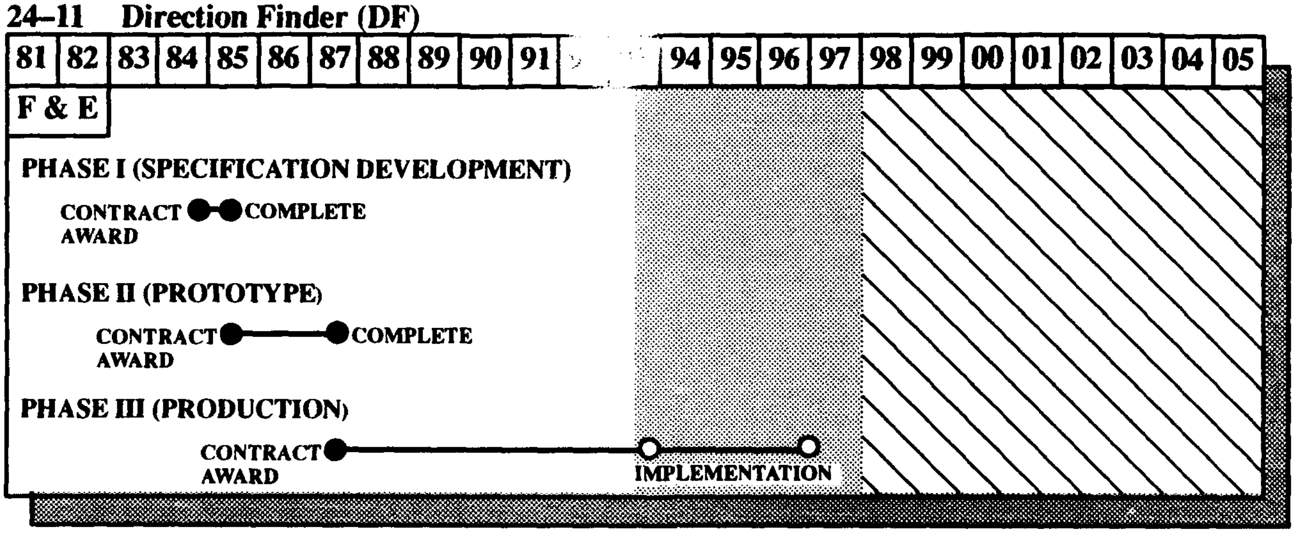
- Incorporation and testing of DF display software enhancement initiated.
- Simulation and repair service/software support contracts awarded.

Related Projects/Activities: DFs will be collocated with communications equipment, depending on the results of facility consolidation activity. 23–01 FSAS, 24–03 VORTAC, and 44–31 Replace Type FA9964 DF are also related projects.

List of Contractors:

- ST Systems Corporation (STX)
  (up to 115 systems plus spares)
  Vienna, Virginia
  - CELTECH Corporation
    Carlsbad, New Mexico
  - CATC Corporation
    San Diego, California

24–11 Direction Finder (DF)



24–12 Mode S

Purpose: This project will improve the surveillance capability of the air traffic control radar beacon system (ATCRBS). Mode S provides more accurate positional information and minimizes interference. This is accomplished by discrete interrogation of each aircraft and improved processing of aircraft replies.

In addition, Mode S provides the medium for a digital data–link which will be used to exchange information between aircraft and various ATC functions and weather data bases.

Approach: 137 Mode S systems will be procured to provide coverage down to the ground at 108 terminals and down to 12,500 feet above mean sea level (MSL) in other areas. Mode S systems are designed to be remote maintenance monitored and unmanned. Existing ATCRBS antennas not capable of improved azimuth resolution will be replaced and additional antennas procured where increased data rates are required.

Products:

- 137 Mode S systems at a maximum production capability of 48 per year.
- Specification for Mode S antenna for long–range radars.
- 13 equipment shelters.
- 56 Mode S back–to–back monopulse antennas for en route surveillance sites.
- 41 new and 34 modified rotary joints.

Progress/Activity from December 1991:

- A Mode S unit was delivered to Orlando, Florida. After OT&E it will be commissioned in a backup mode until the first full Mode S functional system is commissioned in Baltimore. The Orlando unit will then be reconfigured and commissioned as a full Mode S site.
- Completed contractor design acceptance and released software version 1.

Related Projects/Activities: All automation data will be processed through the DLP to the appropriate aircraft. 21–12 AAS software (AERA) will use Mode S data–link for transmitting data from ACFs to aircraft. 22–09 ARTS IIA Interface with Mode S/ASR–9 and 23–02 CWP are related projects. 23–05 Aeronautical Data–link will use the Mode S data–link to transmit weather data to aircraft. 23–09 AWOS data will be provided in response to pilot requests. 24–15 LRR. This project will require telecommunications service from the NICS. The traffic alert and collision avoidance system (TCAS) uses Mode S data formats and frequencies. Mode S will be an RMM system (26–01 RMMS). Most terminal and en route surveillance radars will be collocated with Mode S and share a digital interface with the ATC automation system. Also related are 32–27 DOD/FAA ATC Facility Transfer/ Modernization, 34–12 ATCBI Establishment, 34–20 Surveillance System Enhancements, 44–42 LRR Radome Replacement, 44–45 ATCRBS Relocation, 44–46 ATCBI Replacement, 45–02 DMN Continuation, 45–21 Satellite Communication Circuits System, 45–24 Establish ANICS Satellite Network, 62–20 TATCA, 62–21 ASTA, 63–05 Aeronautical Data–link Communications and Applications, 64–27 Precision Runway Monitor, and R,E&D Plan projects 021–190 ASTA, 022–110 TCAS, 033–110 TASS, and 041–110 Aviation Weather Analysis and Forecasting.

List of Contractors: A contract has been established as a joint venture composed of Westinghouse and Unisys for production and installation of Mode S units.

- Westinghouse Electric Corporation
(interrogators for 137 Mode S sensors)
Linthicum, Maryland

- Unisys Corporation
(data processing for 137 Mode S sensors)
Paoli, Pennsylvania

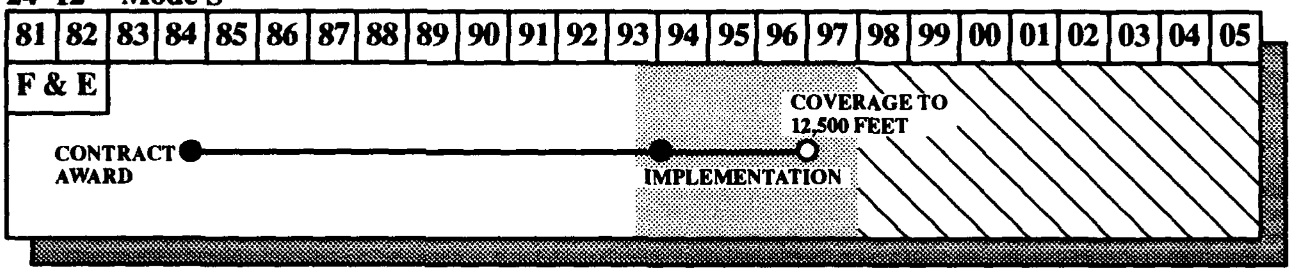
  - Wilcox Electronics
Kansas City, Missouri

  - Unr–Rohn
Birmingham, Alabama

- Radiation Systems Incorporated
(antennas)
Sterling, Virginia

  - Kevlin Microwave Corporation
(rotary joints)
Wilmington, Massachusetts

24–12 Mode S



24–13 Terminal Radar (ASR) Program

Purpose: This project provides economical radar service at airports with air traffic densities high enough to justify the service. It also upgrades the highest density airports with the latest modern equipment.

Replacement of the airport surveillance radar (ASR–4/5/6) is necessary because of the decreasing availability of spare parts and the high–maintenance workload. Repair parts for the ASR–4/5/6 radars are in short supply; parts from decommissioned units are being used to support field requirements.

Approach: Four separate activities have been combined to form this program.

- Replacement of 96 ASR–4/5/6 vacuum–tube radars with ASR–7/8/9 (leapfrog 16 ASR–7s to ASR–4/5/6 sites, leapfrog 40 ASR–8s to ASR–4/5/6, and install 40 ASR–9s at ASR–4/5/6 sites).

- Procurement of ASR–9 systems to provide radar service at airports where the air traffic volume increases to a level requiring the coverage.

- Relocation of existing solid–state radars (ASR–7/8) where necessary due to new construction interfering with required radar coverage or to changes in air traffic volume.

- Procurement of secondary radar systems to provide ATCRBS service at newly qualified facilities.

Data from ASR–9 radars are being remoted in digital format only. At the indicator site, the data is available in digital and analog format.

Products:

- Replace 96 radars.
- Establish the minimum number of additional radars.
- Leapfrog 56 radars.
- Procure up to 36 secondary radars.
- Raise antennas where required.
- Remote data from some terminal radars based on coverage requirements.

Progress/Activity from December 1991:

- Retrofit kits were ordered for 134 systems, with deliveries commencing in October 1993, to modify the transmitter subsystem which experienced higher that expected failure rates.

Related Projects/Activities: 22–09 ARTS IIA software and hardware changes will be required to interface with the ASR–9. Changes to ARTS IIIA software will not be required to accept ASR–9 digital data. ASR–9 installations are planned to precede Mode S installations and must be coordinated. The ASR–9, 24–15 Long-Range Radar, and 24–16 Weather Radar Program are involved with 56–15 NAS Spectrum Engineering Sustained Support since these systems compete for frequency and spectrum. This program will require interfacility communications service from the NICS. 32–13 ATCT Establishment, 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–22 Dallas/Fort Worth Metroplex, 32–24 Chicago Metroplex, 34–13 Terminal Radar Digitizing, Replacement, and Establishment, 34–20 Surveillance System Enhancements, 44–46 ATCBI Replacement, 62–21 ASTA, 63–21 ITWS, 64–13 ASR Windshear Processor, and R,E&D Plan 041–120 Airborne Meteorological Sensors are also related projects.

Problems Resulting in Delays:

- ASR–9 commissioning has been effected by a shortage of region resources which has delayed the selection and preparation of radar sites.

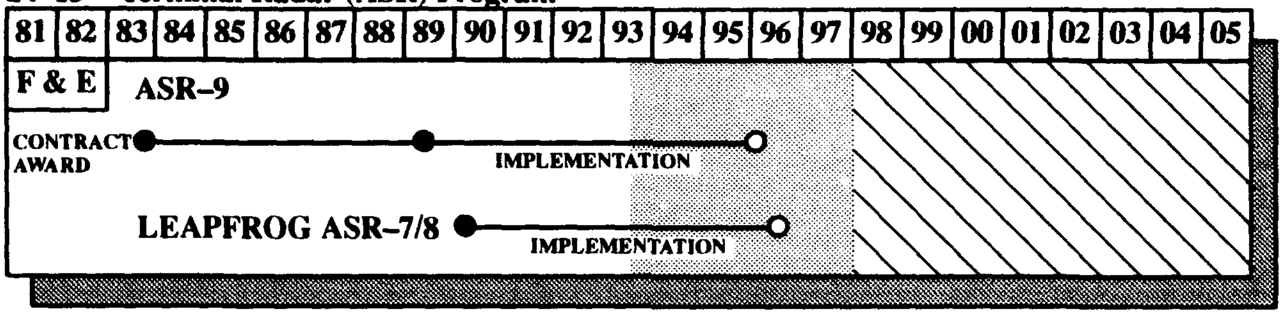
Delays Minimized by:

- The schedule has been revised to reflect region capabilities.

List of Contractors:

- Westinghouse Electric Corporation
  (ASR–9 Systems – 101 for FAA and 8 separately funded for DOD)
  Linthicum, Maryland
  - Varian
    Palo Alto, California
  - Keltec
    Fort Walton Beach, Florida
  - Kevlin
    Woburn, Massachusetts
  - General Defense
    Pinellas Park, Florida
- Raytheon Service Company
  (leapfrog of ASR–7/8 to new locations)
  Washington, District of Columbia

24–13 Terminal Radar (ASR) Program



24–14 Airport Surface Detection Equipment (ASDE–3) Radar

Purpose: The ASDE–3 will provide radar surveillance of aircraft and airport service vehicles at high–activity airports. Radar monitoring of airport surface operations (ground movements of aircraft and other supporting vehicles) is required to provide an effective means of directing and moving surface traffic. This is especially important during periods of low visibility such as rain, fog, and night operations.

Approach: The contract for a ground surveillance radar that will map the airport complex and determine aircraft or service equipment locations and movement was awarded in 1985. An option to this contract was exercised in 1988 to provide additional sensors.

The ASDE–3 antenna may be located on top of the airport traffic control tower (ATCT) or located remotely on its own tower. Installations on existing ATCTs may require structural modifications to the tower.

Products: The basic contract will buy 30 ASDE–3 systems for 17 new sites (includes FAA Academy) and for replacement of 13 older ASDE systems at existing sites. Three additional sensors, provided via contract option, will satisfy the requirement for three dual–sensor systems. Seven additional systems are being procured via separate contract.

Progress/Activity from December 1991:

- Thirteen systems were delivered to the sites and installation has begun.

Related Projects/Activities: 26–01 RMMS will provide remote maintenance monitoring for ASDE–3s. 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 42–20 Tower Integration Program, 62–21 ASTA, 62–23 AMASS, and R,E&D Plan project 021–190 ASTA are also related projects.

Problems Resulting in Delays:

- ASDE commissioning has been delayed at approximately eight or nine problem sites. The delays are caused by the need to build new towers or relocate to a remote tower because the ASDE–3 was unable to be installed on existing towers.

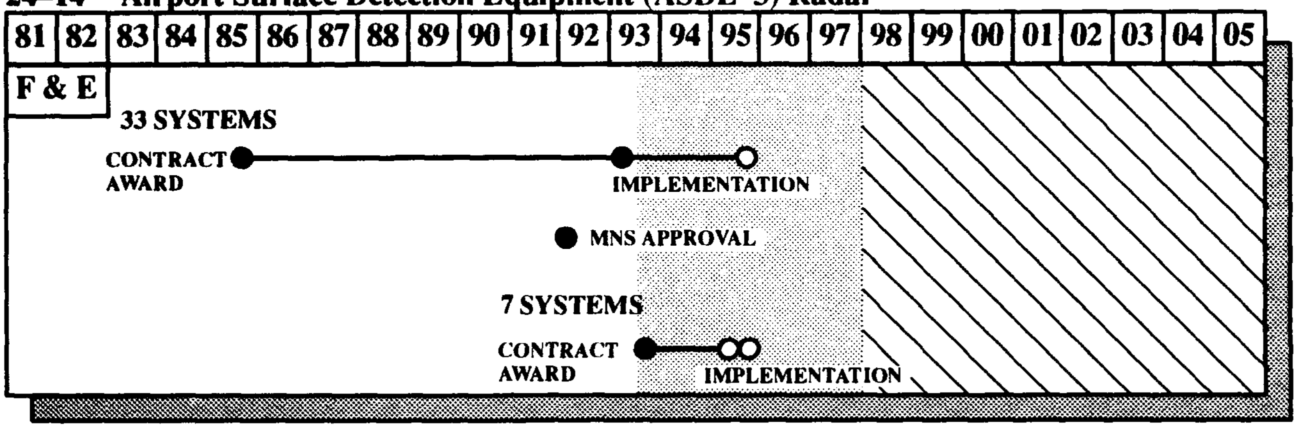
Delays Minimized by:

- Regional personnel are preparing alternate sites, and the schedule has been revised to reflect site availability.

List of Contractors:

- Norden Systems, Incorporated
  (40 ASDE radar systems)
  Long Island, New York

24–14 Airport Surface Detection Equipment (ASDE–3) Radar



24–15 Long-Range Radar Program

Purpose: This project will provide a national surveillance network by installing the ARSR–4 at both existing and new sites and by replacing or upgrading existing radars that are obsolete or require excessive maintenance.

Accurate and timely data on the presence and movements of aircraft must be continuously available to the en route ATC system so that maximum use of the airspace can be safely afforded to all users.

This replacement/upgrade program will significantly reduce maintenance workload and logistics costs, as well as resolve support problems relating to the nonavailability of spare parts for the existing old radars.

Approach: Replace portions of vacuum–tube radars with solid–state devices. Repair and refurbish other portions and improve tolerance to power fluctuations. Provide limited remote control. These steps will extend the usable life of the vacuum–tube radars. RMM will be provided for all ARSR–3 facilities on a retrofit basis.

Expand the joint use of military radars to supplement existing coverage. Jointly procure with the USAF to replace all joint surveillance system (JSS) radars. Leapfrog ARSR–3 radars from JSS sites to locations with older ARSR/FPS systems.

Products:

- 42 three–dimensional ARSR–4 radar systems, including one for field support and training and three fully funded by DOD.
- 10 ARSR–3 leapfrog relocations.
- Long-range radar relocations as required.
- 76 upgraded en route tube–type radars.

Progress/Activity from December 1991:

- First article built and test in progress.

Related Projects/Activities: 21–12 AAS will receive target and beacon data from these radars. 24–12 Mode S is planned to be collocated and interfaced with the radars. 24–13 ASR. This program will require telecommunications service from the NICS. Long-range radars will be remotely monitored from an MCC (26–01 RMMS). 34–20 Surveillance System Enhancements, 44–39 Sustain/Relocate ARSR, 44–40 LRR Improvements, 44–42 LRR Radome Replacement, 44–43 Radar Pedestal Vibration Analysis, and 56–53 Refurbish AN/FPS–20 Radars are also related projects.

Problems Resulting in Delays:

- The leapfrog of ARSR–3 radars has been delayed because of delays in the ARSR–4 delivery schedule.

Delays Minimized by:

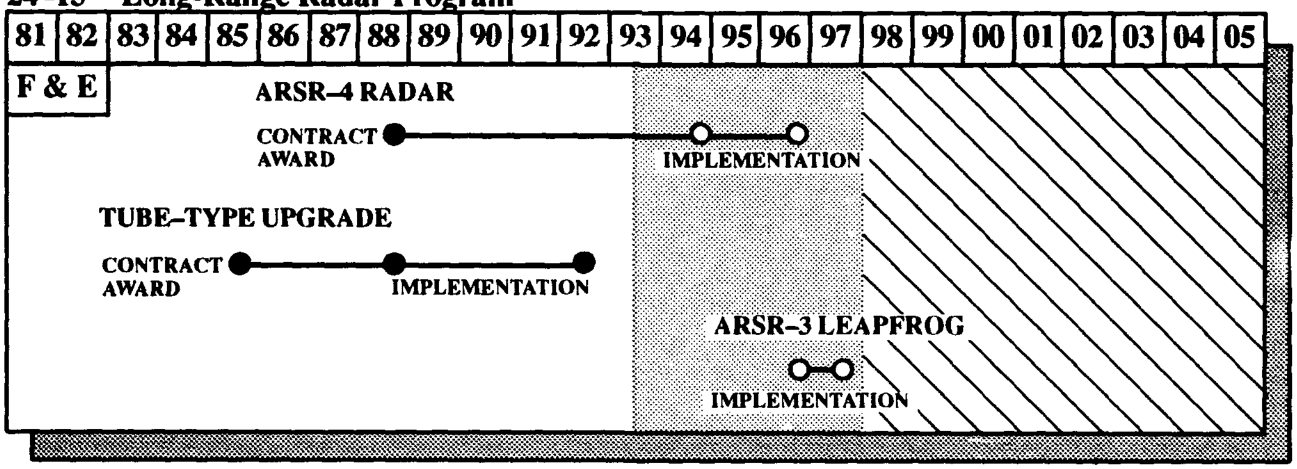
- ARSR–4 schedule stabilized by establishing a second source for solid-state transistors and establishing an industrial incentive program.

List of Contractors:

- Norden Systems, Incorporated
  (64 long-range radar upgrade kits)
  Long Island, New York

- Westinghouse Electric Corporation
  (42 ARSR–4 systems: 39 jointly funded by FAA and DOD and 3 fully funded by DOD)
  Baltimore, Maryland

24–15 Long-Range Radar Program



24–16 Weather Radar Program

Purpose: This project establishes a weather radar network that will provide accurate aviation weather products for en route applications. Radar weather presentations available from today's systems provide limited data for air traffic control. Improved weather data will increase aviation safety and fuel efficiency. In addition to the improvements to be gained in today's system, future automated ATC functions, such as AERA and improved flow management, must have reliable and accurate weather data before maximum fuel efficiency and manpower productivity gains projected for these improvements can be realized.

Approach: This program consists of the definition, development, procurement, and installation of a new Doppler weather radar for en route applications. The long–range Doppler weather radar for en route applications, known as the next generation weather radar (NEXRAD), is being funded jointly by the Department of Commerce (60 percent), the Department of Defense (20 percent), and the FAA (20 percent).

Interim display capability will be provided by principal user processors (PUP) to support operation prior to real-time weather processor (RWP) availability.

Products:

- NEXRAD

– CONUS network (joint purchase with FAA, National Weather Service, and DOD)	113
– FAA	13
– DOD	44
– NWS support	3
– Other	3

- Principal user processors (PUPs) for ACFs and New York MCF — 23

Progress/Activity from December 1991:

- Limited production units delivered and accepted.
- Delivery of full scale production units initiated.

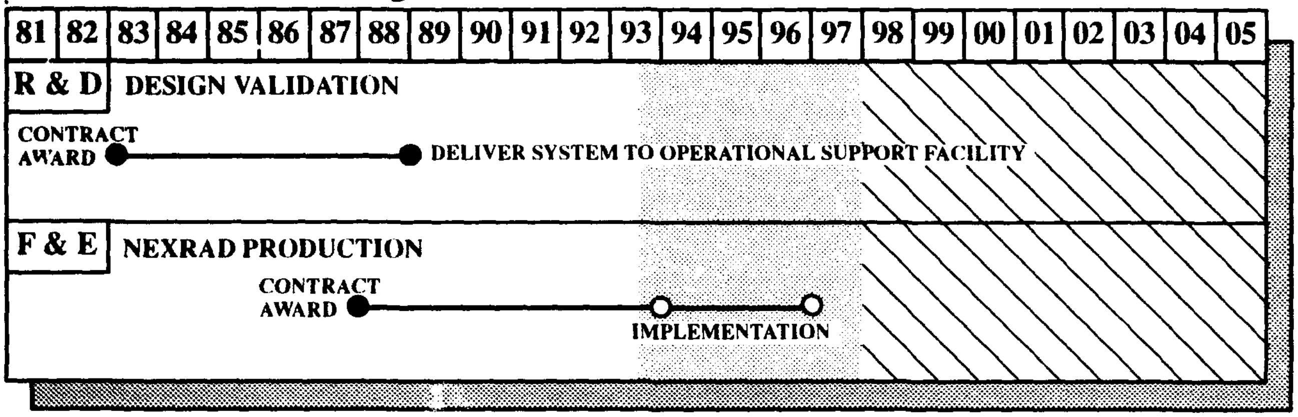
Related Projects/Activities: 23–02 CWP and NICS are related activities. 24–13 Terminal Radar (ASR) Program and 24–18 TDWR are involved with 56–15 NAS Spectrum Engineering Sustained Support since these systems compete for spectrum. FAA non–CONUS NEXRADs will be remote maintenance monitored (26–01 RMMS). 32–24 Chicago Metroplex, 43–02 MWP II, and 45–02 DMN Continuation. 63–22 AWPG provides future improvements to NEXRAD.

List of Contractors:

- Unisys Corporation
  (175 radars, 130 with FAA participation)
  Great Neck, New York

- National Severe Storms Laboratory
  (technical support/algorithm development)
  Norman, Oklahoma

24–16 Weather Radar Program



24–17 Loran-C Systems

Purpose: This project responds to a growing demand for Loran-C random navigation (area navigation) services by the aviation community, particularly in low–altitude, remote, and offshore areas not well served by VOR/DME equipment. Loran-C was developed originally for marine use and is being used for supplemental air navigation by approximately 100,000 users, primarily because of its low acquisition cost and area navigation coverage down to the surface. This is especially attractive for general aviation and rotorcraft operations, as Loran-C can improve access to many airports. Loran-C is intended as a supplemental radio navigation system for aviation use, providing at least single–level coverage for en route and terminal IFR navigation for the contiguous United States. Additionally, nonprecision approaches will be supported where signal requirements are met.

Approach: Studies were completed to define the number and locations of Loran-C stations and signal monitors. Additional Loran-C stations were installed to improve signal coverage for the Gulf of Mexico and fill the midcontinent coverage gap with at least single–level coverage. Signal monitors located at VOR facilities will provide correction values for nonprecision approaches. An interface between the monitors and the VOR will expand the use of the link used to communicate VOR status, performance, and control to also communicate Loran-C monitor data and status.

The FAA provided funds to the United States Coast Guard to procure, operate, and maintain the transmitters under an interagency agreement. Deployment, operation, and maintenance of signal monitors are an FAA responsibility.

Products: Four Loran-C stations were required to complete single–level signal coverage for the 48 contiguous states. There will be 212 monitors provided to support nonprecision approaches, training, logistics, and field support.

Progress/Activity from December 1991:

- Loran signal monitor installation is complete.
- Interface cards have been delivered to the FAA Logistics Center.

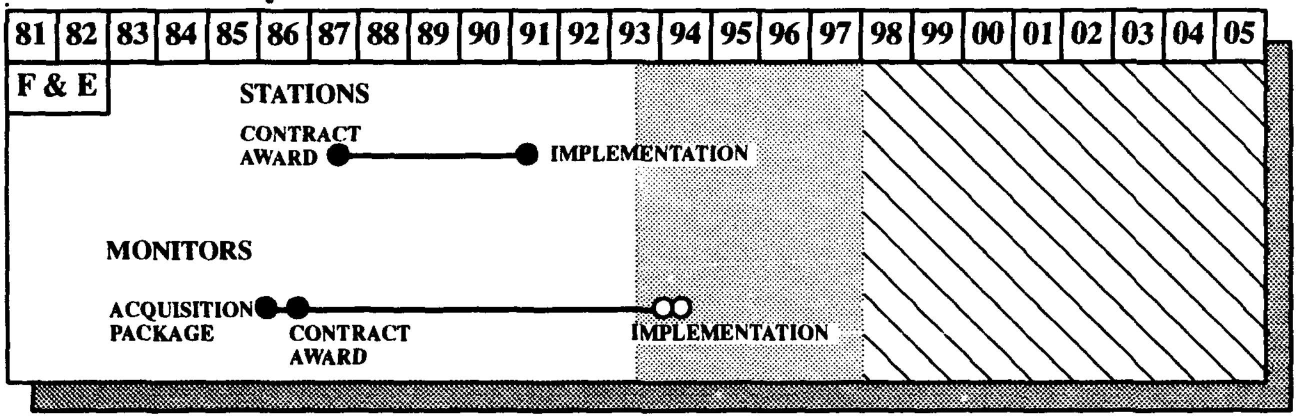
Related Projects/Activities: This project will require telecommunications service from NICS. 24–03 VORTAC, 33–20 AFSS Support Space, 44–14 Sustain VOR/VORTAC, 44–35 Loran-C Monitors and Transmitter Enhancements, 45–02 DMN Continuation, and 64–17 Gulf of Mexico are related projects.

List of Contractors:

- Frontier Engineering, Incorporated
  (212 Loran-C monitors)
  Stillwater, Oklahoma

- Wilcox Electric, Incorporated
  (249 Loran/VORTAC interface cards)
  Kansas City, Missouri

24–17 Loran-C Systems



24–18 Terminal Doppler Weather Radar (TDWR) System

Purpose: This project consists of the procurement and installation of a new TDWR which will detect microbursts, gust fronts, wind shifts, and precipitation. TDWR will be used to provide alerts of hazardous weather conditions in the terminal area and to provide advanced notice of changing wind conditions to permit timely change of active runways.

Microbursts are a weather phenomenon that consist of an intense downdraft that may occur in clear air or in precipitation areas. They are particularly dangerous to aircraft landing or departing. The TDWR scanning mode will be optimized for microburst/windshear detection. The radar will be located near the airport.

Approach: TDWR algorithms were developed by the Government and furnished to the contractor. Data collected using the FAA Doppler weather test bed radar provided the primary basis for algorithm development. This radar, previously used at Memphis, Huntsville, Denver, and Kansas City, is now operating in Orlando. In addition to supporting the algorithm development, the facility will be used to evaluate enhancements for improved algorithms and to evaluate new algorithms on a continuing basis. The system will also be used for operational demonstrations of TDWR display techniques.

A competitive contract was awarded for a contractor–furnished turnkey system to include TDWR design, production, site preparation, installation, and implementation at sites specified and acquired by the Government.

Products: 47 TDWR systems (including 2 support systems).

Progress/Activity from December 1991:

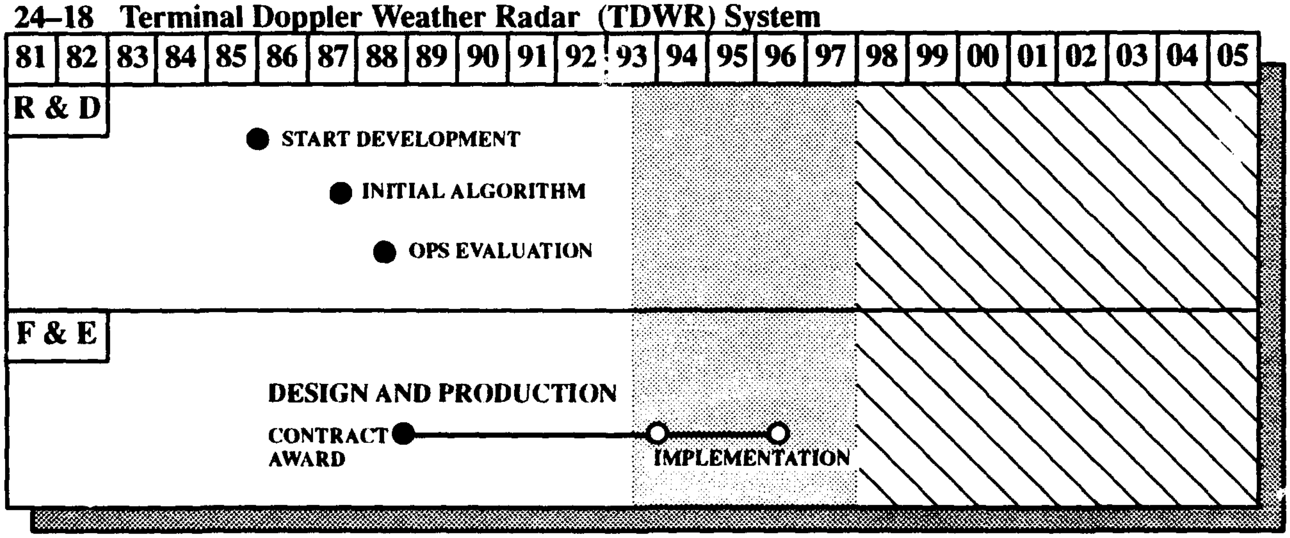
- Integration and shakedown testing completed.
- Operational testing at Oklahoma City and Memphis completed.
- Site preparation and construction proceeding on schedule.
- Air traffic and maintenance training initiated.
- TDWR/LLWAS integration development and design initiated.

Related Projects/Activities: 21–12 AAS. 23–12 LLWAS is related when LLWAS and TDWR are both used at a facility. 24–16 Weather Radar Program, 26–01 RMMS, 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–24 Chicago Metroplex, 43–12 Upgrade LLWAS to Expanded Network Configuration, 45–02 DMN Continuation, 64–13 ASR Windshear Processor and R,E&D Plan projects 021–210 TIDS, 041–120 Airborne Meteorological Sensors, and 042–110 Integrated Airborne Windshear Research are related projects.

List of Contractors:

- Raytheon Corporation
  (47 radar units)
  Sudbury, Massachusetts
- Lincoln Laboratory
  (technical support/algorithm development)
  Sudbury, Massachusetts
- National Center for Atmospheric Research
  (technical support/algorithm development)
  Boulder, Colorado
- National Severe Storms Laboratory
  (technical support/algorithm development)
  Norman, Oklahoma

24–18 Terminal Doppler Weather Radar (TDWR) System



25–08 Radio Control Equipment (RCE)

Purpose: This project provides equipment used to control air/ground radios from a remote location. The RCE is part of the air/ground communications link used to provide voice communications between an air traffic control facility and aircraft. This project will replace the aging, vacuum–tube equipment remaining in the inventory, replace high failure rate equipment, and provide equipment for new air/ground communications links.

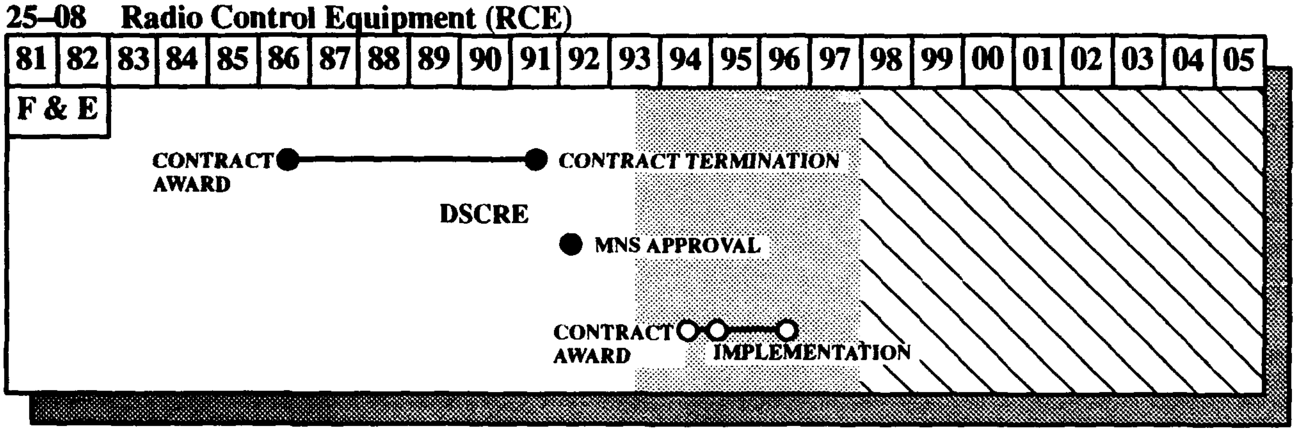
Approach: The original RCE prime contractor was terminated for default in 1991 as a result of failure to make progress, without delivery to any site. Because of problems leading to contract termination, the entire program has been restructured.

A new low–risk approach has been developed to procure the equipment needed to meet the FAA's most urgent requirements. The procurement plan is to acquire current technology, nondevelopmental radio control equipment from commercial vendors through open competition. The technical proposal evaluation will include a.ı operational demonstration to ensure no development work is required to manufacture and implement the RCE system. This will require additional time during the solicitation/evaluation period prior to contract award; however, it will greatly reduce initial system delivery following contract award. This plan will also reduce risk to the Government. The equipment planned for procurement under this approach is usually referred to as the down scoped RCE (DSRCE).

Products: The DSRCE will replace approximately 650 channels of existing equipment and provide up to 1,350 channels of new equipment.

Related Projects/Activities: The DSRCE will be used on air/ground communication links.

25–08 Radio Control Equipment (RCE)



26–01 Remote Maintenance Monitoring System (RMMS)

Purpose: This program provides a system to automate FAA maintenance operations. It provides monitoring and control equipment for most FAA facilities such that equipment performance monitoring, control, and certification can be accomplished from centralized work centers. RMM will permit staffing reductions and consolidation, improve quality of workplace, improve workforce utilization, and increase workforce productivity. When fully implemented, remote maintenance monitoring permits substantial savings in operating cost and manpower.

Approach: Implement the RMMS in an evolutionary fashion to assure a smooth transition of the maintenance automation program.

Remote monitoring subsystems (RMSs) will be employed to collect, store, and transmit performance data as well as to provide the means to remotely adjust, certify, and/or reconfigure the facilities. Systems which are deployed and do not have RMM capabilities will be equipped with RMSs according to the needs of the maintenance work force. Newly designed systems will have RMM embedded.

Maintenance data terminals (MDTs) will be used to access the RMM network. In FY 1989–1991 5,000 MDTs were bought and have been implemented to establish the basic system capabilities.

Maintenance processor subsystems (MPSs) have been installed at all ARTCCs and 9 GNASs to process, store, and route facility data to and from MDTs and RMSs.

Monitor and control software (MCS) in the MPSs will provide the primary facility monitoring and control functions. Interim MCS (IMCS) software is currently installed in all MPSs, and will be used until MCS becomes available.

Maintenance management system (MMS) software is being provided (to run concurrently with MCS in the MPSs) to permit the use of facility data at sectors, work centers, regional offices, and FAA support organizations. MMS will be implemented in two phases: Phase 1 currently provides basic information gathering functions, such as automated facility logs, performance reporting, preventive maintenance scheduling, and a facility, service, and equipment profile data base. Phase 2 will add additional record keeping functions, such as facility modifications, inspections, test equipment management, and personnel training and certification.

Products:

- RMMS software – Interim and final monitor and control software, and maintenance management system software.
- RMMS hardware – 38 MPSs at ARTCCs, GNASs, and field support sectors; up to 5,000 MDTs.
- RMS retrofits – For radar systems, environmental systems, and other facility types shown to be cost beneficial.

Progress/Activity from December 1991:

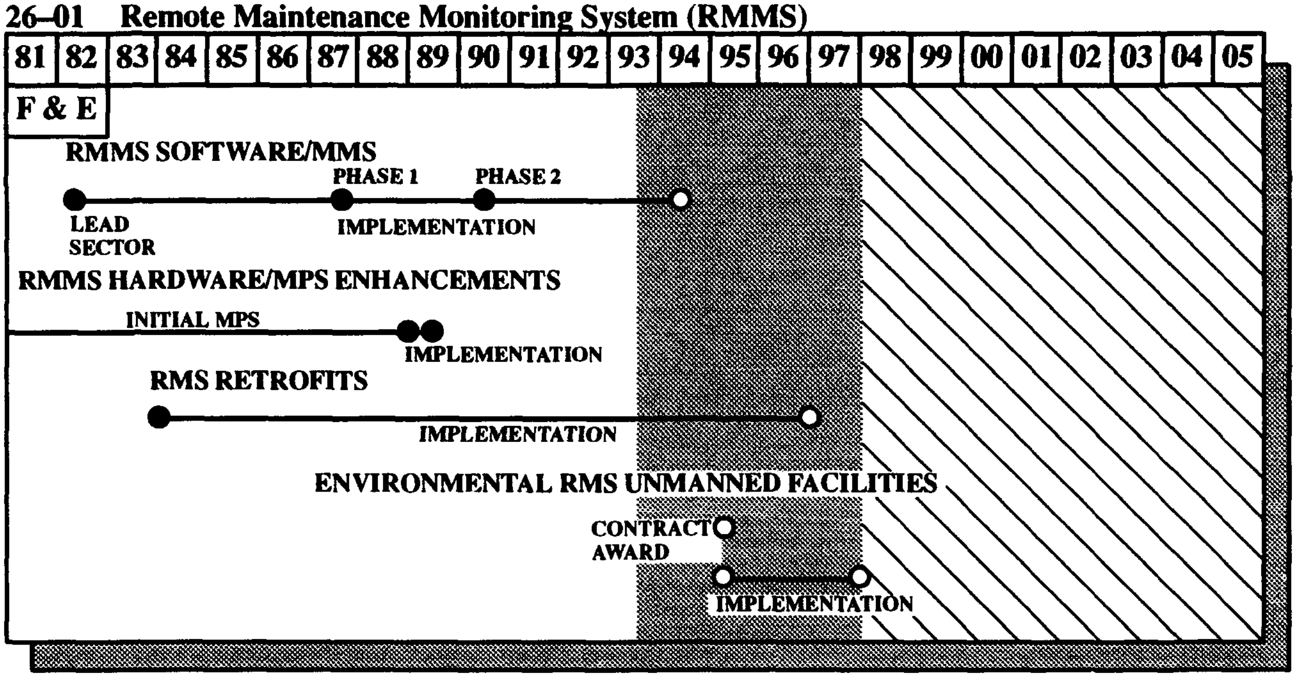
- Final enhancements completed at 11 MPS sites.
- MMS and IMCS enhanced software deployed to all MPS sites.

Related Projects/Activities: The establishment of remote facility monitoring and control from central locations will require coordination and interfaces with most activities, the more significant being: 21–12 AAS, 26–04 MCC, all interfacility communications projects, and project offices with RMS requirements. 46–04 MCC Enhancement, 56–30 Aeronautical Center Training and Support Facilities, and R,E&D Plan project 083–110 AF Maintenance Human Factors are also related projects.

List of Contractors:

- Tandem Computers, Incorporated
  (38 MPS systems)
  Cupertino, California
- International Data Products, Incorporated
  (2,889 MDTs)
  Gaithersburg, Maryland
- American Telephone and Telegraph (AT&T)
  Federal Systems Division
  (approximately 2,000 MDTs)
  Silver Spring, Maryland
- Unisys Corporation
  (MMS and MCS software)
  McLean, Virginia

26–01 Remote Maintenance Monitoring System (RMMS)



26–04 Maintenance Control Center (MCC)

Purpose: This project provides an MCC in two types of facilities: in general NAS sectors (GNASs), known as the GMCC; and in each air route traffic control center (ARTCC), known as AMCC. The MCC is the nerve center for monitoring and control of facilities in a specific jurisdictional area. Should facility failures occur, MCC initiates corrective action and notifies the workforce by telephone or by the regional FM communication network. MCCs also serve as centers for communications and coordination during emergency situations (natural/defense/accident) as well as the primary interface between ATC operations and maintenance support activities. The final configuration will be the result of an evolutionary process incorporating the monitoring of new subsystems as they become part of the NAS.

Approach: Lead sector studies were completed which established the initial procedures and requirements for the GMCC. Prototype GMCC systems were installed and tested at three field sites and are now operational. Production for the remaining 52 GMCC sites started in FY 1992 and will result in the establishment of a GMCC at each Airway Facilities sector.

For the AMCC project, new design–level specifications have been completed and baselined. Design and development of a prototype AMCC are in progress, with testing scheduled at the Technical Center. Production is planned for all ARTCCs.

Products:

- AMCC – Prototypes will be established and tested at the FAA Technical Center prior to production of the field sites.

- GMCC prototypes were completed in 1989. Production units will be deployed to all GNASs, the FAA Technical Center, and the FAA Aeronautical Center.

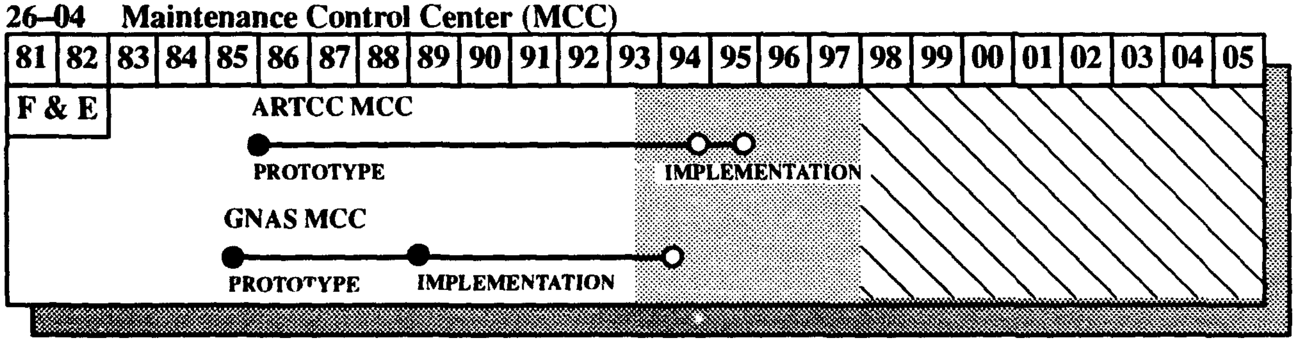
Progress/Activity from December 1991:

- AMCC: New specifications approved. Prototype under development.

- GMCC: Production systems installed in three key sites. All required testing has been completed.

Related Projects/Activities: Systems implemented by this project will use capabilities provided by 26–01 RMMS. The establishment of remote facility monitoring and control from a centralized location will require interfaces and coordination with all NAS program activities implementing RMM capabilities. 46–01 Sustain RMMS. 46–04 MCC will provide follow–on support. 46–28 NAS RCOM and 56–56 NASMAP are related projects.

26–04 Maintenance Control Center (MCC)



26–09 ARTCC Plant Modernization

Purpose: This project ensures that adequate facilities are provided for air route traffic control centers. Certain portions of the ARTCC buildings have been operating in their present configuration since the early 1960's. Within the next five years, much of the existing plant and structures will require replacement, refurbishment, or upgrading. In addition, new requirements have surfaced due to changing energy, safety, security needs, and new equipment installations which may require building additions.

Approach: Modernization designs and site adaptation will be provided by a national contractor. Site–unique designs and construction will be by regional contracts. Construction in ARTCCs specifically required for the implementation of the AAS will be funded under the advanced automation program and other ACF–related programs.

Building expansion, rehabilitation, and modernization include:

- HVAC system and electrical system replacement and upgrade to include critical and essential system switchgear.
- Asbestos abatement and fuel tank replacement.
- Security enhancements.
- Energy conservation.
- Grounds, roads, and parking upgrades.
- Reroofing.
- Central control monitoring system replacement and upgrade.

Products: ARTCC facilities will be involved as follows:

- The 20 existing CONUS centers will house ACFs and will be upgraded as appropriate to provide an additional 20 to 30 years of service.
- Two offshore centers (Anchorage and Honolulu) will continue in service indefinitely and will be converted to ACFs and receive appropriate upgrades. Honolulu will be maintained until the facility is relocated.
- The New York TRACON will receive appropriate upgrades until conversion to an MCF.

Progress/Activity from December 1991:

- The power system site–specific designs are complete for 75 percent of the sites.
- Turn-key for the PCS equipment was started at four sites.
- HVAC Phase 1 is complete and Phase 2 is in process.

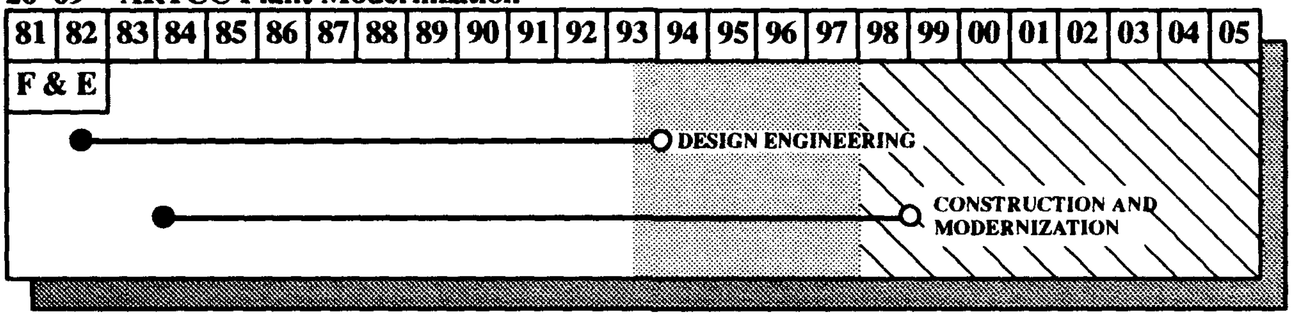
Related Projects/Activities: This project will provide the environment and physical plant interfaces with 21–12 AAS. This mandates an integrated planning and engineering effort to assure the adequacy of the end product and prevent duplication of work. Funds to upgrade the existing PCS will be integrated into the overall master facility modernization plan. 32–44 Advanced Facility Planning, 36–20 ARTCC/ACF Support Space, 46–09 Sustain ARTCC/ACF Facilities, and 56–60 ISMS.

List of Contractors:

- Martin Marietta Corporation
  Air Traffic Systems
  (architectural and engineering support)
  Washington, District of Columbia

- Ralph M. Parsons Company
  Pasadena, California
- Sverdrup Corporation
  (architectural and engineering support)
  Arlington, Virginia
- Various regional contractors

26–09 ARTCC Plant Modernization



26–10 Acquisition of Flight Service Facilities

Purpose: This project acquires the space required to accommodate the modernized FSS configuration of 61 facilities.

Approach: Space for the 61 automated FSSs is being acquired on a sponsor–leased or FAA–provided basis at selected airports throughout the United States and Puerto Rico. The 61 facilities are being designed in accordance with standard FAA operational and technical requirements. These 61 automated facilities range from 8,000 to 12,000 square feet and accommodate all personnel and equipment requirements.

All 61 sites have been selected and 59 facilities have been commissioned. The remaining two are in the design stage.

The following factors are considered in evaluating sponsors' proposals for building facilities:

- Life–cycle cost, which includes all FAA costs associated with a particular location, such as one–time costs, lease costs, maintenance, utility, and service costs. The analysis also considers both lease construction and FAA construction in determining the most cost–effective method.
- Building factors which include location on airport and parking provisions, suitability of technical and administrative space, and electrical distribution and telephone facilities.
- Other factors include telephone exchange capability, number of employees to be relocated, availability of quality housing, number of aircraft operations, and number of based aircraft.

Products: 61 automated flight service station facilities.

Progress/Activity from December 1991:

- The automated FSS site was selected for San Juan, Puerto Rico.

Related Projects/Activities: 23–01 FSAS will be located at the facilities provided by this project. 23–13 ICSS provides the computer–based switching and control equipment required to support FSS air/ground and ground/ground voice communications. 33–20 AFSS Support Space will upgrade several AFSSs. 43–22 FSAS OASIS is a related project

Problems Resulting in Delays:

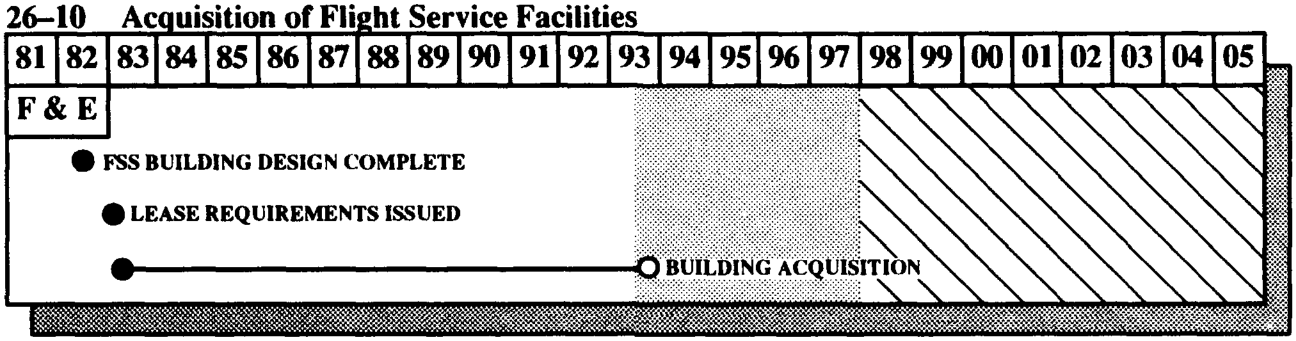
- The building contract for the Honolulu automated FSS was delayed due to a change in building size requirements.

Delays Minimized by:

- The contract for the Honolulu site was modified to include the revised requirements, and the schedule was adjusted accordingly.

List of Contractors: Facility modification/construction contractors are determined by each individual region as required.

26–10 Acquisition of Flight Service Facilities



26–13 System Engineering and Integration Contract (SEIC)

Purpose: This project provides management and technical support for the implementation of the CIP. The complexity and high visibility of this Plan required that unified contractual support be provided to:

- Provide CIP updates.
- Ensure compatibility of existing and evolving systems.
- Identify and compare alternative implementation strategies.
- Assess program impacts.
- Refine technical, cost, and schedule estimates.
- Review technical proposals.
- Evaluate alternative designs.
- Provide technical direction to subsystem contractors.

- Ensure that developed items meet specified requirements.

- Integrate subsystems into the operational system.

The requirement for technical expertise in the support of the large systems engineering and implementation effort cannot be met with the available FAA staff.

Approach: A contract was awarded in 1984 and provides the skills and support tools necessary for implementation of CIP projects and integration of acquired systems. An option was exercised in 1989 to cover support into 1992. The second option, now exercised, will provide support into 1994.

Products: Engineering documentation and management support for:

- CIP updates.

- Program support in the development of functional requirements statements, feasibility and trade studies, performance analyses and model, system designs, system integration plans, system implementation strategies, logistics, and training plans.

- Project management support for requirements analysis, specification development, procurement package review, proposal evaluation, contract monitoring and technical evaluation, and direction of field installation.

- Control tools and systems for benefits analysis, cost analysis, schedule analysis, risk analysis, configuration management, and program control and monitoring.

Progress/Activity from December 1991:

- Led DOT interagency effort to demonstrate utility and application of GPS to all modes of transportation. Effort included a GPS video, brochure, and a live demonstration.

- Completed transition plans for several ARTCC sites. Also completed site-specific engineering and design packages for floor plan design.

- Developed and implemented a plan to provide an alternate CIP reflecting a limited ATC facility consolidation architecture.

- Drafted the Precision Landing System Implementation Plan, a strategic plan that defines the GPS role and time phased data of MLS/ILS/GPS.

Related Projects/Activities: Most of the original projects are supported by the SEIC.

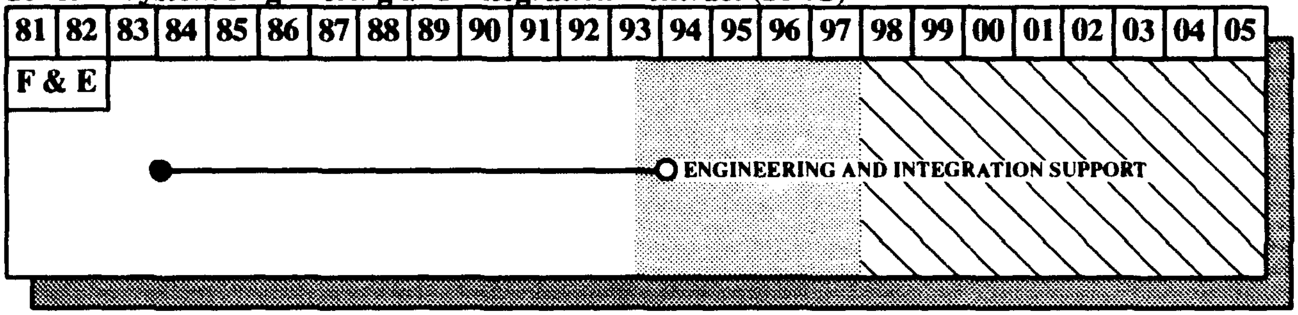
List of Contractors:

- Martin Marietta Corporation
  Air Traffic Systems
  (systems engineering and integration support)
  Washington, District of Columbia

  - Logicon, Incorporated
    San Pedro, California
  - ARINC Research Corporation
    Annapolis, Maryland
  - Ralph M. Parsons Company
    Pasadena, California
  - Stanford Telecommunications, Inc.
    Sunnyvale, California
  - Systems Control Technology, Inc.
    Palo Alto, California
  - EER Systems Corporation
    Vienna, Virginia
  - BTG, Incorporated
    Vienna, Virginia

- MITRE Corporation
  (system development and engineering)
  McLean, Virginia

26–13 System Engineering and Integration Contract (SEIC)



26–16 General Support

Purpose: This project covers efforts in direct support of the overall national airspace system and the ongoing F&E investments that are not covered elsewhere in the plan. These efforts generally improve operations, provide added capabilities, and promote safety.

Approach: Nonrecurring, low–cost F&E projects which have been included in budget requests are: information processors for the aviation safety analysis system; universal printed circuit board testers for installation at planned consolidated maintenance facilities; explosive detection systems; procuring calibration standards to certify test equipment; a computer–aided engineering design system at each regional office; and three–level weather for ARTCC displays.

Certain ongoing efforts must continue to support the NAS, including in–house and contractual engineering, design, and analysis for quick–reaction engineering and other technical assistance; minor regional and locally identified modifications, refurbishments, and equipment relocations; improvement and leasing of FAA Technical Center plant and facilities; earthquake hazard reduction of facilities; procurement, rehabilitation, or replacement of equipment for use in the engineering and development programs at the FAA Technical Center; where cost beneficial, purchasing land or acquiring protective easements for existing facilities rather than continuing to lease properties; real estate and contract management; upgrading of existing support equipment; en route hardware and software systems development and support; ATCRBS support; ARTS II MSAW topography and graphics; ARTS IIIA, ARTS II/IIA, EARTS, and ARTS IIIE software development and system engineering; and projects to meet Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) standards at FAA facilities.

Products:

- Nonrecurring projects.
  - Information processors to support the aviation safety analysis system.
  - Printed circuit board testers.
  - Explosive detection systems.
  - Upgrade the FAA Technical Center plant support complex.
  - Computer–aided engineering design systems.
  - Test equipment calibration standards.
  - Install false reply blanking units at 30 terminal beacon sites.

- Three-level weather for ARTCC displays.

- Ongoing projects.
  - Engineering, designs, and analyses.
  - Regional and local minor projects.
  - Improvements of the plant and facilities at the FAA Technical Center.
  - FAA Technical Center building lease.
  - Purchase and leasing of land and easements.
  - Regional logistics contract support.
  - OSHA and EPA improvements.
  - Printed circuit board maintenance software.
  - Airports precise reference data program.
  - Leasing of space.
  - Earthquake hazards reduction.
  - ARTS II MSAW topography and graphics.
  - ARTS III support.
  - En route hardware and software systems support.
  - ATCRBS support.
  - Terminal software development (TSD).

Related Projects/Activities: This program supports ongoing F&E efforts and operations. 46–16 Continued General Support provides follow-on support. 46–26 NAS Facilities OSHA and Environmental Standards Compliance.

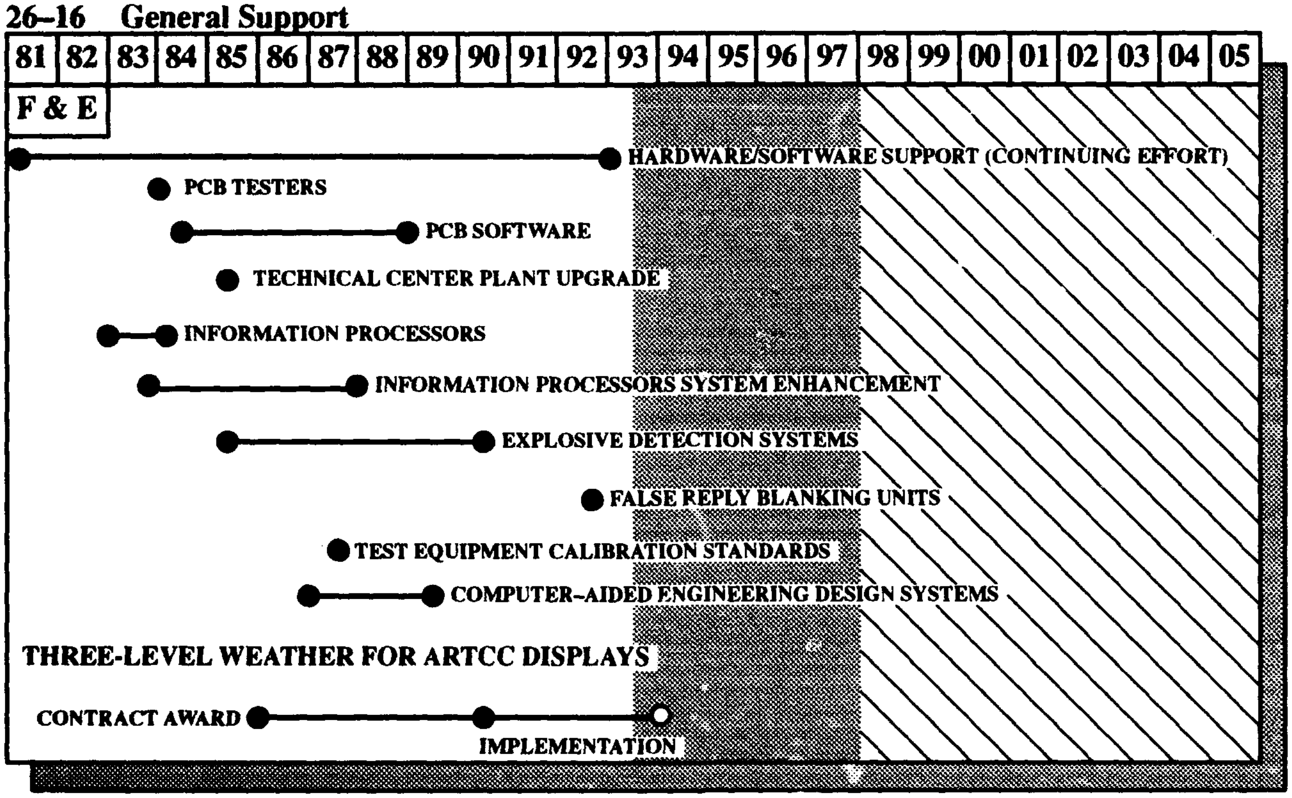
List of Contractors:

- Telephonics Corporation
  (CD–2 weather modification kits)
  Farmingdale, New York

- Auto–Trol Technology Corporation
  (CAEG systems)
  Denver, Colorado

- Most contracts are administered at the regional level.

26–16 General Support



26–19 Technical Support Services

Purpose: This project provides technical services to supplement region, FAA Aeronautical Center, and FAA Technical Center facilities and equipment (F&E) staff efforts necessary to implement NAS improvements. These improvements were anticipated to create peak implementation work requirements on FAA region and center organizations which could not be accommodated within current and projected staffing levels. Analysis of Agency requirements in the 1980's indicated it would not be prudent management to increase the Federal work force to meet anticipated short–term peak work requirements. Since then, NAS modernization schedules have expanded into the future, and the workload requirements have been extended with them. This project has evolved and now provides level-of-effort resources to meet ongoing NAS modernization requirements which exceed Agency staff availabilities.

Approach: A national technical support services contract (TSSC) has been awarded to provide a means whereby regions and centers can obtain the support required to accomplish their F&E mission. This support involves site preparation, equipment installation and tune–up, hands–on testing, and equipment modifications. Another TSSC acquisition is under development. It will allow the FAA to obtain F&E resources to meet its future NAS modernization requirements.

Work under the TSSC is issued to the contractor via a work release which may cover any portion of the "hands on" effort necessary to complete a particular project. Work releases are issued and managed by headquarters for work which is national in scope (cuts across regional boundaries and involves most regions) or in the more common form, issued and managed by and for individual regions. The contract structure provides the capability for the contractor to begin work within 30 to 60 days following issuance of a work release. Most F&E funded projects may be considered for implementation support under this contract.

Funds are obligated via contract modifications which identify planned projects. Work releases are written periodically against routine contract modifications. Emergency modifications to accommodate "pop–up" requirements are initiated as needed.

Funding to support the projects is provided from two sources. Funding for project materials and site preparation costs is provided within other CIP project costs. Funding for overall management is provided on a national basis.

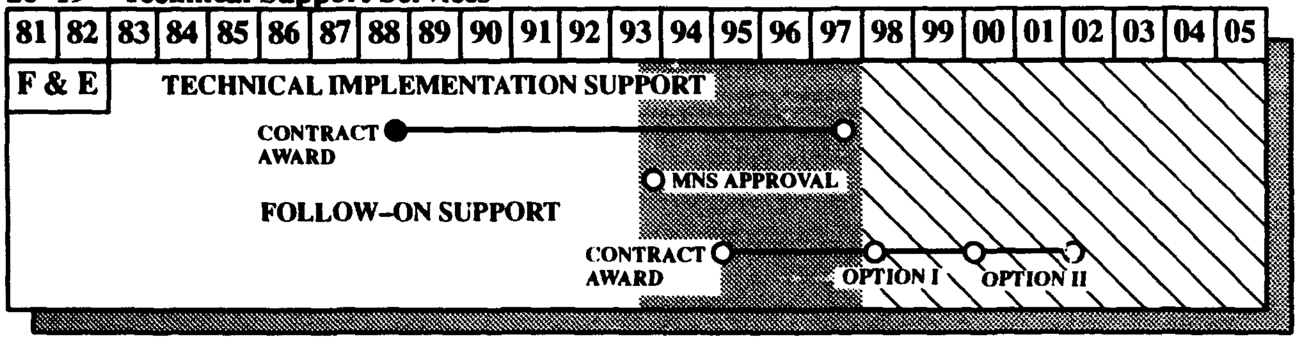
Products: Support regions and centers in completing NAS improvement and implementation.

Related Projects/Activities: Support to many F&E projects.

List of Contractors:

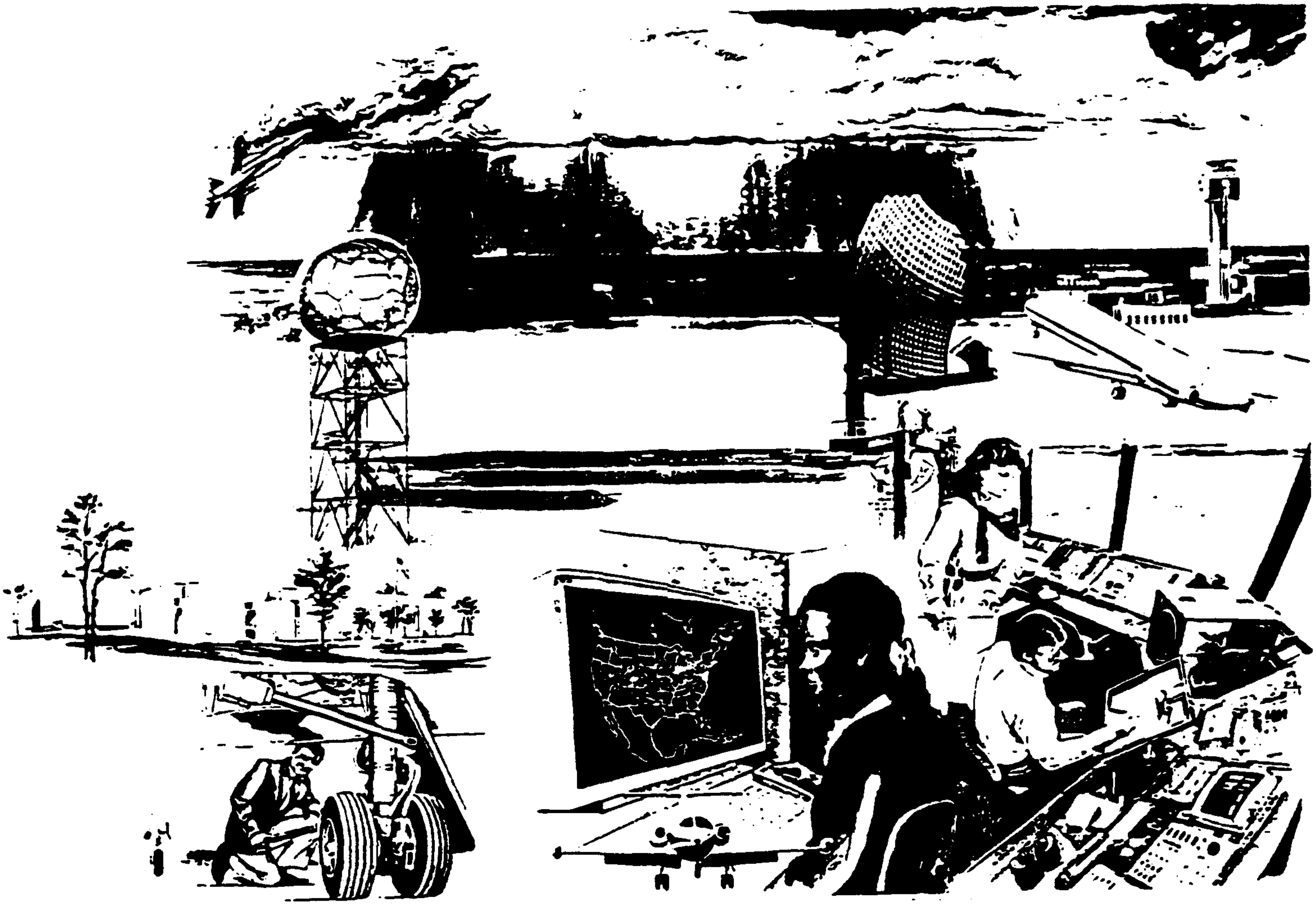
- Raytheon Service Company
  (technical services)
  Washington, District of Columbia

26–19 Technical Support Services



Chapter 3: Growth

The Growth chapter describes those requirements that expand, relocate, or consolidate existing facilities/equipment.



CHAPTER 3
GROWTH

The purpose of this chapter is to identify major areas where growth will occur, and ensure that the FAA takes appropriate measures to accommodate it. Growth in air transportation often results in changes in demand, requirements, or goals of the national airspace system (NAS). This chapter identifies areas and items that respond to actual or forecasted growth. These items often involve efforts/activities being planned or carried out external to the FAA. For instance, many airports that function as airline hubs are planning additional runways and gates. These types of rapid growth will increase demand on NAS air traffic control (ATC) and may affect system capacity, safety, and operability.

This chapter also identifies long–range items that lead to increases in demand on the system. These emerging requirements are being evaluated and, until firm requirements are established, will only be addressed in the introductory narrative. Schedules are included for decisions to be made at future dates.

A significant amount of growth results from the gradual increase in air carrier operations and enplanements. Growth raises requirements for new airports and new runways. It also causes new requirements to support other agencies and to develop and implement new FAA concepts, apply new technologies, reduce costs, and make other changes to meet user demand.

The decision to commit to a limited TRACON consolidation strategy drives the need for new projects for metroplex control facilities (MCFs) in certain major metropolitan areas. These MCFs will allow for improved airspace management. That is, by collocating the TRACONs for all of the airports within a small geographic area into one facility, it becomes much easier to manage the entire airspace as a single entity. For example, in southern California, there is a huge operational complexity associated with managing and coordinating arrival and departure traffic to the closely–spaced major airports (Los Angeles International, Burbank, John Wayne, Ontario, San Diego, etc.) coincident with the large number of general aviation and military aircraft transitioning the same area. A single southern California MCF can handle this complexity much more easily by permitting easier communications and coordination between previously separated controllers. At the same time, it can permit a greater commonality of airspace rules and procedures, enabling both simpler rules for pilots and better use of the airspace capacity. Because MCFs are a way of handling NAS growth, they are described in this chapter.

The ATC system is generally adequate for today's demand, but a number of major airports are congested. The FAA's 1993 Aviation System Capacity Plan lists 23 airports where airline aircraft experienced more than 20,000 hours of delay in 1992. Table 3–1 lists these airports.

Table 3-1. Airports Experiencing More Than 20,000 Hours of Delay to Airlines in 1992

Atlanta, GA	Hartsfield International	Minneapolis, MN	Minneapolis–St. Paul Intl.
Boston, MA	Logan International	New York, NY	La Guardia
Charlotte, NC	Charlotte/Douglas Intl.	New York, NY	Kennedy International
Chicago, IL	O'Hare International	Newark, NJ	International
Dallas/Ft Worth, TX	International	Orlando, FL	International
Denver, CO	Stapleton International	Philadelphia, PA	International
Detroit, MI	Metropolitan Wayne County	Phoenix, AZ	Sky Harbor International
		Pittsburgh, PA	International
Honolulu, HI	International	San Francisco, CA	International
Houston, TX	Intercontinental	Seattle, WA	Seattle–Tacoma Intl.
Los Angeles, CA	International	St. Louis, MO	Lambert/St. Louis Intl.
Miami, FL	International	Washington, DC	Washington National

To meet increased demand and reduce congestion, a major new airport is being constructed in Denver. FAA is building and equipping the new ATC systems at this location. New airport planning is progressing in Los Angeles, Miami, Minneapolis, Atlanta, Boston, San Diego, Austin, and Chicago. Major airport improvements are planned at Dallas/Fort Worth, Chicago O'Hare, Atlanta, Newark, Boston, St. Louis, Detroit, Honolulu, Washington National and Dulles, Philadelphia, New York JFK, San Diego, Memphis, New Orleans, Salt Lake City, and Baltimore-Washington International. Some Department of Defense (DOD) ATC operations will transfer to the FAA. By 2000 there will be more civil use of military airfields. Some military airfields may be entirely transferred to the civilian aviation system. Table 3–2 lists the 33 airports forecasted to increase to 20,000 hours of delay by 2002.

Table 3-2. Airports Forecasted to have 20,000 or More Hours of Delay to Airlines by 2002

Atlanta, GA	Hartsfield International
Baltimore, MD	Baltimore–Washington International
Boston, MA	Logan International
Charlotte, NC	Charlotte/Douglas International
Chicago, IL	O'Hare International
Covington/Cincinnati (OH), KY	International
Dallas/Ft Worth, TX	International
Detroit, MI	Metropolitan Wayne County
Honolulu, HI	International
Houston, TX	Intercontinental
Las Vegas, NV	McCarran International
Los Angeles, CA	International
Memphis, TN	International
Miami, FL	International
Minneapolis, MN	Minneapolis–St. Paul International
Nashville, TN	International
New York, NY	Kennedy International
New York, NY	La Guardia
Newark, NJ	International
Ontario, CA	Ontario International
Orlando, FL	International
Philadelphia, PA	International
Phoenix, AZ	Sky Harbor International
Pittsburgh, PA	International
Raleigh–Durham, NC	International
Salt Lake City, UT	International
San Diego, CA	International – Lindbergh Field
San Francisco, CA	International
Seattle, WA	Seattle–Tacoma International
St. Louis, MO	Lambert/St Louis International
Washington, DC	Dulles International
Washington, DC	Washington National
Windsor Locks, CT	Bradley International

FAA has identified six major areas of growth: DOD to FAA ATC operations transfer, metroplex control facilities, civil use of military airfields, major new airports, major airport expansion, and hubbing.

The FAA must acquire facilities and equipment to handle the added requirements from the aforementioned growth areas.

DOD TO FAA ATC OPERATIONS TRANSFER

The DOD currently has responsibility for 60 terminal radar approach control (TRACON) facility operations in the NAS. In accordance with the DOD/FAA Memorandum of Agreement (MOA) of 1988 (as revised in 1993) and its associated interagency subagreements, responsibility for several DOD terminal approach control operations will transfer to the FAA. In addition, a small number of current FAA approach control operations will be accomplished by modernized military approach control facilities. It is expected that these transfers will enlarge the FAA's NAS architecture.

Two of the FAA/DOD agreed–upon air force base (AFB) transfers will be accomplished earlier than originally scheduled. Pease AFB, NH, closed in January 1991. The Pease approach control functions were absorbed into the Manchester, NH, TRACON in 1991. The approach control functions at Scott AFB, IL, will be absorbed by the St. Louis TRACON in 1994.

Given the NAS architecture change driven by the FAA limited consolidation decision, a new plan is being developed for final locations and timing of the transferred TRACON functions. When implemented, FAA controllers will provide service to those military airfields from an FAA facility (e.g., an MCF, adjacent stand–alone facility, or assumption of the military facility). To date, three military TRACONs have been identified specifically for consolidation to a MCF. The remainder of the military TRACONs still must be evaluated for best final operational location and appropriate time of transfer.

A comprehensive transition plan is being developed jointly with the DOD to identify facilities and functions to be transferred and services to be provided. Activity is underway on a site–by–site basis to identify the facilities and equipment needed to support this effort. As the planning effort matures, the facilities and equipment needed to support this growth will be identified and listed in this chapter.

METROPLEX CONTROL FACILITIES

As indicated previously, the decision to pursue a limited TRACON consolidation strategy has driven the need for MCF as exceptions to the general rule. That is, normally MCFs will be established only when determined to be operationally justified and cost beneficial in accordance with approved MCF investment criteria. TRACON consolidation or collocation will be accomplished where determined to be cost effective or when mission need dictates.

To date, five specific locations have been shown to have these major operational advantages: southern California, New York, Chicago, Dallas/Fort Worth, and Denver. Each of these areas is characterized by a dense confluence of terminal and en route traffic, closely–spaced and highly–interactive major airports, current airspace rules and procedures complexity, and a wide diversity of commercial, general aviation, and military users. Creation of a single MCF in each area will go a long way towards simplifying the airspace control procedures for the FAA. Moreover, it can materially improve airport capacity use by ensuring a smooth and steady transition from en route to terminal operations, and vice versa. For example, by collocating the Milwaukee, South Bend, and Rockford TRACONs into the new Chicago Metroplex, the traffic flow in and out of the Chicago metro area will substantially smooth out the north–south and east–west information flow derived from the outlying TRACONs.

The Denver MCF and Dallas/Fort Worth MCF have a slightly different justification. Initially, Denver and Dallas/Fort Worth will support the parent airport. Denver and Dallas/Fort Worth simply do not have the same urgent operational issues as the other areas for TRACON consolidation, (e.g., major airports operating closely together). Later, however, it is planned to relocate the Colorado Springs and Pueblo TRACONs to improve inbound–outbound Denver traffic flows.

Four other areas have been identified as possible MCF sites: Potomac (Washington–Baltimore area), northern California (San Francisco Bay area), central Florida (Orlando–Tampa area), and Atlanta. Each of these is currently being evaluated against operational and cost–benefit criteria, and will be phased in through this CIP and budget process as they are shown to be essential.

There are two separate scenarios visualized for MCF construction and implementation. For those MCFs already under construction or already operational (southern California, Dallas/Fort Worth, Denver and Chicago), initial implementation will be based on installation of existing automated radar terminal systems (either ARTS IIIA or ARTS IIIE). Later, the terminal advanced automation system (TAAS) will be installed when it is available. After a period of dual ARTS/TAAS operations in the MCF, the ARTS equipment will be deactivated and removed. For those MCFs that have not been approved or where construction has not started (Potomac, northern California, central Florida, and Atlanta), there will be no interim ARTS stage in the new MCF building. Instead, TAAS will be installed as the initial system. There will be a dual period of ARTS operation at the old facility and TAAS operation at the new facility, after which the old facility and its ARTS will be deactivated.

In both cases, additional TRACON consolidations into the MCF will be scheduled when they are needed for operational reasons. For example, southern California consolidation will be completed well before TAAS becomes available. In other cases (e.g., Chicago), there is less urgency for TRACON consolidation and more need to replace the TRACON itself (in this case, to provide urgently needed growth for the O'Hare TRACON). In Chicago, TRACON consolidation will occur after TAAS is delivered and fully operational.

CIVIL USE OF MILITARY AIRFIELDS

Civil use of military airfields, either through joint use agreements or surplus property agreements, can have a significant effect on the demand for support facilities and services. A joint use agreement has been negotiated for Scott AFB, 18 miles east of St. Louis, for development of a new civil runway. Surplus property agreements will or are being developed for military airfields.

Further, in 1991, the Defense Base Closure and Realignment Commission recommended 70 military establishments be closed. In 1993, the commission recommended closing an additional 140 military establishments. The President and Congress approved both of these lists under Public Law 101–510. The Secretary of Defense must begin to close the bases listed in the report within two years and complete the action within six years. It is anticipated most of these airfields will be conveyed to public ownership and continue to be used as civil airports. A tentative schedule of closures of the airfields is shown in Table 3–3. The growth of civil activity at these airfields is likely to be gradual, and the FAA's major challenge is to develop a smooth transition plan from military to civil support of radar, instrument landing systems (ILSs), or other facilities/systems with the intent to provide supplementary facilities to replace or complement precision approach radar.

Once a decision has been made to transfer selected military facilities to the FAA, they will be analyzed to determine if they are affected by current or projected limited consolidation programs.

Table 3-3. Approved Military Base Closures

1991	1992	1993	1994	1995	1996	1997
Pease AFB, NH	*Eaker AFB, AR	*Bergstrom AFB, TX	*Fritzsche AAF, CA	*Castle AFB, CA	March AFB, CA	El Toro MCAS, CA
	*England AFB, LA	**Carswell AFB, TX	*Grissom AFB, IN	Hamilton AAF, CA	*Tustin MCAS, CA	Alameda NAS, CA
	*George, AFB, CA	*Chanute AFB, IL	*Loring AFB, ME	*Tipton AAF, MD	Plattsburg AFB, NY	Agana NAS, Guam
		*Chase NAS, TX	*MacDil AFB, FL	Glenview NAS, IL	Barbers NAS, HI	
		Mather AFB, CA	*Norton AFB, CA	Griffis AFB, NY	Cecil NAS, FL	
		*Williams AFB, AZ	*Rickenbacker AFB, OH	K. I. Sawyer AFB, MI	Newark AFB, OH	
		*Myrtle Beach AFB, SC	*Moore AAF, MA			
		*Wurtsmith AFB, MI	*Moffett NAS, CA			
		Midway Island NAS	*Richards Gebaur AFB, MO			
			Homestead AFB, FL			
			Lowry AFB, CO			
			Dallas NAS, TX			
			Memphis NAS, TN			

Dates are Calendar years.

* 1991 Defense Base Closure and Realignment Commission Decisions.
** Transfered to Navy as identified in the 1993 Commission Decision.

AAF – Army Air Field
AFB – Air Force Base
ARS – Air Reserve Station
MCAS – Marine Corp Air Station
NADC – Naval Air Development Center
NAS – Naval Air Station

This plan considers the possible effects of civil use of military airfields, including the redistribution and relocation of air traffic, the assumption or replacement by FAA of essential radar and other facilities previously provided by the military, and the requirement for new facilities, equipment, and services.

It is important to review the status of military airfields on a regular basis. Changing military missions and budget constraints will result in additional base closures in the future. There generally is a transition period of two to five years from the time a base closure is announced until termination of the military use of the facility. The FAA uses this time to work with the civil aviation community to plan the transition to civil use.

MAJOR NEW AIRPORTS

Major new airports will create significant demands for ATC equipment. The airports will require the establishment, modernization, and relocation of a variety of facilities and equipment. A project has been included in this plan for the FAA facilities and equipment required to support the airport construction in Denver. Additional airports are anticipated in the future, including commercial service airports for the Chicago, Los Angeles, San Diego, New Orleans, Minneapolis, Boston, Miami, and Austin areas.

The FAA office responsible for program management, working jointly with the appropriate regional offices, will provide for the planning, engineering, procurement, installation, and integration of the FAA facilities and equipment required to support the establishment of new airports. Total project funding is being requested and provided on a multiyear basis for each individual airport. Necessary acquisitions will be accomplished through existing projects for facilities and equipment described in various chapters of this plan.

A summary description of new and proposed airports follows, and detailed information is provided on individual project sheets contained in this chapter.

Denver, Colorado

The city and county of Denver are constructing a major new international airport to replace the existing Stapleton Airport. The new airport will function as a major airline transfer point for east/west traffic, providing increased capacity to support the growing needs of the air transportation system. Initially, the airport will have 5 runways and may eventually grow to 12.

Austin, Texas

Austin is one of the fastest growing communities in the southwest, and air travel in that area has increased to a point of near saturation. The growth has exceeded the official forecasts to the point of unacceptable conditions during peak demands. The expansion of the present Robert Mueller Airport is limited by noise, land use, and airspace considerations. The city has passed a resolution to relocate airport operations to Bergstrom AFB.

Chicago, Illinois

Expansion of the existing Chicago O'Hare International Airport is required to meet current airport operations and accommodate forecasted growth for the future. However, due to physical constraints and environmental concerns, extensive expansion is not practical.

A site selection study is now underway for a third major airport in the Chicago area to increase the air traffic system capacity, reduce delays, enhance air traffic safety, and provide for future expansion. It is imperative for the FAA to plan and start design for the facilities and equipment requirements. Initial actions to effect the development include the necessary engineering studies, design application, and program support.

Minneapolis/St. Paul, Minnesota

This international airport is congested and its expansion is limited by land use and noise constraints. The airport is a major airline hub and serves a substantial origin and destination market. At present, a potential site has been recommended and further studies are being conducted.

Miami, Florida

In light of the announced closure of Homestead AFB, Dade County, Florida, has passed a resolution to become a civil sponsor for the base. It is intended that this location will become a civil reliever airport for Miami International.

MAJOR AIRPORT EXPANSION

The expansion of existing airports normally requires new approach aids and relocation of existing facilities. This plan provides for monitoring the progress of new runways to provide FAA support for facilities and services.

Precise timing of new runway construction depends on several favorable factors, including environmental acceptability, availability of funding, and, in some cases, the concurrence of airlines. It takes about two years between the commitment to build and the actual commissioning of a new runway. This is a relatively short time for facilities and equipment programming purposes, so it is important to provide a certain amount of flexibility to adjust or reprogram needed facilities when runway construction schedules change.

New runways are proposed or under construction at a number of major airports including Atlanta, Charlotte, Dallas/Fort Worth, Detroit, Houston, Kansas City, Louisville, Memphis, New Orleans, Orlando, Philadelphia, Phoenix, Pittsburgh, Raleigh-Durham, St. Louis, Salt Lake City, and Washington Dulles.

Some new runways are planned to correct situations where parallel runways were developed so close together that they cannot be fully used during adverse weather. For example, the proposed runways in Philadelphia and St. Louis are intended to permit independent approaches to parallel runways during all weather conditions, correcting a current imbalance between visual meteorological conditions (VMC) and instrument meteorological conditions (IMC) capacities.

Most new runways are intended to accommodate a gradual increase in activity which may be due to airline hub operations (Charlotte, Dallas/Fort Worth, Pittsburgh, Raleigh–Durham, and Salt Lake City), the growing travel demands of metropolitan areas (Houston, Phoenix, and Washington Dulles), attempts to attract hubbing operations (Kansas City and Louisville), or support of tourism (New Orleans and Orlando).

The increase in aircraft operations is usually gradual, and is forecasted to average approximately three percent annually. In response to this increase, FAA acquisitions of facilities and equipment will be accomplished through projects in various chapters in this plan. Major efforts, such as Dallas/Fort Worth, will have individual projects developed because of their significant impact on multiple components of the NAS. These efforts can be characterized by major facility expansion/relocation and extensive airspace realignment.

HUBBING

The greatest increase in airport activity during the past 10 years occurred at airline hubs. Airlines concentrate a large number of flights at these airports within a short time to facilitate passenger transfers. The banks of connecting flights involve large numbers of jet transports and smaller commuter aircraft, offering passengers a wide choice of destinations. Airline decisions to hub at particular airports have a significant impact on the FAA, increasing ATC workload and requiring additional facilities and services. Some of these airline decisions are difficult to anticipate because they are made quickly in a competitive business environment.

Hubbing will continue to affect FAA requirements in the future. A number of hubs are not yet fully used, and airlines will add flights as demand grows and additional aircraft are purchased. The growth at these airports will be gradual and to some degree predictable. The FAA will monitor these airports to anticipate resource requirements.

Additional hubs may be developed but the current slowdown in demand suggests that this will not occur during the next few years. The development of new hubs will be carefully monitored, but will inevitably involve short notice to the FAA, so a certain amount of flexibility must be maintained to respond effectively to unexpected developments.

No En Route Projects in this Chapter

32–04 Provide ARTS IIIE Upgrades for Select Air Traffic Facilities

Purpose: Because of growth to the NAS, some ARTS IIIA facilities have near-term operational requirements that exceed the design limits of their hardware and software architectures. These ARTS IIIA facilities must be upgraded to continue the present levels of air traffic control services and reliability until the advanced automation system (AAS) has been implemented. This project will implement an enhanced system architecture based on proven hardware and software upgrades provided to the New York TRACON.

Approach: Acquire additional hardware, software, and site adaptation software packages to upgrade selected ARTS IIIA to ARTS IIIE facilities with ARTS IIIA identical functionality.

This approach will capitalize on increased processing capacity and expansion capability of the New York TRACON design, which utilizes a local area network (LAN) to distribute central processing and track processing functions between two banks of Input/Output Processors, Model B (IOPBs). This also allows the full digital ARTS displays (FDADs) to off-load display processing functions from the IOPBs. Additionally, this approach minimizes upgrade costs because much of the major hardware required to configure an ARTS IIIE is already being acquired or refurbished under the existing Interim Support Program.

Products: Upgrades to three operational ARTS IIIA facilities and the FAA Academy with options to upgrade up to five additional operational facilities.

Progress/Activity from December 1991:

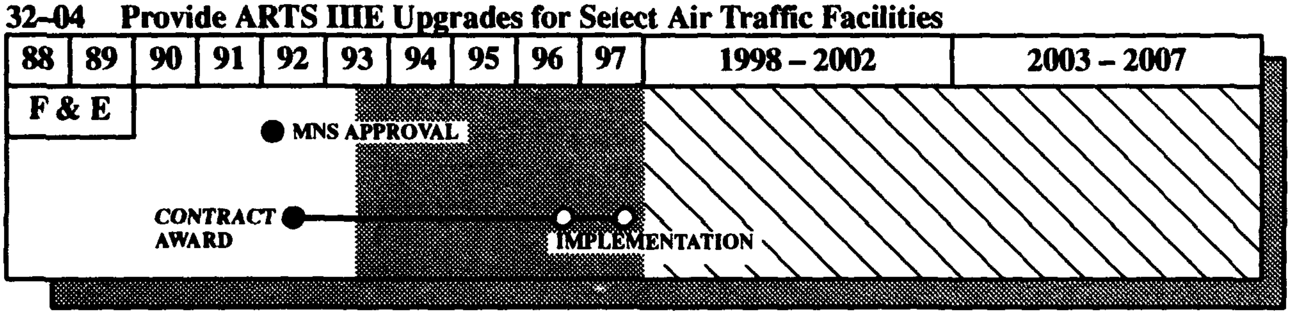
- Contract awarded.

Related Projects/Activities: 22–16 BRITE, 32–16 DBRITE, 32–20 Expand ARTS IIIA Capacity and Provide MCI Capability, 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–22 Dallas/Fort Worth Metroplex, 32–24 Chicago Metroplex, 32–26 Southern California Metroplex, 32–29 Establish Additional Radar Positions, 42–21 Terminal Software Development, 46–30 ISP, and 56–58 NAILS.

List of Contractors:

- Unisys Corporation
  Air Traffic Control Systems
  (hardware and software)
  St. Paul, Minnesota

32–04 Provide ARTS IIIE Upgrades for Select Air Traffic Facilities



32–06 Expand Automated Radar Terminal System (ARTS) IIA Capacity and Provide Mode C Intruder (MCI) Capability

Purpose: With the deregulation of the airline industry and the use of traffic hubbing at selected airports, aviation has undergone significant growth in recent years. This project will provide additional ARTS IIA peripheral processors to support increases in aircraft tracking and transponder equipage, and the addition of an MCI capability.

Approach: To increase ARTS IIA processing capability, a modern peripheral processor using reduced instruction set computer technology will be added to the ARTS IIA system. Software will be provided to alert controllers to Mode C intruders. Modifications will be made to ARTS IIA displays to satisfy increased data requirements.

Products:

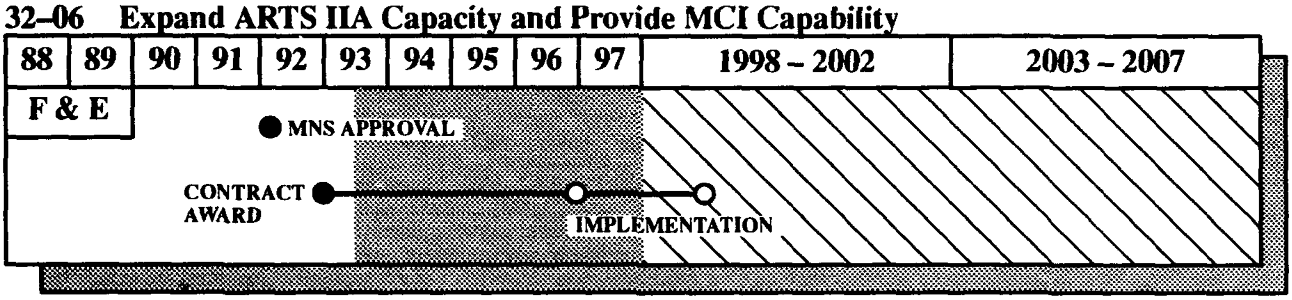
- MCI software for ARTS IIA locations.
- Peripheral processors.
- Modifications to ARTS II displays.

Related Projects/Activities: 46–30 ISP. Products will be procured through related projects and contracts to the extent possible.

List of Contractors:

- Unisys Corporation
  Electronic and Information Systems Group
  (hardware and software)
  Paoli, Pennsylvania

32–06 Expand ARTS IIA Capacity and Provide MCI Capability



32–12 Enhanced Terminal Voice Switch (ETVS)

Purpose: This project will provide modern communication switches to meet the ATC requirement in the terminal area. The ETVS will provide access to air/ground and ground/ground facilities, an interface to the AAS, access to available backbone network features, and an interface to network monitoring and control.

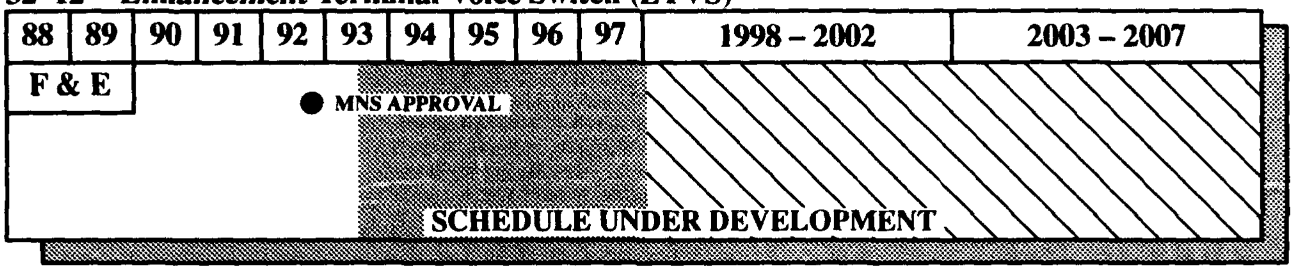
Approach: The ETVS will use modern off–the–shelf switch technology adapted to meet FAA terminal switch requirements. Most FAA requirements are well understood by commercial providers, and it is expected that two or more commercial switches will be available that are adaptable to FAA requirements. An acquisition program will be initiated which uses an existing commercial switch modified to meet all unique requirements via a limited developmental program.

Products: Approximately 250 switches will be procured to replace 120 ICSS Phase I and 130 TVSR switches.

Related Projects/Activities: 21–12 AAS, 22–12 TVSR, and 23–13 ICSS.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

32–12 Enhancement Terminal Voice Switch (ETVS)



32–13 Airport Traffic Control Tower (ATCT)/Terminal Radar Approach Control (TRACON) Establishment

Purpose: This project will provide for the establishment of new terminal ATC facilities, and the assumption by the FAA of ownership and maintenance of sponsor–owned towers that meet airway planning standards cost–effectiveness criteria. These are in addition to FAA requirements in support of those growth items identified elsewhere in this chapter (e.g., major new airports and assumption of bases being closed by DOD).

This project will establish new TRACONs as traffic growth dictates unless the function should be provided by an MCF.

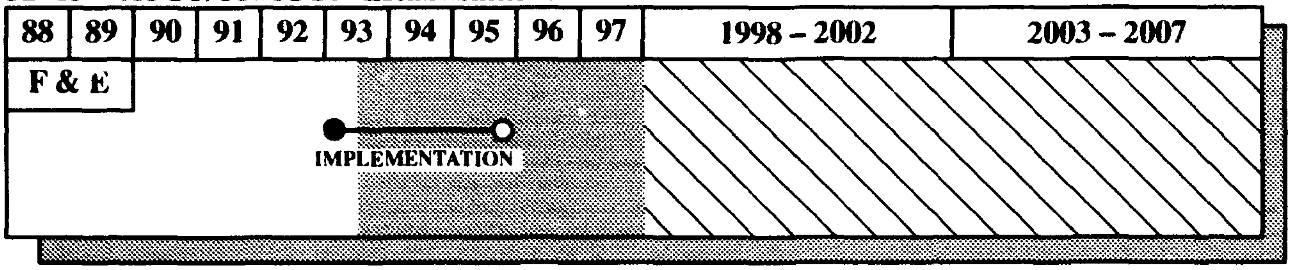
Approach: FAA headquarters develops national standards and makes national equipment support buys. Construction will be accomplished at the regional level by regional contractors, and national architectural and engineering support are available for site–specific designs.

Products: Historically, one or two locations per year have qualified for establishment of a new tower/TRACON or FAA assumption of ownership of an existing facility.

Related Projects/Activities: 22–12 TVSR, 23–13 ICSS, 24–13 ASR, 32–44 Advanced Facility Planning, 42–13 ATCT/TRACON Modernization, and 42–14 ATCT/TRACON Replacement.

List of Contractors: Multiple construction and design contracts to be determined by the regions.

32–13 ATCT/TRACON Establishment



32–16 Establish/Expand Digital Bright Radar Indicator Tower Equipment (DBRITE)

Purpose: This project will provide additional DBRITE systems to support the requirement to establish radar displays and interface capabilities for satellite ATCTs that do not currently have radar. Systems will also be provided to expand service at those sites currently operational with DBRITE.

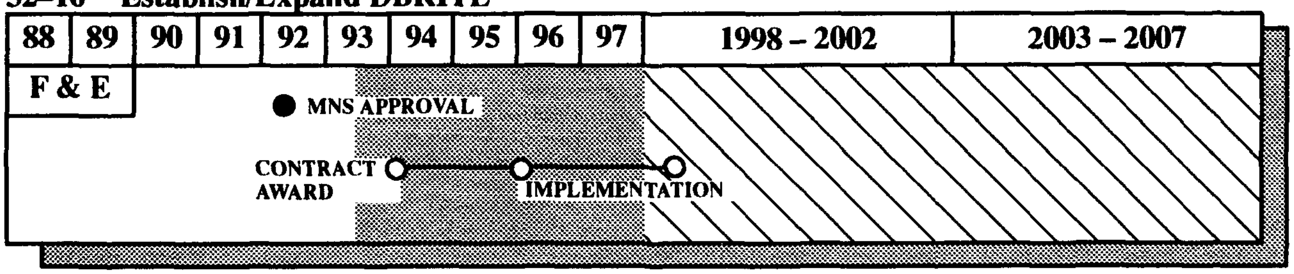
Approach: Procure additional DBRITE systems through a new FAA acquisition. As discussed in Chapter 2, remoting service to provide DBRITE information at satellite towers will be obtained using the most effective and cost beneficial means. Present alternatives include television microwave links (TMLs) and analog fiber optic communications. Cost-benefit studies will be performed on a site-by-site basis in selecting the most appropriate means. TML terminals and repeaters to support DBRITE satellite tower establishments will be provided by exercising option quantities contained in the current TML contract in Chapter two.

Products:

- Establish DBRITEs for satellite ATCTs to support new requirements.
- Expand current DBRITE systems to support new requirements.

Related Projects/Activities: 22–16 BRITE, 46–30 ISP, 32–04 Provide ARTS IIIE Upgrades for Select AT Facilities, and MCF and TRACON projects.

32–16 Establish/Expand DBRITE



32–20 Expand Automated Radar Terminal System (ARTS) IIIA Capacity and Provide Mode C Intruder (MCI) Capability

Purpose: This project provides additional ARTS IIIA input/output processors (IOPs) to support increased capacity and MCI capability.

Approach: To increase ARTS IIIA processing capability, sufficient IOPs will be added to the current system to ensure there will be six IOPs at each single sensor site and eight IOPs at each multi–sensor site and very high density single sensor sites. MCI software will be developed and implemented into existing ARTS IIIA operational software. Ancillary ARTS IIIA hardware and logistics support will also be procured to support MCI. Video time compression (VTC) will be developed to eliminate the display overload problem (flicker) on the data entry and display subsystems (DEDS) that occurs when facilities are at or near their maximum display track capacity.

Products:

- MCI software for ARTS IIIA locations.
- 277 input/output processors.
- VTC kits.

Progress/Activity from December 1991:

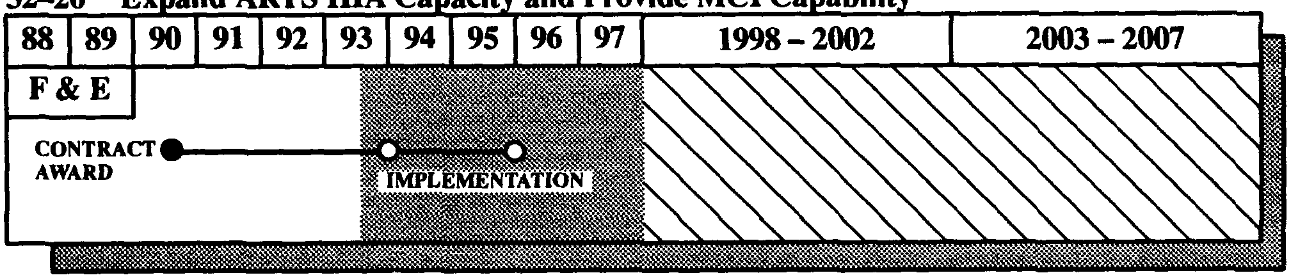
- Preliminary design review (PDR) on IOPs baseline.
- Software specification review for IOP baseline.
- Factory acceptance test completed on MCI baseline.

Related Projects/Activities: 32–04 Provide ARTS IIIE Upgrades for Select AT Facilities, 46–30 ISP, and 52–21 ARTS IIIA PAM Modernization.

List of Contractors:

- Unisys Corporation
  Air Traffic Control Systems
  (hardware and software)
  St. Paul, Minnesota

32–20 Expand ARTS IIIA Capacity and Provide MCI Capability



32–21 New Airport Facilities, Denver, Colorado, and Denver Metroplex

Purpose: The city and county of Denver are constructing a major new airport to replace the existing Stapleton Airport. This project implements improvements needed to service actual and forecasted air traffic growth. It also provides improved service to system users, increases airspace capacity, and allows for improvement of ATC operations.

Approach: A project this complex requires a dynamic plan with processes in place to address transition, resource availability, operations, architectural and engineering design requirements, etc.

This regional project is jointly managed at the local level by a regional project manager, with national activities managed by a headquarters project manager.

The FAA facilities and equipment required will be planned, engineered, procured, installed, and integrated to support the use of the new commercial service airport.

Construction of FAA facilities, as well as acquisition and installation of equipment, although funded under this project, will be obtained through various projects contained in other chapters of this plan.

This project also involves activities to consolidate Colorado area TRACONs into the Denver MCF.

Products: FAA facilities and equipment (e.g., ATCT, TRACON, navigation, landing, power, communications, weather and surveillance systems) for the new commercial service airport at Denver, Colorado.

Progress/Activity from December 1991:

- Construction of the TRACON and ATCT are completed.
- Mile High and Falcon VORTACs commissioned.
- Irondale ASR–9 construction completed.

Related Projects/Activities: 21–11 VSCS, 21–12 AAS, 22–11 Multichannel Voice Recorders, 22–12 TVSR, 22–16 BRITE, 24–03 VORTAC, 24–08 RVR, 24–09 Visual Navaids, 24–13 ASR, 24–14 ASDE, 24–18 TDWR, 25–08 RCE, 26–05 Large Airport Cable Loop Systems, 32–04 Provide ARTS IIIE Upgrades for Select AT Facilities, 32–44 Advanced Facility Planning, 34–06 ILS, 34–08 RVR Establishment, 34–12 ATCBI Establishment, 34–13 Terminal Radar Digitizing, Replacement, and Establishment, 43–02 MWP–2, 43–12 Upgrade LLWAS to Expanded Network Configuration, 45–02 DMN, 46–01 Sustain RMMS, 46–28 NAS RCOM, 46–30 ISP, and interfacility communications.

List of Contractors:

Regional Contracts

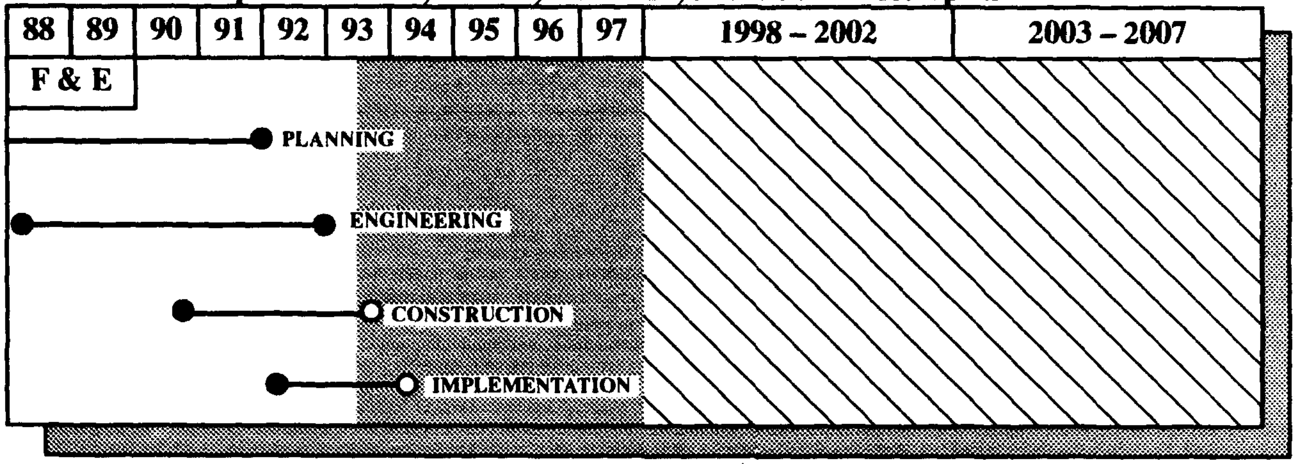
- RJO Enterprises, Incorporated
  (engineering and program management)
  Lanham, Maryland
- Howard, Needles, Tammen and Bergendorf, Incorporated
  (architectural and engineering)
  Bellevue, Washington
- E. T. La Fore
  (TRACON construction)
  Denver, Colorado
- M. A. Mortenson
  (ATCT construction)
  Colorado Springs, Colorado
- CTC–Geotech
  (architectural and engineering)
  Denver, Colorado

- Woodward–Clyde
  (architectural and engineering)
  Denver, Colorado

National Contract

- Raytheon Service Corporation
  (technical support services)
  Seattle, Washington

32–21 New Airport Facilities, Denver, Colorado, and Denver Metroplex



32–22 Dallas/Fort Worth Metroplex

Purpose: A Dallas/Fort Worth (D/FW) Metroplex air traffic system plan has been developed to describe improvements needed to D/FW airspace for actual and forecasted air traffic growth. This project provides for establishment, expansion, and modernization of FAA facilities and equipment (F&E) as needed to implement the plan and allow for increased capacity and efficiency of aircraft operations.

Approach: A project this complex requires a dynamic plan with processes in place to address transition, resource availability, operations, program master plan, etc.

This regional project is jointly managed at the local level by a regional project manager, with national activities managed by a headquarters project manager.

The FAA facilities and equipment required will be planned, engineered, procured, installed, and integrated to support the use of new/expanded commercial service airports in the D/FW area. A total of 12 reliever airports capable of turbo–jet operations will also benefit as a result of implementation of this plan. Airport traffic control towers and terminal approach control facilities will be constructed and communications, navigation, landing, surveillance, and automation equipment will be purchased and installed.

Construction of FAA facilities, as well as acquisition and installation of equipment, including logistics support, although funded under this project, will be obtained through established projects described in various chapters of this plan.

Products: FAA facilities and equipment (e.g., ATCT, TRACON, terminal automation, approach and landing aids, navigational aids, communications, weather, and surveillance systems) to improve the terminal air traffic control system in the D/FW, Texas area.

Progress/Activity from December 1991:

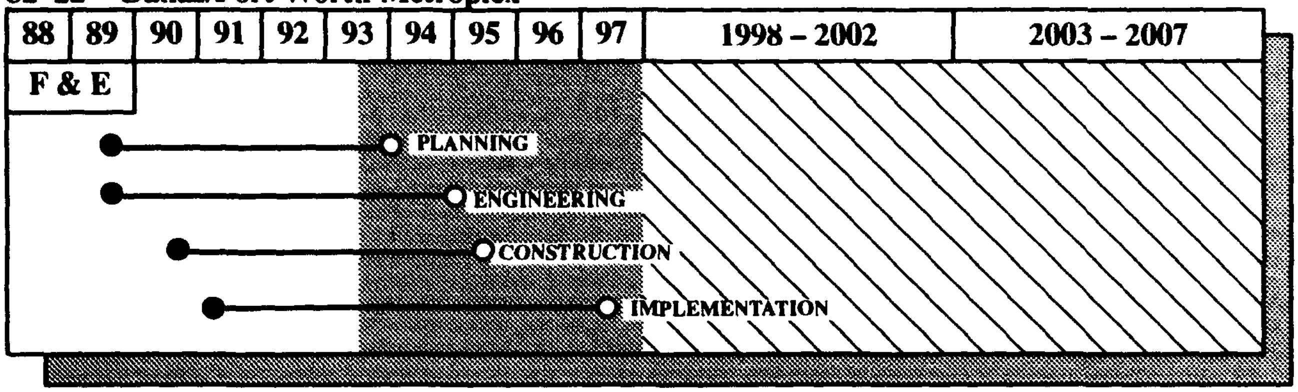
- Construction of northwest corner post VORTAC is complete.
- Construction contract awarded for northeast and southeast corner post VORTACs.
- Invitation for bids (IFB) issued for construction of TRACON expansion.
- Construction of the east and west ATCTs is complete.
- Existing contract modified for acquisition of equipment to expand present voice switching system to serve new east and west ATCTs.
- Existing contract modified for acquisition of second ASR–9 system to serve D/FW Airport (fourth to serve D/FW Metroplex).
- Record of Decision issued for final Environmental Impact Statement for D/FW Airport improvements.

Related Projects/Activities: 21–11 VSCS, 21–12 AAS, 24–03 VORTAC, 24–08 RVR, 24–09 Visual Navaids, 24–13 ASR, 25–08 RCE, 32–04 Provide ARTS IIIE Upgrades for Select AT Facilities, 32–44 Advanced Facility Planning, 34–06 ILS, 34–08 RVR Establishment, 34–12 ATCBI Establishment, 43–02 MWP–2, 45–02 DMN, 46–01 Sustain RMMS, 46–28 NAS RCOM, 46–30 ISP, and interfacility communications.

List of Contractors: This effort is planned to be accomplished in–house. Regional architect/engineering contractors will be used for design work. Equipment/facilities will be provided in conjunction with other CIP projects.

- Sedalco, Incorporated
  (east ATCT)
  Fort Worth, Texas
- Ed Parker and Associates
  (west ATCT)
  Fort Worth, Texas
- Joe R. Jones Incorporated
  (northwest corner post VORTAC)
  Weatherford, Texas
- DEG Enterprises Incorporated
  (east ASR–9 site)
  Norfolk, Nebraska
- Tony Crawford Construction
  (southwest cornerpost VORTAC)
  Dallas, Texas
- Freese and Nichols, Incorporated Consulting Engineers
  (architect–engineers for TRACON expansion)
  Fort Worth, Texas

32–22 Dallas/Fort Worth Metroplex



32–24 Chicago Metroplex

Purpose: This project provides improved service to airspace users, increases airspace capacity, and allows for improvement of ATC operations. Combining three area TRACONs with the new Chicago TRACON into an MCF will provide real–time traffic management, reduce delays, and further enhance air traffic safety.

As part of an ongoing effort to enhance overall aviation safety and accommodate growth, the FAA performed a System Safety and Efficiency Review of the Chicago airspace system. A total of 102 recommendations came from this review, one of which was the relocation of the existing Chicago O'Hare TRACON to an off–airport site.

This relocation provides significant operational benefits. Additionally, physical constraints precluded growth at the present facility with its 18 operational displays. Based on projected traffic growth studies, the Chicago TRACON will need a minimum of 26 operational radar displays with associated handoff positions by 1993. This project will result in fewer flight delays, increased efficiency, and enhanced safety.

Approach: Acquire sufficient land and construct a new modular facility for the Chicago TRACON away from the Chicago O'Hare Airport. The facility will be large enough to accommodate the future consolidation of three area TRACONs when the Chicago MCF is created. Planned activities include:

- Siting and construction of a new facility.
- National and regional procurement and installation of systems and equipment.
- Installation and engineering to relocate existing systems.
- Interface to a planned metropolitan area network (METRONET) to provide an independent communication system.
- Engineering and installation of television microwave link systems for DBRITE remoting.
- Consolidate three nearby TRACONs with the new Chicago TRACON to create the Chicago MCF.

Products: A new MCF located at an off–airport site away from the existing location at O'Hare.

Progress/Activity from December 1991:

- Site adaptation completed.
- Construction contract awarded.
- Human resource management plan developed.
- Program management plan developed.
- System architecture document developed.

Related Projects/Activities: 21–11 VSCS, 21–12 AAS, 22–16 BRITE, 24–08 RVR, 24–13 ASR, 24–16 Weather Radar Program, 24–18 TDWR, 25–02 DMN, 25–08 RCE, 26–05 Large Airport Cable Loop Systems, 32–04 Provide ARTS IIIE Upgrades for Select AT Facilities, 32–44 Advanced Facility Planning, 43–02 MWP–2, 45–02 DMN, 45–05 Expansion/Reconfiguration of LDRCL, 45–20 Critical Telecommunications Support, 46–01 Sustain RMMS, 46–28 NAS RCOM, 46–30 ISP, and interfacility communications.

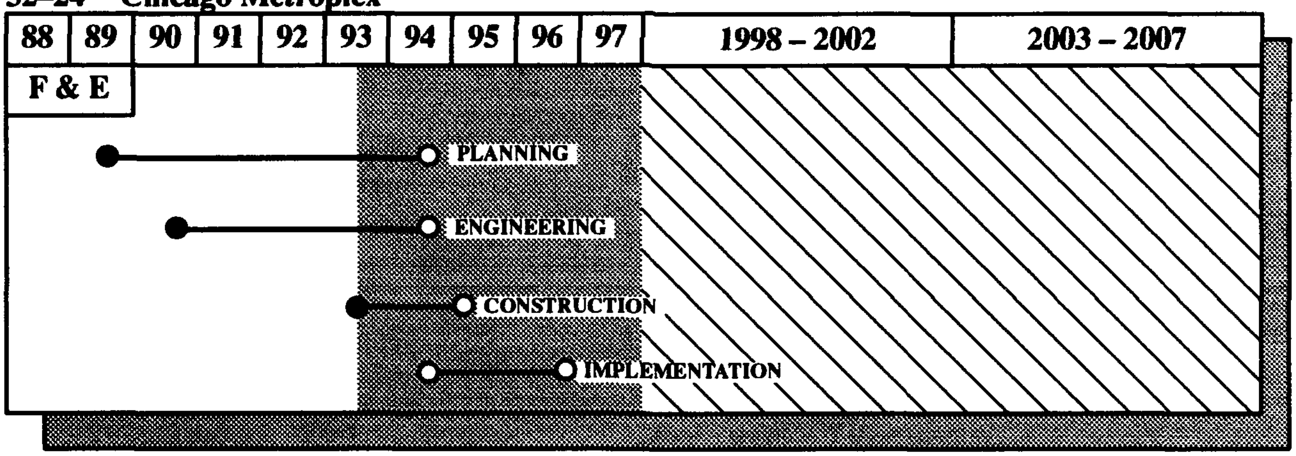
Problems Resulting in Delays: The original schedule for this project was based upon a staff study which was conducted two years ago.

Delays Minimized by: New data was obtained and revalidated.

List of Contractors:

- Volpe National Transportation Systems Center
  (planning)
  Cambridge, Massachusetts
- Holmes and Narver
  (TRACON architecture and engineering)
  Orange, California

32–24 Chicago Metroplex



32–26 Southern California Metroplex

Purpose: This project provides improved service to users of the airspace in the southern California area, increases airspace capacity, and allows for improvement of ATC operations. Combining five southern California area TRACONs will provide real–time traffic agement, reduce delays, and enhance air traffic safety.

Approach: Southern California MCF involves activities necessary to consolidate five southern California area ARTS III TRACONs into a common ATC facility. Los Angeles, Coast, Ontario, Burbank, and San Diego TRACONs are identified for consolidation based on traffic volume and operational interconnectivity. Establishing this common ATC facility requires extensive planning, engineering, procurement, installation, integration, and transition activities. Automation, communications, and surveillance equipment must be provided to the physical facility in addition to logistics support. Extensive coordination of the human resource element must be accomplished.

The consolidation will initially relocate existing ARTS equipment into the new facility. At a later date, the facility will transition to AAS and VSCS equipment, and become an MCF.

Products:

- Improve management of air traffic in the southern California area.
- Construction of facilities, as well as acquisition and installation of equipment to support the establishment and operation of an MCF for the southern California area.

Progress/Activity from December 1991:

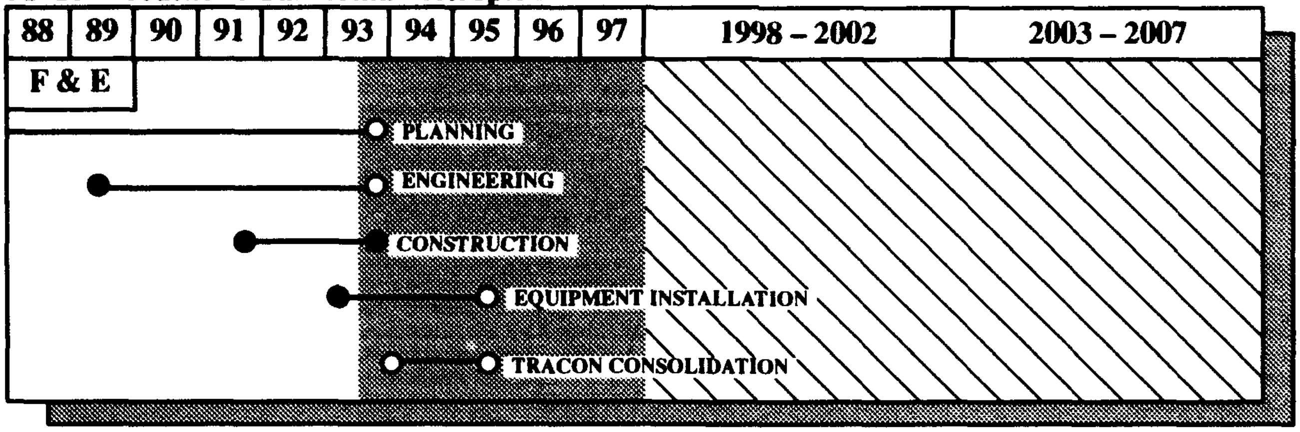
- Construction of building is underway.
- Installation of power conditioning systems has begun.
- Some equipment deliveries have arrived.

Related Projects/Activities: 21–11 VSCS, 21–12 AAS, 22–11 Multichannel Voice Recorders, 25–08 RCE, 32–04 Provide ARTS IIIE Upgrades for Select AT Facilities, 32–44 Advanced Facility Planning, 34–08 RVR Establishment, 35–07 NADIN, 43–02 MWP–2, 45–02 DMN, and 46–28 NAS RCOM. Products will be produced through related projects and contracts to the extent possible.

List of Contractors:

- Volpe National Transportation Systems Center
  (planning)
  Cambridge, Massachusetts
- ARINC
  (planning and engineering architecture)
  Crystal City, Virginia
- HNTB
  (architecture and engineering)
  Seattle, Washington
- Burnhart
  (TRACON building)
  San Diego, California
- SRC
  (engineering)
  Burlington, Massachusetts

32–26 Southern California Metroplex



32–27 DOD/FAA Air Traffic Control Facility Transfer/Modernization

Purpose: In 1988 the FAA and Department of Defense signed a memorandum of agreement (MOA) concerning radar approach controls in the NAS. This document was last updated and reaffirmed in 1993. It established national policy for realignment of some FAA and DOD approach control jurisdictions in the far–term. The transfer provides an optimal mix of ATC assets for the benefit of the entire system. This project provides for FAA assumption of certain DOD approach control facilities, the modernization of the Guam Combined Center Radar Approach Control (CERAP), and the RAPCON at Edwards AFB, California.

Approach: The FAA will provide approach control service formerly provided by DOD at agreed–upon transfer locations. FAA controllers will provide service to these military airfields from an FAA facility (e.g., an area control facility, metroplex control facility, adjacent stand–alone facility, or assumption of the military facility). While a complete plan for FAA assumption of the specific DOD facilities is being evaluated, some portions have started. For example, Manchester TRACON absorbed Pease AFB, NH in 1991 and St. Louis TRACON will absorb Scott AFB, IL TRACON in 1994. Additionally, three others are included in separate MCF projects. The absorption of the DOD facilities constitutes growth in the FAA's NAS architecture and will be part of an integrated schedule. Approaches and schedules for the modernization of the Guam CERAP and the Edwards AFB RAPCON are still under discussion.

Products:

- Transfer of several DOD approach control facilities and absorption of their services in the FAA NAS.
- Modernization of Guam CERAP and High Edwards AFB RAPCON.

Progress/Activity from December 1991:

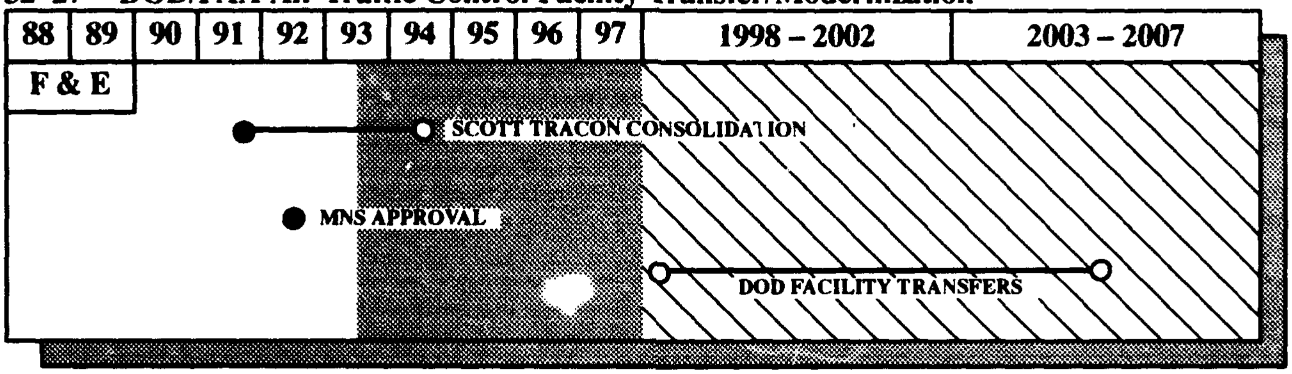
- Re-evaluations of the Gulf Coast architecture initiated.
- A revision was completed to the MOA.

Related Projects/Activities: 21–11 VSCS, 21–12 AAS, 22–11 MCVR, 24–12 Mode S, 25–08 RCE, 32–28 DOD Base Closures, 32–29 Establish Additional Radar Positions, 32–36 Northern California Metroplex, 32–40 Central Florida Metroplex, 32–42 New York Metroplex, 32–44 Advanced Facility Planning, 34–13 Terminal Radar Digitizing, Replacement, and Establishment, 34–23 Communications Facilities Expansion, 42–13 ATCT/TRACON Modernization, 42–14 ATCT/TRACON Replacement, 43–02 MWP–2, 45–02 DMN Continuation, 46–01 Sustain RMMS, 46–07 Power Systems, 46–28 NAS RCOM, and MCF and TRACON projects.

List of Contractors:

- Contractors will be those associated with the list of related projects/activities.
- Planning assistance is being provided by MITRE and Martin Marietta Corporations.

32–27 DOD/FAA Air Traffic Control Facility Transfer/Modernization



32–28 DOD Base Closures

Purpose: This project will provide necessary facilities and equipment to support known base closure impacts. It will also mitigate impacts from future DOD base closures that contain needed aviation facilities/services.

In accordance with Public Law 101-510, Title XXIX, the Secretary of Defense released a list in 1991 of 70 military establishments to be closed. In 1993, a second list was released consisting of an additional 140 military establishments to be closed. Congress has approved these closures. An additional list, issued by the Secretary of Defense, will be made public in 1995.

A number of these military establishments provide ATC service for civilian and military air traffic. Closure of some bases will have little or no impact on aviation, yet several will require the FAA to assume air traffic control services for airspace currently controlled by military personnel. These will require the FAA to equip and upgrade those base facilities that will be converted for civilian use.

Approach: Approximately 24 to 40 bases may be converted to airports for civilian use. To provide the necessary services, the FAA must replace/upgrade the air traffic control facilities that cannot be logistically supported by FAA's training and supply support center.

Summarized below are the capabilities which the FAA plans to provide with this project:

- Spare Parts: DOD will provide supply support for these facilities and equipment until they can be replaced by the FAA. This will require engineering resources to plan, design, and implement procurement strategies for a number of equipment types, assemblies, and subassemblies.

- Computer Software Programs: Develop testing, implementation, and maintenance support strategies for rehosting DOD computer software operations. Also, provide fully tested operational software and associated maintenance diagnostic software in the event of automation hardware replacement.

- Hardware Replacement: Provide hardware systems to replace the existing DOD equipment as part of integrated logistics and standardized equipment programs.

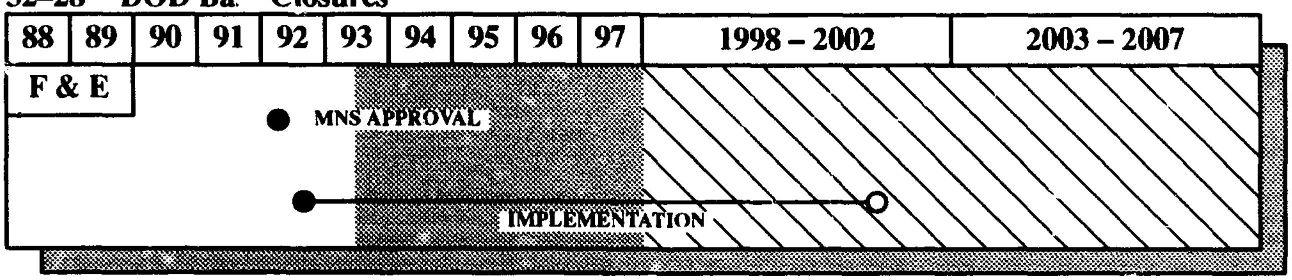
- Implementation Support: Provide engineering and installation support services required to replace, modify, or otherwise upgrade DOD facilities absorbed by the FAA.

- Maintenance Support: Provide an interim operational/maintenance program to support the development of maintenance/certification criteria on existing DOD equipment that will be maintained until replacement with FAA systems. This program will also provide modifications to DOD equipment to meet minimum FAA standards. It will also include provisions for telecommunications, underground cabling, utilities, and real estate acquisitions.

Products: Facilities and equipment which will support the transition of military airfields to civil airports, or airspace realignments to incorporate airspace previously controlled by the DOD.

Related Projects/Activities: 32–27 DOD/FAA ATC Facility Transfer/Modernization. Products will be procured through related CIP projects and contracts to the extent possible.

32–28 DOD Ba. Closures



32–29 Establish Additional Radar Positions

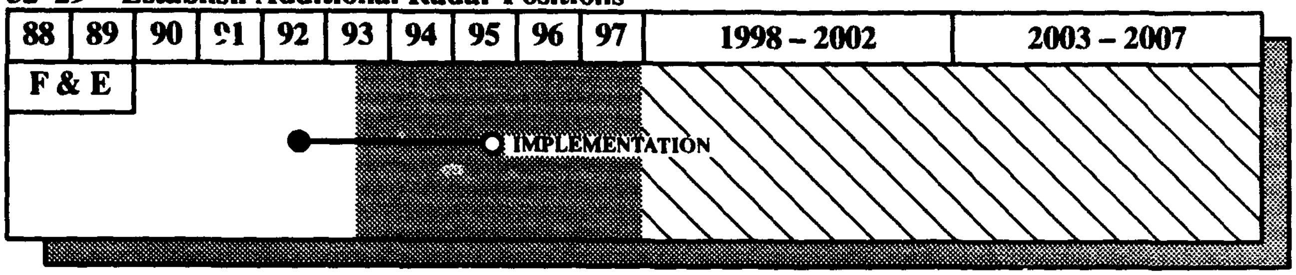
Purpose: This project will provide the necessary equipment at automated terminal radar approach control (TRACON) facilities to meet growth and capacity requirements. This equipment will also be used to provide support for parallel instrument approach procedures, enhanced target generator (ETG) training laboratories, and maintenance functions. Some facilities will require digital display capability.

Approach: The equipment is a critical link in sustaining terminal approach control requirements. Radar displays, associated communications, and other peripheral equipment will be procured by exercising options in existing contracts, when possible. Surplus radar displays will be refurbished and redistributed to other ARTS facilities.

Products: Up to 150 additional positions.

Related Projects/Activities: 32–04 Provide ARTS IIIE Upgrades for Select AT Facilities, 32–27 DOD/FAA ATC Facilities/Modernization, 42–13 ATCT/TRACON Modernization, and 42–14 ATCT/TRACON Replacement.

32–29 Establish Additional Radar Positions



32–34 Potomac Metroplex

Purpose: This project provides improved service to users of the airspace in the Washington, DC area, increases airspace capacity, and allows for improvement of ATC operations. Combining approach control facilities will provide real–time traffic management, reduce delays, and enhance air traffic safety.

Approach: The Washington, DC terminal area has been identified for consolidation based on traffic volume and operational interconnectivity. Establishing this common ATC facility requires extensive planning, engineering, procurement, installation, integration, and transition activities. Automation, communications, and surveillance equipment must be provided to the physical facility in addition to logistics support. Extensive coordination of the human resource element must be accomplished.

Construction of FAA facilities, as well as acquisition and installation of equipment, including logistics support, will be obtained through established projects described in various chapters of this plan.

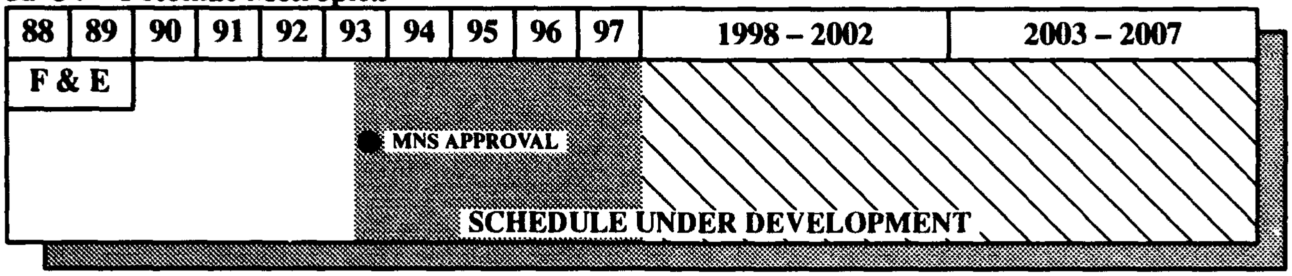
Products:

- Improved management of air traffic in the Potomac area.
- Construction of facilities, as well as acquisition and installation of equipment to support the establishment and operation of an MCF for the Potomac area.

Related Projects/Activities: 21–11 VSCS, 21–12 AAS, 21–15 ACF, 22–11 MCVR, 25–08 RCE, 32–44 Advanced Facility Planning, 43–02 MWP-2, 45–02 DMN Continuation, 46–01 Sustain RMMS, 46–07 Power Systems, 46–28 NAS RCOM, and interfacility communications.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

32–34 Potomac Metroplex



32–36 Northern California Metroplex

Purpose: This project provides improved service to users of the airspace in the northern California area, increases airspace capacity, and allows for improvement of ATC operations. Combining approach control facilities will provide real–time traffic management, reduce delays, and enhance air traffic safety.

Approach: The northern California terminal area has been identified for consolidation based on traffic volume and operational interconnectivity. Establishing this common ATC facility requires extensive planning, engineering, procurement, installation, integration, and transition activities. Automation, communications, and surveillance equipment must be provided to the physical facility in addition to logistics support. Extensive coordination of the human resource element must be accomplished.

Construction of FAA facilities, as well as acquisition and installation of equipment, including logistics support, will be obtained through established projects described in various chapters of this plan.

Products:

- Improved management of air traffic in the northern California area.
- Construction of facilities, as well as acquisition and installation of equipment to support the establishment and operation of an MCF for the northern California area.

Related Projects/Activities: 21–11 VSCS, 21–12 AAS, 21–15 ACF, 22–11 MCVR, 25–08 RCE, 32–27 DOD/FAA Air Traffic Control Facility Transfer/Modernization, 32–44 Advanced Facility Planning, 43–02 MWP–2, 45–02 DMN Continuation, 46–01 Sustain RMMS, 46–07 Power Systems, 46–28 NAS RCOM, and interfacility communications.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

32–36 Northern California Metroplex

88	89	90	91	92	93	94	95	96	97	1998 – 2002	2003 – 2007
F & E											
					● MNS APPROVAL						
						SCHEDULE UNDER DEVELOPMENT					

32–38 Atlanta Metroplex

Purpose: This project provides improved service to users of the airspace in the Atlanta area, increases airspace capacity, and allows for improvement of ATC operations. Combining approach control facilities will provide real–time traffic management, reduce delays, and enhance air traffic safety.

Approach: The Atlanta terminal area has been identified for consolidation based on traffic volume and operational interconnectivity. Establishing this common ATC facility requires extensive planning, engineering, procurement, installation, integration, and transition activities. Automation, communications, and surveillance equipment must be provided to the physical facility in addition to logistics support. Extensive coordination of the human resource element must be accomplished.

Construction of FAA facilities, as well as acquisition and installation of equipment, including logistics support, will be obtained through established projects described in various chapters of this plan.

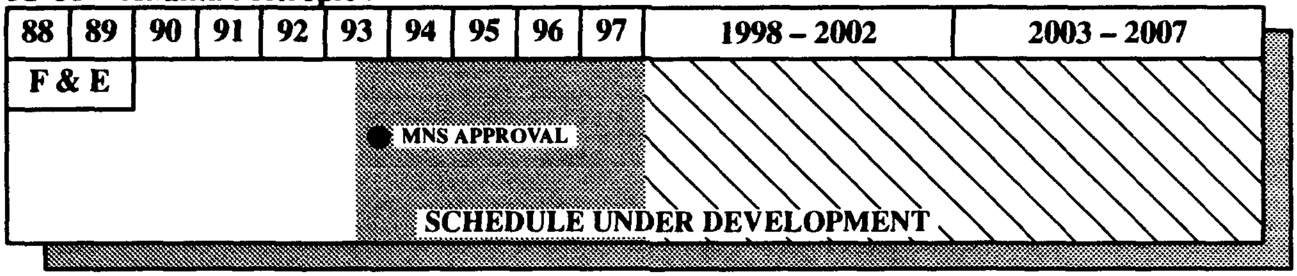
Products:

- Improved management of air traffic in the Atlanta area.
- Construction of facilities, as well as acquisition and installation of equipment to support the establishment and operation of an MCF for the Atlanta area.

Related Projects/Activities: 21–11 VSCS, 21–12 AAS, 22–11 MCVR, 25–08 RCE, 32–44 Advanced Facility Planning, 43–02 MWP–2, 45–02 DMN Continuation, 46–01 Sustain RMMS, 46–07 Power Systems, 46–28 NAS RCOM, and interfacility communications.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

32–38 Atlanta Metroplex



32–40 Central Florida Metroplex

Purpose: This project provides improved service to users of the airspace in the central Florida area, increases airspace capacity, and allows for improvement of ATC operations. Combining approach control facilities will provide real–time traffic management, reduce delays, and enhance air traffic safety.

Approach: The central Florida terminal area has been identified for consolidation based on traffic volume and operational interconnectivity. Establishing this common ATC facility requires extensive planning, engineering, procurement, installation, integration, and transition activities. Automation, communications, and surveillance equipment must be provided to the physical facility in addition to logistics support. Extensive coordination of the human resource element must be accomplished.

Construction of FAA facilities, as well as acquisition and installation of equipment, including logistics support, will be obtained through established projects described in various chapters of this plan.

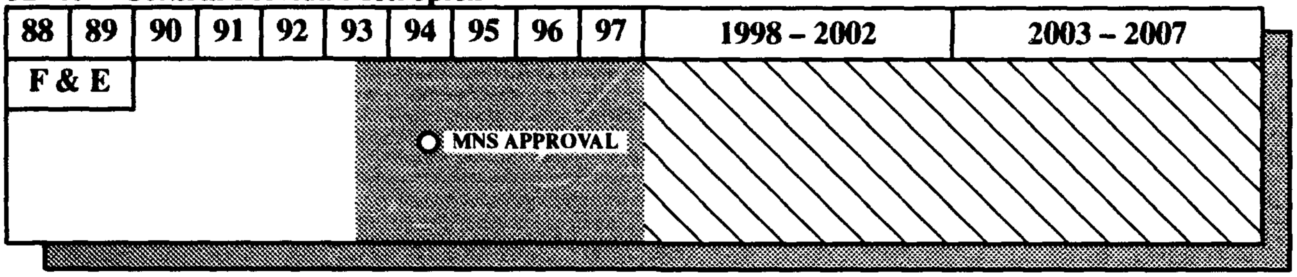
Products:

- Improved management of air traffic in the central Florida area.
- Construction of facilities, as well as acquisition and installation of equipment to support the establishment and operation of an MCF for the central Florida area.

Related Projects/Activities: 21–11 VSCS, 21–12 AAS, 22–11 MCVR, 25–08 RCE, 32–27 DOD/FAA Air Traffic Control Facility Transfer/Modernization, 32–44 Advanced Facility Planning, 43–02 MWP–2, 45–02 DMN Continuation, 46–01 Sustain RMMS, 46–07 Power Systems, 46–28 NAS RCOM, and interfacility communications.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

32–40 Central Florida Metroplex



32–42 New York Metroplex

Purpose: This project provides improved service to users of the airspace in the New York area, increases airspace capacity, and allows for improvement of ATC operations. Combining approach control facilities will provide real–time traffic management, reduce delays, and enhance air traffic safety.

Approach: The New York terminal area has been identified for consolidation based on traffic volume and operational interconnectivity. Establishing this common ATC facility requires extensive planning, engineering, procurement, installation, integration, and transition activities. New automation, communications, and surveillance equipment must be provided to the physical facility in addition to logistics support. Extensive coordination of the human resource element must be accomplished.

Expansion of the current New York TRACON facility, as well as acquisition and installation of equipment, including logistics support, will be obtained through established projects described in various chapters of this plan.

Products:

- Improved management of air traffic in the New York area.
- Expansion of facilities, as well as acquisition and installation of equipment to support the establishment and operation of an MCF for the New York area.

Related Projects/Activities: 21–11 VSCS, 21–12 AAS, 22–11 MCVR, 25–08 RCE, 32–27 DOD/FAA Air Traffic Control Facility Transfer/ Modernization, 32–44 Advanced Facility Planning, 43–02 MWP–2, 45–02 DMN Continuation, 46–01 Sustain RMMS, 46–07 Power Systems, 46–28 NAS RCOM, and interfacility communications.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

32–42 New York Metroplex

88	89	90	91	92	93	94	95	96	97	1998 – 2002	2003 – 2007
F & E											
						SCHEDULE UNDER DEVELOPMENT					

32–44 Advanced Facility Planning

Purpose: Establishment of MCFs will provide an ATC architecture that maximizes technological advances in data processing, telecommunications, and voice switching to meet increased capacity and safety demands. This project will improve air traffic service and provide for efficient use of existing and planned resources through centralized planning, terminal facility upgrade, and consolidation.

New MCFs will be established only when an operational need is identified and validated, and when determined to be cost effective and beneficial.

Approach: The NAS is being modernized through the replacement of aging equipment and facilities to meet growing aviation user demands. There are many ongoing projects which will provide improved equipment, capabilities, and facilities that capitalize upon the technology advances of these NAS projects.

Centralized management is provided for the development of MCF national standards, system integration and test, consolidated TRACON refurbishment/rehabilitation, and DOD coordination.

As the prerequisite NAS programs are implemented, permitting consolidation, all en route and arrival ATC services will be provided from either ACFs, MCFs, or stand-alone TRACONs.

The level of consolidation under the ACF/MCF/TRACON architecture will be based on extensive studies and analyses, taking into consideration operational criteria, system capacity, safety, vulnerability, technical and operational risks, benefits, cost, and personnel impacts.

MCFs will be constructed or current buildings will be expanded. These facilities will accommodate the new systems and the consolidation of operations within their areas of responsibility.

Major activities include:

- Planning, benefit–cost, vulnerability, and risk analysis.
- Development of operational requirements.
- MCF airspace design.

- Conducting site–specific studies and analysis.
- Integration of active DOD radar approach controls.

Products: The selected system architecture will include supporting system documentation for a specified number of MCFs and consolidated TRACONs to provide arrival, departure, and en route control functions resulting in more efficient and effective air traffic control.

Progress/Activity from December 1991:

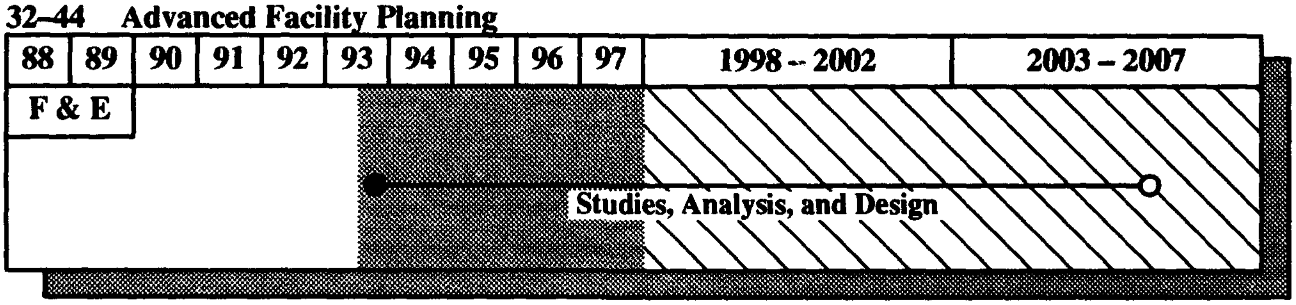
- Updated cost-effectiveness study.
- Continued refinement of system architecture and implementation planning.
- Continued development of a Congressional report on program concept and plan.
- Participated in the operational planning management team review of architecture alternatives.
- Continued additional DOD integration planning.
- Initiated site–specific consolidation benefits analyses.

Related Projects/Activities: 21–11 VSCS, 21-12 AAS, 23–02 CWP, 23–05 Aeronautical Data–Link, 25–02 DMN, 26–01 RMMS, 26–04 MCC, 26–07 Power Systems, 26–09 ARTCC Plant Modernization, 32–13 ATCT Establishment, 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–22 Dallas/Fort Worth Metroplex, 32–24 Chicago Metroplex, 32–26 Southern California Metroplex, 32–27 DOD/FAA ATC Facility Transfer/Modernization, 32–34 Potomac Metroplex, 32–36 Northern California Metroplex, 32–38 Atlanta Metroplex, 32–40 Central Florida Metroplex, 32–42 New York Metroplex, 34–13 Terminal Radar Digitizing, Replacement and Establishment, 34–23 Expansion/Reconfiguration of RCR, 36–20 ARTCC/ACF Support space, 42–13 ATCT/TRACON Modernization, 42–14 ATCT/TRACON Replacement, 46–09 Sustain ARTCC/ACF Facilities.

List of Contractors:

- MITRE Corporation
  (software/system integration)
  McLean, Virginia
- Booz–Allen and Hamilton
  (cost–effective support)
  Washington, District of Columbia
- Adsystech, Incorporated
  (financial management and requirements analysis)
  Washington, District of Columbia
- Washington Consulting Group
  (cost-benefit analysis)
  Washington, District of Columbia

32–44 Advanced Facility Planning



33–20 Automated Flight Service Station (AFSS) Support Space

Purpose: This project provides additional AFSS operational support space and addresses deficiencies in power, heating, ventilating, and air conditioning (HVAC) systems. These facilities are operating in an environment whose concept is over 12-years old and whose scope has transitioned to a new era of automation, technology, and resource management.

Approach: Provide additional space, either by construction or lease, at 59 AFSS locations to ensure that the provision of aviation services continue uninterrupted. In addition, address HVAC, environmental, and power concerns as appropriate to the facility. Fifty of these buildings are leased from a sponsor (city, county, or other local agency), and the remainder are FAA owned. Requirements at each AFSS are unique and will require individual assessment and corrective action.

Conditions at most facilities restrict effective and efficient use of existing space or preclude their intended use. Examples include multiple use and occupancy of single person/program offices; insufficient storage space; equipment rooms which will not accommodate additional racks or equipment; automation rooms at or nearing maximum capacity; inadequate air handling/ventilation systems; lack of power conditioning; noise, vibration, and noxious fumes from emergency generators; and the inability of administrative office space to accommodate support equipment/ personnel.

An initial AFSS space study completed in 1991 (Operational Support Space Requirements Validation Team (OSSRVT) Report) documented space, power, and environmental deficiencies at 10 of the 12 facilities surveyed. It remains now to validate requirements at the remaining facilities, develop recommended solutions, and implement necessary corrective actions.

These actions could include relocating some equipment/functions out of the AFSS, modifying the facility mission to reduce space requirements, reallocating space within the facility for more compact utilization, or providing additional space, either by construction or lease. HVAC, environmental, and power concerns would be addressed at every facility regardless of space requirements. The assessment study will be F&E funded.

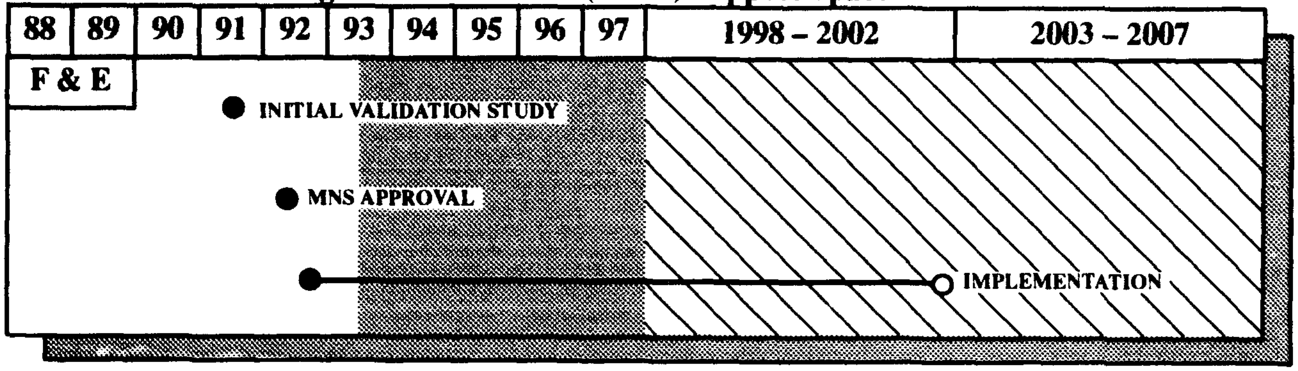
Products: Modernization of the existing 59 AFSSs to meet growing and changing system demands. Initial documents include the OSSRVT Report, September 1991.

Progress/Activity from December 1991:

- Site visits made to Prescott AFSS, Prescott, AZ; Ft. Worth AFSS, Ft. Worth, TX; and the Southwest Regional Office to identify/discuss concerns.
- Paper survey "AFSS Building Concerns Questionnaire" completed to gather site-specific information for each AFSS.
- Questionnaires compiled and summarized.
- Funding provided for Louisville AFSS modernization.

Related Projects/Activities: 23–01 FSAS, 23–13 ICSS, 24–17 LORAN–C Systems, 43–03 Provide FSAS Power Conditioning Systems, 43–22 FSAS OASIS, 44–35 LORAN–C Monitors and Transmitter Enhancements, 45–21 Satellite Communication Circuits, 45–24 ANICS Satellite Network, 56–02 CBI Expansion, and 56–28 CORN.

33–20 Automated Flight Service Station (AFSS) Support Space



34–06 Instrument Landing System (ILS)

Purpose: This project establishes new, partial, and full ILSs, and upgrades existing ILS facilities. ILSs are needed to keep the NAS operating efficiently until research data is available to support a decision on implementing the microwave landing system (MLS) and/or the differential global positioning system (DGPS), expected by 1995. Additionally, this project will ensure that ILS remains a viable system during any transition to MLS/DGPS precision approach systems. This project may include the procurement and installation of other equipment as necessary to ensure full ILS operational capability. This range of equipment includes distance measuring equipment (DME), medium–intensity approach lighting system with runway alignment indicator lights (MALSR), high–intensity approach lighting system with sequence flashers (ALSF–2), locator outer markers (LOM), and runway visual range (RVR) units..

Approach: Category II/III precision landing requirements will be met with the MLS program, unless DGPS also proves capable of providing this service more cost–effectively than MLS. However, ILS will continue operation at existing locations for a suitable transition period to allow users sufficient time to acquire new avionics. All procurements and locations will be in accordance with Agency policy and plans established for the implementation of the MLS. Requirements for ILSs will continue during MLS transition. Systems for FY 93 locations and beyond will have embedded remote maintenance monitoring (RMM) capability. The following describes each approach for this project.

- Category I ILS: Two contracts are planned to complete this requirement. An "interim contract" included all requirements through FY 92. The subsequent contract will to incorporate procurement strategy to fulfill ILS requirements from FY 93 through FY 97.
- Category II/III ILS: These requirements will be fulfilled through the exercise of priced options in an existing contract. These will be for all new qualifier runways.
- Other equipment: Other necessary equipment is factored into planned contract awards, including options.

Products:

- New Establishments
  - Provide Category I/II/III ILSs and associated equipment at sites that meet FAA criteria and are approved by Congress.
  - Provide Category I/II/III ILSs and associated equipment at Congressionally mandated sites.
- Upgrades
  - Those facilities with an existing localizer–only facility and which meet FAA requirements will be upgraded to full operational capability through the acquisition of glide slopes, middle and/or outer markers, approach lighting systems, etc.
  - Those facilities which are mandated by Congress.

Progress/Activity from December 1991:

- 44 ILSs have been delivered.

- A letter contract has been awarded for 34 ILSs including 5 for DOD use.

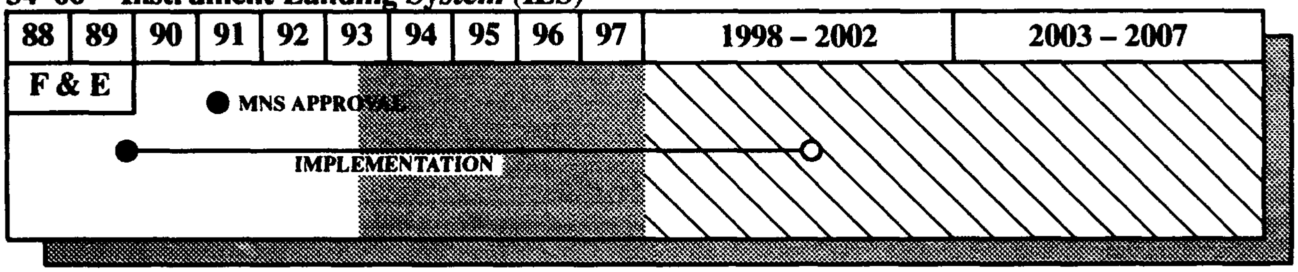
- Proposals have been received for the competitive FY 1993 and beyond procurement.

Related Projects/Activities: 24–07 MLS, 24–08 RVR, 24–09 Visual Navaids, 26–01 RMMS, 32–21 New Airport Facilities, Denver, Colorado, and Denver Metroplex, 32–22 Dallas/ Ft. Worth, 34–08 RVR Establishment, 34–09 Establish Visual Navaids for New Qualifiers, 44–20 AN/GRN–27 ILS Replacement, 44–22 Mark 1A, 1B and 1C ILS, 44–23 Takeover of AIP/ADAP Funded Non–Federal ILS, 44–29 RVR Replacement, 46–05 Airport Cable Loop Systems Sustained Support, and R,E&D project 022–140 Vertical Flight Program.

List of Contractors:

- Wilcox Electric Incorporated
  (existing/interim ILS contracts)
  Kansas City, Missouri

34–06 Instrument Landing System (ILS)



34–08 Runway Visual Range (RVR) Establishment

Purpose: The project will establish additional RVRs at locations qualified through increased operations and new qualifying airport locations arising from the construction of new airports, new runways, and runway extensions. These RVRs will be installed at two runway take–off positions to support reduced take–off minima and airport capacity enhancements. Types of RVRs installed will be site dependent to maintain one type of RVR at that location. The RVRs will support the new ILSs, assumption of military airfields, and MLS or GPS requirements on precision approach runways. The project will also provide airport capacity enhancements through RVR installations on nonprecision approach runways.

Approach:

- Refurbish and reinstall surplus Tasker 500 systems at new locations based on new requirements.

- To meet the necessary procurement of 323 RVR systems, existing RVR systems will be refurbished and reinstalled, and an additional 100 new generation RVR systems will be procured.

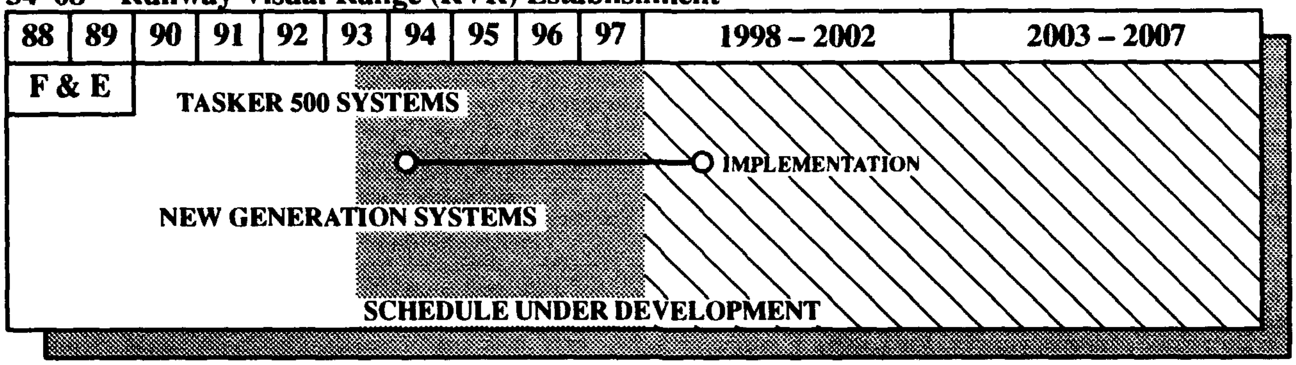
- Provide an additional 100 new generation RVRs through a follow–on contract with multi–year option quantities.

Products: 100 new RVR systems and refurbished Tasker 500 systems.

Related Projects/Activities: 21–12 AAS (TCCC), 23–09 AWOS (ASOS), 24–08 RVR, 26–01 RMMS, 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–22 Dallas/Ft. Worth Metroplex, 32–26 Southern California Metroplex, 34–06 ILS, and 44–29 RVR Replacement.

Project Status: The New Generation section of this project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

34–08 Runway Visual Range (RVR) Establishment



34–09 Establish Visual Navaids for New Qualifiers

Purpose: This project will provide safety–related facilities and enhancements at airports to match air traffic growth requirements. Equipment for the establishment of remote radio control for the visual navaids identified in this project are included as required.

Approach: Visual navaids will be installed in conjunction with other related projects where possible. Medium–intensity approach lighting system with runway alignment indicator lights (MALSR) and high–intensity approach lighting system with sequence flashers (ALSF–2) will be installed with ILSs in accordance with Agency standards. These visual navaids will not be duplicated for a subsequent MLS installation on the same runway. Runway–end identification lights (REIL), precision approach path installations (PAPI), and omnidirectional approach lighting systems (ODALS) will be qualified in accordance with Airway Planning Standards.

Products:

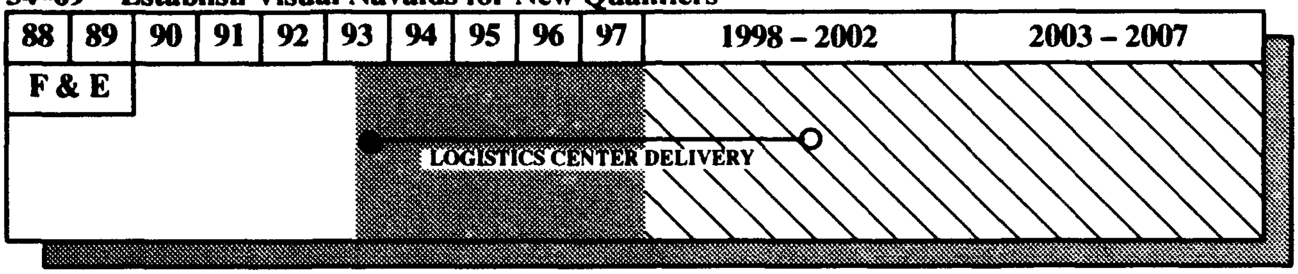
- ALSF–2 20 systems.
- MALSR 200 systems.
- REIL 300 systems.
- PAPI 400 systems.
- ODALS 200 systems.

Related Projects/Activities: 24–07 MLS, 24–09 Visual Navaids, 26–01 RMMS, 34–06 ILS, and major new airports/expansions.

List of Contractors:

- DME Corporation
  (REILS)
  Ft. Lauderdale, Florida
- New Bedford Panoramex
  (PAPI)
  Upland, California

34–09 Establish Visual Navaids for New Qualifiers



34–12 Air Traffic Control Beacon Interrogator (ATCBI) Establishment

Purpose: ATC surveillance of aircraft by ground–based equipment will be required well into the next century. This project will establish surveillance capability at new qualifying ATC facilities.

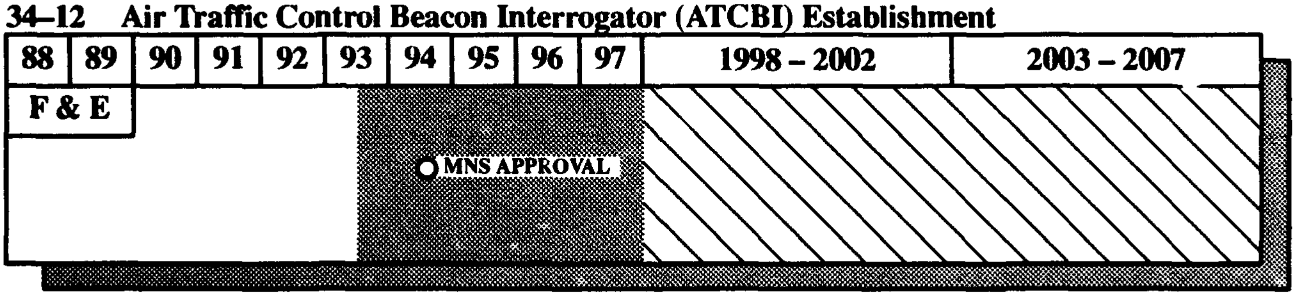
Approach: Secondary radar surveillance units will be procured to support new establishments through existing contracts.

Products: Secondary radar units at new sites (quantity and locations to be determined).

Related Projects/Activities: 24–12 Mode S, 26–01 RMMS, 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–22 Dallas/Ft. Worth Metroplex, and 34–13 Terminal Radar Digitizing, Replacement, and Establishment.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

34–12 Air Traffic Control Beacon Interrogator (ATCBI) Establishment



34–13 Terminal Radar Digitizing, Replacement, and Establishment

Purpose: This project will provide digitized radar data suitable for use in ATC facilities with AAS equipment where the approach control function will be performed. After completion of the ASR–9 program, many terminal areas will have aging ASR–7/8 radars and inadequate weather detection capabilities. Replacement of the ASR–7/8 systems is required to contain supportability costs of obsolescence. Digital radar will be provided for those terminals which require radar replacement, for terminals expected to qualify for radar approach control by the year 2000, and for sites affected by MCF consolidation. This project also supports relocation of terminal radars as necessary to maintain coverage.

Approach: The FAA will meet its needs for terminal radar through joint acquisition with DOD of a radar system functionally equivalent to the ASR–9 radar system and/or moving target detector (MTD) upgraded ASR–7/8 radars that will remain in the FAA inventory after completion of the ongoing ASR–9 project. Cost benefit analysis studies have been conducted and show a post ASR–9 technology radar to be the most cost beneficial from an operational and life cycle standpoint.

Products: Current plans envision:

- Terminal radars to replace aging ASR–7/8 radars, establish new qualifiers, provide DOD terminal control, and provide FAA support systems.
- Terminal radar to support automation requirements compatibility with the advanced automation system.
- Terminal radars to provide gap–fillers for existing FAA and military coverage, and provide mobile radar units.
- Terminal radars necessary in support of the DOD to FAA ATC facility transfer/ modernization.

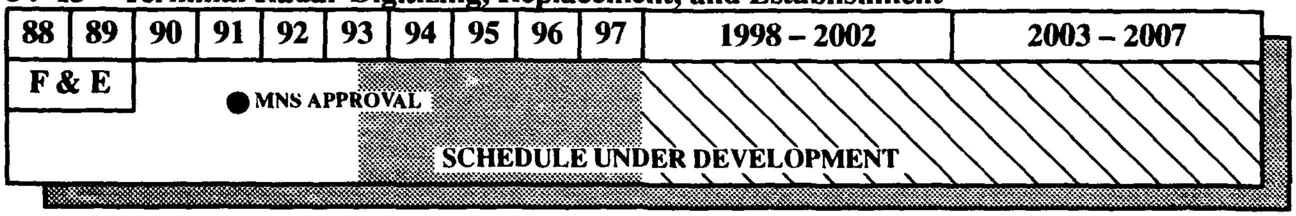
Progress/Activity from December 1991:

- Terminal radar digitization study report completed.
- Acquisition plan approved by FAA.
- Life cycle costing completed.
- Joint DOD/FAA procurement office formulated.

Related Projects/Activities: 21–12 AAS, 24–13 ASR, 26–01 RMMS, 32–21 New Airport Facilities, Denver, Colorado, and Denver Metroplex, 32–27 DOD/FAA ATC Facility Transfer/ Modernization, 32–44 Advanced Facility Planning, 34–12 ATCBI Establishment, 44–46 ATCBI Replacement, 44–60 Sustain/Relocate ASR, 64–13 ASR–9 Modification for LLWAS and MCF projects.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

34–13 Terminal Radar Digitizing, Replacement, and Establishment



34–20 Surveillance System Enhancements

Purpose: This project will improve the timing, tracking, and display of aircraft position data.

Approach: This project improves surveillance system capability through two related enhancements that collectively improve radar accuracy for target positioning, conflict alert, and minimum safe altitude warning (MSAW); reduces track–swapping; and allows full use of the Mode S discrete addressing capability.

The first enhancement, the integrated radar beacon tracker (IRBT), will be developed and installed at those locations equipped with both primary and Mode S secondary radars. The IRBT will simultaneously correlate Mode S and primary reports at the radar site into a single track report, thus reducing the processing time required later at the ATC facility and improving the accuracy of the reported aircraft position.

The second enhancement, the advanced message format, is required to transmit IRBT reports to the ATC facility. Specifically, the advanced format will allow the transmission of more accurate range and azimuth data, surveillance/beacon file numbers, radar quality, confidence and validity information, Mode S address, and velocity interpolated from Doppler returns.

The Mode S, ASR–9, and air route surveillance radar–4 (ARSR–4) will incorporate the capability to operate with advanced format and IRBT information. These enhancements will allow each sensor and combination of sensors to use full design capability. ARSR–3 radars may be provided with the capability to interface with Mode S units.

Products: Fusion tracker (formerly IRBT)/advanced format capability for Mode S, ASR–9, and ARSR–4 sensors.

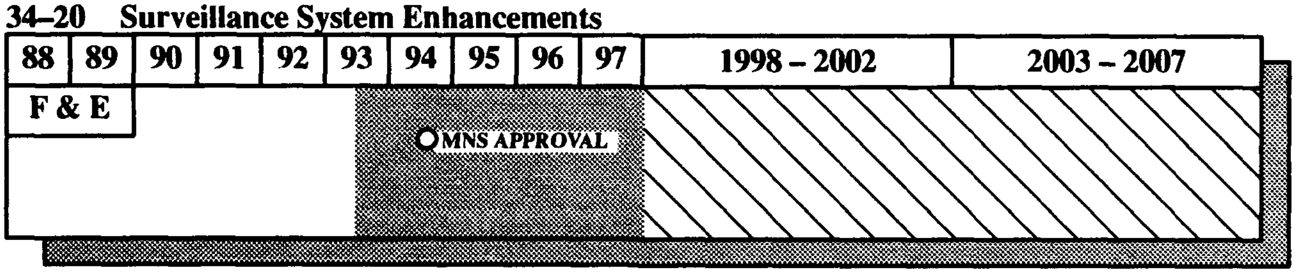
Progress/Activity from December 1991:

- Developed the advanced format algorithms for use in Mode S.
- Updated the Mode S testbed to incorporate latest inputs.

Related Projects/Activities: 21–12 AAS, 24–12 Mode S, 24–13 ASR, and 24–15 LRR.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

34–20 Surveillance System Enhancements



34–23 Communications Facilities Expansion

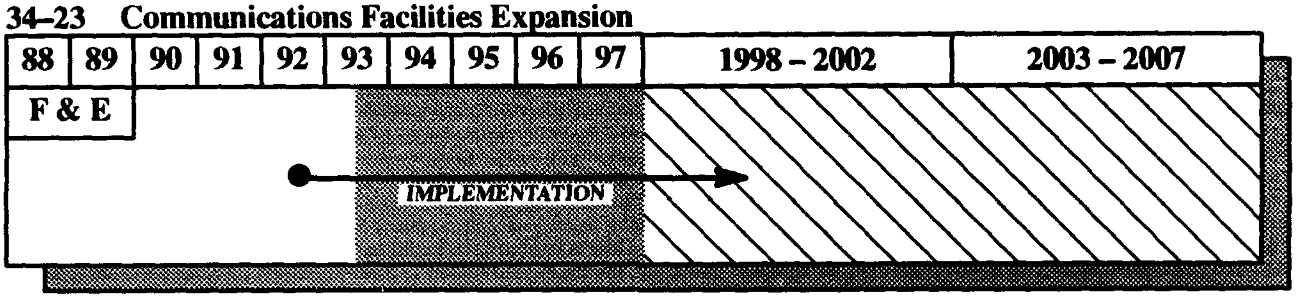
Purpose: This project will establish additional remote communications capabilities from remote communications facilities (RCFs), including remote center air/ground (RCAG) communications facilities, remote communications outlets (RCOs), and remote transmitter/receiver (RTR) facilities to satisfy air traffic demands. Increasing air traffic operational needs for air/ground (A/G) communications coverage has made it essential to expand existing RCFs by adding A/G communication frequencies and relocating owned/leased facilities for proper communication coverage. Due to their direct impact on air traffic operations, these projects require a responsive reaction to establish, relocate, or expand an RCF.

Approach: Each region must complete a cost–benefit analysis for each proposed expansion project.

Products: For planning purpose, 165 facilities are being used as an initial estimate for coverage improvements for all regions.

Related Projects/Activities: 21–11 VSCS, 22–12 TVSR, 23–13 ICSS, 25–08 RCE, 32–27 DOD/FAA ATC Facility Transfer/Modernization, 32–44 Advanced Facility Planning 44–03 Air/Ground Communications RFI Elimination, civil use of military airfields, major new airports, major airport expansion, hubbing, and MCF projects.

34–23 Communications Facilities Expansion



35–07 National Airspace Data Interchange Network (NADIN) II Continuation

Purpose: This project completes the NADIN II packet switch network (PSN). The initial commercial - off-the-shelf (COTS) network provides users a high speed switching capability with 24 nodes and 2 network control centers (NCCs). The project will meet the requirements to provide network interfaces to selected NADIN I message switch network (MSN) users via a NADIN MSN/PSN gateway. This project will also provide an auxiliary rack reporting function to indicate status changes in the power distribution subsystem, TELCO power, and auxiliary rack temperatures from operational nodes of the NADIN PSN to the NCC operators.

Approach: NADIN II will employ an incremental acquisition strategy. Increment 1 provided the COTS network only. Increment 2 provides custom development capabilities, including a NADIN MSN/PSN gateway and auxiliary rack reporting requirements.

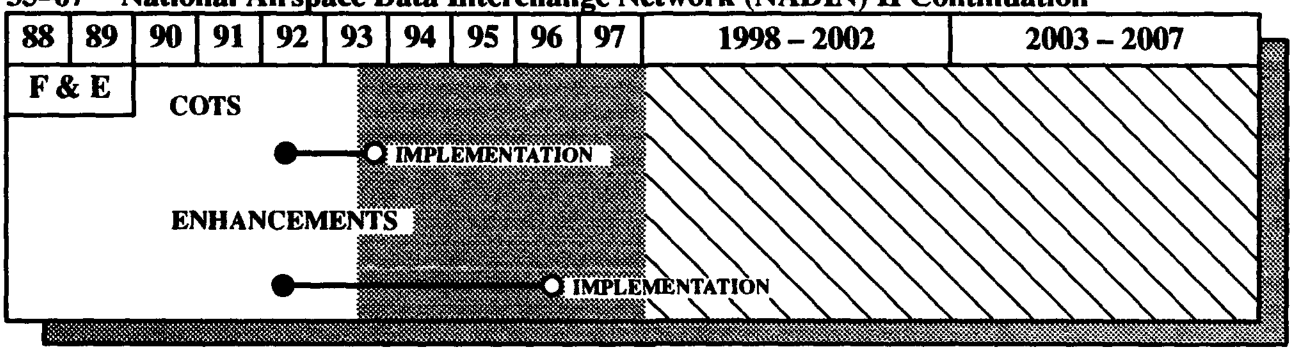
Products: NADIN II provides: data communications services for the NAS: protocol conversion capability between packet switching and message switching networks through the use of a custom developed NADIN MSN/PSN gateway; an auxiliary rack reporting capability to the NCC operators; and a highly connected backbone network for use by the NADIN PSN.

Related Projects/Activities: The NADIN PSN will interface with virtually all operational systems in the NAS requiring interfacility data switching service. WMSCR, ADAS, and DLP are among the initial projects requiring NADIN II data communication services. This project will require interfacility communications service. The use of RCR/RCL by NADIN II will reduce overall operating costs.

List of Contractors:

- Harris Corporation
  Government Information Systems Division
  (COTS equipment)
  Melbourne, Florida

35–07 National Airspace Data Interchange Network (NADIN) II Continuation



35–20 Interfacility Data Transfer System for Edwards AFB RAPCON

Purpose: This project provides interfacility data transfer between the Edwards AFB RAPCON and the Los Angeles ARTCC. The implementation of new software for the Edwards AFB system will improve ATC facility transfer and control of flights operating in the R-2508 complex. This software improvement will also allow Edwards RAPCON to continue with the national program of expanding tower and en route control.

Approach: Software will be developed to provide interfacility data transfer through emulation of an ARTS IIIA by mosaic tracking direct access radar channel (MDARC). This program will contribute to controller productivity in may ATC facilities in the southern California area, thereby increasing safety and efficiency of the ATC process.

The software effort is being performed in two stages: an interim software version (mosaic tracking DARC architecture – version D (MAD)), followed by the final software release, version E (MAE).

Products:

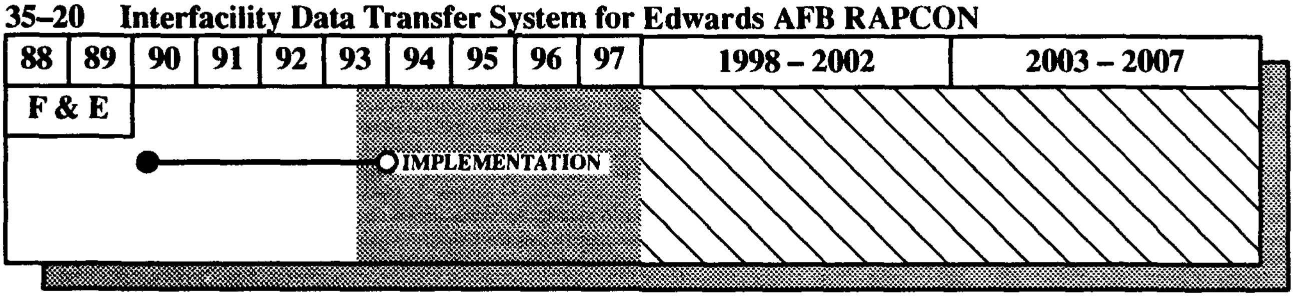
- Software releases for MAD and MAE
- Refurbished disk drives.
- Replacement of printed circuit assemblies.
- Cable assemblies for interconnection of en route automation components.
- Enhanced DARC (EDARC) tape drives.

Related Projects/Activities: None.

List of Contractors:

- Dimensions International, Incorporated (software)
  Alexandria, Virginia
  - RMS Technologies
    Marlton, New Jersey

35–20 Interfacility Data Transfer System for Edwards AFB RAPCON



36–13 Capital Investment Plan (CIP) System Engineering and Technical Assistance

Purpose: This project provides expertise in system engineering (including software engineering) and program management (including configuration management, NAS test and evaluation, and interface management) of CIP implementation. The requirements for system engineering and program management expertise cannot be met with the available FAA staff. Contractual support is required to augment declining resources under the current system engineering and integration (SEI) contract.

Approach: One or more contracts will be awarded to provide the skills and support tools necessary for implementation of the CIP.

Products:

- CIP annual updates.

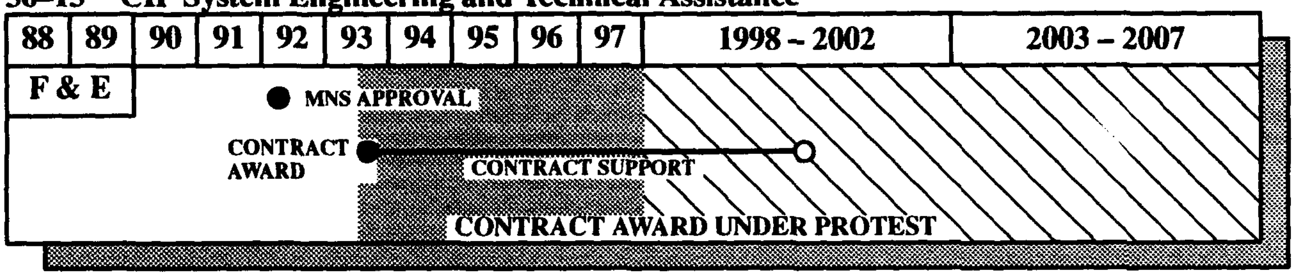
- System engineering support to translate general performance requirements established by users into final, workable systems. This includes system designs, integration, and implementation strategies.

- Program management support for CIP projects to ensure efforts are accomplished within acceptable parameters of cost, schedule, and technical performance.

- Software engineering support for CIP projects containing software development. This includes supporting the improvement of the software acquisition process, and providing projects with consultation support, software engineering training, software engineering tools expertise, liaison to external groups, and software engineering policies, standards, and guidelines.

Related Projects/Activities: All projects within the CIP.

36–13 CIP System Engineering and Technical Assistance



36–20 ARTCC/ACF Support Space

Purpose: This project provides the additional ARTCC/ACF space required to accommodate increased staffing levels and functional requirements. These additions will resolve shortfalls within the current ARTCC buildings and provide for additional AAS support space and anticipated future space requirements.

Regional studies were reviewed and an independent study was conducted by the system engineering and integration contractor (SEIC) to determine existing capabilities and validate future requirements.

Approach: The objective of space management is to make optimum use of space at existing NAS facilities. This is accomplished by logically preparing and scheduling construction of new areas, and by managing the configuration and utilization of facility and building space with respect to hardware, environment, operations, and maintenance personnel. All user requirements for space are included as well as applicable standards for allotment of space to equipment, people, and operations.

Estimates were based on staffing levels and authorized space requirements generated from guidelines established in Agency directives and orders.

Current, interim, and future ARTCC Airway Facilities and Air Traffic administrative and support space shortfalls have been identified in the following areas:

- Operational basement wing: (space lost to new/replacement systems) including administrative offices and storage space, Airway Facilities workshop and maintenance areas, calibration laboratories, Air Traffic flight data office, traffic management unit, and playback room.
- Air Traffic/Airway Facilities training classrooms, briefing rooms, dynamic simulation capability in ARTCCs, computer based instruction, office space, software maintenance, and administration.

Site–by–site requirements have been identified through detailed analysis of the variables within the 18 "standard" and four "unique" ARTCCs. These requirements will be integrated with other construction projects at specific ARTCCs.

Products:

- 18 updated standard ARTCC/ACF environments providing space for personnel and support activities.
- 4 updated unique ARTCC/ACF environments.

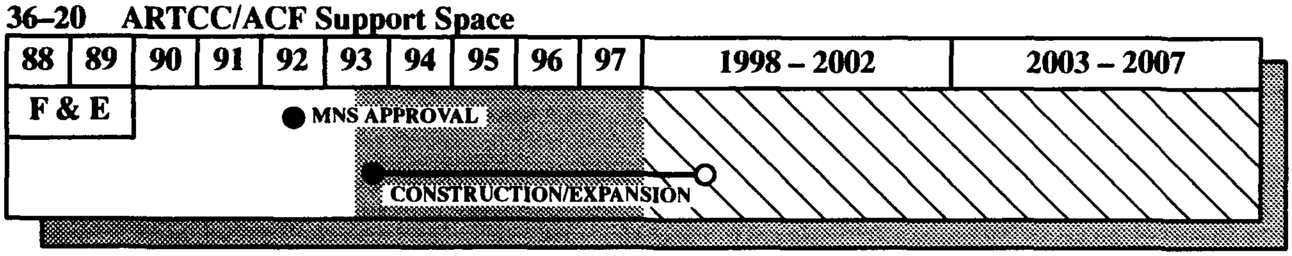
Progress/Activity from December 1991:

- A standard design has been completed for a new operations support wing, and the Seattle site adaptation design has begun.

Related Projects/Activities: The expansion and reallocation of space within the ARTCC (e.g., 21–12 AAS) will require coordination with other activities scheduled to transition into the ARTCC. Requirements for 26–09 ARTCC Plant Modernization, including relocation of equipment, asbestos removal, and upgrade/expansion of power systems will be accomplished under separate projects contained in the various chapters of this plan.

List of Contractors: Multiple construction contracts will be awarded by the regions.

36–20 ARTCC/ACF Support Space



36–23 NAS In–Plant Contract Support Services (NAS/IPCSS)

Purpose: This project will continue to provide experienced procurement and production resources to represent FAA interests during the award and performance of critical CIP contracts.

Approach: A contract was awarded for providing nonpersonal services in the areas of procurement, including cost analysis and production surveillance. Most of these services will be performed onsite at selected contractor plants, and will include the following functions.

- Assist the contracting officer in the review and evaluation of contractor's proposals, and furnish recommendations as appropriate.
- Perform production support, surveillance, and status reporting of potential and actual slippages in contract delivery schedules, and report as appropriate to FAA representatives.
- Report inadequacies in compliance with the contract specifications, terms, and other conditions to the contracting officer.

The contractor will provide improved contract administration and effective oversight of the contractor's production activities and potential problem areas. In addition, an onsite presence provides the FAA with better data to assess contract and production activities, and to evaluate planned versus actual contract progress.

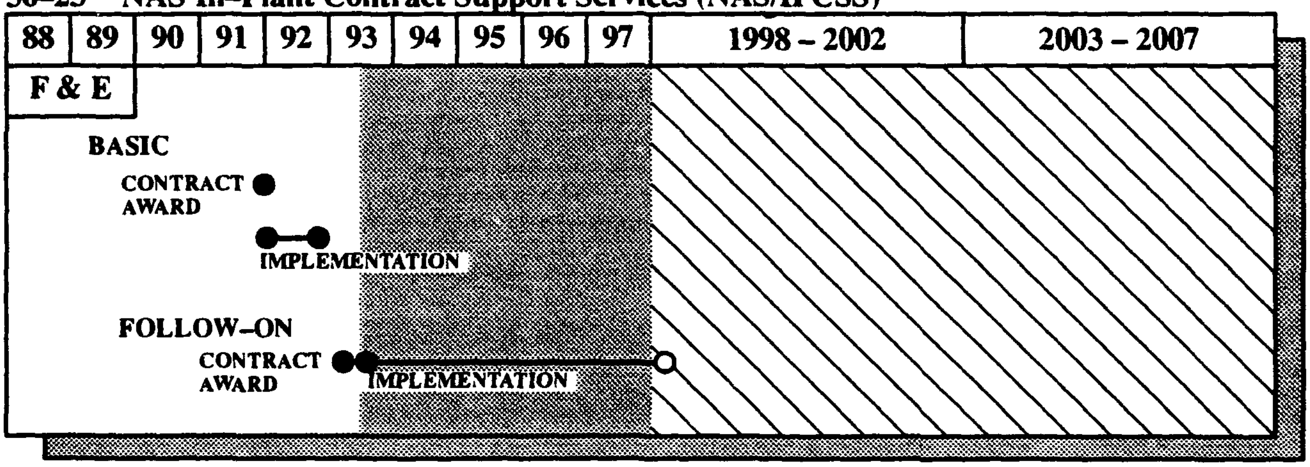
Products: Monthly status reports to the contracting officers of selected programs; administrative assistance for selected cost analyses, contract administration functions, and production surveillance; and monthly briefings to senior management on the status of selected contracts.

Related Projects/Activities: Any FAA project/program requiring acquisition/production surveillance support.

List of Contractors:

- CEXEC
  (contract support and surveillance)
  McLean, Virginia

36–23 NAS In–Plant Contract Support Services (NAS/IPCSS)



36–24 NAS Regional/Center Logistics Support Services

Purpose: This project will continue to provide procurement, real estate, material management, and automated data processing support resources to support FAA regional/center logistics personnel in the implementation of CIP contracts.

Approach: A contract will be awarded for providing nonpersonal services in the above areas. Most of these services will be performed onsite at FAA region/center logistics offices, and will include the following functions.

- Assist the contracting officer in various functions related to the solicitation, award, and administration of field contracts.
- Prepare documentation for real property and surplus property reports, processing capitalizations, and reviewing project materiel reports.
- Prepare leases and renewals, appraisals, site surveys, and lease versus purchase studies.

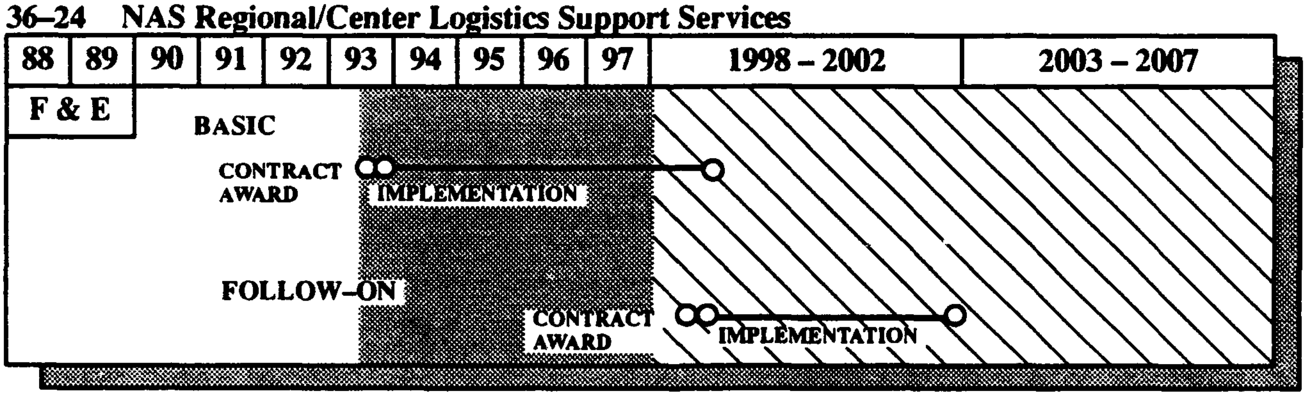
These will assure that planned preparation activities for receipt of new systems are accomplished in a timely manner. In addition, they will provide for timely and comprehensive preparation of reports, studies, and procurement related documents.

Products:

- Status reports to the contracting officers of various CIP procurements.
- Administrative assistance in the performance of various logistics functions.
- Pre–award and post–award contract assistance.
- Automated data processing support relative to the use of logistics data bases and software.

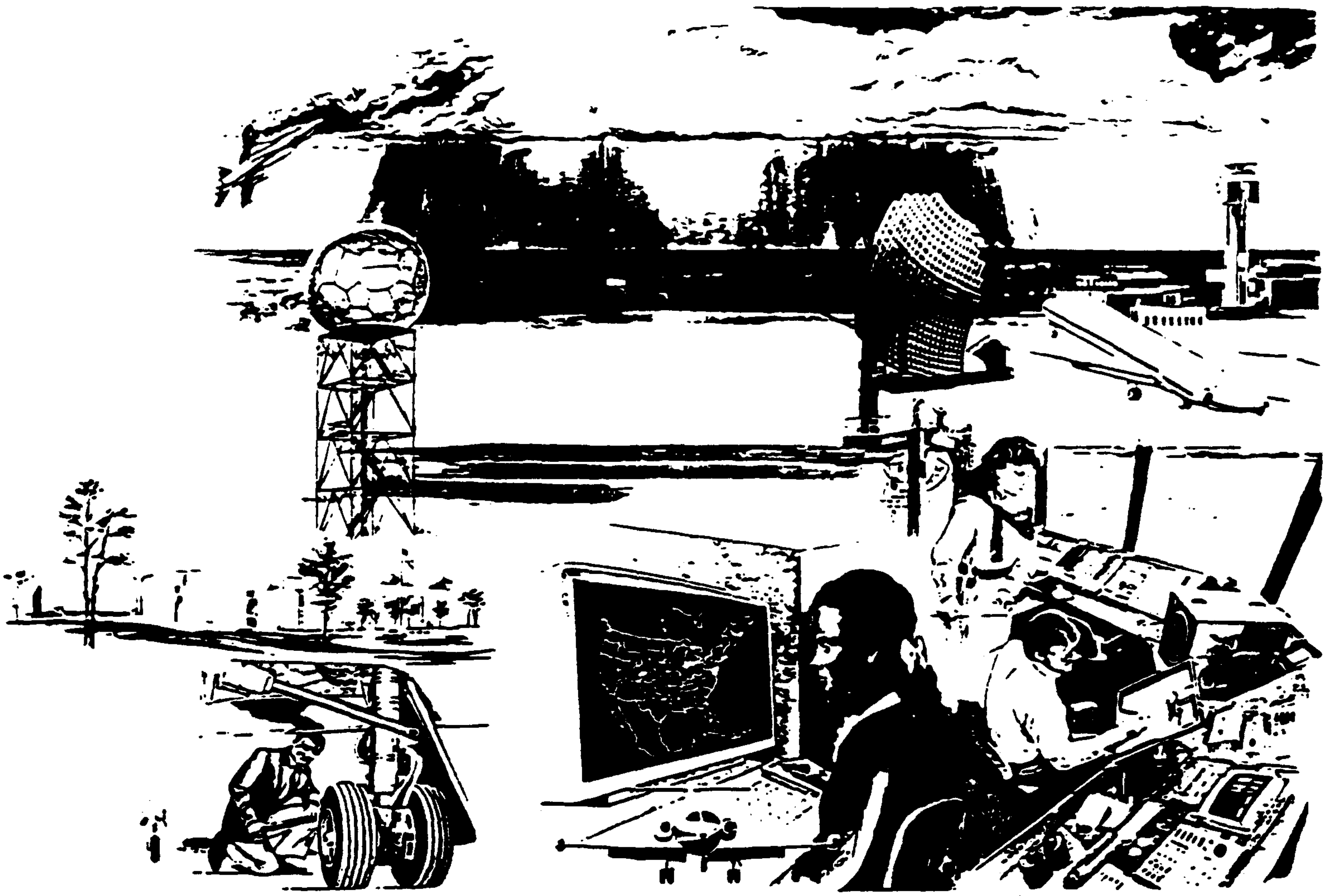
Related Projects/Activities: Any regional activity requiring procurement support services.

36–24 NAS Regional/Center Logistics Support Services



Chapter 4: Infrastructure Replenishment

The Infrastructure Replenishment chapter covers additional items identified since development of the original NAS Plan. This chapter presents projects that refurbish structures, replace obsolete equipment, or relocate facilities to maintain service, improve effectiveness, or reduce cost.



CHAPTER 4
INFRASTRUCTURE REPLENISHMENT

Infrastructure replenishment projects are necessary for the continued economical operation of the existing National Airspace System (NAS). They include the refurbishment, modernization, or replacement of existing buildings, structures, and physical plants that house operational air traffic control, navigation, surveillance, and communication equipment. This chapter also includes several follow–on projects from the original NAS Plan. In addition, projects are included that relocate equipment and facilities to maintain the current level of service, improve effectiveness, or reduce operational costs. A discussion of the expansion and modernization of interfacility communications equipment and facilities is included in this chapter.

For purposes of explanation, the projects are categorized below in the context of the major functional area that each supports. However, these major system areas are highly interrelated and many projects (e.g., interim support program) support several functional areas.

AUTOMATION

These projects sustain or replace those NAS subsystems that assist controllers satisfying airspace user needs for service; included are the provision of separation services, accommodation of increasing demand, desire for user preferred routes/altitudes, and delivery of improved weather services. Some specific projects include:

- Sustain the combined center radar approach control (CERAP) at San Juan until a refurbished terminal radar approach control (TRACON) is completed. The San Juan International Flight Service Station (IFSS) will upgrade to an automated IFSS.
- Interim support action required to assure continuation of air traffic control (ATC) operations. This support helps maintain system operations, increase capacity, and establish new capabilities at several ATC facilities.
- ATCT and TRACON modernization or replacement investments to extend facility economic life and refurbish TRACONs coincident with installation of a new TRACON automation system replacing the existing automated radar terminal system (ARTS).
- Tower integration project to ensure that all projects that interface with the airport traffic control tower (ATCT) are properly integrated.
- Flight service automation system (FSAS) computer replacement project for all 61 automated flight service stations (AFSSs), 23 flight service data processing systems (FSDPSs), and two aviation weather processors (AWPs).
- FSAS operational and supportability implementation System (OASIS) for extended life-cycle hardware and software.
- Operational data base management system (ODMS) to modernize the aeronautical information management system.

SURVEILLANCE

These projects sustain or replace those NAS subsystems that provide the position/velocity of aircraft in United States airspace, on the airport surface, and over the ocean. Some representative projects include.

- Air route surveillance radar (ARSR) relocations to improve air space coverage to meet requirements.
- Airport surveillance radar (ASR) replacements at high–density airports.
- Obsolete ATC beacon interrogator (ATCBI) equipment replacements with modern Mode S compatible units.
- Long range radar (LRR) radome replacements.

TELECOMMUNICATIONS

These projects sustain or replace subsystems that provide the capability for the air/ground and ground/ground voice and data communications, and the interfacility communication of information, such as aircraft surveillance data. Representative projects in this area include:

- Remote communication facilities to improve operational performance in a crowded radio frequency spectrum.
- Interfacility communication projects that expand/enhance present facilities including two satellite communication projects.
- Support to reduce cost of voice and data transmissions.
- NAS communications to assure FAA command and control during crisis or national emergency.

WEATHER

These projects sustain or replace those NAS subsystems that provide pilot and controller with the meteorological information necessary to ensure safe and efficient aircraft and system operation. This includes knowledge of weather phenomena, such as severe weather, windshear, clear air turbulence, microbursts, wake-vortex, winds aloft, precipitation, and icing. Projects included in this area:

- Existing low–level windshear alert system (LLWAS) units modified to a Phase III configuration to significantly increase system effectiveness.
- Digital altimeter setting indicators (DASIs) at ATCTs to be replaced with dual sensor units.
- Meteorologist weather processor (MWP) II with additional capabilities and enhancements.
- National graphic weather display system (GWDS) at automated flight service stations (AFSSs) for timely weather reporting/information.

NAVIGATION AND LANDING

These projects sustain or replace subsystems that provide pilots with accurate knowledge of their aircraft's position so they can properly navigate the aircraft in all weather conditions. Some representative projects include:

- Second–generation very high frequency omnidirectional range/tactical air navigation (VOR/TACAN) sustained with modern equipment which provides enhanced remote maintenance monitoring (RMM) capabilities and improved operational performance.
- Obsolete direction finder (DF) replacement at existing AFSSs.
- Projects requiring the replacement of existing equipment: tactical air navigation (TACAN) antennas, runway visual range (RVR) units, AN/GRN–27 and Wilcox CAT II/III instrument landing systems (ILSs).
- Replacement of all ILS localizer traveling wave antennas and their power distribution networks.
- Takeover of non–federal ILSs and the associated equipment to satisfy public law.

MAINTENANCE AND OPERATIONS

These projects sustain or replace those NAS sub–systems and facilities that collectively support or enhance high quality service and provide continued operation of the various system elements through monitoring control, maintenance, and testing of hardware and software components. Some of the projects in this section include the following:

- Expanded remote maintenance monitoring system (RMMS) and enhanced/upgraded sector maintenance control centers (MCCs).
- Construction efforts completed at Level III, IV, and V airports for new cable loop systems.
- Airport traffic control towers (ATCTs) upgraded to current Occupational Safety and Health Administration (OSHA) fire safety standards.
- Replace/repair all leaking underground petroleum tanks and install leak detectors to prevent further environmental pollution.
- Environmental cleanup of hazardous materials at FAA facilities and locations.
- System safety and efficiency review (SSER) initiatives and activities by AF organizations.
- Thermal neutron analysis (TNA) for airport/aircraft security.
- Air route traffic control center (ARTCC) resectorization for more effective coverage.
- Radio frequency interference (RFI) van standardization for more efficient, economical utilization.
- Minor national or local items addressed by the continuing general support project.

41–06 Traffic Management System (TMS) Sustainment

Purpose: Outdated equipment at the ARTCCs, TRACONs, air traffic control system command center (ATCSCC), Technical Center, Aeronautical Center, and emergency operations facility (EOF) will be replaced by upgrading the enhanced traffic management computer complex (ETMCC) to an operational facility level to sustain the TMS until implementation of the ACCC. It will also replace the existing system architecture with an architecture that complies with FAA and National Institute of Standards and Technology (NIST). The new architecture will have the capability to support COTS equipment and transportability of software to various types of equipment.

This project will also improve the TMS capacity by advancing to an architecture that will allow various tools and programs developed in a COTS environment to interface with the enhanced traffic management system (ETMS). It will provide new equipment (hardware and software) that will establish an automation platform capacity to support new functions and interfaces.

Approach: Supportability of the existing system must be extended beyond 1995. To maintain the system, a program of regular upgrades needs to be implemented. Continuation of traffic management services dictates that the ETMCC be sustained through the AAS time frame and beyond. The advancement of the ETMCC hub facility functional capabilities to an outboard traffic management processor (TMP) will ensure continual availability of critical flow management services. Continuation and expansion of the EOF is critical in light of the FAA's increasing reliance on automation and concerns regarding terrorism and computer system security.

Without upgrades, the TMS will not be capable of processing the information generated by the increased traffic. In addition, for the TMS to accomplish its mission, interfaces are required to existing and planned air traffic systems (e.g., DOTS, ODAPS, EARTS).

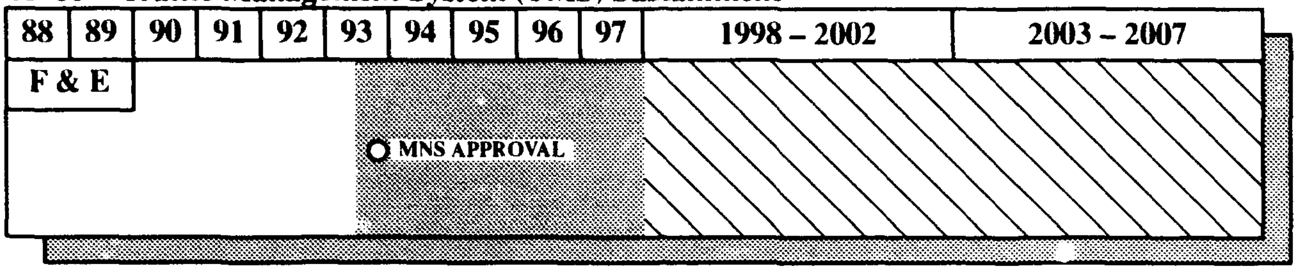
Action in the short-term will ensure that the TMS maintains the capability of providing required services. By so doing, it will maximize air traffic throughput; minimize air traffic delays; and establish a reliable, serviceable automation platform that will continue to function until implementation of AAS.

Products: Establish and maintain system interfaces by upgrading TMS hardware and software. Operational traffic management services are currently provided by 21 ARTCCs, the ATCSCC, and 26 TRACONs. Operational computer facilities are housed at the traffic management computer complex (TMCC) at the FAA Technical Center and ETMCC at the Volpe National Transportation System Center. Support functions are established at the FAA Technical Center for testing support, the FAA Academy for training support, and the FAA Logistics Center for maintenance support.

Related Projects/Activities: 21-06 TMS.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

41–06 Traffic Management System (TMS) Sustainment



41–21 En Route Software Development

Purpose: This project provides the required support for the integration and implementation of NAS en route software changes to correct operational problems and provide systems enhancement.

Approach: Requirements for software services exceed in–house capabilities. Continued contractor support will be required until the Advanced Automation System begins implementation. The contractor will develop software functions and provide support services to implement and maintain en route software as per the following current and future needs:

- Implementation of time–critical corrections to system problems.
- Increasing system capacity by activities such as COMPOOL resizing (memory for data storage/radar data base tables) due to software updates.
- Reducing system vulnerability by improving system security.
- Continued development of conflict resolution advisory (CRA) and Host data–link (HDL).
- Development of center radar ARTS presentation (CENRAP).
- Development of arrival sequencing program/en route spacing program (ASP/ESP) – Package II.
- Other tasks, as assigned, to develop software functions and provide support services to implement and maintain en route software.

Products: The contractor will develop software functions and provide support services to implement and maintain en route software as per the following recurring and nonrecurring tasks:

- Recurring projects
  - Support for NAS en route system releases.
  - FAATC support.

- Project requirements analysis.

- Nonrecurring projects
  - Three–level weather.
  - Flight plan communications link (FPCL).
  - San Juan FDIO.

Progress/Activity from December 1991:

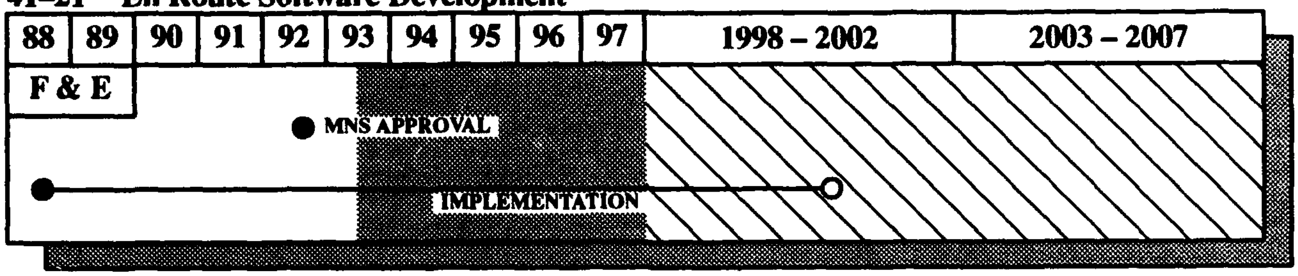
- Acquisition plan approved.

Related Projects/Activities: 21–06 TMS, 21–09 CRA Function, 63–05 Aeronautical Data–Link Communications and Applications, and R,E&D project 021–180 Terminal ATC Automation (TATCA).

List of Contractors:

- Computer Sciences Corporation
  (testing and software support)
  Silver Spring, Maryland

41–21 En Route Software Development



42–13 Airport Traffic Control Tower (ATCT)/Terminal Radar Approach Control (TRACON) Modernization

Purpose: This project modernizes terminal facilities by increasing tower cab height to improve visibility, replacing obsolete equipment, and rehabilitating space in support of growth and expansion. It includes modernization of existing towers and TRACONs to provide for support of tower automation projects, additional operating positions, training space, administrative support areas, and replacement of obsolete or unreliable items such as engine generators, uninterruptible power supplies, batteries, and HVAC systems.

With each passing year, facilities exceed their planned design life. Major efforts need to be initiated to upgrade environmental systems and rehabilitate and expand operational and administrative spaces. This project implements a modified system architecture with equipment and rehabilitation changes to satisfy ongoing Air Traffic requirements. Also included are new requirements for base buildings with sufficient space to accommodate all of the associated ATC functions needed in a modern ATC facility.

Approach: The regions annually recommend which ATCTs/TRACONs are to be modernized. FAA headquarters validates and prioritizes the recommendations. The number of ATCTs/TRACONs to be modernized depends on funding availability. FAA headquarters will develop national standards and make national environmental support buys. Renovation and refurbishment will be accomplished at the regional level. Construction will be by regional contracts.

Products: Approximately 20 facilities per year will receive some level of major modernization, and over 100 facilities per year will need some level of minor modernization, (e.g., tower console, wind instruments, clocks). Installation of the new TRACON automation system replacing the current ARTS will be accomplished concurrently with TRACON modernization. In addition, eight to twelve mobile ATCTs will be acquired for basing within certain regions and the FAA Logistics Center. These units will be used for spontaneous response to disasters, shutdowns, asbestos removal, and events such as airshows and fly–ins at nontowered airports. Also included in this project is the tower interim display system (TIDS) requirement which will integrate the many tower related data collection, processing, display, and entry/control systems into a comprehensive information system.

Related Projects/Activities: 22–12 TVSR, 23–13 ICSS, 32–13 ATCT Establishment, 32–29 Establish Additional Radar Positions, 32–44 Advanced Facility Planning, 42–14 ATCT/TRACON Replacement, 42–20 Tower Integration Program, NAS Interfacility Communications System (NICS), 62–25 Future TRACON Automation System, and R,E&D project 021–210 TIDS.

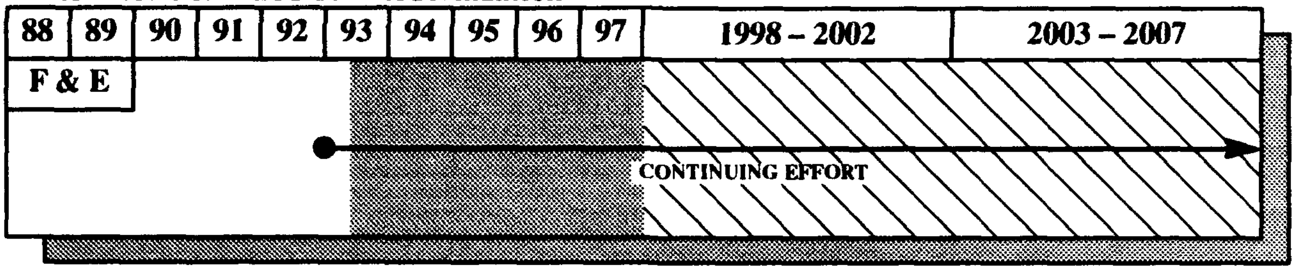
List of Contractors:

- Holmes & Narver, Incorporated
  (architectural and engineering services)
  Orange, California

- Volpe National Transportation Systems Center
  (subcontract administration)
  Cambridge, Massachusetts

- Regional construction contractors will be determined by the regions.

42–13 ATCT/TRACON Modernization



42–14 Airport Traffic Control Tower (ATCT)/Terminal Radar Approach Control (TRACON) Replacement

Purpose: This project provides replacement ATCT/TRACON facilities in accordance with agency cost/benefit criteria. The economic life–cycle of many of the 430 ATCT/TRACON facilities has been exceeded. Within the next 10 years nearly 150 facilities will need to be replaced to enhance air safety and meet operational requirements.

Approach: The FAA develops national standards for constructing ATCTs and TRACONs in accordance with their nominal categories, i.e., low, intermediate, and major levels of activity. Construction will be by regional contracts and national architectural engineering support is available for site–specific designs. A major consideration in establishing the project scope is the effective management of increasing volumes of traffic, changing airport configurations, enhanced equipment/software developments, additional operating positions, increased staffing levels, and expanded administrative space requirements.

Given the limited ATC facility consolidation decision, replacement of some TRACONs will be needed as they reach the end of their economic life.

Replacement of the ATCT will be treated as a separate decision from replacement of the TRACON. That is, in many cases, ATCT replacement is needed only because of line–of–sight obstruction to the ATCT controllers, which does not affect the TRACON. In these cases, only the ATCT will be replaced, and the existing TRACON will remain in its location until its economic life expires. In other cases, it may be desirable to replace the ATCT and TRACON simultaneously, especially when the TRACON can no longer handle the traffic requirements without large–scale expansion.

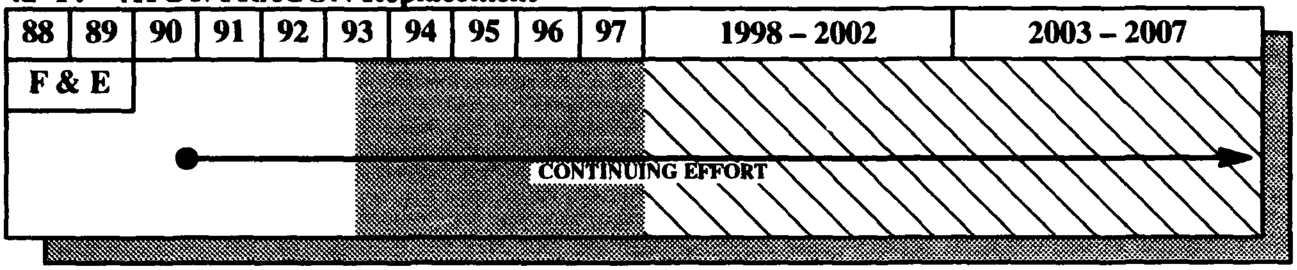
Products: Approximately five to seven ATCT facilities will be replaced each year. Approximately one or two TRACONs per year will be replaced, including the St. Louis and Salt Lake City TRACONs.

Related Projects/Activities: 22–12 TVSR, 23–13 ICSS, 32–13 ATCT/TRACON Establishment, 32–29 Establish Additional Radar Positions, 32–44 Advanced Facility Planning, 42–13 ATCT/TRACON Modernization, 42–20 Tower Integration Program, NAS Interfacility Communications System (NICS), and 62–25 Future TRACON Automation System.

List of Contractors:

- Multiple construction contracts will be determined by the regions.
- Holmes & Narver, Incorporated (architectural and engineering services) Orange, California

42–14 ATCT/TRACON Replacement



42–20 Tower Integration Program

Purpose: This project provides the support to accomplish transition planning, site specific engineering, and configuration modeling necessary to integrate all associated NAS equipment projects into the ATCTs. ATCTs are planned to receive 60 NAS equipment replacements and establishment projects by numerous program offices. This project will identify the critical elements of the ATCT, not included in existing projects.

Approach: There are many projects progressing concurrently in the tower; however, this project will utilize engineering studies and analyses, including equipment mockups, to assess the shortfalls in the ATCT transition planning. Shortfalls to be identified and planned for include interim electrical power, equipment room expansion, associated HVAC needs, and human factors considerations.

Products: Engineering studies and analyses, including transition guidance and transition plans for up to 430 FAA ATCTs, plus support planning for 216 DOD owned ATCTs in the NAS.

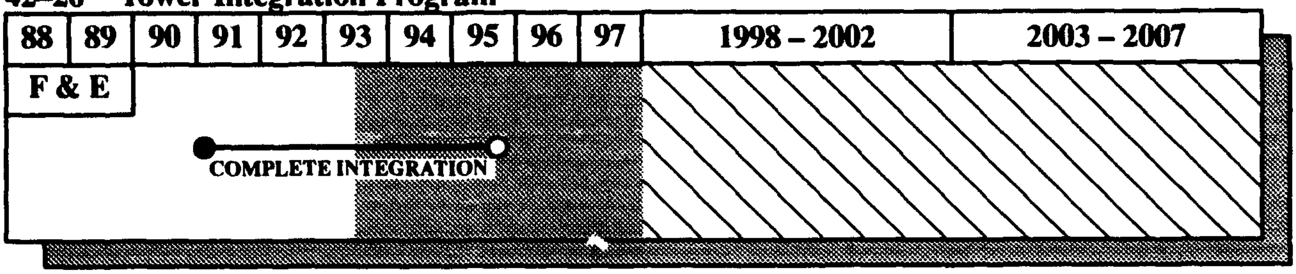
Progress/Activity from December 1991:

- The tower integration laboratory (TIL) construction was completed and computers to simulate airport systems were installed. The TIL is open and functional requirements are being refined. The TIL computer aided design tool was used to assist several sites in resolving tower cab space problems.
- A project to develop a facility system analysis tool (FSAT) was established. This PC-based tool will access various data bases and assist configuration management and transition planning. Various regions were visited and user requirements collected. The basic tool will be distributed prior to 1994.
- The site specific model transition plan was completed and regional ATCT transition planning continues to be supported.

Related Projects/Activities: 21–06 TMS, 21–12 AAS, 22–12 TVSR, 23–05 Aeronautical Data–link, 23–13 ICSS, 24–14 ASDE, 25–08

RCE, 26–01 RMMS, 42–13 ATCT/TRACON Modernization, 42–14 ATCT/TRACON Replacement, 56–47 NAS Implementation Support, 62–23 AMASS, and weather/navaids projects.

42–20 Tower Integration Program



42–21 Terminal Software Development

Purpose: This project provides required contract support for integration and implementation of NAS terminal software changes to correct operational problems, and also provides systems enhancement for the ARTS IIA, ARTS IIIA, ARTS IIIE, and EARTS.

Approach: Requirements for software services exceed in–house capabilities. Continued contractor support will be required until the advanced automation system is implemented. The contractor will develop software functions and provide support services to implement and enhance terminal software as described in "Products" below.

Products: The contractor will provide technical software support services for the following recurring and nonrecurring tasks:

- Recurring projects
  - Central support of terminal software.
  - New local patch collection.
  - Standardization of local casefiles.
  - Casefile status information.
  - Local patch testing.
  - National patch library (NPL) maintenance.
  - Update the NPL data file.
  - General software development requirements.
  - Requirements analysis.
  - Configuration management of software documentation and code.
  - Software design, development, and test documentation.
  - Firmware support and modifications.
  - Terminal system releases.
  - NAS sub system releases.
  - National deployment.
- Nonrecurring projects
  - Terminal NPL completion.
  - NPL data file.
  - NPL data file summary.
  - NPL configuration control.
  - NPL status reports.
  - Modification of code and development of runstreams.

- Requirements analysis and software development of initial terminal data link (a set of options).
- Recode ARTS IIIE software to higher order language for common console application (a set of options).
- Terminal intrusion function (work assignment).
- Terminal area traffic control automation enhancements (work assignments).

Progress/Activity from December 1991:

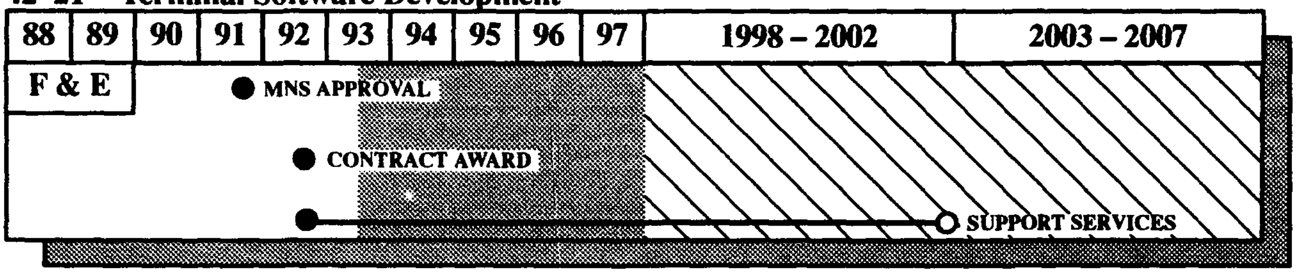
- Contract awarded to Paramax Systems Corporation.
- Work begun under central software support.

Related Projects/Activities: 32–04 Provide ARTS IIIE Upgrades for Select AT Facilities.

List of Contractors:

- Unisys Corporation
  (software engineering support)
  Pleasantville, New Jersey

42–21 Terminal Software Development



42–22 Sustain San Juan Facilities

Purpose: This project replaces or upgrades various systems to sustain the CERAP operation until refurbishment is completed under project 42–13. Also, the international flight service station (IFSS) will be upgraded to an automated IFSS (AIFSS).

Approach: Replace/upgrade the San Juan CERAP systems and, convert/upgrade the San Juan IFSS to an AIFSS, as provided in the Southern Region's San Juan CERAP/IFSS facility transition plan. Examples of upgrades are listed below.

Products:

- Modernize and sustain CERAP.
  - Replace WECO 301A communications system with ICSS.
  - Replace the RML system from CERAP to Pico with an LDRCL system.
  - Realign 18 existing operating positions and equipment, and remove unnecessary consoles.

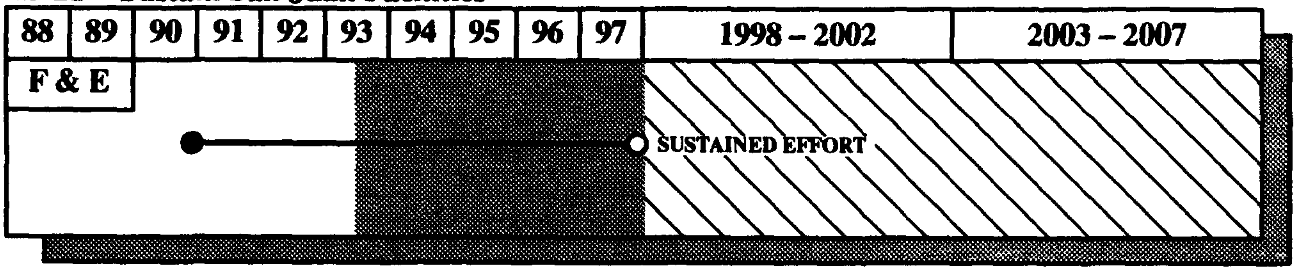
- Establish a workstation for an Airway Facilities system engineer.

- Replace/upgrade environmental systems and facilities for the CERAP and AIFSS.
  - Replace engine generators.
  - Replace/upgrade the chiller and cooling tower system.
  - Upgrade electrical service; provide redundancy to power conditioning system.

- Replace/upgrade the IFSS to an AIFSS.
  - Provide a model 1 full capacity automation system and operational consoles (including operational equipment).
  - Provide a Type III ICSS telecommunication system.
  - Provide weather graphics system.
  - Improve the reliability of telecommunications between San Juan, the mainland, and other Caribbean countries.

Related Projects/Activities: None.

42–22 Sustain San Juan Facilities



42–24 Replacement of Controller Chairs

Purpose: This project replaces and/or upgrades the operational controller chairs. The replacement began in 1992.

Approach: Completely replace the operational position chairs in all Air Traffic facilities. A maintenance and parts contract will provide ongoing controller chair maintenance.

Products: This project includes the replacement of controller chairs at all ARTCCs, ATCTs, AFSSs, and FSSs.

Progress/Activity from December 1991:

- Funding resources allocated and distributed to all Regions.
- Approximately 80 percent of the ATC chairs were procured.

Related Projects/Activities: None.

Problems Resulting in Delays: The regional option approach rather than a national procurement prolonged the procurement cycle.

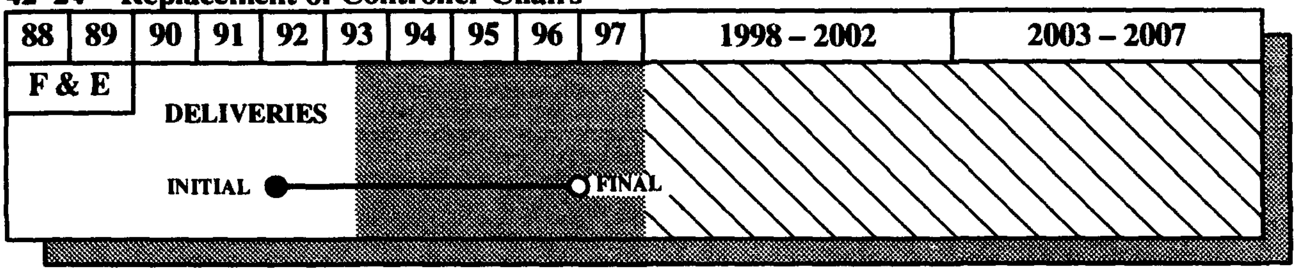
Delays Minimized by: The controller chair replacement requirement has been categorized as "urgent and compelling" to expedite regional procurement actions.

List of Contractors:

- Domore Corporation
  (approximately 4,500 ATC chairs)
  Elkhart, Indiana

- Charvoz, Incorporated
  (approximately 2,250 ATC chairs)
  Fairfield, New Jersey

42–24 Replacement of Controller Chairs



42–25 ARTS IIIA Data Entry and Display Subsystem (DEDS)

Purpose: A current requirement exists to provide each controller with conventional radar and beacon video supplemented with alphanumeric data. At Level 3, 4, and 5 TRACONs this data is provided using the ARTS IIIA computer and displayed on DEDS consoles.

The required display would contain modern electronic circuitry that could be logistically supported until the ARTS IIIA system is replaced by AAS equipment. The new electronic components would also require few and minor alignment adjustments.

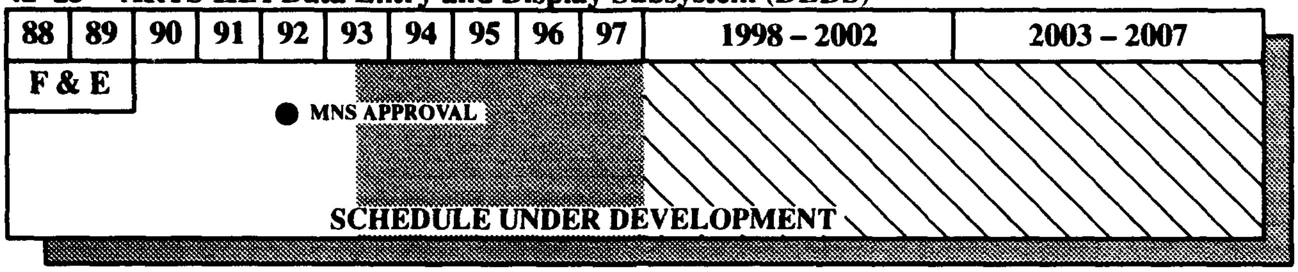
Approach: Establish a schedule of DEDS replacement requirements. Perform cost–benefit analyses based on the determined requirements. Upon accomplishment of the preceding steps, request approval to proceed with procurement actions.

Products: The FAA urgently needs displays of high reliability, availability, and maintainability with sufficient alphanumeric display capacity to sustain the ARTS IIIA systems at 62 sites until replacement by the terminal portion of the AAS.

Related Projects/Activities: TBD

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

42–25 ARTS IIIA Data Entry and Display Subsystem (DEDS)



43–01 National Graphic Weather Display System (GWDS)

Purpose: This project will provide a uniform near real–time GWDS capability at the automated flight service stations (AFSSs) for timely dissemination of available weather information and flight hazards to pilots.

Approach: Acquire GWDS hardware and all support services under a single, turnkey contract to:

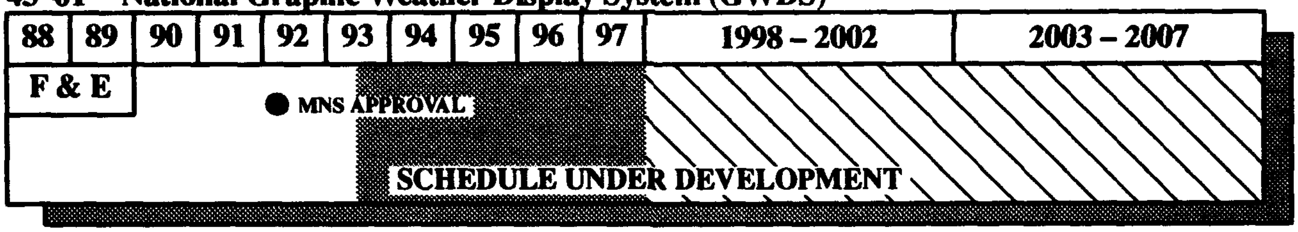
- Upgrade or replace components of the current GWDS that have reached the end of their operational life expectancy.
- Provide a nationally standardized level of service and efficiency.

Products: 63 systems, one at each of the 61 AFSSs; one at the FAA Technical Center; and one at the Academy.

Related Projects/Activities: 23–01 FSAS and 43–02 MWP II.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

43–01 National Graphic Weather Display System (GWDS)



43–02 Meteorologist Weather Processor (MWP) II

Purpose: This project will extend the current level of service provided by MWP I from 1995 to 2000, and improve the overall MWP performance and availability. MWP II will also add new capabilities and enhancements.

Approach: The Program Office has finalized the MWP II Acquisition Plan, following the recommendations of the MWP alternatives study to procure a leased, commercial–off–the–shelf (COTS) MWP II system and service. The MWP II acquisition has been put on hold. The current recommendation is to combine the program with the real–time weather processor (RWP).

Products:

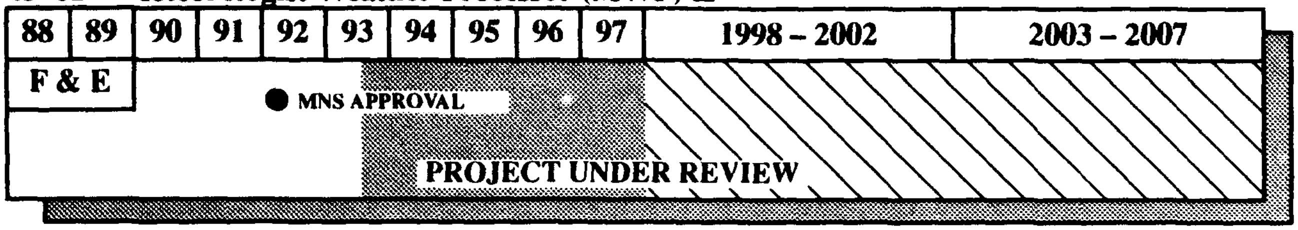
- 21 MWP IIs at ARTCC CWSUs, except Honolulu.
- 1 CFMWP (2 workstations) at the ATCSCC CFWSU.
- Display of national NEXRAD radar mosaic for the ATCSCC MWP; regional mosaic for ACFs and MCFs.
- Acquisition of new weather surface observation (AWOS/ASOS), satellite (GOES–NEXT), lightning, and NEXRAD products.
- MWP briefing terminals for MCFs.
- Improved workstations and briefing terminal display capability including plotting of gridded data and PIREPs.
- Acquisition of geosyncronous satellite data for Pacific and Atlantic coverage for oceanic ATC applications (Oakland and New York ACFs).
- Acquisition of polar orbiting weather satellite data for Anchorage ACF.
- Acquisition of high resolution/frequency atmosphere forecast grid data, including upper air winds and temperature from the National Meteorological Center.
- NAS interfaces to the RWP and WMSC replacement for dissemination of CWSU warnings and advisories to ATC users and to the MPS for status reporting.

Related Projects/Activities:

- 21–06 Traffic Management System (TMS): analysis in progress to define MWP II to TMU interface for radar mosaics and lightning strike data integration into aircraft situation displays.
- 23–02 CWP: RWP–MWP II interface will provide unrestricted access to NEXRAD Doppler weather radar products and alerts.
- 23–04 WMSC Replacement: advisories and warnings are electronically disseminated to automation subsystems via WMSC replacement and are displayed via briefing terminals, along with forecast and sensor data, to support flow control in the ARTCC and at Central Flow.
- 23–09 AWOS/ASOS will provide automated surface weather observation capabilities.
- 24–16 Weather Radar Program: NEXRAD display workstations will augment the MWP II, prior to RWP deployment, by providing access to advanced Doppler weather radar products.
- 35–07 NADIN II Continuation will provide the MPS interface and a transitional interface to the WMSC replacement until RWP deployment.
- 26–01 RMMS: an interface for dissemination of status and performance data to the maintenance processing system (MPS).
- 32–34 Potomac Metroplex, 32–36 Northern California Metroplex, 32–38 Atlanta Metroplex, 32–40 Central Florida Metroplex, 32–42 New York Metroplex.
- 43–01 National Graphical Weather Display System: analysis in progress to assess viability of consolidating MWP II and GWDS procurements.
- 61–23 Oceanic Automation Program (OAP).

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

43–02 Meteorologist Weather Processor (MWP) II



43–03 Provide Flight Service Automation System (FSAS) Power Conditioning Systems

Purpose: This project will provide power conditioning and battery backup systems in AFSSs which are subject to frequent power fluctuations due to weather or commercial power outages. Several electronic systems installed at AFSSs are especially sensitive to power fluctuations. When fluctuations occur, they frequently result in temporary loss of service to the flying public.

Approach: This project will provide requirements definition, procurement, site preparation, installation, spare parts, and training needed to properly equip AFSSs with the necessary PCS. Each selected AFSS will be modified to establish a critical power distribution system. This critical power distribution system will be connected to a PCS and sized to accommodate existing and future loads. In addition to eliminating fluctuations, the PCS will allow equipment connected to critical power to operate uninterrupted in the event of power failures lasting up to several minutes.

Modifications to AFSS buildings owned by the Government will be accomplished either by contract or by the Government workforce. Design changes to facilities not owned by the Government, but which are under lease to the FAA, will be negotiated with the lessor.

Some facilities may require the installation or replacement of obsolete standby power systems (i.e., engine generators) to allow the PCS to operate at maximum efficiency.

A PCS will be designed to be compatible with both currently installed and future electronics equipment planned for an AFSS. The PCS will operate without manual intervention and require only minimal maintenance.

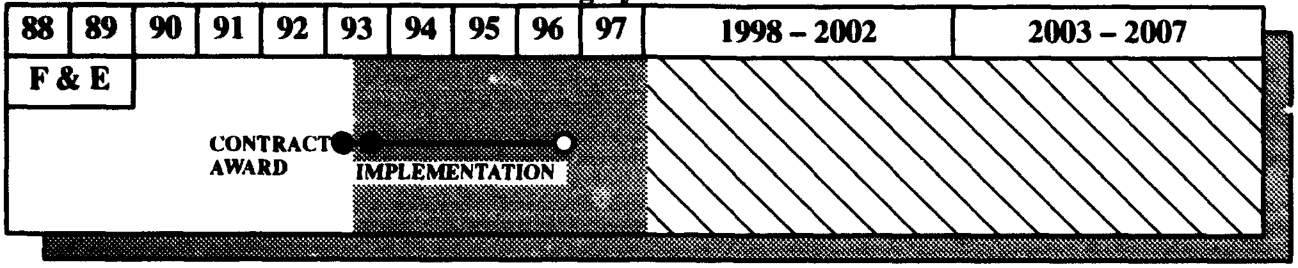
Products: 61 PCSs.

Progress/Activity from December 1991:

- Requirements analysis completed.
- Contract combined with existing Navy Contract.

Related Projects/Activities: 22–12 TVSR, 23–01 FSAS, 33–20 AFSS Support Space, 43–22 FSAS OASIS, weather display systems, and data modems.

43–03 Provide FSAS Power Conditioning Systems



43–04 Flight Service Automation System (FSAS) Computer Replacement

Purpose: This project will establish the requirements and provide the procurement methodology for replacement of current flight service automation system equipment. Included are identification and evaluation of alternatives to automated weather processors (AWPs), flight service data processing systems (FSDPSs), and the automated flight service station (AFSS) consoles. Funding is required to procure or lease the replacement systems by the end of the supportable life cycle of the model 1 full capacity equipment.

Approach: This project will identify new requirements or alternative solutions to the current system, and develop the specification for the replacement of the AFSS system equipment. This project will continue the operation of the 61 AFSSs with upgraded automation hardware, software, procedures, supply support, and training.

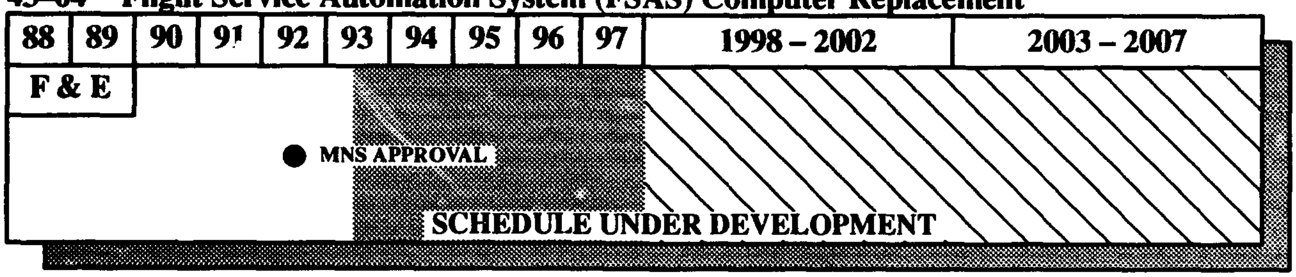
Products: New hardware and software for:

- 23 FSDPSs.
- 2 AWPs.
- 61 AFSSs.

Related Projects/Activities: 23–01 FSAS, 23–13 ICSS, and 43–22 FSAS OASIS.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

43–04 Flight Service Automation System (FSAS) Computer Replacement



43–12 Upgrade Low–Level Windshear Alert System (LLWAS) to Expanded Network Configuration

Purpose: LLWAS will provide local controllers and pilots with information on hazardous wind conditions on or near airports that create unsafe conditions for aircraft landings or departures. The purpose of expanding the network is to significantly increase system effectiveness. LLWAS performance enhancement will also result from improving the LLWAS algorithm by integrating LLWAS with terminal doppler weather radar (TDWR) when both sensors are collocated, and by evaluating ice–free LLWAS sensors.

Approach: Windshear detection equipment is being implemented through an ongoing program for LLWAS.

The expanded network LLWAS is also called LLWAS–3. LLWAS–3 will replace all of the software and hardware, include highly reliable ice–free wind sensors, and increase the number of wind sensors at 78 airports. Five new airports will be equipped with LLWAS–3. The remaining 32 airports with LLWAS–2 will either be upgraded (hardware and masts) without adding sensors or may be replaced by the ASR windshear processor. The new LLWAS hardware (electronics) will include integrated logistics support and improved maintenance diagnostics.

The enhancements will improve LLWAS performance by: completing scientific algorithm refinements that specifically address the mitigation of false alarms caused by "chinook" wind conditions; completing LLWAS interfaces to the TDWR; testing and evaluating candidate LLWAS wind sensors for compliance with the ice–free wind sensor requirements; continuing an interagency agreement with the USAF to have Lincoln Laboratory complete the TDWR/LLWAS integration algorithm and maintenance diagnostics algorithms; providing runway oriented windshear alerts; increasing the density of wind sensors and eliminating sensor sheltering effects; and supporting the Volpe National Transportation Systems Center to complete a specification for a wind sensor replacement.

Products: Expansion of the six–sensor improvement LLWAS at up to 110 sites. LLWAS enhancements will also provide algorithms for windshear detection and identification, integrated LLWAS/TDWR, and improved LLWAS wind sensors.

Related Projects/Activities: 21–12 AAS, 23–12 LLWAS, 24–18 TDWR System, 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–29 Establish Additional Radar Positions, 63–21 ITWS, 64–13 ASR–9 Modification for LLWAS, and R,E&D Plan projects 041–120 Airborne Meteorological Sensors and 042–110 Integrated Airborne Windshear Research.

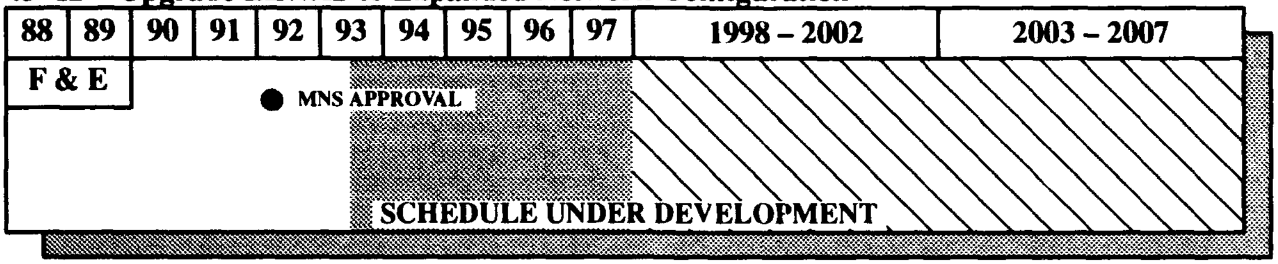
List of Contractors:

- Lincoln Laboratory
  (algorithm/integration design)
  Lexington, Massachusetts

- Volpe National Transportation Systems Center
  (sensor testing)
  Cambridge, Massachusetts

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

43–12 Upgrade LLWAS to Expanded Network Configuration



43–13 Digital Altimeter Setting Indicator (DASI) Replacement

Purpose: DASI provides a digital readout of barometric pressure/altimeter setting at ATCT/TRACON locations. The barometric pressure/altimeter setting number serves as a reference against which aircraft altimeters can be adjusted for atmospheric pressure variations. Periodic updating of altimeter setting while en route enables pilots to maintain the correct vertical separation between aircraft and ground obstructions.

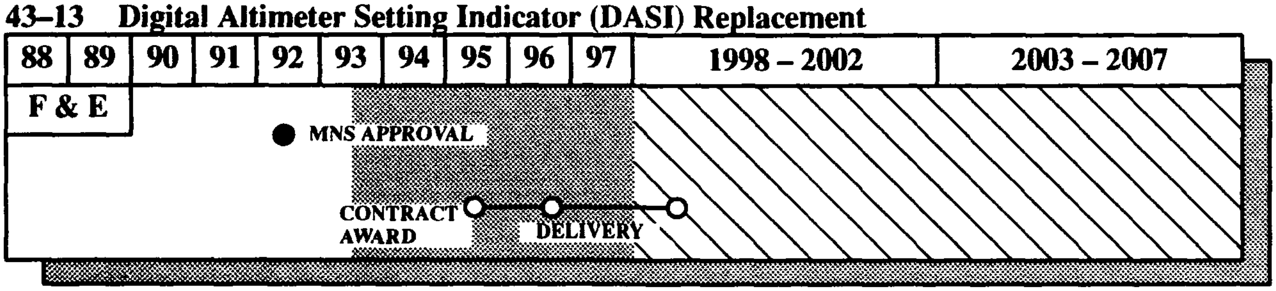
The purpose of this project is to replace 175 obsolete DASIs at ATCTs. Some of these DASIs have been in service since 1976 and are becoming unmaintainable.

Approach: This project will be done via an 8(a) set–aside contract.

Products: 175 DASI systems.

Related Projects/Activities: R,E&D Plan project 021–210 TIDS.

43–13 Digital Altimeter Setting Indicator (DASI) Replacement



43–14 Integrated Communications Switching System (ICSS) Logistics Support

Purpose: This project transfers site and depot level logistics support responsibility for Denro Type 3 ICSSs used in automated flight service stations from the manufacturer to the FAA. The FAA does not own any site or depot spares, documentation, or test equipment for the Phase I Denro Type 3 ICSSs. Spare parts for the Phase I systems are provided by the manufacturer in the form of site spares. Site spares, documentation, and test equipment were procured for the Phase IA Denro Type 3 ICSSs. Depot–level test equipment was not procured for these Phase IA systems. Failed parts for both the Phase I and Phase IA Denro Type 3 ICSSs are returned to the manufacturer for repair or replacement. It would be more cost effective for the FAA to assume site and depot level logistics support responsibility for the Denro Type 3 ICSSs now being supported by contracts with the manufacturer. The FAA does not plan to replace those switches.

Approach: The current support contract with the ICSS manufacturer (Denro) expired in May 1992. A follow–on contract was awarded to provide continuing contractor ICSS site, depot maintenance services, and depot support for the Type 3 equipment. The assumption of site and depot level logistics support responsibility by the FAA involves the purchase of required site spares, depot spares, configuration control and training documentation (task analyses, manuals, etc.), and automatic test equipment (including test beds) from the manufacturers. Additionally, all Denro Phase I Type 3 ICSS units must be upgraded to the latest hardware baseline, and appropriate baseline documentation and training provided to the Regions and FAA Logistics Center. A contract will be awarded to Denro to accomplish the equipment upgrade activities. While the normal lead time for implementation of FAA Logistics Center support responsibility is four years, action is underway to reduce that lead time significantly. Interim repair of the ICSS equipment must be funded until the Regions and FAA Logistics Center assume site and depot level logistics support responsibilities.

Products: Upgraded Phase I Type 3 ICSSs, depot test equipment and test bed hardware, configuration and training documentation, and site and depot level spares.

Progress/Activity from December 1991:

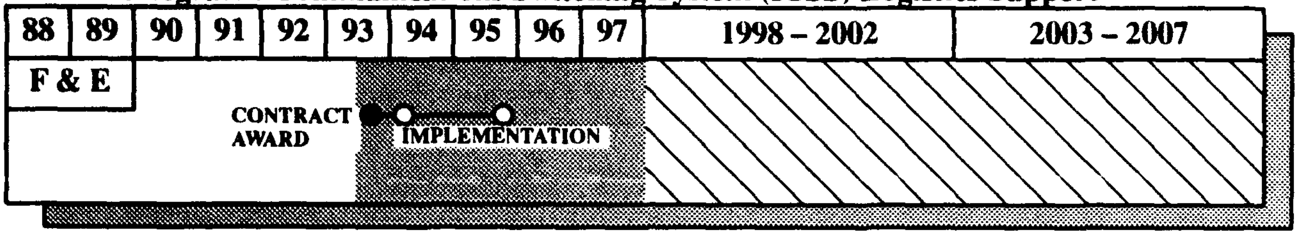
- RFP issued for ICSS maintenance follow–on services.
- Letter contract awarded for ICSS maintenance follow–on services.
- Sole source justification for other than full and open competition approved to upgrade the Denro Phase I Type 3 ICSSs to the Phase IA ICSS equipment baseline.
- ICSS Phase I upgrade RFP issued.

Related Projects/Activities: 23–13 ICSS.

Problems Resulting in Delays: Contract award slipped approximately six months pending the procurement decision and development of an acquisition approach.

Delays Minimized by: Frequent discussions are conducted with the contractor and FAA acquisition personnel to ensure that expeditious action is taken to eliminate administrative obstacles.

43–14 Integrated Communications Switching System (ICSS) Logistics Support



43–21 Operational Database Management System (ODMS)

Purpose: This project will modernize the aeronautical information management system to meet notice to airmen (NOTAM) and aeronautical information requirements of the NAS and the flying user community, both civil and military.

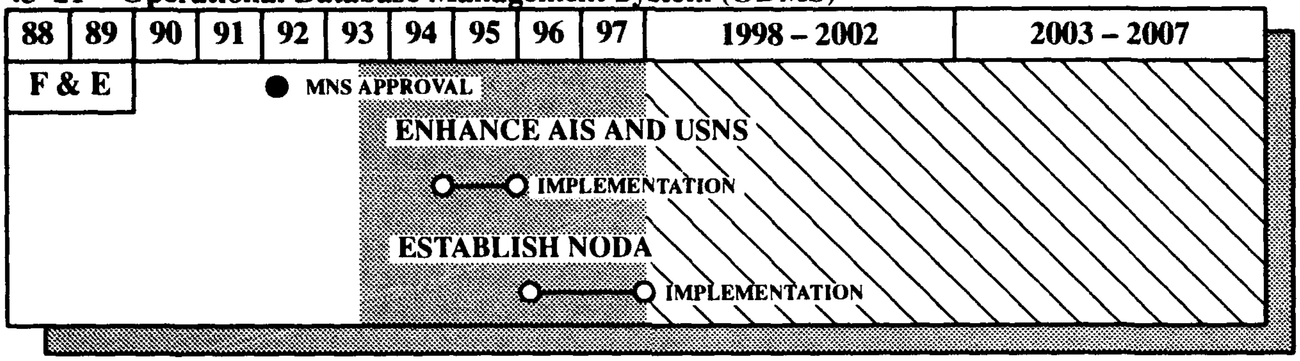
Approach: To ensure integrity and consistency among all NAS air traffic control and user based systems, a common, national, relational, aeronautical information data base will be established. Included will be the development of policy and procedures, and new hardware and software resources to facilitate data entry, collection, and validation, information quality control, timely dissemination, and system flexibility and expendability. Detailed requirements analyses for the aeronautical information system (AIS) and the United States NOTAM System (USNS) are currently being conducted. Upon completion of requirements definition, new front–end application development tools will be evaluated and selected for creating, exploring, and developing alternative system design concepts. Requirements will be defined and validated using proof–of–concept work and exploratory subsystem development. All of this work will lead to a product specification for the ODMS.

In addition, a national operational data archive (NODA), i.e., national data base, will be established with the possibility of adding new front–end application development tools to allow users the ability to create, select, and retrieve data for analyses and evaluation of the operational system. This will entail significant work in the area of data management, i.e., policies, procedures, and large data base design alternatives and research. Initially, NODA will constitute the archiving of operational data by manual means, graduating to archiving the operational data electronically and cataloging these data in FAA's corporate repository, followed by data access and retrieval for analysis purposes from selected workstations and eventually reaching the ODMS end–state.

Products: This project will provide hardware and software that will permit timely distribution of safety critical information throughout the FAA, aviation industry, and flying public. In addition, this project will provide efficient and effective management of the data collection, manipulation, and dissemination of critical aviation safety related data. Each processor in the NAS will have an up–to–date flight information data base which is essential to the safe operation of the air traffic control system.

Related Projects/Activities: 21–12 AAS, 23–01 FSAS, 32–21 New Denver Airport and Denver Metroplex, 32–22 Dallas/Fort Worth Metroplex, 32–24 chicago Metroplex, and 32–26 Southern California Metroplex.

43–21 Operational Database Management System (ODMS)



43–22 FSAS Operational and Supportability Implementation System (OASIS)

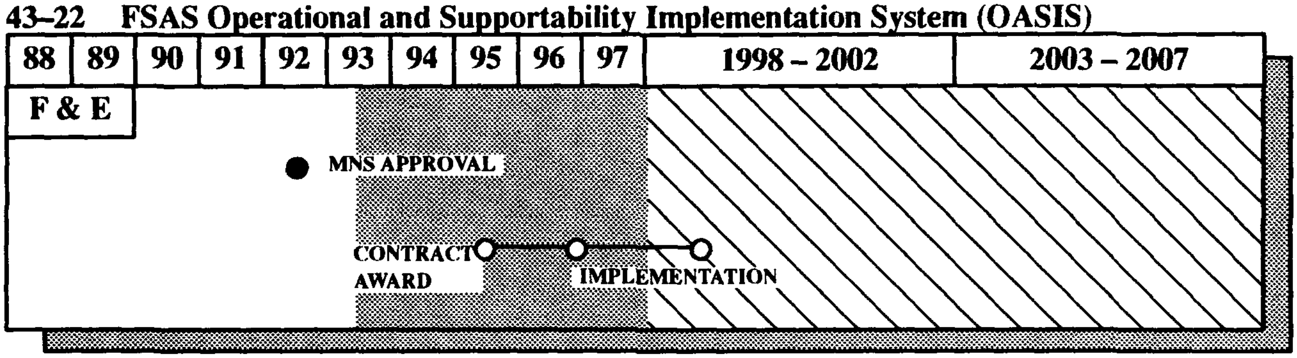
Purpose: This project will provide the hardware and software necessary to extend the life cycle of the current FSAS subsystems until deployment of the FSAS computer replacement project contained in this chapter. The existing system is logistically unsupportable beyond 1995 and is presently at its operational performance and capacity limits.

Approach: Commercial–off–the–shelf (COTS) hardware and software will consist of workstations and networks with shared servers and mass storage. This equipment will be installed at the existing 61 AFSSs. In addition, software changes necessary to accommodate operational requirements and to integrate the network with the existing FSDPS will be provided.

Products: COTS workstations, networks, mass storage, and associated software.

Related Projects/Activities: 23–01 FSAS, 23–02 CWP, 23–13 ICSS, 26–10 Acquisition of Flight Service Facilities, 33–20 AFSS Support Space, 43–01 National GWDS, 43–03 FSAS PCS, and 43–04 FSAS Computer Replacement.

43–22 FSAS Operational and Supportability Implementation System (OASIS)



44–03 Air/Ground Communications Radio Frequency Interference (RFI) Elimination

Purpose: This project will provide selected remote communication facilities (RCFs) with modern radio equipment and ancillary equipment to improve operational performance in an increasingly crowded radio frequency spectrum. The existing equipment does not meet minimum performance requirements for the congested radio frequency spectrum environment. The RCF equipment is used for transmitting and receiving voice between air traffic personnel and aircraft pilots using the numerous RCFs (formerly identified as RCAG, RTR, and RCO facilities). The RCF radio frequency interference (RFI) solution will improve air/ground radio communication service for those selected sites that have a persistent RFI problem.

Using multicouplers and combiners to group frequencies will eliminate crowded antenna conditions at RCFs and help reduce receiver desensitization. Grouping multiple frequencies on single antennas will improve antenna separation on existing RCF antenna towers. Ancillary devices such as bandpass and notched filters, insulators, high Q cavities, and hybrid combiner units also serve to correct RFI problems. Solid–state linear power amplifiers will improve maintenance support of those RCFs requiring increased transmitting power. These improvements will provide a reduction in intermodulation products, thus eliminating the major source of RFI at congested sites. This program is an interim measure and will eventually be replaced by the air/ground replacement program. The design of the existing equipment does not meet the current RF spectrum requirements.

Approach: Procure equipment to resolve existing RFI problems. Provide funds for facilities that require extensive installation activity to correct RFI problems. Maintain a depot inventory of products correcting RFI problems for use by AF maintenance sectors. The products will be procured by indefinite quantity competitive contracts.

Funds will also be provided to the regions to upgrade RCFs experiencing RFI problems, in accordance with FAA Order 6850.3, RCF Installation Standards Handbook.

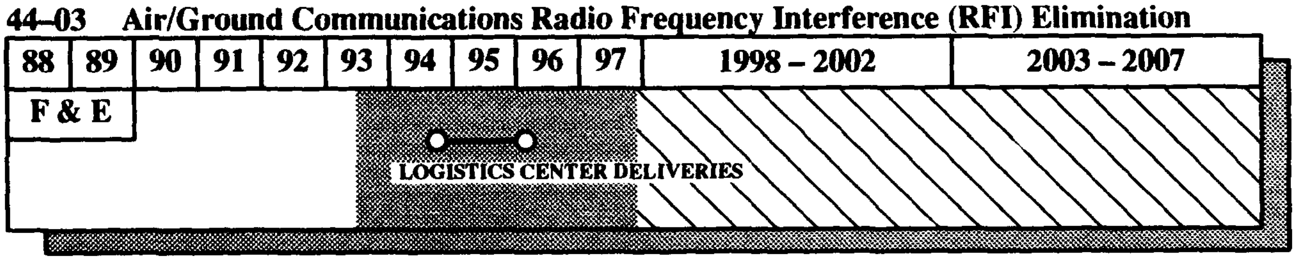
Products: This project will provide an indefinite quantity of multicouplers, combiners, linear power amplifiers, and ancillary devices, such as filters, to reduce and eliminate RFI.

Progress/Activity from December 1991:

- Multicoupler, combiner, and linear power amplifier acquisition documentation has been completed.

Related Projects/Activities: 24–09 Visual Navaids, 25–08 RCE, 34–23 Communications Facilities Expansion, 44–04 A/G Radio Replacement, and 46–16 Continued General Support.

44–03 Air/Ground Communications Radio Frequency Interference (RFI) Elimination



44–05 Backup Emergency Communications (BUEC) Replacement

Purpose: This project will replace the existing BUEC at air route traffic control centers (ARTCCs)which have parts supply problems and rising maintenance costs. The original BUEC system deployment was completed in the late 1970's. Since the system's inception, the operating environment has greatly changed, e.g., loss of alternate leased circuits to air/ground outlets. The loss of air/ground communications has the most severe ATC impact. Lack of the radio link precludes the application of any type of separation or guidance. While fallback to manual procedures is possible during radar failures, the inability to speak with aircraft personnel cancels all options for control. This project will provide additional BUEC type equipment to expand present BUEC coverage, plus equipment to relocate, and equipment to replace existing sites where maintainability problems are impacting the existing service.

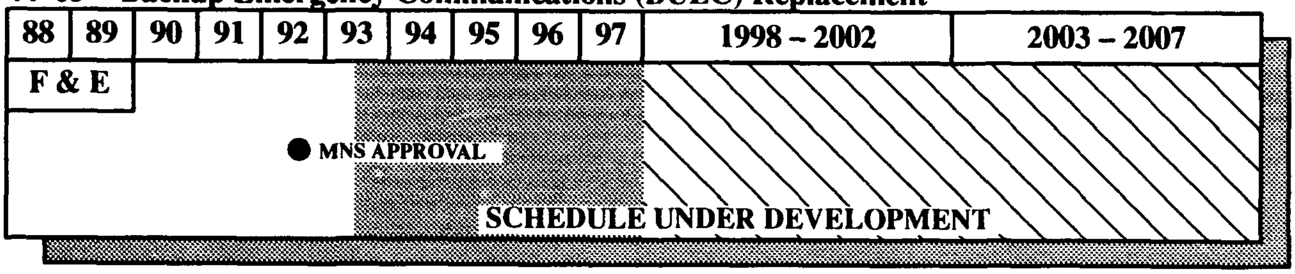
Approach: Procure additional nondevelopmental items such as transceivers and ancillary items to augment the current BUEC capabilities at ARTCCs in response to increased Air Traffic demands for coverage.

Products: Remote transceivers and control equipment will be procured after hardware requirements are determined.

Related Projects/Activities: 21–11 VSCS, 25–08 RCE, 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–22 Dallas/Fort Worth Metroplex, 32–24 Chicago Metroplex, 32–26 Southern California Metroplex, 32–34 Potomac Metroplex, 32–36 Northern California Metroplex, 32–38 Atlanta Metroplex, 32–40 Central Florida Metroplex, and 32–42 New York Metroplex.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

44–05 Backup Emergency Communications (BUEC) Replacement



44–07 Emergency Transceiver Replacement

Purpose: This project will provide for the replacement of obsolete emergency transceiver equipment in ATCT and TRACON facilities. This equipment is required to provide backup emergency transceiver communications capability for critical air traffic operations at these facilities. The majori emergency equipment now in use in the A nd TRACONs is maintenance–intensive, nologically obsolete, and meets neither minimum performance standards for operation in a congested radio frequency spectrum environment, nor the criteria for RFI elimination.

The FAA is currently experiencing severe logistics support and RFI problems with the existing equipment. Much of the equipment is 30-years old and was purchased prior to the implementation of the 25 kHz channel spacing requirement. The obsolete hardware, lack of logistics support, and growing number of RFI problems all contribute to the urgent need to replace this equipment.

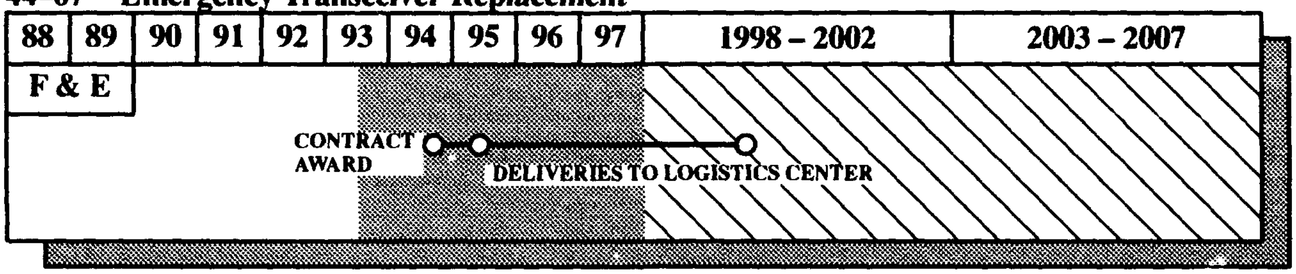
Approach: Procure modern transceivers for ATCT and TRACON facilities.

Products: A total of 1,941 modern transceivers may be procured for installation at ATCT and TRACON facilities.

- VHF transceivers (ATCT) – 809
- UHF transceivers (ATCT) – 438
- VHF transceivers (TRACON) – up to 485
- UHF transceivers (TRACON) – up to 209
- VHF transceivers (Academy) – 5
- UHF transceivers (Academy) – 5
- VHF transceivers (FAATC) – 5
- UHF transceivers (FAATC) – 5

Related Projects/Activities: None.

44–07 Emergency Transceiver Replacement



44–09 Replace Visual Approach Slope Indicators (VASIs) with Precision Approach Path Indicators (PAPIs)

Purpose: The objective of this project is to: (1) satisfy the ICAO standard requiring installation of PAPIs at all international runways and (2) satisfy air line pilots association (ALPA) and general aviation requests for PAPIs at all validated approaches within federally controlled airspace by January 1, 1995. In addition, the remote maintenance monitoring capability to the visual glideslope indicators is to be installed at all airports. Also, maintenance man–hours required to aim the visual glideslope indicators is to be reduced by implementing advancements in aiming technology.

Approach: Visual glideslope indicators are provided to airports throughout the United States. At present, approximately 1,387 VASIs are deployed as part of that capability. In a separate complementary activity, the FAA is procuring 343 PAPIs for new installations.

ICAO Annex 14, Airdromes, paragraph 5.3.6.2, requires the installation of PAPIs at all international airport runways by January 1, 1995. The United States has agreed to comply with the international ICAO standard.

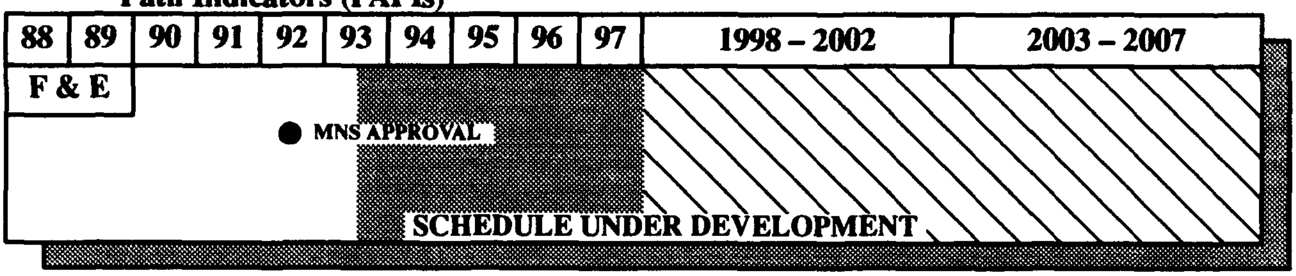
ALPA has petitioned the FAA to deploy PAPIs to all runways, thus replacing completely the current VASI complement. The general aviation community has also indicated their preference for PAPIs. The airline pilots, as well as the general aviators, feel that the additional precision provided by PAPI makes the system superior to VASI.

Products: At present, there are approximately 218 federally controlled international runways. Eleven PAPIs will be installed at United States international runways as a result of the ongoing FAA procurement, leaving 207 runway approach systems to be converted in later years.

Related Projects/Activities: TBD

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

44–09 Replace Visual Approach Slope Indicators (VASIs) with Precision Approach Path Indicators (PAPIs)



44–12 Low–Power TACAN Antennas

Purpose: This project provides for the replacement of obsolete antennas with low–power consumption TACAN antennas. The new antennas reduce primary AC input power requirements from 5,000 watts to 300 watts, while maintaining the same radio frequency (RF) power output. This reduction removes the requirement for engine–generated power for the antenna.

The DOD requires tactical air navigation (TACAN) equipment for air navigation throughout the 1990's. The present TACAN antenna rotating elements are experiencing logistic support problems which impacts TACAN availability. In addition, the low–power TACAN antenna is easier to maintain.

Approach: FAA and DOD will jointly fund, to the extent practical, replacement of the existing mechanical rotating TACAN antennas with new, low–power TACAN antennas. The FAA is responsible for funding and maintaining TACANs which compose a portion of the common system (i.e., primarily en route). DOD normally funds and maintains on–base TACANs. DOD provided funds to acquire 119 low–power TACAN antennas. The FAA funded 84 additional antennas for a total buy of 203. Future quantities for replacements will be based on DOD requirements.

Products: 203 low–power TACAN antennas.

Progress/Activity from December 1991:

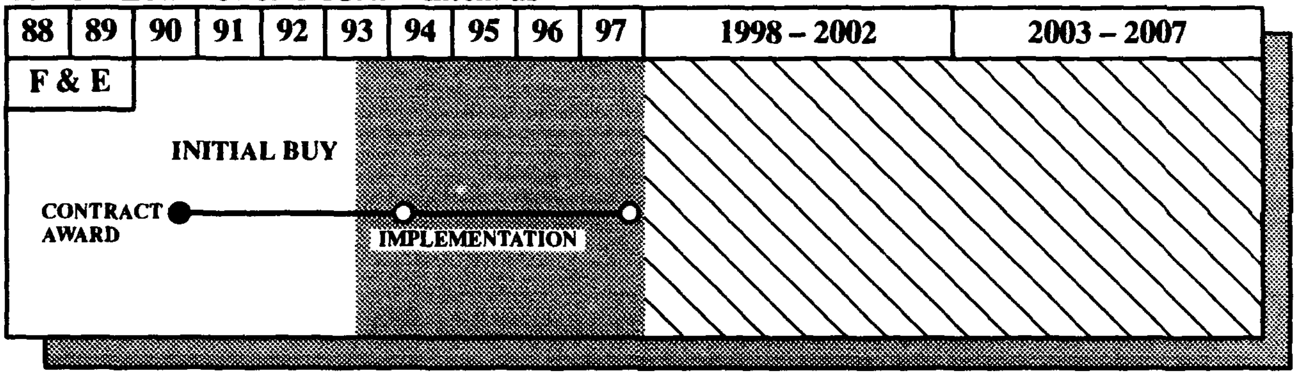
- Contract sold by JTP Radiation, Inc. to Radiation Systems, Inc. (RSI).
- Conducted initial confidence test of first article antenna at FAATC.

Related Projects/Activities: 24–03 VORTAC and 44–14 Sustain VOR/VORTAC.

List of Contractors:

- Radiation Systems, Inc. (RSI)
  (203 low–power antenna units)
  Sterling, Virginia

44–12 Low–Power TACAN Antennas



44–14 Sustain VOR/VORTAC

Purpose: This project sustains the air navigation and approach aids network through establishment, replacement, relocation, and conversion of VORTAC, VOR/DME, and VOT. The project also provides enhancements to those systems to satisfy NAS operational requirements.

Approach: Subsystems, special equipment, and retrofit kits will be procured and installed to ensure that en route navigation and approach aids function as designed at all geographic locations. The aids are required for safe and efficient flight and landing operations.

Engineering support will be provided to improve radio navigation system performance and effectiveness with respect to the following:

- VORTAC, VOR/DME RMM retrofits compatible with MPS.
- Relocation of VORTAC and VOR/DME facilities to accommodate route structure changes, real estate considerations, and site suitability.

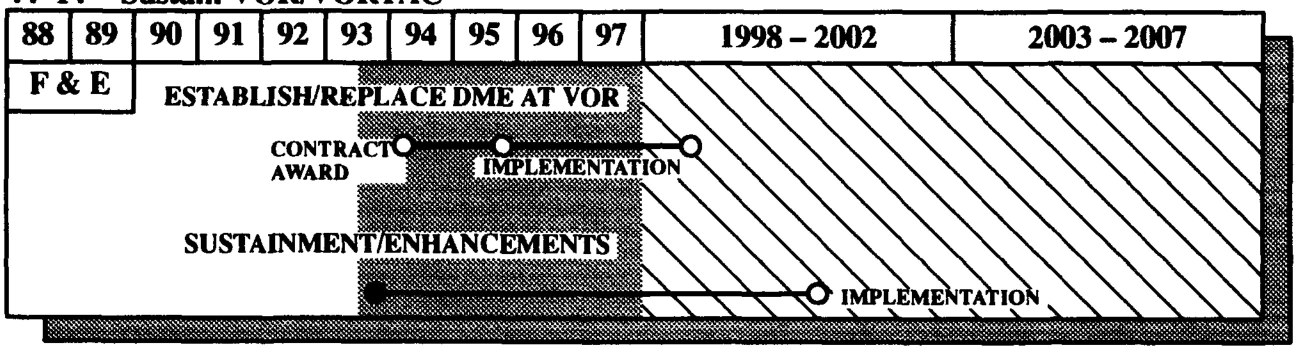
- Conversion of conventional VORs to Doppler VOR's (DVORs) to solve siting problems and obtain required signal coverage.
- Modification of TACAN equipment for battery backup power.
- Conversion of mountaintop counterpoise VORs to conventional counterpoise.
- Site installations at new VORTAC locations.

Products:

- Procurement of special test material and equipment.
- 950 RMM retrofit kits.
- 490 TACAN battery backup modification kits.
- 94 DVOR kits.

Related Projects/Activities: 23–09 AWOS, 24–03 VORTAC, 24–17 Loran-C Systems, and 44–12 Low–Power TACAN Antennas.

44–14 Sustain VOR/VORTAC



44–20 AN/GRN–27 Instrument Landing System (ILS) Replacement

Purpose: This project provides for replacement of the current AN/GRN–27 ILS inventory. Many of these systems, which support Category II and Category III operations, have been in service for nearly 20 years. These systems are experiencing severe logistics support problems because parts are not available from the manufacturer which ceased production of AN/GRN–27 equipment in 1976. Maintenance costs are up sharply as parts must be custom manufactured or refurbished to restore failed systems and subassemblies. Because of their importance in providing all–weather approaches to major airports, these instrument landing systems should be replaced as quickly as possible. This project is intended to replace the obsolete AN/GRN–27 equipment, antennas, shelter, etc., not upgrade the associated approach or approach lighting system.

Approach: This project will procure ILSs, prepare sites and install systems, as well as provide spare parts and training needed to equip and operate ILS approaches at replacement locations.

Replacement equipment will incorporate RMM capabilities and require only minimal manual intervention. It will provide improved performance necessary to sustain reliable approach guidance into the next decade until transition occurs to a suitable alternative.

Obsolete AN/GRN–27 systems will be disposed of in a manner which precludes further use in the NAS.

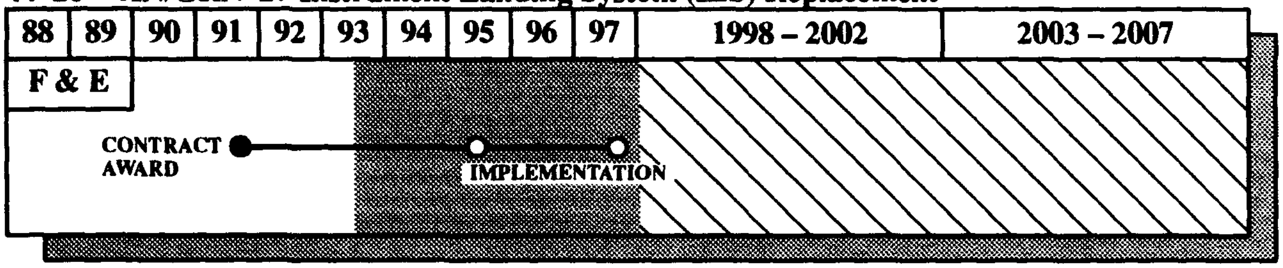
Products: 75 CAT I/II/III ILSs to replace AN/GRN–27 ILSs.

Progress/Activity from December 1991:

- System design review (SDR) completed.
- Preliminary design review (PDR) completed.

Related Projects/Activities: 34–06 ILS, 44–21 Wilcox CAT II/III ILS Replacement, 44–23 Takeover of AIP/ADAP Funded Non–Federal ILS and Associated Equipment, and 44–24 ILS and Visual Navaids Engineering and Sparing.

44–20 AN/GRN–27 Instrument Landing System (ILS) Replacement



44–21 Wilcox CAT II/III Instrument Landing System (ILS) Replacement

Purpose: This project will provide for replacement of the current Wilcox CAT II/III ILS inventory. These systems, which support CAT II and CAT III operations, are not equipped to support remote maintenance monitoring.

Approach: Equipment and logistics support will be procured to replace existing Wilcox CAT II/III facilities to prevent severe logistics support problems, and to maintain the integrity and reliability of these facilities. In addition, allowing for embedded remote maintenance monitoring will reduce the requirement for site visits to approximately one each quarter.

The new equipment will provide improved performance necessary to sustain reliable approach guidance into the next decade.

Products: 25 CAT II/III ILS.

Related Projects/Activities: 44–20 AN/GRN–27 ILS Replacement, 44–23 Takeover of AIP/ADAP Funded Non–Federal ILS and Associated Equipment, and 44–24 ILS and Visual Navaids Engineering and Sparing.

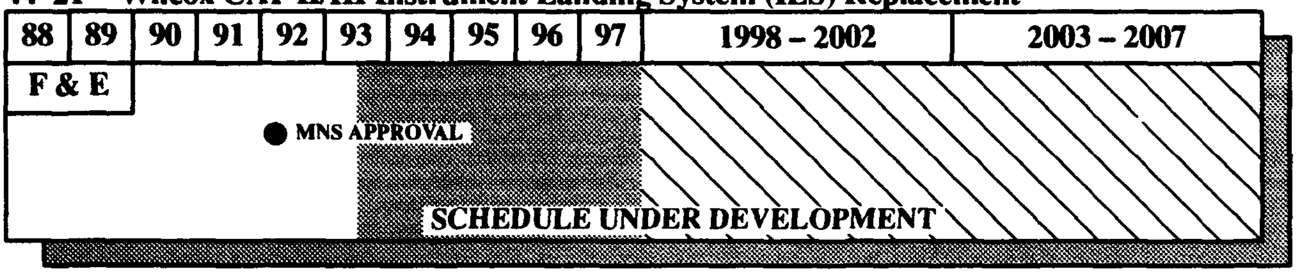
List of Contractors:

- Wilcox Electric Corporation
  (ILS equipment)
  Kansas City, Missouri

- New Bedford Panoramics
  (Antennas)
  Upland California

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

44–21 Wilcox CAT II/III Instrument Landing System (ILS) Replacement



44–22 Mark 1A, 1B, and 1C Instrument Landing Systems (ILSs)

Purpose: CAT I Mark 1A, 1B, and 1C instrument landing systems are nearing the end of their life cycle. These older systems are experiencing maintenance and supportability problems.

Approach: Twenty–seven CAT I Mark 1As will be replaced and the 1Bs and 1Cs will be incorporated into a service life extension plan (SLEP). This program will provide supportable and maintainable equipment until the next generation precision approach aids are available.

Products: Approximately 27 CAT I Mark 1A replacement systems and SLEP modifications to the remaining 153 Mark 1B and 1C ILSs.

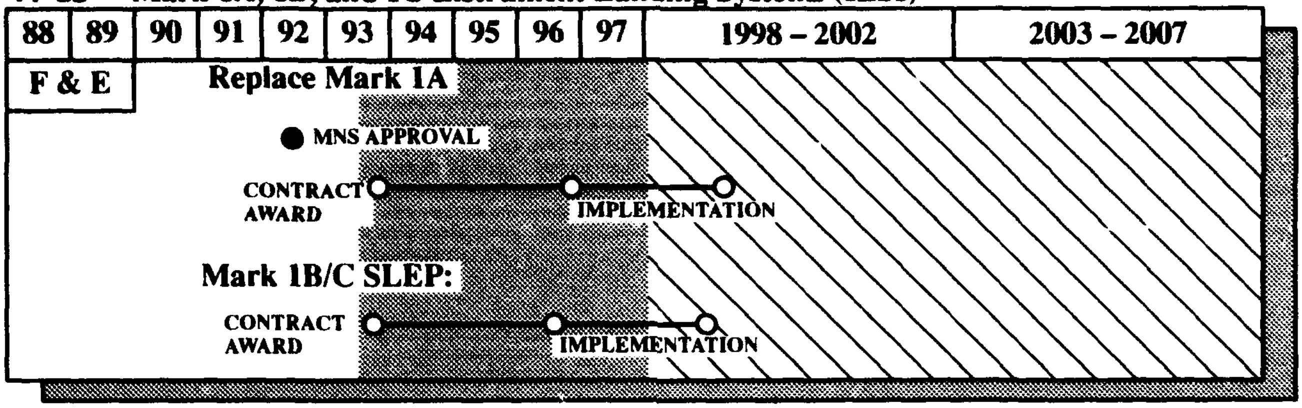
Progress/Activity from December 1991:

- Solicitation preparation for replacement of Mark1As.

- Mark1Bs and 1Cs SLEP under development.

Related Projects/Activities: 34–06 ILS, 44–23 Takeover of AIP/ADAP Funded Non-Federal ILS and Associated Equipment, and 44–24 ILS and Visual Navaids Engineering and Sparing.

44–22 Mark 1A, 1B, and 1C Instrument Landing Systems (ILSs)



44–23 Takeover of AIP/ADAP Funded Non–Federal ILS and Associated Equipment

Purpose: Public Law number 101–516, Section 324, mandates the takeover of AIP/ ADAP funded ILSs and associated equipment. There are 34 AIP funded ILSs identified for takeover, of which eight were not built to FAA specification and were being modified to permit inclusion into the FAA inventory; however, the modifications were not completed. Of the remaining 26 systems, 18 have counterparts in the FAA inventory and therefore are supportable. Eight are not identified by manufacturer but will be specification versions.

Approach: Each ILS has an associated MALSR and RVR. These facilities usually need extensive refurbishment due to improper burial of cables, construction of light supports, and sizing of engine-generators.

Funding is required for replacement of a portion of the ILS facilities and associated equipment. Funding will also be required for refurbishment of a majority of ILSs and associated facilities. This includes replacing shelters, repairing roads, rebuilding pads for localizer antennas, resurveying ground check points, and acquiring additional spares for the Logistics Center and technical training. Regions shall be responsible for each ILS takeover and requesting waivers as necessary. Prior to takeover, all grant requirements must be met, to include installation and commissioning.

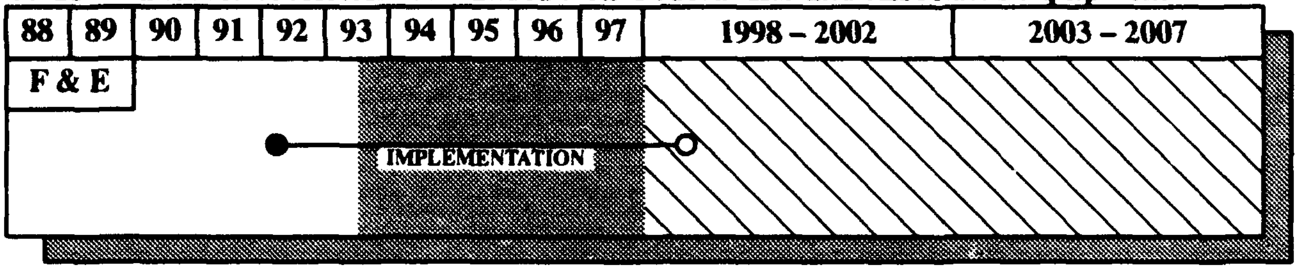
Products: 34 ILSs, 24 MALSRs, 6 ALSF–2s, 6 RVRs, 7 DMEs, and 7 LOMs.

Related Projects/Activities: 34–06 ILS, 44–20 AN/GRN–27 ILS Replacement, 44–21 Wilcox CAT II/III ILS Replacement, 44–22 Mark 1A, 1B, and 1C ILSs, and 44–24 ILS and Visual Navaids Engineering and Sparing.

Problems Resulting in Delays: Actual rehabilitation and reconfiguration of the acquired non–federal systems has exceeded the original schedule estimates for accomplishing full takeover and completing implementation.

Delays Minimized by: Procurement actions are being expedited to the extent possible while attempting a sole–source procurement with the manufacturers of the respective systems.

44–23 Takeover of AIP/ADAP Funded Non–Federal ILS and Associated Equipment



44–24 ILS and Visual Navaids Engineering and Sparing

Purpose: This project will provide for the continued engineering support of deployed instrument landing system capabilities and visual navaids. The engineering effort addresses technical problems which arise as a result of routine facility establishment, equipment relocations, and restoration. The project engineering effort applies technological advances to allow ILS and visual aid components to continue to meet safety and capacity requirements, particularly under conditions where difficult environmental/site situations are encountered.

Approach: Engineering evaluations will be conducted to bring advances in technology into use to further reduce the vulnerability of the ILS in demanding site situations, and to improve the reliability and maintainability of the ILS and visual aids. The results of these efforts will be confirmed by field tests. Fixes to technical problems will be developed and components of the ILS and visual aids modified or replaced. The project will replace all localizer traveling wave antennas (TWAs) and associated RF distribution networks. The existing TWAs are reducing localizer reliability and require frequent corrective maintenance.

Products:

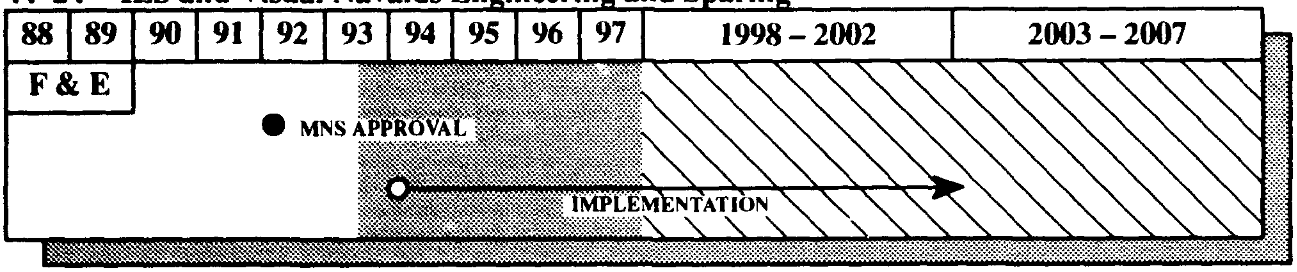
- Special test material and equipment.
- Emergency spares.
- Localizer antenna array.

Progress/Activity from December 1991:

- Contract awarded for initial quantity (34) traveling wave antenna replacements.

Related Projects/Activities: 24–09 Visual Navaids, 44–20 AN/GRN–27 ILS Replacement, 44–21 Wilcox CAT II/III ILS Replacement, 44–22 Mark 1A, 1B, and 1C ILSs, and 44–23 Takeover of AIP/ADAP Funded Non–Federal ILS and Associated Equipment.

44–24 ILS and Visual Navaids Engineering and Sparing



44–29 Runway Visual Range (RVR) Replacement

Purpose: This project will satisfy the need for continued replacement of the obsolete RVR systems.

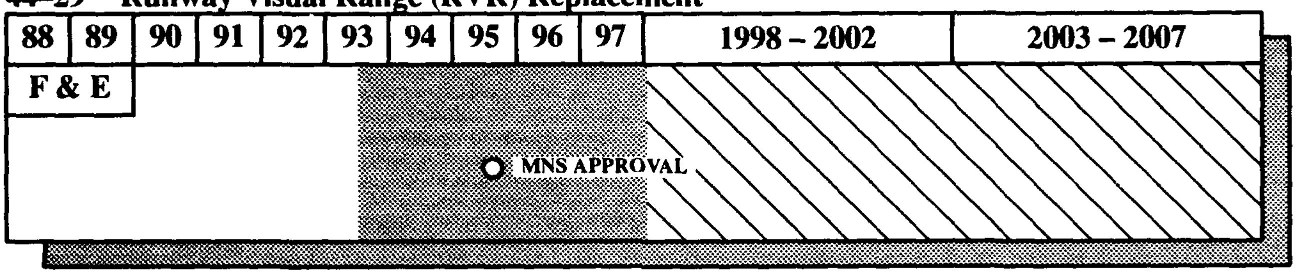
Approach: This project will provide equipment through a follow–on procurement to complete replacement of old Tasker 500 RVRs.

Products: Replace Tasker 500 RVRs with new generation RVRs at 197 locations.

Related Projects/Activities: 21–12 AAS, 23–09 AWOS, 24–08 RVR, 26–01 RMMS, and 34–08 RVR Establishment.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

44–29 Runway Visual Range (RVR) Replacement



44–30 Sustain Distance Measuring Equipment (DME)

Purpose: This project replaces outdated DMEs collocated with instrument landing systems (ILSs) and terminal nondirectional beacons (NDBs) with solid–state equipment. These DMEs are a critical component of the NAS since they are used to support ILS/NDB precision and nonprecision instrument approach procedures.

The majority of DMEs collocated with ILS and terminal NDB systems are obsolete tube–type or older solid-state systems, nearing or having reached the end of their normal life expectancy. As such, these DMEs are difficult and expensive to maintain since replacement parts are either difficult to obtain or unavailable.

Approach: Maintenance concepts and functional system specifications are upgraded to enhance DME capabilities at ILS and terminal NDB facilities. Replacement equipment are procured as required to meet the new specifications for system upgrade. The number of DMEs to be modernized is scheduled to be defined in FY 1994.

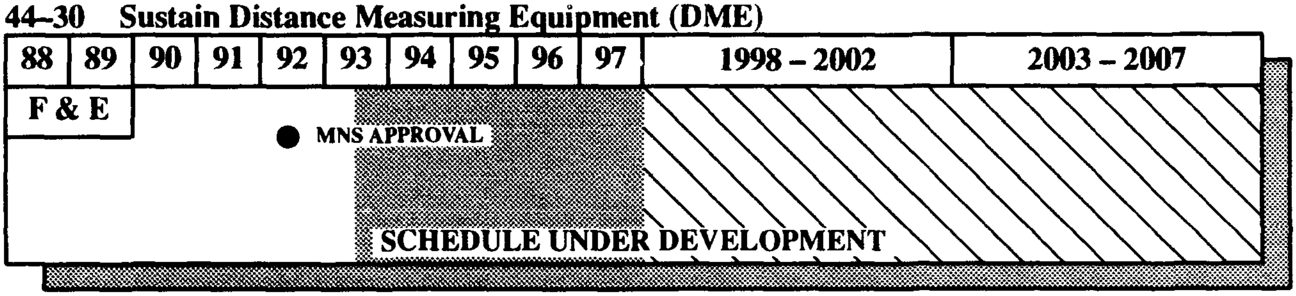
The modernization of DME will provide for the replacement of DME with RMM capabilities which will interface with the maintenance processor subsystem (MPS) and TCCC.

Products: 225 DMEs are candidates for replacement.

Related Projects/Activities: 24–03 VORTAC, 24–07 MLS, 26–01 RMMS, 34–09 Establish Visual Navaids for New Qualifiers, 44–20 AN/GRN–27 ILS Replacement, 44–21 Wilcox CAT II/III ILS Replacement, and 44–32 Replace NDB.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

44–30 Sustain Distance Measuring Equipment (DME)



44–31 Replace Type FA9964 Direction Finder

Purpose: This modernization project replaces all obsolete FA9964 direction finder (DF) systems in the automated flight service stations. The FA9964 DFs covered by this project are all the remaining DFs in operational use that were not included in the upgrade provided by project 24–11.

DFs are used to guide lost aircraft and to provide pilots with position information during inflight emergencies. The aircraft's bearing is determined on the ground by using radio transmissions from the aircraft. Distance of aircraft from given locations (DF antenna) can be determined after establishing two lines of bearing. The guidance information is then transmitted to the aircraft on a voice channel.

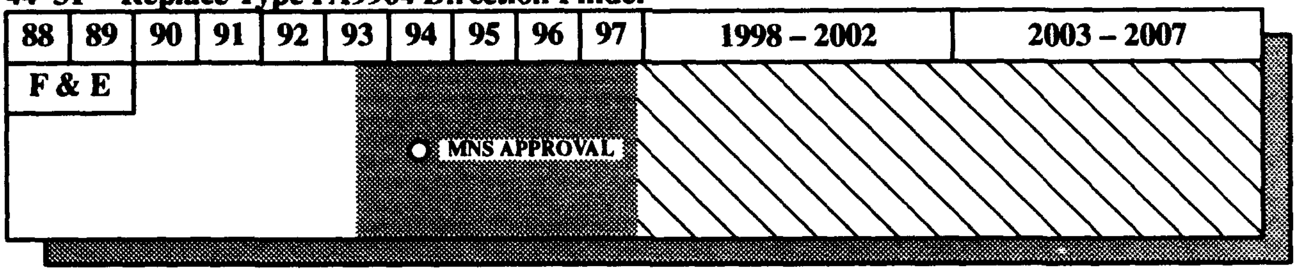
Approach: The quantity and location of equipment to be replaced are scheduled to be defined in FY 1995. The project will be accomplished by competitive procurement with installations by regional personnel.

Products: DFs will be replaced by upgraded solid–state equipment.

Related Projects/Activities: 23–01 FSAS and 24–11 DF.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

44–31 Replace Type FA9964 Direction Finder



44–32 Sustain Nondirectional Beacon (NDB)

Purpose: This project will sustain the NDBs presently in the NAS. These NDBs are a critical component of the NAS since they are used to support some en route airways and NDB nonprecision instrument approach procedures.

The majority of NDBs in the NAS are obsolete tube–type or older solid–state systems, nearing or having reached the end of their normal life expectancy. As such, these NDBs are difficult and expensive to maintain. Replacement parts are often difficult to obtain or unavailable.

Approach: The quantity and location of equipment to be sustained/replaced are scheduled to be defined in FY 1995. If NDB equipment is to be replaced, it will be with modern NDBs with RMM capability. NDB equipment replacement requirements will be sufficient to sustain NDB operations until these systems are replaced by other systems such as GPS.

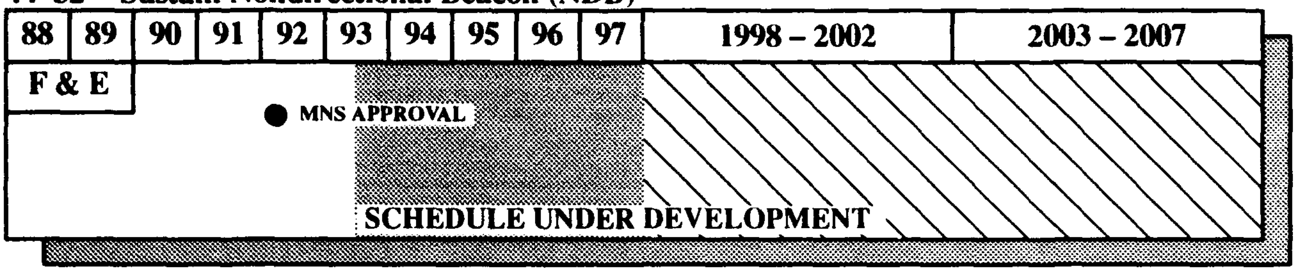
Products: The following NDBs and associated peripherals are candidates for replacement/sustainment.

- 560 NDB transmitters (mix of low/medium/ high power).
- 565 antenna systems (including antenna tuning units).
- 560 monitor receivers.

Related Projects/Activities: 44–30 Sustain DME and 56–23 IAPA.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

44–32 Sustain Nondirectional Beacon (NDB)



44–33 Approach Lighting System Improvement Program (ALSIP) Continuation

Purpose: This project will provide for the modernization of airport lighting systems. The modernization will result in improved safety and increased energy efficiency for both the approach light and guidance lighting systems. This is a follow–on program to retrofit existing airport runway approach lighting systems with low–impact resistance approach light supports and other improvements.

Replacement of the existing rigid tower structures with light–weight and low–impact resistant structures that collapse or break apart on impact will reduce damage to an aircraft should it strike an approach light tower structure during takeoff or landing. The program will also result in a significant reduction in FAA energy consumption and the replacement of obsolete equipment.

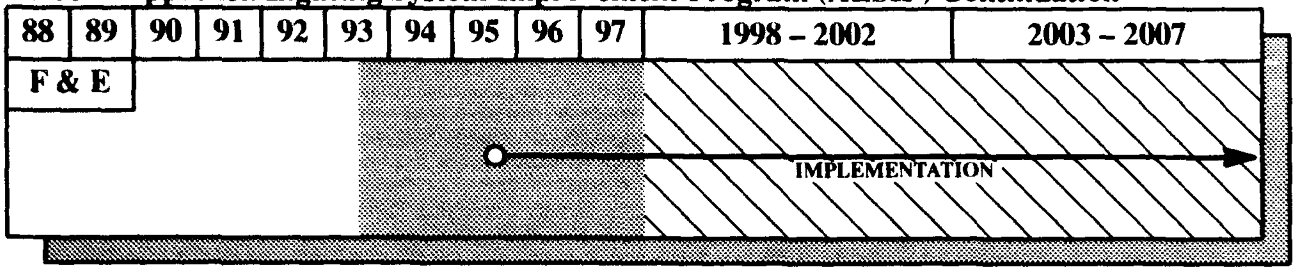
Federal aviation regulations authorize a pilot to descend below the published minimum descent altitude or decision height, provided that approach lights and threshold lights for the intended runway are distinguishable. The installation of threshold light bars as part of the existing medium–intensity approach lighting system with runway alignment indicator lights (MALSR) will provide a visual reference to the runway threshold and make the present system more effective in low–visibility conditions. The modification will enhance safety and comply with ICAO minimum requirements.

Approach: This program retrofits nonfrangible, high–intensity approach lighting systems on Category I runways with frangible MALSRs. When the program is fully implemented, energy consumption of these systems will have been reduced by 60 percent over FY 1976 base–year requirements.

Products: 135 existing rigid MALSRs, SSALF, SSALR, and ALSF–1 systems will be converted to MALSRs on low–impact structures.

Related Projects/Activities: 24–09 Visual Navaids, 24–10 ALSIP, and 62–21 ASTA.

44–33 Approach Lighting System Improvement Program (ALSIP) Continuation



44–35 Loran-C Monitors and Transmitter Enhancements

Purpose: This project maximizes the overall system performance of Loran–C. This will be accomplished by modifying the Loran-C signal monitors, relocating about 50 units, and enhancing the Loran-C transmitters.

The modification must be made to all monitors to include data related to establishment of the midcontinent Loran-C chains. Without modification, the monitors cannot recognize the existence of the chains and will not provide the intended service to aviation. The two chains did not exist when the monitor procurement contract was awarded in 1986, and the chain parameters needed for the modification were not available until late 1990. Tests by the FAA Technical Center and other organizations have shown that Loran-C signals do not propagate uniformly over the surface of the earth. The signal analysis work was not adequate to identify exactly how monitor locations should be changed, but does support the expectation that some of the units will have to be relocated after at least one year of collecting seasonal data. The initial installation of monitors is uniform across the NAS. Modifications to the monitors will enhance their operation.

There are two types of enhancements to be made to the Loran-C transmitter stations. The enhancements reduce the number of unscheduled signal outages and assure essential interstation communications. A 1987 study showed that six of the Loran-C chains each experience an average of four unscheduled outages per day. There are several correctable causes of the outages, but they remain a problem. The second enhancement is to perform improvements in many of the timing links between stations. The Loran-C system is based on the availability of precise time information at all transmitter stations and the measurement of actual signal timing differences at the signal monitor receivers. Reliable communications between all points are needed to assure the transfer of timing data.

Approach: Modify all Loran-C monitor hardware/software to maximize system performance and provide the capability to monitor the new midcontinent Loran-C transmitter chains.

Establishing values for the midcontinent chain parameters and analysis of Loran-C signal characteristics will be conducted in support of this project. Upon completion of these activities, 212 monitors will be modified and approximately 50 monitors will be relocated.

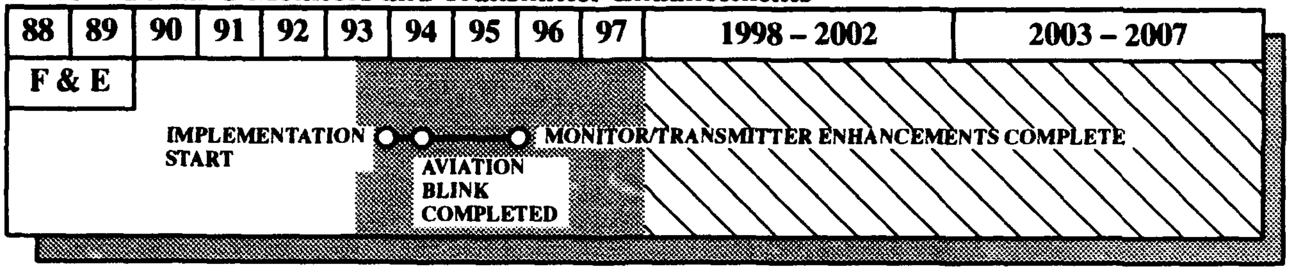
Enhance the Loran-C transmitters to reduce the number of unscheduled signal outages, correct a signal problem in the tube–type transmitters, and improve the reliability of the timing link between transmitter stations.

Products:

- Modification of 212 monitors.
- Relocation of approximately 50 monitors.
- Enhancements to Loran-C transmitters.

Related Projects/Activities: 24–17 Loran-C Systems, 33–20 AFSS Support Space, and 64–17 Gulf of Mexico.

44–35 Loran-C Monitors and Transmitter Enhancements



44–39 Sustain/Relocate Air Route Surveillance Radar (ARSR)

Purpose: This project will relocate existing long–range radars as required to enhance and improve air space coverage to meet Air Traffic requirements.

Approach: The regional inputs will be prioritized and validated at FAA headquarters. The relocation projects will be coordinated to ensure compatibility with the ARSR-3 leapfrog program and the Joint Radar Planning Group recommendations for ARSR–4 initial locations. The refurbishment and/or retrofit of FPS–60 radars will be accomplished to be compatible with ARSR–3 logistics support and remote maintenance monitoring capabilities. The availability of these extra radars would alleviate the radar shortage in the NAS and allow for placement to meet NAS radar networking coverage requirements.

Products: Approximately two sites per year will be relocated, according to Air Traffic national requirements. Eight units will be provided for NAS radar network coverage.

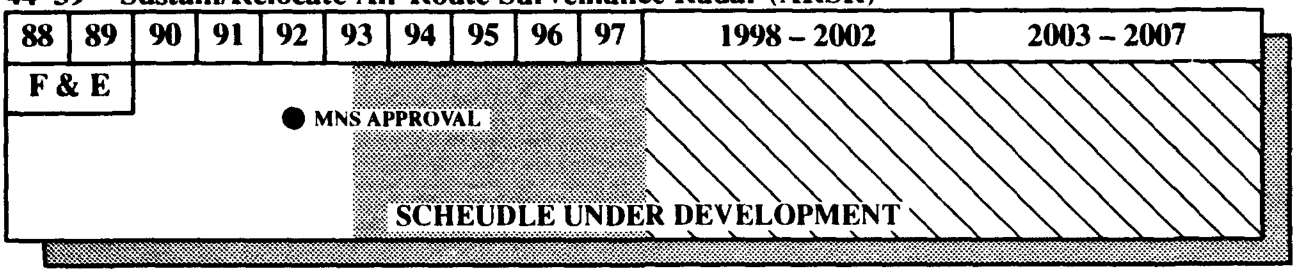
Progress/Activity from December 1991:

- An FPS radar was transferred from Keesler AFB to the FAA to be installed at the Aeronautical Center as a training facility.

Related Projects/Activities: 24–15 Long-Range Radar Program, 44–40 Long-Range Radar Improvements, 44–45 ATCRBS Relocation, 44–46 ATCBI Replacement, and 56–53 Refurbish AN/FPS–20 Radars.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

44–39 Sustain/Relocate Air Route Surveillance Radar (ARSR)



44–40 Long-Range Radar (LRR) Improvements

Purpose: This project will provide improvements to the current inventory of long-range radars that will extend their useful life and/or provide a smooth transition to a beacon–only en route surveillance system should the Agency decide to discontinue en route primary radar surveillance services .

Approach: The FAA is currently evaluating a potential phase–out of en route primary radar within the interior United States. The Joint Surveillance System (JSS) coverage around the perimeter of the United States would be unaffected by any phase–out (e.g., ARSR–4 radars). In the event en route primary radar services are required beyond 2005, the LRR improvements program will continue the activity begun with the solid state receiver/digital moving target indicator (SSR/DMTI) to upgrade the current inventory of ARSR–1/2 and FPS radars. The upgrade will be accomplished by replacing aging and obsolete components and material to make them more supportable and, in so doing, increase the service life another 15 to 20 years. The major part of the improvement will consist of upgrading the transmitter in both ARSR–1/2 and FPS radars. Other improvements will include rotary joint replacements, wave guide replacement, intercabinet wiring replacement, cooling and dehumidifier upgrades, power conditioning upgrades, and interior and exterior grounding upgrades.

Should the FAA/DOT decide not to continue en route primary radar surveillance beyond 2005, a transition to a beacon–only en route radar surveillance system will be developed and implemented. The transition will address disposal of the primary radars, physical plant changes, and equipment modifications for use with Mode S or other beacon surveillance radars.

Regardless of the en route primary decision, certain improvements such as power grounding, cable tray cleanup, and rotary joint replacements will be accomplished.

Products:

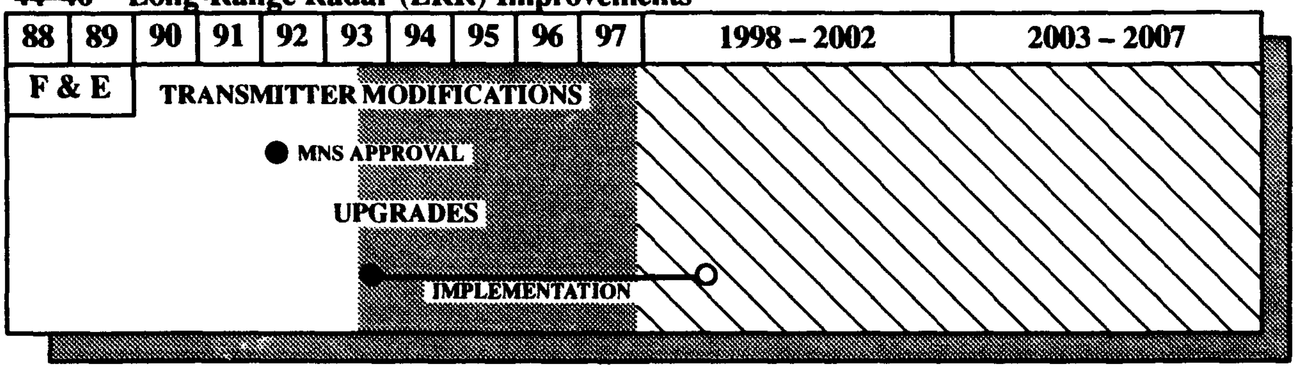
- ARSR–1/2 radar set controls.
- Cable tray cleanup.
- Power and grounding problems resolution.
- Long-range radar transmitter upgrade.

Progress/Activity from December 1991:

- ARSR-1/-2 radar set control project was completed.
- SSR/DMTI installation and commissioning project was completed.

Related Projects/Activities: 24–15 LRR Program, 44–39 Sustained Relocation of ARSR, 44–42 LRR Radome Replacement, 44–43 Radar Pedestal Vibration Analysis, and 56–53 Refurbish AN/FPS–20 Radars.

44–40 Long-Range Radar (LRR) Improvements



44–42 Long-Range Radar (LRR) Radome Replacement

Purpose: This project will replace existing radomes at most LRR facilities in the NAS. The majority of the radomes at LRR sites have been in service for 25 to 30 years. The radomes have exceeded their normal life expectancy, and their maintenance has become labor intensive.

Current radomes are also not compatible with the new Mode S monopulse antenna system. These radomes are too small to physically accommodate the Mode S antenna system. In addition to being larger, the new radome will minimize radar signal interference, such as antenna beam skewing and excessive attenuation, as compared to existing radome metal frames and dielectric materials.

Approach: Replace all obsolete and Mode S noncompatible LRR radomes. Radome procurement will be initiated with a request for proposal (RFP). The technical specification will require that the new radome be compatible with the Mode S system.

Products:

- Phase I – 25 radomes.
- Phase II – 10 radomes.
- Phase III – option for 75 radomes for balance of the LRR facilities.

Progress/Activity from December 1991:

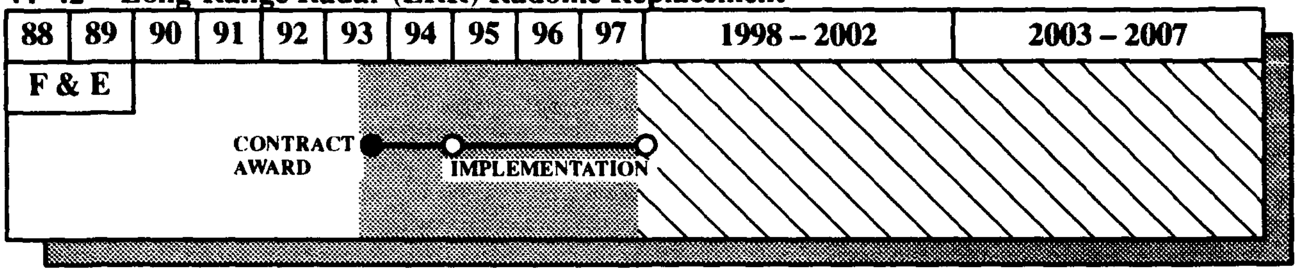
- Proposals received; evaluations begun.
- Contract award

Related Projects/Activities: 24–12 Mode S, 24–15 LRR Program, and 44–40 Long-Range Radar Improvements.

List of Contractors:

- Electronic Space Systems Corp. (ESSCO)
  (35 LRR Radomes)
  Concorde Mass

44–42 Long-Range Radar (LRR) Radome Replacement



44–43 Radar Pedestal Vibration Analysis

Purpose: This project will provide vibration monitoring sensors on radar pedestals and vibration analysis equipment to analyze the monitored data. Radar pedestal equipment maintenance is an expensive and labor–intensive activity. There is currently no reliable method of predicting impending failures or monitoring the physical and functional integrity of radar pedestals. The FAA operates a scheduled seven–year overhaul cycle requiring 15 to 18 scheduled overhauls annually. An additional eight to ten emergency pedestal repairs are also performed each year.

Approach: Vibration sensors will be installed on radar pedestals, initially on en route radar pedestals. Vibration analysis equipment will be located at the FAA Logistics Center and selected maintenance centers. Monitoring and analysis will be performed to provide information on impending pedestal problems to eliminate unnecessary overhauls, reduce emergency repair actions, and more accurately budget resources for pedestal maintenance.

Remote maintenance monitoring capability at radar facilities will be analyzed to determine compatibility with pedestal vibration monitoring.

Products:

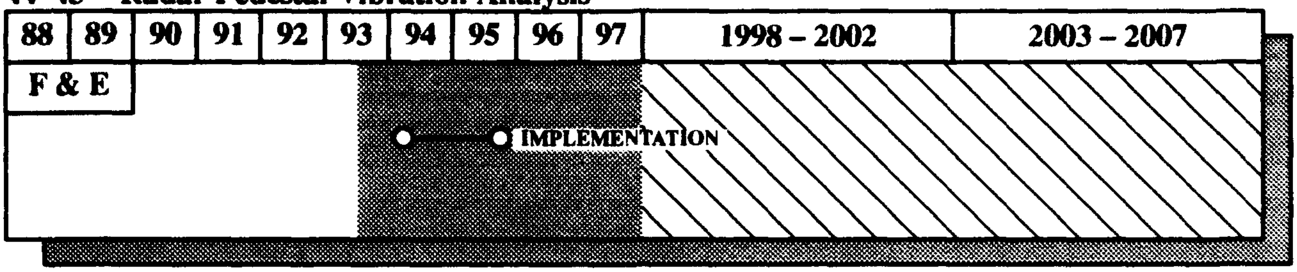
- Radar pedestal vibration sensor installations.
- Vibration analysis equipment.

Progress/Activity from December 1991:

- Specification for production equipment was initiated.

Related Projects/Activities: 24–15 Long-Range Radar Program and 44–40 Long-Range Radar Improvements.

44–43 Radar Pedestal Vibration Analysis



44–45 Air Traffic Control Radar Beacon System (ATCRBS) Relocation

Purpose: This project will provide continued support for the FAA ATCRB/ATCBI systems. The project provides: relocation of the newer ATCBI–4/5 systems available as a result of Mode S installations; disposal of the ATCBI–3s; and provisions for radar beacon performance monitors (RBPMs) at 25–30 ATCBI locations where shortages exist.

Approach:

- The project will consist primarily of technical and engineering services performing "in–place" installation at ATCBI–3 locations. Services will also be performed at sites receiving Mode S to prepare and ship assets. Relocated remote system monitors (RSMs) will be used for new establishments at locations presently without an RSM.

- Limited procurement for hardware and ATCBI test sets needed to support the relocation program.

- Project includes provisions for storage of assets required for immediate or future ATCBI requirements.

Products: At the completion of the ongoing Mode S procurement, the following systems will have been made available for relocation or reestablishment of new ATCBIs/ATCRBs:

- ATCBI–5: 52 each.

- ATCBI–4: 44 each.

- RBPM: 96 each.

Additional hardware will be needed to support the relocation effort for beacon test sets, line drivers, and site spares.

Progress/Activity from December 1991:

- A Program Manager has been assigned and the matrix team has been formed.

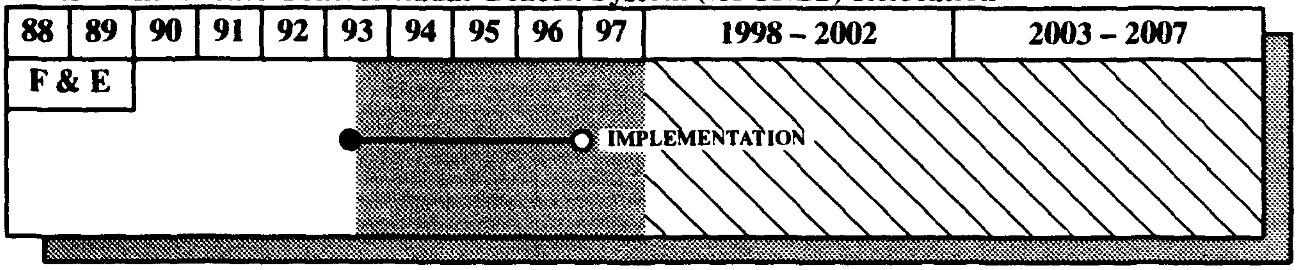
- Developed and coordinated a project implementation plan (PIP).

- Provided a statement of work (SOW) to the technical services support contractor (TSSC).

- Updated leapfrog schedule to reflect Mode S/ASR-9 schedule changes and regional requests.

Related Projects/Activities: 24–12 Mode S, 44–39 Sustain/Relocate ARSR, 44–46 ATCBI Replacement, and 44–60 Sustain/Relocate ASR.

44–45 Air Traffic Control Radar Beacon System (ATCRBS) Relocation



44–46 Air Traffic Control Beacon Interrogator (ATCBI) Replacement

Purpose: This project will replace aging and obsolete ATCBI–3/4/5 equipment with Mode S and compatible systems to maintain ground surveillance and increase supportability. The ATCBI–3s are 1950's vacuum tube technology that is being phased out of the FAA inventory. ATCBI–4 systems are 1971 transistor logic technology at the end of its 20-year life cycle. The ATCBI–5s are 1976 integrated circuit technology systems that are also approaching the end of its 20-year life cycle.

Approach: This project will be dependent upon the results of the Mode S alternatives study, which will determine the type of beacon system to be procured and the estimated costs.

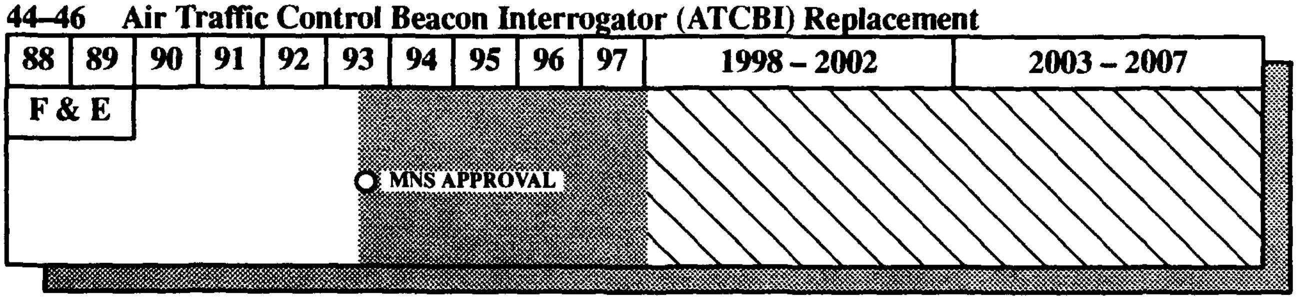
To satisfy requirements for new ASR–9 establishments, a procurement of standardized Mode S equipment is planned prior to the award of this replacement contract. These systems will be funded as part of the ASR–9 establishment program.

Products: Terminal and enroute surveillance information sufficient to replace that provided by existing ATCBI beacons and other newly qualified sites.

Related Projects/Activities: 24–12 Mode S, 24–13 ASR Program, 26–01 RMMS, 34–12 ATCBI Establishment, 34–13 Terminal Radar Digitizing, Replacement, and Establishment, 44–39 Sustain/Relocate ARSR, and 44–60 Sustain/Relocate ASR.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

44–46 Air Traffic Control Beacon Interrogator (ATCBI) Replacement



44–60 Sustain/Relocate Airport Surveillance Radar (ASR)

Purpose: This project will provide for relocations and associated refurbishments of terminal radars.

Relocation of existing radars becomes necessary due to new construction interfering with required radar coverage or changes in air traffic volume.

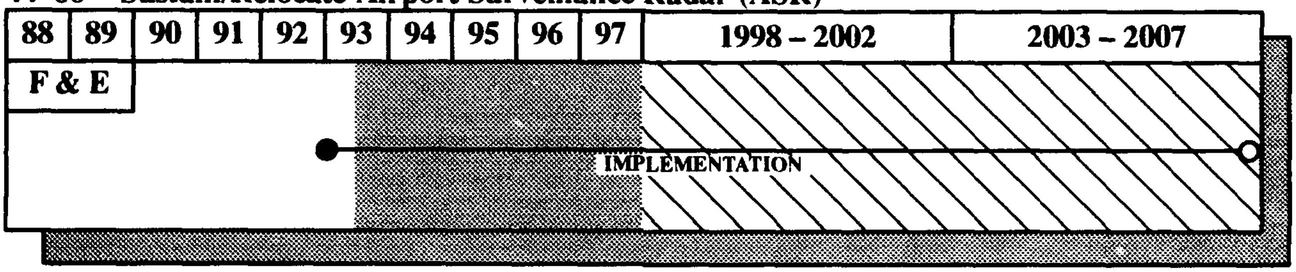
Approach: Regions provide candidates for relocation. Headquarters validates priorities and funds relocations through the annual budget process.

Products:

- Relocate the minimum number of additional radars.
- Raise antenna height where required.
- Remote data from some terminal radars based on coverage requirements.

Related Projects/Activities: 34–13 Terminal Radar Digitizing, Replacement, and Establishment, 44–45 ATCRBS Relocation, and 44–46 ATCBI Replacement.

44–60 Sustain/Relocate Airport Surveillance Radar (ASR)



45–02 Data Multiplexing Network (DMN) Continuation

Purpose: This project provides the NAS with modern data communications technologies for cost–effective, point–to–point data transmission. These technologies include: (1) data multiplexing, which enables a number of independent transmission requirements to be consolidated onto a single circuit; and (2) automated network monitoring and control, which enables the identification of failed network elements from central locations and circuit restoral in real time. The use of data multiplexing is an integral part of the FAA's strategy for cost–effective interfacility communications transmission.

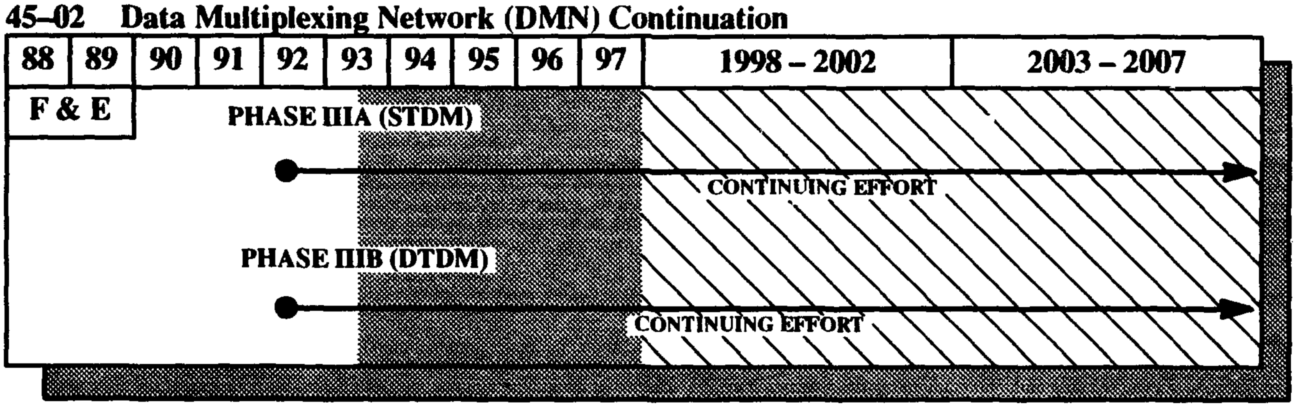
Continuing effort is required to complete installation of statistical time division multiplexing (STDM) network equipment and deterministic time division multiplexing (DTDM) network equipment.

Approach: This project will provide for the continuation and completion of Phase III of the data multiplexing network effort to provide circuit–end equipment for data transmission requirements.

Products: Continue to acquire modems, multiplexing modems, channel service units/data service units, high–speed time division multiplexer, and automated network management systems for the DTDM procurement and statistical multiplexers for the STDM procurement.

Related Projects/Activities: 21–06 TMS, 23–09 AWOS, 24–12 Mode S, 24–16 Weather Radar Program, 24–17 Loran–C Systems, 24–18 TDWR System, 32–34 Potomac Metroplex; 32–36 Northern California Metroplex, 32–38 Atlanta Metroplex; 32–40 Central Florida Metroplex; 32–42 New York Metroplex; and 45–20 Critical Telecommunications Support; however, DMN provides network transmission services to a majority of CIP projects that require point–to–point data connectivity.

45–02 Data Multiplexing Network (DMN) Continuation



45–05 Expansion/Reconfiguration of Low Density Radio Communications Link (LDRCL)

Purpose: This project provides the interfacility communications system with the capability to establish low density microwave spurs to the RCL backbone. LDRCL also provides point–to–point microwave radio systems in support of NAS requirements to replace existing RML systems, and establishes new systems not previously covered under the RML replacement program.

Approach: Phase I provides for the replacement of low capacity, obsolete radar microwave link (RML) spurs to the radio communications link (RCL) backbone. Phase II provides interfacility communications where it is economically advantageous when compared to leased service or where leased service does not exist. LDRCL network equipment will provide network connectivity to RCL for isolated NARACS VHF repeater equipment.

Analyses will be conducted on alternative transmission methods and network topologies to satisfy interfacility communications. Where economically feasible, LDRCL components will be provided for new spurs and user access networks, or to enhance existing LDRCL segments to provide increased capabilities. Commercial–off–the–shelf equipment will be used.

Products: LDRCL segments.

Progress/Activity from December 1991:

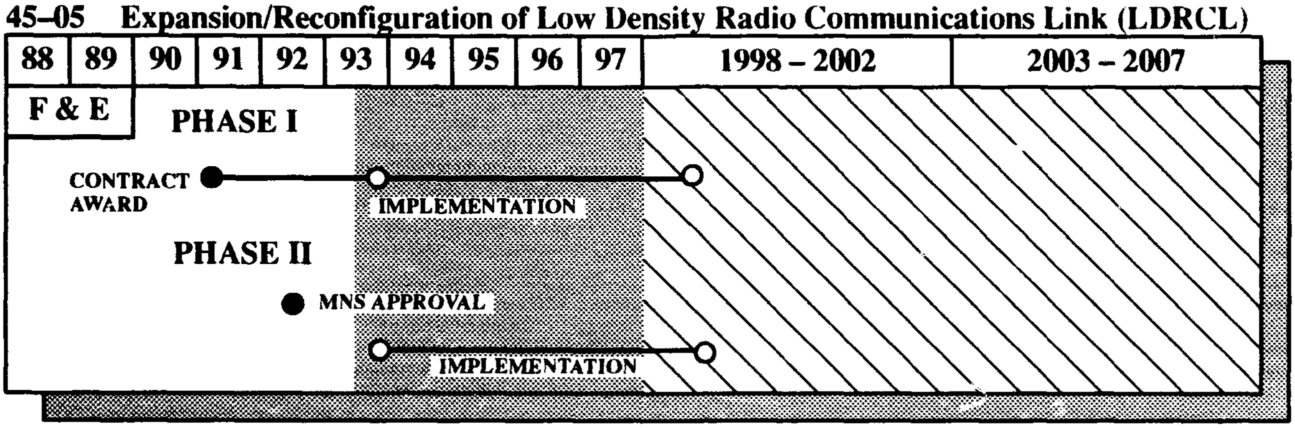
- Site preparation plan (SPP) evaluated for test systems.
- Project implementation plan (PIP) in final stages of development.
- Contractor's master test plan (MTP) submitted for approval.

Related Projects/Activities: 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–22 Dallas/Fort Worth Metroplex, 32–24 Chicago Metroplex, 32–26 Southern California Metroplex, 32–34 Potomac Metroplex, 32–36 Northern California Metroplex, 32–38 Atlanta Metroplex, 32–40 Central Florida Metroplex, 32–42 New York Metroplex, 45–06 RCL Backbone Routing and Circuit Restoral, and 46–28 NAS RCOM.

List of Contractors:

- Alcatel Network Systems
  (460 LDRCL systems)
  Richardson, Texas

45–05 Expansion/Reconfiguration of Low Density Radio Communications Link (LDRCL)



45–06 RCL Backbone Routing and Circuit Restoral (RCR)

Purpose: RCR provides modern digital switching and multiplexing equipment that enables the FAA to restore and reroute critical NAS voice and data services which use NAS interfacility communications systems (NICS). This includes the RCL LDRCL.

Approach: RCR consists of COTS nondevelopmental item (NDI) hardware and software components to be located at 24 major nodes. These nodes will be located at the 20 CONUS ARTCCs and 4 RCL junction locations. In 1984, program approval was given for RCR to provide the RCL backbone with automated routing and restoral capability. RCR will also satisfy the radar microwave link (RML) major acquisition commitment by completing the RCL network and providing the required availability. Installation of a 6-node pilot network is scheduled to begin in 1994.

Products:

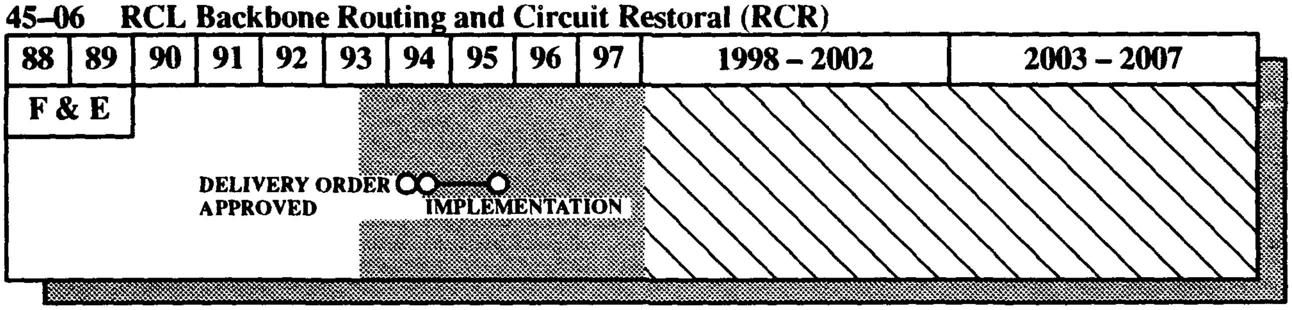
- 24 nodes (RCL backbone) at 20 CONUS ARTCCs and 4 RCL junction locations (Air Force Network Equipment Technologies (NET), Inc. contract at DECCO).

Progress/Activity from December 1991:

- Pilot network equipment ordered.
- Pilot network surveys completed.

Related Projects/Activities: 21–12 AAS, 23–01 FSAS, 26–01 RMMS, 45–05 Expansion/Reconfiguration of LDRCL, and 45–20 Critical Telecommunication Support.

45–06 RCL Backbone Routing and Circuit Restoral (RCR)



45–20 Critical Telecommunications Support

Purpose: The critical telecommunications support budget provides the necessary complementary F&E funding for major operationally funded telecommunication programs, and for the myriad of small telecommunications activities that are ongoing, without separately identified F&E funds. It is the primary source of funding for the numerous pieces of hardware required to operate a nationwide telecommunication system. The FAA pursues this objective through projects that result in major FAA–owned telecommunications facilities; implementation of FAA–owned airport telecommunications; and the acquisition of engineering services and equipment to support leased communications initiatives to improve service and save costs. This project establishes the resources for follow–on support for these efforts and procurement of upgrades to existing systems.

Approach: Project offices will identify specific sustaining telecommunications requirements and upgrades. Procurements are initiated as required for the following:

- Telecommunications facilities operation:
  - Software updates and enhancements.
  - Hardware updates and enhancements.
  - System/component reconfigurations.
  - Performance upgrades.
- Airport telecommunications:
  - Airport telecommunications facilities.
- Leased communications initiatives:
  - Technology improvements.
  - FAA ownership of embedded base equipment.
  - Centralized facility circuit termination equipment.

Products:

- FY 1992 and prior:
  - 1,600 mini–demarcation systems.
  - Automated line test equipment.
  - RCL drop and insertion equipment.
  - LDRCL test bed at FAA Technical Center.
  - NADIN IA memory enhancements.
  - Circuit diversity enhancements to RCL.
- FY 1993 and later:
  - 1,400 mini–demarcation systems.
  - Cutover to LINCS.
  - Circuit diversity enhancements to RCL.
  - RCL drop and insertion equipment.
  - Establishment of LDRCL.

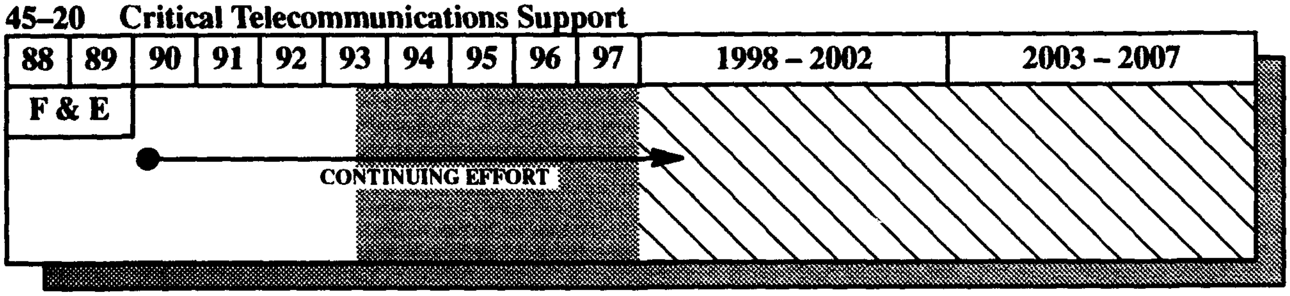
Also, a digital NICS backbone that will provide high capacity interfacility communications with significantly improved availability at lower overall costs than the current system.

Progress/Activity from December 1991:

- Small demarcation system implementation continued. Compatible automated line test equipment was installed in ARTCCs.
- Circuit diversity installations to eliminate single-point-of-failure on RCL were ongoing.
- Additional RCL drop and insert points have been identified. Selected sites received equipment during this period.
- Transition to new LINCS contract underway.

Related Projects/Activities: 21–11 VSCS, 22–12 TVSR, 23–13 ICSS, 32–34 Chicago Metroplex, 45–02 DMN Continuation, 45–06 RCL Backbone RCR, 45–21 Satellite Communication Circuits System, 45–24 Establish ANICS Satellite Network, and 63–05 ADL Communications and Applications.

45–20 Critical Telecommunications Support



45–21 Satellite Communication Circuits System

Purpose: This project provides an FAA satellite interfacility communications network. The network supports the FAA strategy for cost–effective interfacility communication transmission by providing redundant alternatives to avoid single-points-of-failure through circuit diversity. The network will also meet NAS service availability and message quality requirements.

It economically supports the increased requirement for communications and data circuits needed to support the ACF, MCF, and flight service station consolidation programs, particularly in remote areas. It also supports the enhanced traffic management system (ETMS) as well as broadcast requirements.

Approach: CIP communication requirements through 2000 will be examined and compared with the FAA's capability to provide such services. Transmission alternatives, including continued use of leased circuits, microwave, satellites, and fiber optics will be analyzed. A plan will be developed to include a comprehensive cost–effective, satellite–based network.

Satellite services will be implemented in stages, as required to assure orderly growth and compatible telecommunication services.

A competitive national requirements type contract will be awarded to include design, production, site preparation, installation, and implementation at locations to be specified.

The earth stations will be acquired on a lease basis. The space segment and maintenance service will also be leased.

This project will benefit from experience gained in the development, design, production, installation, and implementation of traffic management system/aircraft situation display, full duplex interim communication network, and meteorologist weather processor currently in operation.

Products:

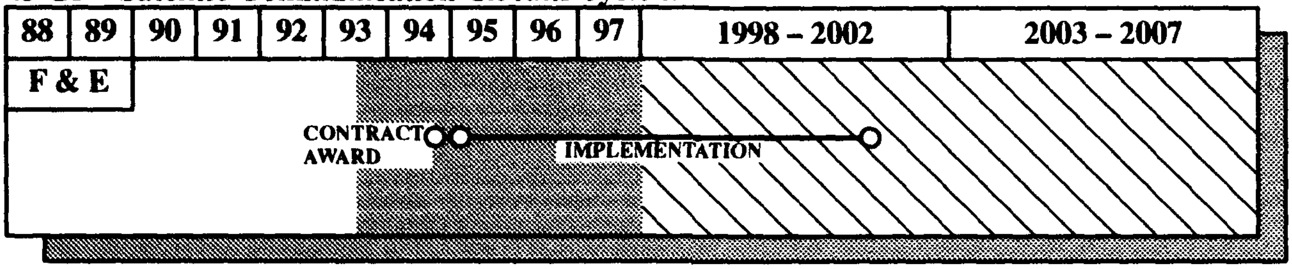
- Approximately 500 earth station terminals.
- Network management and control subsystem.
- Limited number of vehicle transportable earth stations for temporary service requirements and disaster recovery.
- Communication system connecting ACFs and MCFs to the Central Flow Control Facility (CFCF).

Progress/Activity from December 1991:

- Developed a source selection plan.

Related Projects/Activities: 21–06 TMS, 23–09 AWOS, 24–12 Mode S, 26–01 RMMS, 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–22 Dallas/Fort Worth Metroplex, 32–24 Chicago Metroplex, 32–26 Southern California Metroplex, 32–34 Potomac Metroplex, 32–36 Northern California Metroplex, 32–38 Atlanta Metroplex, 32–40 Central Florida Metroplex, 32–42 New York Metroplex, 33–20 AFSS Support Space, 45–20 Critical Telecommunications Support, 45–24 ANICS, and 63–05 ADL Communications and Applications.

45–21 Satellite Communication Circuits System



45–24 Establish Alaskan NAS Interfacility Communications System (ANICS) Satellite Network

Purpose: This project provides for the establishment of an FAA–backbone interfacility communications system within the Alaskan Region using satellite earth station technology. It supports the FAA strategy for cost–effective interfacility communication transmission and fulfills the requirements of FAA Order 6000.36, Communications Diversity, by providing redundant alternative routes, and avoids single points of failure through circuit diversity to meet NAS service availability and message quality requirements in the expanding ATC environment. This system parallels the radio communications link (RCL) system function.

Approach: Initially, readily available off–the–shelf satellite earth stations and associated equipment will be used to establish a voice and data network in Alaska to meet NAS telecommunications requirements. A network monitoring and control system will be provided to allow for rerouting circuits, monitoring the quality of the circuits, and for initial circuit establishment and termination. The network control center will be located in the Anchorage ARTCC.

The Alaskan network will be established in three phases: Phase I establishes satellite earth stations at 53 critical locations needed to support the IFR portion of the Alaska ATC system. Phase I also sets up the network control center in the Anchorage ARTCC to support NAS facility monitor and control functions. Phase II introduces additional earth stations into the network, and Phase III implements non–FAA circuit station requirements from other eligible Government agencies (DOD and NWS NAS support requirements).

Specific applications are: radar data from sites to ACF/ARTCC; radio air–to–ground voice communications between RCAGs/RCFs and ARTCC/ACF/AFSSs; flight data between ATCT/ARTCC/ACF/AFSSs; navaids–to–ACF/SFO/AFSS data; NEXRAD to ACF data; FSDPS data between ACF and AFSSs; and associate operational support voice and data communications.

The entire procurement is planned for a 10–year program. The initial contract will cover a 5–year period that will then be followed with five 1–year options, if fully exercised.

Products: Provide reliable and cost–effective telecommunications for Alaskan Region facilities to meet all present and future NAS requirements.

Progress/Activity from December 1991:

- Acquisition approval.

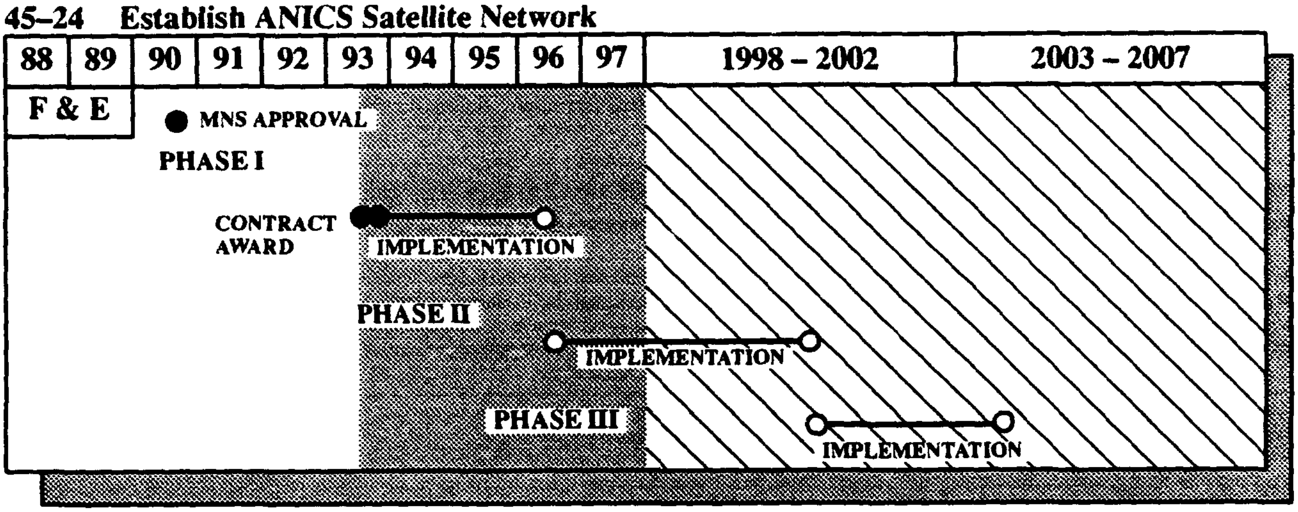
- GSA Delegation of Procurement Authority (DPA) received.
- RFP released.
- Phase I site surveys being conducted.

Related Projects/Activities: Interfacility communications for all CIP projects within the Alaskan Region. 23–09 AWOS, 24–12 Mode S, 33–20 AFSS Support Space, 45–20 Critical Telecommunications Support, and 45–21 Satellite Communication Circuits System.

Problems Resulting in Delays: The ANICS RFPs were issued late due to the delay in obtaining DPA reinstatement and Acquisition Review Board (ARB) approval.

Delays Minimized by: The ANICS program office intends to accelerate deployment upon contract award and expects the project schedule to be back within acceptable limits by the beginning of FY 1994.

45–24 Establish ANICS Satellite Network



45–25 Air Traffic Operational Management System (ATOMS) Local Area/Wide Area Networks

Purpose: The data collected by ATOMS are essential for the accurate and complete analysis of the air traffic system and the development and evaluation of system improvements.

FAA management requires access to real–time information for review, planning, and decision-making air traffic control system operations. This requirement includes the ability to collect and analyze air traffic operational data and facility staffing information to provide timely management data to Congress, DOT, other Government departments and agencies, the public, as well as for internal FAA management use.

ATOMS is to evolve into a local area network at headquarters and several smaller prototype local area networks supporting data collection and preliminary data review and analysis in the field. Those smaller networks would then be tied into a nationwide network supporting both headquarters and all field sites.

Approach: Develop a comprehensive list of equipment which must be replaced and a schedule for gradual replacement.

Identify those software applications which are essential to the data collection and analysis that will furnish air traffic management with effective management tools.

Develop a location priority list for prototype local area networks to: serve as intermediate data collection sites for multiple field sites; review and validate data collection efforts; perform primary analysis tasks; and serve as hubs for data analysis and review prior to the archiving of data into the national data bases maintained at headquarters.

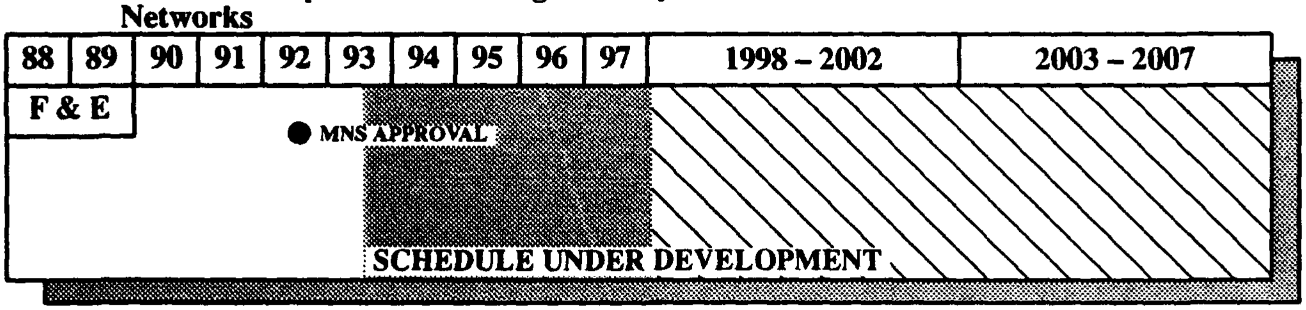
Develop an acquisition strategy for personal computer systems that is compatible with the OATS program.

Products: Procure commercial information technology products and services consisting of workstations, file servers, network hardware and software, backup tape drives, repairs on LAN hardware, cables transceivers, application software, licenses and fees, training, and documentation for 628 widely dispersed locations.

Related Projects/Activities: TBD

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

45–25 Air Traffic Operational Management System (ATOMS) Local Area/Wide Area Networks



46–01 Sustain Remote Maintenance Monitoring System (RMMS)

Purpose: This project will expand the existing RMMS network, replace obsolete COTS components, and enhance or upgrade existing maintenance automation software. This modernization will sustain the productivity levels achieved through the implementation of RMMS capability, while maintaining system technology currency.

Approach: Maintenance concepts and functional system specifications will be upgraded to enhance the RMMS implemented prior to 1992 under projects 26–01 RMMS and 26–04 MCC. Replacement hardware and software will be procured as required to meet the new specifications for system upgrades, and rehosting of software will be considered where appropriate.

The modernization of the RMMS will provide for the replacement or enhancement/upgrade of the maintenance processor subsystem (MPS) and its related peripheral equipment, application software, and interfaces with the area control facility maintenance control center (AMCC), the general NAS sector maintenance control center (GMCC), and the national maintenance coordination center (NMCC).

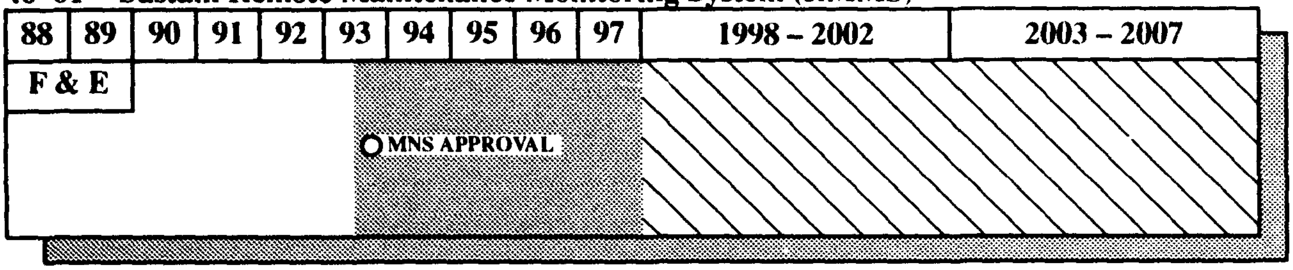
Products:

- New generation processors and required peripherals will be provided to replace/update:
  - Up to 38 maintenance processor systems (MPSs).
  - Up to 60 maintenance control centers at general NAS sectors.
  - Up to 5,000 maintenance data terminals (MDTs).
  - Up to 25 maintenance control centers at area control facilities.
  - Up to 2 maintenance control centers at the NMCC.
- Rehost existing maintenance automation software to include maintenance management system (MMS), monitor and control software (MCS), and MDT applications.
- Expand the RMMS network to accommodate systems not previously included.
- Replacement hardware and software for deployed RMMS.

Related Projects/Activities: 26–01 RMMS, 26–04 MCC, 32–34 Potomac Metroplex; 32–36 Northern California Metroplex; 32–28 Atlanta Metroplex; 32–40 Central Florida Metroplex; 32–42 NY Metroplex, 46–04 MCC Enhancement, 56–56 NASMAP, and all CIP projects related to maintenance monitoring automation.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

46–01 Sustain Remote Maintenance Monitoring System (RMMS)



46–04 Maintenance Control Center (MCC) Enhancement

Purpose: This project will enhance/upgrade the MCCs in each Airway Facilities sector. It provides backup power to sustain sector MCC operation during extended power outages. The MCC serves as the focus for facility maintenance and restoral activities within a specific jurisdiction. The final configuration will be the result of an evolutionary process incorporating new equipment additions to the NAS and maturing operational requirements.

Approach: Aging COTS components of the MCC hardware and software systems will be replaced, enhanced, or upgraded. The modernization will sustain workforce productivity achieved through the implementation of RMMS capability, and will maintain system currency with technology.

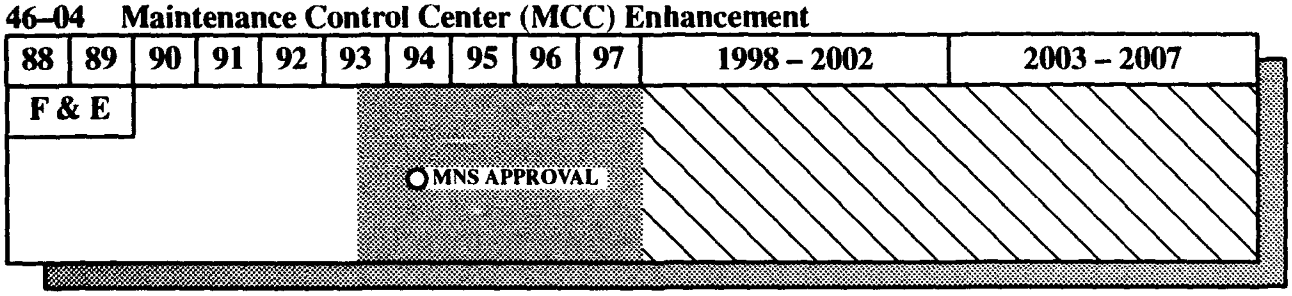
Systems implemented by this project will use capabilities provided by the remote maintenance monitoring system and will require interfaces and coordination with all project activities implementing RMM capabilities.

Products: Upgraded/enhanced hardware and software components of the MCC.

Related Projects/Activities: 26–01 RMMS, 26–04 MCC, 46–01 Sustain RMMS, 56–56 NASMAP, 64–05 Augmentations for GPS, and all CIP projects concerned with the facility maintenance monitoring and restoral functions.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

46–04 Maintenance Control Center (MCC) Enhancement



46–05 Airport Cable Loop Systems Sustained Support

Purpose: This project provides for the continuance of the airport cable loop project and updates existing systems when required. Newly planned construction efforts continue at activity Level III, IV, and V airports beyond the year 2000. Airport cable replacement and repair are ongoing efforts. Cable loop systems are used at several airports. They are reliable and allow increased capacity of signal transmission. Fiber–optic cable is cost effective when installed with power cable since it may be placed in the same trench without any adverse effects.

Approach: This project will provide for both installations of new replacement cable and expansion or update of existing airport cable loop projects. The regions will continue to define requirements for new, expanded, and updated facilities. Signal and power cable will be reconfigured from radial to loop systems where practical. Spare cable, repair tools, and kits must be provided to meet the needs of the NAS through the year 2005.

Products:

- Reliable and flexible power and/or signal distribution systems.
  - FY 1989 and prior: 24 systems.
  - FY 1994 and later: 130 systems.

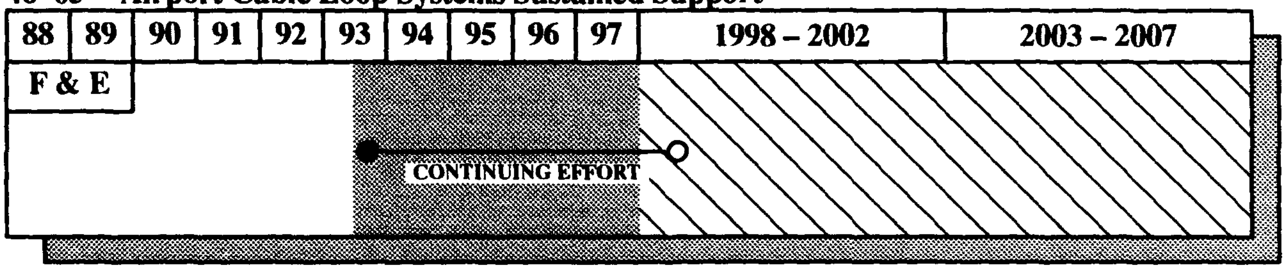
Progress/Activity from December 1991:

- Southern Region: Completed construction of cable loop system at Atlanta Hartsfield International Airport.
- Northwest Mountain Region: Cable loop system installation started at the new Denver airport.
- Western Pacific Region: Initiated cable loop design stage at both Burbank and Los Angeles International Airports in California, and also at Phoenix Sky Harbor International Airport, Arizona.
- Central Region: Cable loop project in design stage at Indianapolis International Airport, Indiana; also, design phase started at St. Louis/Lambert International Airport.
- Eastern Region: Fiber–optic systems are in the design phase at both Dulles International Airport and Middletown, Pennsylvania.

Related Projects/Activities: The airport cable loop project is related to all other airport projects such as 24–07 MLS, 26–01 RMMS, and 34–06 ILS, all of which require buried cable for power, signal, control, and communications between sites.

List of Contractors: Contractors will be determined by the regions.

46–05 Airport Cable Loop Systems Sustained Support



46–07 Power Systems Sustained Support

Purpose: This project provides the optimum type and quality of main and standby electrical power and grounding. This assures high facility reliability and availability, while reducing electrical interference, operating cost, and energy consumption at NAS facilities. To achieve these objectives, it is necessary to improve, refurbish, overhaul, and replace aging equipment on a continuing basis. Engine generators and power conditioning systems become difficult to support with age, and may become overloaded because of additional new electronic systems, facility collocations, replacements, or modification. Some existing engine generators, as well as power and line conditioning systems remaining in the NAS are not suitable for the newer generations of electronic equipment using switching power supplies. They must be updated, when cost–effective, or replaced with systems or equipment which tolerate current harmonics caused by modern electronics. Once updated or replaced they require sustained support. Battery/dc distribution systems must be updated because of age. The grounding and lightning protection systems in some facilities are not adequate for modern electronics, have deteriorated with age, or have damaged components. These must be surveyed and modified or upgraded to assure proper operation of new NAS equipment. Additionally, some facilities have old wiring which must be replaced to meet the requirements of the National Electrical Code.

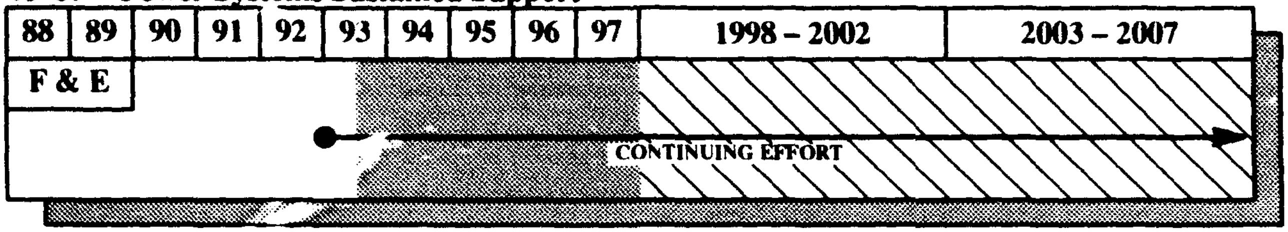
Approach: This project will provide reliable power sources and power and line conditioning devices on a continuing basis. Facility lightning protection, grounding, and electrical distribution systems will be updated on a long–term continuing basis in accordance with a sustained national policy. Power system projects must be accomplished to assure success of all agency programs, continued safety of field personnel, and assured facility availability during commercial power failures.

Products:

- Engine generator replacements: FY 1991 and prior-55; FY 1992 and later – 750 (24/year).
- Engine generator modifications and refurbishment: FY 1991 and prior – 25; FY 1992 and later – 1,995 (12/year).
- Facility lightning protection, grounding, bonding, and shielding: FY 1991 and prior – 800; FY 1992 and later – 6,000 (500/year).
- Facility electrical improvements.
- Battery/dc distribution systems.

Related Projects/Activities: This project is related to 32–34 Potomac Metroplex, 32–36 Northern California Metroplex, 32–28 Atlanta Metroplex, 32–40 Central Florida Metroplex, 32–42 New York Metroplex, and those projects affecting manned Airway Facilities buildings, such as 46–08 Modernize and Improve FAA Buildings and Equipment Sustained Support, 46–22 Fuel Storage Tanks, and 56–54 Provide FAA Housing. Also related are those projects affecting Agency electronic and communication conditioning devices, lightning and grounding systems, and facility availability and personnel safety throughout the NAS.

46–07 Power Systems Sustained Support



46–08 Modernize and Improve FAA Buildings and Equipment Sustained Support

Purpose: This project provides support to sustain and upgrade existing buildings and plant equipment which house and support NAS navigation, communications, surveillance, and visual/electronic landing systems. This project develops new building standards and funds modifications necessary to bring facilities into compliance with published standards.

Approach: Continue the comprehensive modernization and improvement of buildings and plant equipment which house and support NAS facilities. Modifications to repairable facilities will be made to keep the buildings in usable condition. Modifications will also be made to maintain the buildings' integrity, enhance energy conservation through the installation of cost–beneficial insulation, and meet new equipment environmental support requirements and structural seismic compliance.

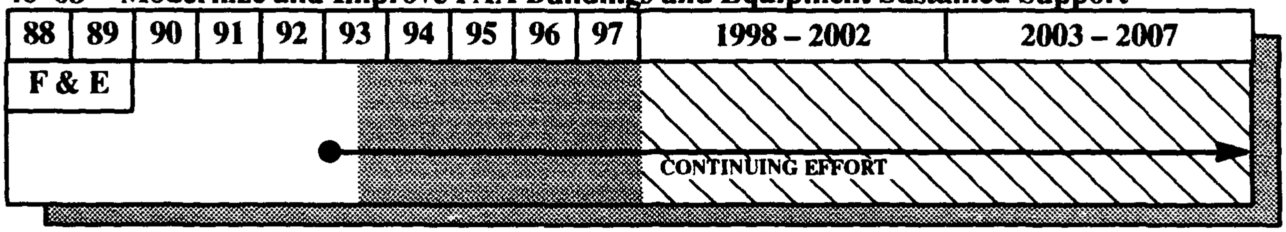
Buildings and structures which cannot be economically upgraded or modified will be replaced with modular structures based on current standard national designs. This project will cover buildings and structures currently used to house, support, and maintain NAS facilities and systems. Seismic studies are conducted under project 46–16 at facilities in high risk areas.

Products:

- Define requirements for sustaining building and plant support.
- Multi–year building and plant improvement/modernization program involving approximately 2,400 separate improvements at 1,000 facilities each year.

Related Projects/Activities: 46–07 Power System Sustained Support, 56–54 Provide FAA Housing, and all facility establishment projects scheduled for deployment at existing structures.

46–08 Modernize and Improve FAA Buildings and Equipment Sustained Support



46–09 Sustain ARTCC/ACF Facilities

Purpose: This project provides for rehabilitation or replacement of various components of the original ARTCC/ACF facilities as they become obsolete and require refurbishment.

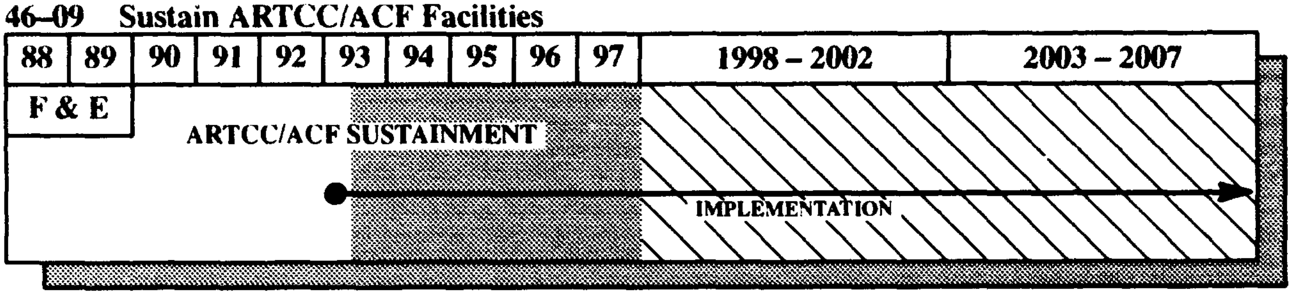
Approach: National programs will be developed for some major systems, such as replacement of older chillers, and regional projects will be developed for site–specific projects. A major consideration is also building code compliance. Revisions to building codes and the updating of standards has left the ARTCCs deficient with respect to compliance especially in such critical areas as efficient interior layouts, environmental concerns, handicap accessibility, and fire protection.

Products: Upgraded facilities for continued support of ACF operations.

Related Projects/Activities: 21–12 AAS, 26–09 ARTCC Plant Modernization, 32–44 Advanced Facility Planning, and 56–62 Child Care Centers.

List of Contractors: Multiple construction contracts to be determined by the regions.

46–09 Sustain ARTCC/ACF Facilities



46–16 Continued General Support

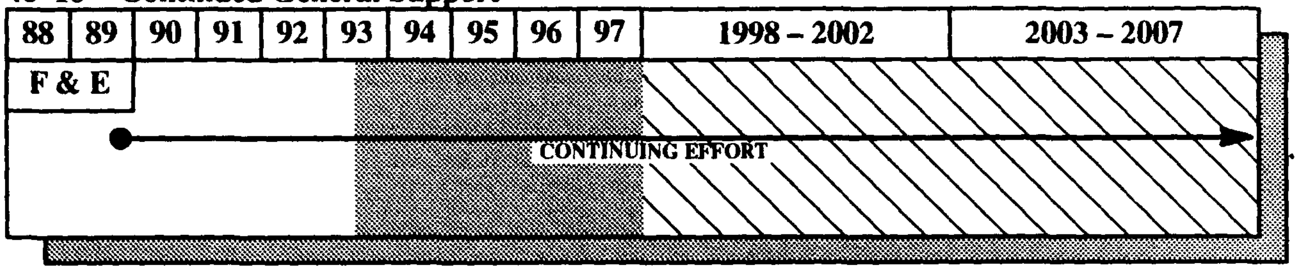
Purpose: This project provides continued general support for NAS initiatives and activities that arise annually. Included are: (a) regional projects that respond to changing air routes or hubbing; (b) infrastructure replacements necessitated by natural disasters; (c) radio frequency interference (RFI) vans; (d) thermal neutron analysis (TNA); (e) CD–2 sustainment; (f) CD–2 three level weather; (g) Airway Science Grant Program; (h) EARTS enhancements; (i) System Safety and Efficiency Reviews (SSERs) Airway Facilities support; (j) ARTCC resectorization, and (k) small nonrecurring national programs not covered in any other CIP program.

Approach: Regions are allocated funding after they have listed all their local projects in a priority order. Each region submits small improvement projects that develop without notice and require immediate action. National program managers are allocated requested amounts to complete short–term programs or exercise options on existing contracts to meet administration or Congressional mandates.

Products: Engineering feasibility studies, additional ATC operating positions due to increased demand, purchasing land, upgrading of off–road equipment, other national and regional requirements, natural disaster recovery, and 11 RFI vans.

Related Projects/Activities: 26–16 General Support and 44–03 A/G Communications RFI Elimination.

46–16 Continued General Support



46–22 Fuel Storage Tanks

Purpose: This project provides compliance with the Hazardous and Waste Amendments of 1984 to the Clean Water and Solid Waste Disposal Act which requires that owners (including the Federal Government) of underground petroleum fuel storage tanks shall: notify local (state, county, municipal) Governments of such tanks; clean sites that are leaking and replace tanks; and install leak detectors to prevent further environmental pollution.

Approach: The revised electrical power policy directive reflects a decreasing need for engine–generator standby power and associated fuel tanks. Engine–generators will be replaced by battery standby power at many locations. Leaking underground fuel tanks will be located and replaced or removed. Contaminated sites will be cleaned to acceptable standards. Double–walled fiberglass tanks with internal leak detectors will be installed at sites where continued use of engine–generators is required. Some small gasoline engine–generators will be converted to propane fuel with aboveground tanks. Fuel leak detectors are required to preclude the possibility of future leaks causing either soil and/or water contamination. No detectors are required for existing tanks which are not replaced or repaired until required by EPA or state and local municipalities. Aboveground fuel tanks with monitors and spill containment will be used at sites where environmentally feasible.

Products: Leaking fuel tanks will be located and replaced. Either new tanks will be installed or small engine–generators will be converted to propane fuel with aboveground propane tanks. As an alternative to the underground tank, above–ground tanks with leak detectors and spill containment may be installed if feasible. The affected inventory has been estimated to be 425 sites with 15 percent exceeding the 15–year life expectancy.

Approximately 1,750 tanks need to be replaced or removed. However, 650 of these sites have tanks that are 15 years or older. Approximately 15 percent or 100 sites are considered "leakers". Should these sites not qualify for conversion to battery standby power or alternative energy sources, they shall be replaced with conforming aboveground and underground tanks or propane conversion.

Leak detectors will not be installed at sites that are candidates for battery standby power or alternative energy sources unless required by federal, state, or local law.

Removal of tanks, site cleanup, and disposal of tanks, engine-generators, and associated electrical equipment will be required at 1,750 sites after conversion to battery standby power is completed.

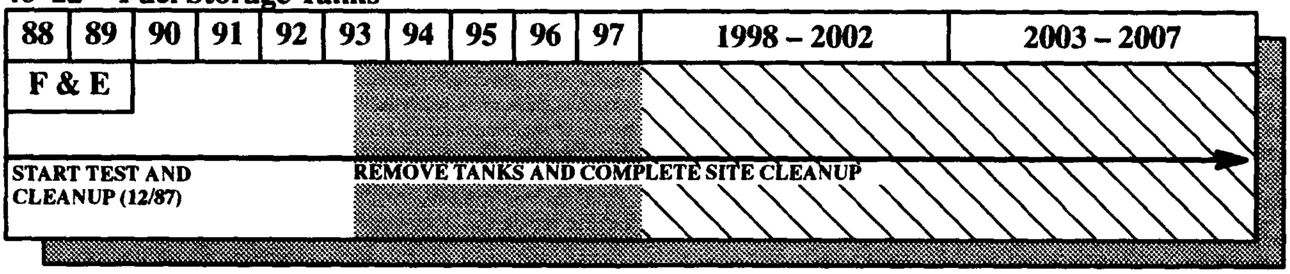
Progress/Activity from December 1991:

- Regions continue to test tanks, replace tanks, remove defective tanks, and cleanup contaminated sites.
- All participants will report accomplishments annually as required by the Fuel Tank Implementation Order.

Related Projects/Activities: 26–07 Power Systems and 46–07 Power Systems Sustained Support.

List of Contractors: Multiple contracts will be determined by the regions.

46–22 Fuel Storage Tanks



46–23 Environmental Cleanup

Purpose: This national program has been established to ensure that all FAA facilities meet existing and future federal, state, and local environmental regulations for cleanup of hazardous substances resulting from FAA activities. "Cleanup Activities" (as defined by OMB Circular A–11) are federal remedial actions under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended; corrective actions under the Resource Conservation and Recovery Act (RCRA), as amended; site studies in preparation for a cleanup or corrective action; and equivalent actions under other federal, state, interstate, and local laws, regulations, or requirements.

Approach: For contaminated sites, the following approach will be employed to assess the severity of the problems as required by law. A preliminary assessment–site investigation or removal assessment will determine whether environmental damage has occurred. If damage has occurred, the first priority will be to secure the site and prevent exposure to pollutants. If necessary, a remedial investigation/feasibility study (RI/FS) will be undertaken to determine the extent of contamination and the best technology to be used for cleanup. Upon completion of the RI/FS, cleanup of all hazardous substances, contaminated soil, and ground water will take place.

This program also includes FAA–wide environmental policy development.

Products: Over 110 sites will undergo extensive investigatory work and possible remediation.

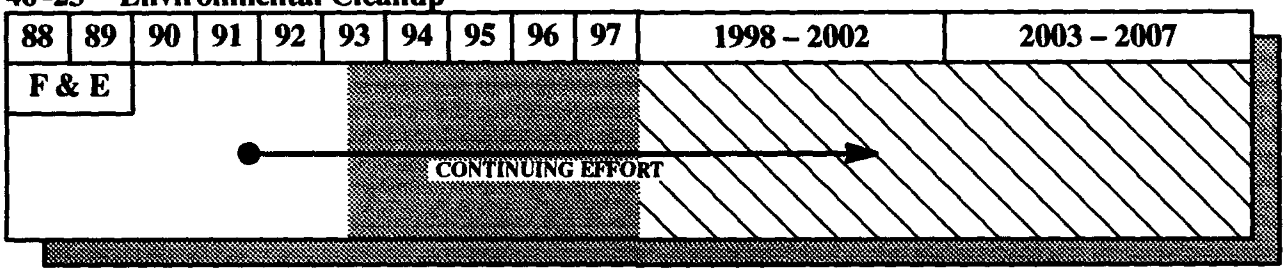
Progress/Activity from December 1991:

- Of the four substantially contaminated areas at the FAA Technical Center, remedial design work is finished at one site and is in progress at a second. Conceptual design work was completed on the third, and a feasibility study was completed on the fourth site. The remaining sites at the facility will require either minor removal actions or long-term monitoring.
- Site investigation reports were transmitted to the EPA for 25 sites within the Alaskan Region.
- Additional sites were investigated and remediated in the Northwest Mountain Region, Southwest Region, Southern Region, and Eastern Region, and others as needed.

Related Projects/Activities: 46–22 Fuel Storage Tanks.

List of Contractors: Multiple contracts to be determined by the regions and centers.

46–23 Environmental Cleanup



46–26 NAS Facilities OSHA and Environmental Standards Compliance

Purpose: The FAA is responsible for ensuring that the requirements of applicable public law are implemented uniformly at all facilities (manned and unmanned) used to control and service the NAS. Under the provisions of public law, each FAA employee shall be provided with a safe, healthful, and environmentally sound place of employment. This project includes the upgrade of tower facilities to current OSHA fire, life, and personnel safety standards. Many facilities were designed/constructed before the application of current OSHA safety standards. Several OSHA inspections have resulted in threatened and/or actual facility shutdowns.

Approach: NAS facilities will be evaluated for fire/life safety deficiencies and asbestos containing building materials (ACBM). Qualified, licensed professional services will determine the required corrections to bring each facility into compliance with OSHA regulations. ACBM must be identified and properly disposed of before the installation of some scheduled ATC tower equipment upgrades. Failure to do so could result in exposing personnel to hazardous conditions.

- Conduct:

- Independent studies and site assessments (i.e., environmental and occupational).
- Equipment monitoring, testing, or measurement of environmental contamination, conditions, or occupational exposures.
- Hazardous material management program, to include clean–up, handling, transportation and facility restoration.
- Waste prevention program, to include recycling, alternative sources/product substition, and personnel awareness.
- Energy conservation studies and reduction projects not associated with a national modernization program.

- Provide:
  - Worker protection as required by OSHA (i.e., personal protective equipment).
  - Spill prevention plan, to include clean–up, containment, measurement, and prevention of both identified and unidentified materials.
  - Interagency assistance with medical monitoring and surveillance of employees.

- Test, store, and dispose of PCB transformers and capacitors that are not associated with national facility modernization program.

- Accommodate facility alterations required by corrective actions taken to ensure compliance with OSHA regulations.

Approximately 90 percent of the present 441 active ATC towers will require effort to correct the life and fire safety deficiencies. Standard ATC towers were completed in 1992 and nonstandard ATC towers will be done by 1994. No corrective effort is planned at existing ATCTs scheduled for replacement or modernization by the end of calendar year 1995. A contract will be awarded to evaluate representative ATC tower facilities for ACBM. Evaluation results will be maintained in a computerized data base for inspection requirements and scheduled corrective activities. ACBM will be handled on an as–required basis in the abatement/upgrading of each facility. Where necessary, the ACBM will be removed, encapsulated, or contained.

Products:

- Develop:
  - Capabilities for waste minimization/prevention.
  - Capabilities to assess environmental concerns.
  - Alternative products and personal protective equipment to counter the rising cost of both disposal and liability of hazardous material.
  - Updated and new equipment for compliance with chlorofluorocabon (CFC) control laws.

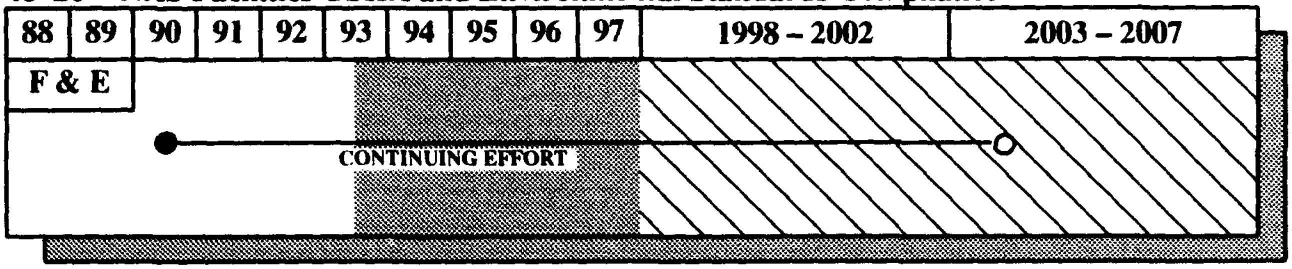
Progress/Activity from December 1991:

- Evaluated all standard design ATCTs.
- Initiation of nonstandard design evaluation for ACBM.
- Initiated evaluation of nonstandard design for ATCTs.

Related Projects/Activities: 26–16 General Support.

List of Contractors: Multiple construction contracts will be administered by the regions for the ATCT upgrades. Most regions will use the TSSC.

46–26 NAS Facilities OSHA and Environmental Standards Compliance



46–28 National Airspace System (NAS) Recovery Communication (RCOM)

Purpose: This project supports Executive Orders 12472 and 12656, and National Security Decision Directives 47, 97, 145, 180, 286, and 314. This project ensures the existing national radio communication system (NARACS) remains fully capable of establishing minimum essential command and control communication necessary to direct the management, operation, and reconstitution of the NAS in support of the FAA/DOT/DOD missions during a national, regional, and/or local emergency in the event the normal common carrier telecommunication/landline connectivity between NAS facilities is interrupted. The RCOM project will provide improved NARACS emergency communications essential during and after earthquakes, hurricanes (typhoons), and tornadoes. This improved emergency communications network will continue to save flying hours for FAA flight inspection aircraft. The communications network plan for RCOM is designed to better serve emergency communications, which includes routine daily communications activities for aviation security, accident investigations, and dispatching and redirecting Airway Facilities maintenance technicians and supplies.

The initial mission of this project is to complete the existing NARACS network and subsequently establish and/or improve the necessary redundancy, mobility, connectivity, interoperability, and restorability to obtain survivability of FAA telecommunications during conditions of crisis or national emergency.

Approach: Because NARACS consists of varying types of system requirements, the RCOM project is separated into two phases. Phase I began in 1992 and will continue through 1994. This phase involves completing residual NARACS system manufacturing, installations, documentation, and training and maintenance packages. Phase II involves NARACS system upgrade, expansion, and enhancement requirements. The candidate requirements include but are not limited to providing nondevelopmental multichannel microwave radio connectivity in coordination with LDRCL/RCL programs where required.

Products:

- Phase I
  - Complete the manufacturing and installation of five High Frequency/Single Sideband (HF/SSB) radio systems that are now partially manufactured. In addition, complete the installation of HF systems at Kansas City ARTCC, Parkville, KS; remote HF transceiver site, Kansas City Regional Office; Leesburg ARTCC; and San Juan, Puerto Rico.

- Completion of system level instruction books.
- Completion of training and maintenance packages.
- Antenna replacements where required.
- Multichannel microwave radio connectivity where operationally required.
- Engineer, rehabilitate, or replace planned communications and electronics systems for FAA emergency operations.
- Implementation of Federal Standard 1045 which specifies an automatic link establishment system capability.
- Uninterruptible power systems where operationally required.
- Expand the secure telephone network.
- Complete offshore NARACS site requirements.

- Phase II
  - NARACS system expansion and upgrade, which includes replacement for existing NARACS hardware deemed obsolete or unsupportable. This may include VHF/FM repeaters, base stations at selected locations, mobile and VHF/FM hand held units. These items will tie into the RCL/LDRCL network to complete the required NARACS connectivity.
  - Continued expansion of the secure telephone network.

Progress/Activity from December 1991:

- Established contract to define Phase II mission need and requirements documents.
- Developed an acquisition package for uninterruptible power systems.

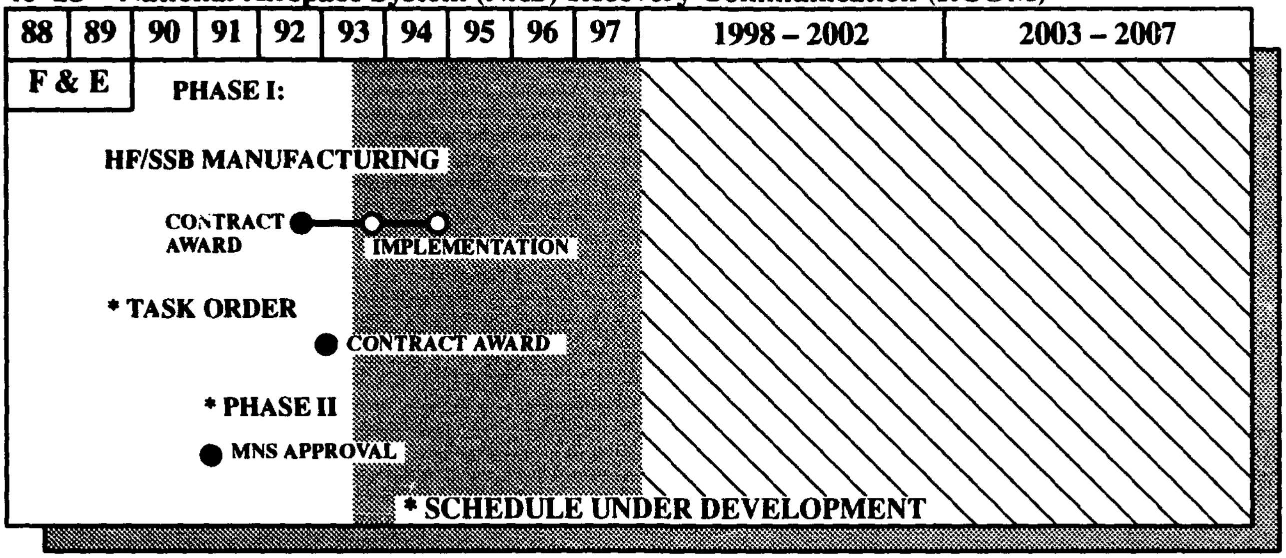
Related Projects/Activities: 25–02 DMN, 26–04 MCC, 32–21 New Airport Facilities, Denver, Colorado and Denver Metroplex, 32–22 Dallas/Fort Worth Metroplex, 32–24 Chicago Metroplex, 32–26 Southern California Metroplex, 32–34 Potomac Metroplex, 32–36 Northern California Metroplex, 32–38 Atlanta Metroplex, 32–40 Central Florida Metroplex, and 32–42 New York Metroplex.

List of Contractors:

- Eastern Computers, Incorporated
  (NY Regional Office HF/SSB,
  Honolulu HF/SSB subsystem,
  Logistics Center test–bed)
  Virginia Beach, Virginia
- United States Tower Service Limited
  (tower and antenna maintenance)
  Frederick, Maryland

Project Status: Phase II of this project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

46–28 National Airspace System (NAS) Recovery Communication (RCOM)



46–30 Interim Support Program (ISP)

Purpose: This project provides for the ISP to sustain and upgrade ATC operations awaiting the implementation of the AAS program. The ISP alleviates system support problems, increases capacity, and provides for near–term expansion of the air traffic system to relieve the increasing demand for aviation services.

Approach: The FAA has defined interim support actions which are consistent with current CIP schedules, require no R&D effort, and can be implemented with maximum use of off–the–shelf devices and existing project contracts. These actions involve hardware replacement (including logistics support), the addition of operating positions at some existing facilities, and software adaptions to expand the capacity of several ARTS units. To the extent possible, products will be procured through related projects and contracts.

Products:

- 155 256k solid–state replacement memories for ARTS IIIA/EARTS.
- Terminal radar facilities at six qualifying locations.
- Second radar at two facilities.
- Additional ARTS IIA and ARTS IIIA operational and training positions at some facilities.

- Replace/upgrade ARTS IIA/IIIA disk/tape drives.
- 16 uninterruptible power systems for ARTS IIA.
- ICSS emergency bypass for some facilities.
- EARTS provisioning.
- Replacement ceilometers and hygro-thermometers.
- 55 capture–effect glide slope (CEGS) antenna conversion kits.
- 76 solid state receiver/digital moving target indicator (SSR/DMTI) kits for long range radar receiver upgrade.

Progress/Activity from December 1991:

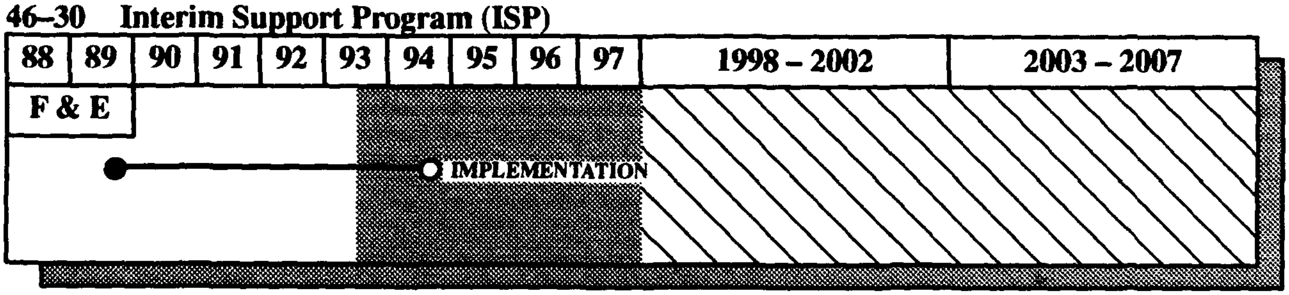
- Solid-state memory commissioned at 155 sites.
- 25 CEGS delivered.
- All 298 weather sensors delivered.
- All 76 SSR/DMTI systems delivered and installed.

Related Projects/Activities: This project relates to an extensive list of CIP projects that sustain ATC operations in the interim period awaiting full implementation of AAS.

List of Contractors:

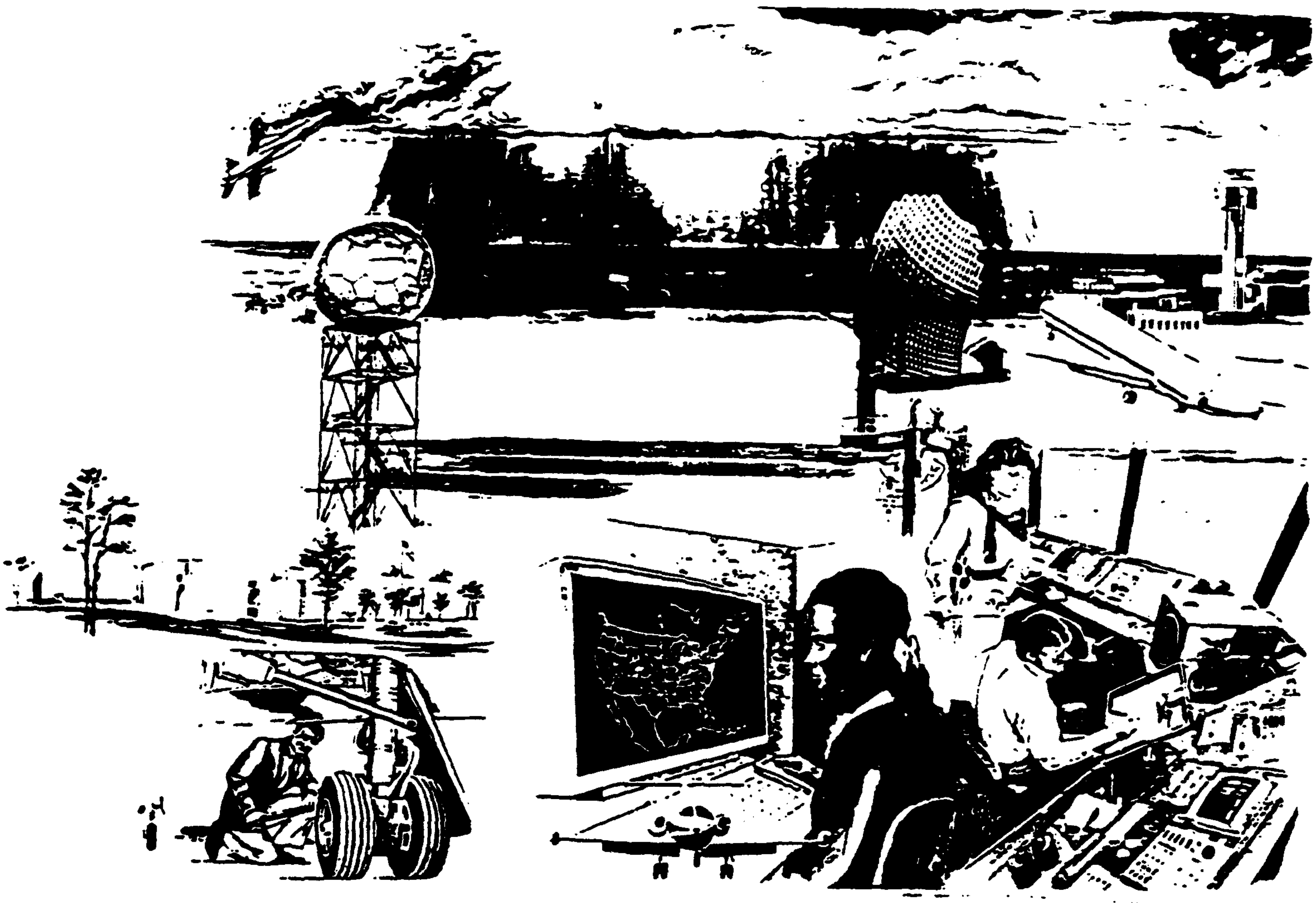
- Exide Electronics
  (16 uninterruptible power systems)
  Raleigh, North Carolina
- Unisys Corporation
  (155 solid–state memories; keyboards; disk drive refurbish)
  St. Paul, Minnesota
  - SSCI
    Tustin, California
  - Metric, Inc.
    Ft. Walton Beach, Florida
- Wilcox Electric
  (55 capture–effect glide slopes)
  Kansas City, Missouri
- T. H. Grifft Company
  (rotating beam ceilometer(RBC)/recorders–weather sensors)
  Anaheim, California
- Norden Systems, Incorporated
  (SSR/DMTI kits)
  Norwalk, Connecticut

46–30 Interim Support Program (ISP)



Chapter 5: Supportability

The Supportability chapter describes projects that support logistics, provide for personnel training, and manage the information and human resource aspects of NAS modernization.



CHAPTER 5
SUPPORTABILITY

INTRODUCTION

Supportability encompasses all personnel, systems, equipment, tools, and other resources required to sustain the national airspace system (NAS) at a constant state of operational availability.

The projects described in this chapter represent the FAA's assessment of the various improvements required in the area of NAS supportability. This assessment will be revised annually. Planned improvements for each of the seven supportability activity areas are briefly described below. Project descriptions which follow provide more detail concerning today's assessment of the future evolution of NAS supportability.

MAINTENANCE AND OPERATIONS SUPPORT

Maintenance and operations support in the 1990's will be characterized by the completion of many ongoing NAS equipment modernization programs. Many of these replacement systems will contain built–in diagnostics, automated test equipment, and redundancy for "fail–safe" operations. By the end of the decade, all NAS facilities should have remote maintenance monitoring (RMM) capabilities, and most will support some level of RMM capability. With full implementation of the RMM system, the maintenance work force will be centralized and consolidated to optimize responsiveness.

Environmental projects which reduce energy consumption and improve physical plant and structures will continue, and the maintenance management system (MMS) will be fully deployed, giving field technicians access to facility, logistics, and administrative data via portable computer terminals accessible to the maintenance processor subsystem network. As a result of MMS implementation, many paper–based logging, accounting, and other data recording functions will be automated, and routine administrative paperwork will be reduced to a fraction of that existing today.

AIRCRAFT PROGRAM

Flight inspection, training, and related research and development will be significantly changed by new NAS subsystem deployment and by improvements in aircraft and avionics during the 1990's. The age of the current aircraft fleet, combined with the need for sophisticated high–technology aircraft systems, will necessitate replacement of much of the fleet during the coming decade. The goal is a more standardized fleet with fewer aircraft types, allowing improved service at lower overall cost. Standardization will reduce the chance of pilot or aircraft maintenance personnel error through elimination of requirements for multiple aircraft proficiency. It will also reduce parts and equipment inventory as well as training costs for flight and maintenance personnel. New FAA aircraft will be capable of supporting NAS improvement initiatives, provide greatly improved support and performance, and be suitable for adaptation to accommodate new technology.

TECHNICAL SUPPORT/QUALITY ASSURANCE

As the 1990's proceed, maintenance control centers (MCCs) will play an ever–increasing role in NAS quality assurance. MCCs will be established in every sector, and MCC specialists will assume full–time responsibility for NAS performance monitoring, control, and maintenance coordination. The remote maintenance monitoring system will support remote certification of NAS facilities from MCCs or maintenance work centers by personnel possessing appropriate training credentials and authorization.

Implementation of the aviation safety analysis system (ASAS) and the national aviation safety data system (NASDC) will provide a cost–effective, fully integrated capability to provide information for identifying potential safety issues. It will also provide timely and accurate information to enhance safety inspection and productivity. It will improve the FAA's capability to respond to safety information requests, and provide decision support data to agency management and safety inspectors.

LOGISTICS SUPPORT

Logistics support in the 1990's will place more emphasis on integrated logistics support and automated information systems to enhance the national airspace integrated logistics support (NAILS) process. Automated systems will be established to assist in the development of integrated logistics support requirements which will be tailored to the maintenance concept of the systems being acquired. The automated system will provide program managers with the tools and/or models to use when making life–cycle logistics support decisions.

HUMAN RESOURCE MANAGEMENT

The primary objective of the human resource management (HRM) program is to ensure that adequate personnel with appropriate knowledge, skills, and abilities are present at the right time and at the right locations to support NAS modernization. Additional objectives include developing an integrated HRM strategy which is coordinated across the various segments of the FAA work force, and the development of information to estimate training resource requirements and develop and evaluate alternative training strategies. Other objectives include the identification of funding requirements to support the human resource aspects of the NAS modernization and the development of planning tools to aid FAA managers in projecting human resource requirements and examining human resource impacts of alternative transition and system design strategies. Finally, the process includes the effective communication of NAS HRM program information to the field and the receipt of input from the field.

The FAA Human Resource Management Plan will be updated annually during the 1990's in an ongoing effort to provide adequate levels of trained staff in appropriate locations to meet all FAA supportability requirements. This plan will reflect the changing nature of work as NAS modernization continues.

TRAINING

The 1990's will see considerable development of computer based training hardware and software. The FAA Academy infrastructure and capabilities will be expanded to keep pace with the training requirements associated with new systems being deployed during the 1990's. Advanced simulators, new training centers for radar and automation functions (ILS/MLS, VOR/DME, GNAS, aeronautics, and standards), and classroom improvements will be required. Systems for a multimedia curriculum, instructional material preparation and refinement, and more decentralized distributed training resources will also be implemented. The deployment of advanced automation system (AAS) CIP projects represents a major step forward in the automation of air traffic control operations. The Air Traffic Division of the FAA Academy provides training support for the operational human resources that will use the AAS equipment. Project support entails the delivery, installation, and testing of the actual equipment (e.g., common consoles, tower position equipment, etc.), and the design, development, and validation of required training. Also supported is the modification, development, and maintenance of software required to support the training systems; development of scenarios, training of instructional cadre in the operation of the operational equipment and additional equipment, and additional training requirements resulting from the deployment of the AAS systems; and interdependent and independent CIP projects through FY 2000 and beyond.

The FAA Center for Management Development (CMD), located in Palm Coast, Florida, will continue to provide centralized resident management training. It will expand to accommodate the developing training delivery technology, including audio conference, audio graphic, and satellite television broadcast with two–way audio and computer graphics.

SYSTEMS RESEARCH AND DEVELOPMENT

The FAA general support and system support laboratories will continue to play a key role in NAS modernization. Throughout the 1990's, research and development activities will be conducted by these laboratories, examining new technological developments and conducting subsystem testing and evaluation.

51–22 En Route Analysis and Reporting

Purpose: Air Traffic facilities have the requirement to quickly evaluate impacts to new or proposed changes in routes, traffic flows and metering, approach and departure procedures, and delay programs. This evaluation examines requirements in three areas: safety, efficiency, and the environment. These evaluations need to be conducted at both the national and local levels.

Approach:

- Automation improvements will be made to the manual, national-level traffic flow management (TFM) system.
- Acquire the tactical and strategic capability for planning of air traffic management, airspace design, and air traffic control procedures.
- Acquire the capability to conduct "what if" analyses relating airspace and flow management decisions to predicted flows, controller workload, and efficiency measures.
- Acquire the environmental assessment capability at ARTCCs and TRACONs of proposed changes to traffic flows, route structures, and procedures.
- Acquire the long-term planning capability for responses to airport improvements such as runway additions or extensions, precision approach installations, and radar upgrades.

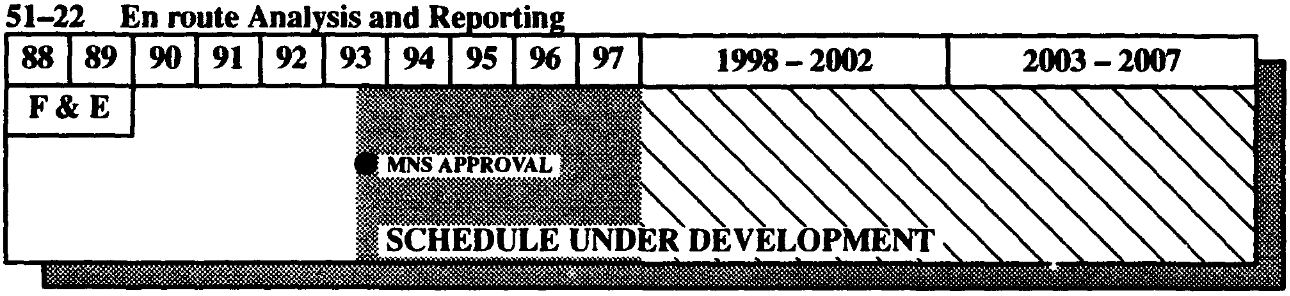
This project will analyze which tools will satisfy these requirements and how best to acquire these capabilities.

Products: This project will provide analytical and performance evaluation capabilities to air traffic control facilities to assess proposed responses to dynamic traffic demand in controller workload, system capacity, efficiency, and environmental impact.

Related Projects/Activities: 21–06 TMS, 21–13 AERA, 41–06 TMS Sustainment, and 45–25 ATOMS Local Area/Wide Area Networks.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

51–22 En route Analysis and Reporting



52–21 ARTS IIIA Peripheral Adapter Module (PAM) Modernization

Purpose: This project will modernize the ARTS IIIA PAM by emulating its functions with modern capability to enhance its efficiency and supportability. The current ARTS IIIA PAM is 20-years old and many replacement components are hard to obtain. The PAM interfaces the integrated magnetic tape (IMT), the teletype model 40 teleprinter (TTY), and the interfacility communications adaptor (ICA) with the ARTS IIIA system. The IMT transport has the same supportability problems as the PAM. The IMT is a nonstandard, seven track, 200 bits per inch (BPI) unit with mechanical components that can be obtained from only one manufacturer via special order.

Operationally, the peripherals (IMT, TTY, ICA) that interface with the PAM and the ARTS IIIA computer system cannot be automatically switched, have no on–board diagnostic capability, and insufficient input/output processor B (IOPB) interfaces for the the Mode C intruder configuration.

Approach: The IMT function will be replaced by interface cards that connect into the IOPB on a personal computer (PC). The PC contains software that will emulate the IMT function. The back–to–back switching capability currently performed by the PAM mode plug will be a switch contained on the IOPB interface card. The disk subsystem backup capability currently performed by the IMT will be handled by the hard disk capability of the PC.

The TTY function will be replaced by interface cards that connect into the IOPB and a PC serial communications port. The PC contains an asynchronous communications software package that emulates the TTY function. The back–to–back switching capability currently performed by the PAM mode plug will be a switch contained on the IOPB interface card. The TTY function PC differs from the IMT function PC.

The ICA function will be replaced by interface cards that will be connected to the IOPB and daisy chained together, then connected into a converter which will be connected to the interfacility modem. The ICA protocol will be emulated in firmware on the card connected into the IOPB. The back–to–back switching capability currently performed by the PAM mode plug will be a switch contained on the IOPB interface card.

Products: One modernized PAM package consisting of the hardware and software required to upgrade the current ARTS IIIA PAM capability. The support software and card reader function will be included with this package.

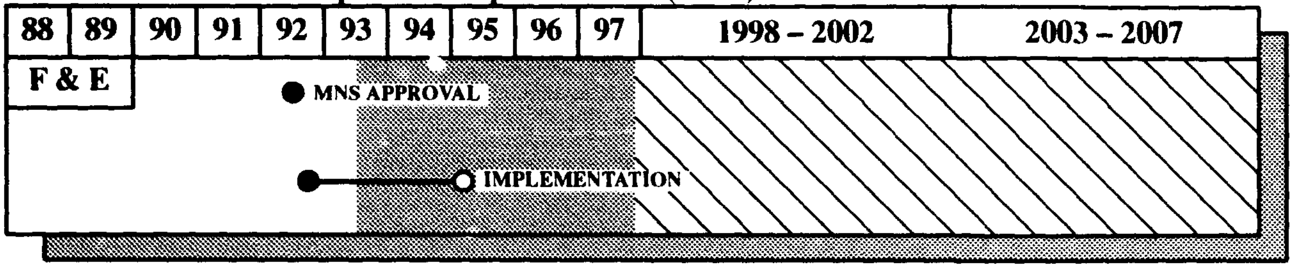
Progress/Activity from December 1991:

- Keysite testing of TTM emulator at Denver and Atlanta TRACONs was completed.
- All hardware and software for TTY emulators were ordered for full field deployment.
- Requirements determination was completed for TMT emulation.
- Evaluation of design alternatives for the IMT emulator was initated.

Related Projects/Activities: 32–20 Expand ARTS IIIA Capacity and Provide MCI Capability.

Section 2

52–21 ARTS IIIA Peripheral Adapter Module (PAM) Modernization



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Section 3

No Flight Service and Weather Projects in this Chapter. **Page 5–3–1 omitted.**

Section 4

No Ground–to–Air Projects in this Chapter. **Page 5–4–1 omitted.**

No Interfacility Communications Projects in this Chapter. **Page 5–5–1 omitted.**

Section 5

Section 6

56–02 Computer Based Instruction (CBI) Expansion

Purpose: This project provides for the expansion and upgrade of the present CBI training capability for technical employees in the following areas: Air Traffic (AT), Airway Facilities (AF), Flight Standards (FS), Aircraft Certification, and Security and Aviation Safety. The CBI expansion project allows flexibility in conducting a program of individually prescribed proficiency training in the field.

Approach: Present equipment will be replaced at AF and AT training offices, regions, centers, and the FAA Academy to handle training programs and to conduct technical training for new requirements. Learning centers are being considered for AT and AF field locations which have a substantial requirement for high–volume AAS transition training. The CBI expansion project will provide CBI resources for software compatibility and maximum administrative and operational efficiency.

A centralized system has been established to ensure that equipment procured for CBI will effectively meet increased training needs. CBI capability will be used to support student management, testing, evaluation, content updates, and record keeping. Currently, CBI learning stations interface with a mainframe computer at the FAA Academy in Oklahoma City. This mainframe support is leased on an interagency agreement among the FAA, Army, and the Air Force, and is one of five systems linked nationally to share courseware and technical resources. A move toward the use of networked computer systems will occur in the next decade. Dependency on mainframe computers will decrease. The networked systems will allow transfer of CBI courseware, thereby increasing the available storage of existing mainframes for training management data, records, and reports.

Replacement: The Vikings and IST II computers currently used in the field and at the FAA Academy for CBI training will be phased out by 1994. New replacement computers will have advanced technology capabilities, such as expert systems, compact disk read only memory (CD ROM), video disk, and digital audio. New hardware will accommodate the present CBI curriculum until the new courses for the AAS equipment have been designed and developed.

Products:

- Under the office automation technology and services (OATS) contract, CBI equipment contains video disk, CD ROM, digital audio, color monitors, and new interface capabilities.
- A student orientation course, a systems checkout review, a site manager's course, and several courses for the services have been developed for the multimedia delivery platforms for use on the new CBI equipment. These courses and lessons employ video disk, digital audio, color graphics, animation, and interactive activities using the mouse.
- Design and development of additional courses on the full feature computer equipment are underway.
- New equipment includes software authoring systems that enhance course development and reduce programming time.

Progress/Activity from December 1991:

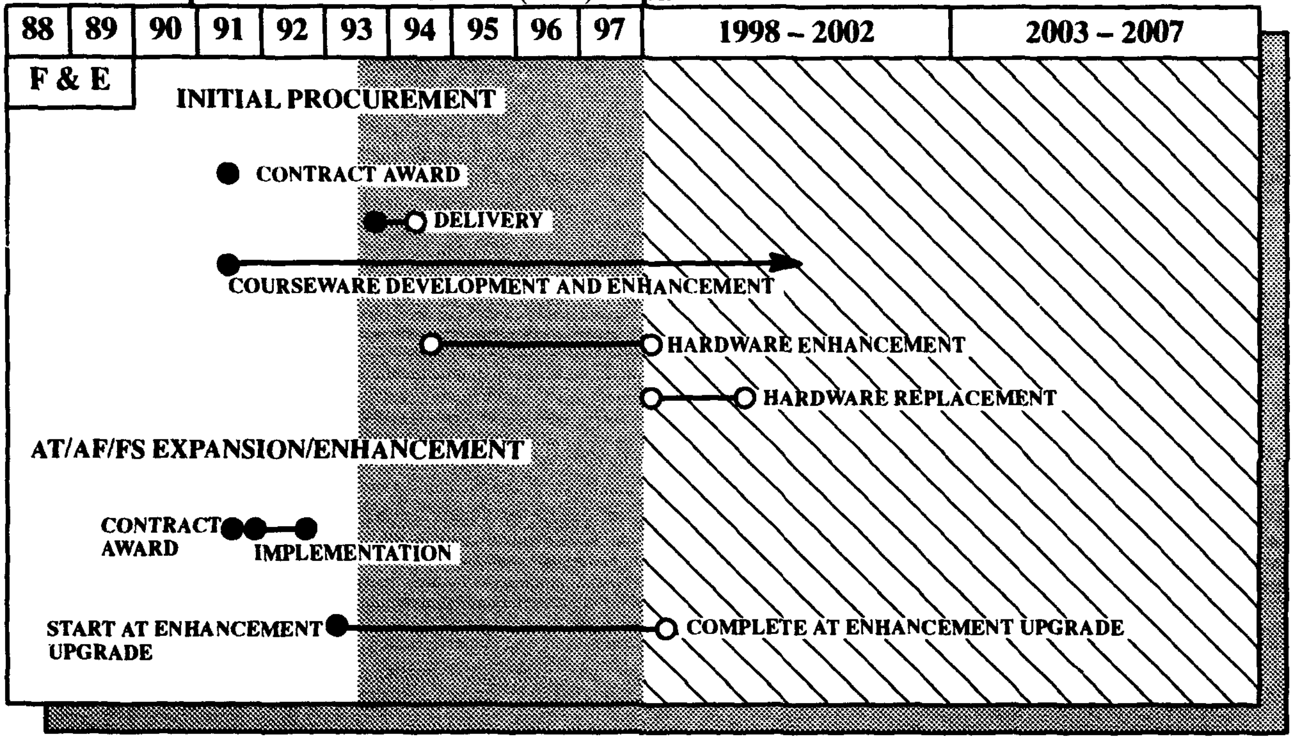
- 1,450 OATS CBI training terminals will be delivered to field sites during FY 1993 and FY 1994.
- CBI courseware development is in progress and courses will be available for use with the first deployment of the CBI training equipment.

Related Projects/Activities: 33–20 AFSS Support Space, 56–56 NASMAP, and 56–61 FAA Systems Architecture.

List of Contractors:

- Applied Science Associates (software development) New Carrollton, Maryland

56–02 Computer Based Instruction (CBI) Expansion



56–11 Aircraft Fleet Modernization

Purpose: This project will acquire current technology aircraft to overcome shortcomings associated with the increasing age and obsolescence of the FAA fleet (i.e, the limitations of the current fleet to meet mission requirements), the maintenance problems and excessive downtime associated with supporting out of production aircraft, and the inefficiency of operating a fleet of multiple aircraft types.

Approach: Plans have been developed and initiatives begun to acquire current technology aircraft capable of accomplishing flight program requirements. Planned initiatives are to replace aging, obsolescent:

- Aircraft having insufficient range and capability with aircraft capable of performing long–range international flight inspection mission requirements.
- Domestic flight inspection aircraft with a fleet designed for human and safety factors as well as mission efficiency.

- Multi-mission aircraft with logistically supportable aircraft that can perform both the semiautomated flight inspection (SAFI) mission and the automated flight inspection system (AFIS) mission.

Adequate training support will be provided for the projected increase in hiring of aviation safety inspectors. This will assure adequate resources to meet the recurrent training and currency/proficiency needs of the aircraft safety inspector work force.

Products:

Flight Inspection Program

- Medium size/range domestic flight inspection system aircraft.
- Large size/long range international flight inspection system aircraft.
- Multi-mission flight inspection system aircraft.

Progress/Activity from December 1991:

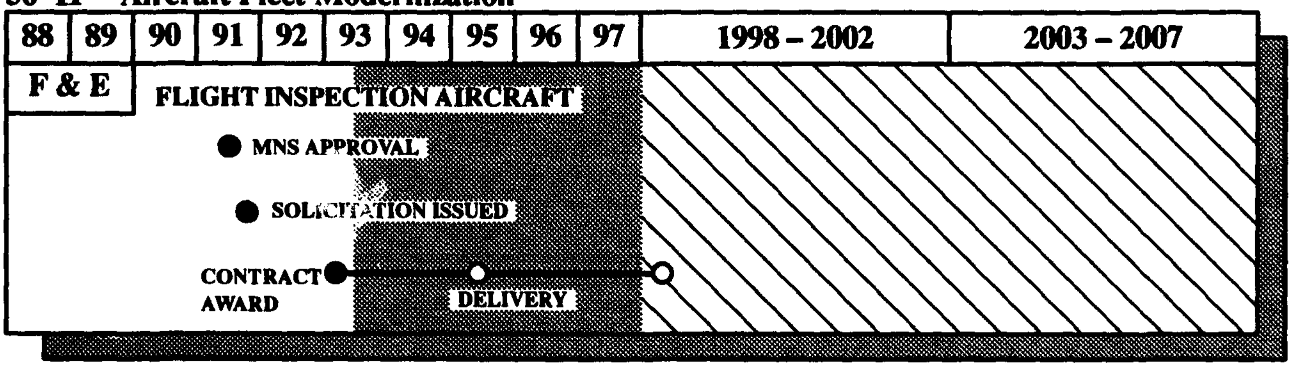
- RFP issued for 16 flight inspection systems.
- Completed evaluation of responses to flight inspection system proposals.
- Conducted operational demonstration on proposed flight inspection aircraft.
- Started fact-finding and negotiations on proposed flight inspection aircraft.
- Developed analysis and mission need documentation for research and development aircraft.

Related Projects/Activities: 56–12 Aircraft Related Equipment Program.

List of Contractors:

- E-Systems, Incorporated
  (integration contractor)
  Greenville, Texas

56–11 Aircraft Fleet Modernization



56–12 Aircraft Related Equipment Program

Purpose: This project will provide technological upgrades and enhancements needed for the FAA aircraft fleet to meet the requirements of CIP initiatives in the area of en route and terminal navigation aids, as well as upgrades required by changing regulations and ongoing replacement of obsolete equipment. It will also enhance the FAA's obsolete, 12 year old, automated aircraft management information system (AMIS) which no longer has the capability to efficiently support aircraft program requirements.

Approach: Plans considering all current and projected aircraft program requirements have been developed and are being continually updated. Aircraft fleet technological upgrade implementations are scheduled to coincide with new workloads generated by CIP initiatives and requirements of changing regulations. Obsolete equipment will be replaced on an ongoing basis as required to ensure safe and efficient fleet operation. A new AMIS requirements study will be conducted and the system will be enhanced or redeveloped as necessary to meet aircraft program requirements.

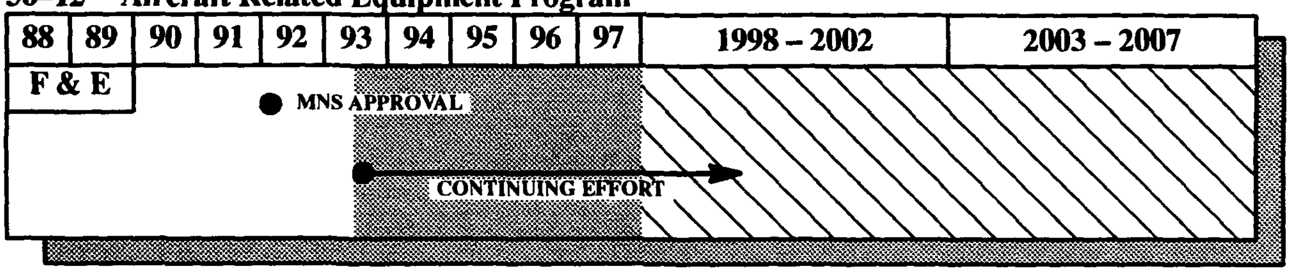
Products: A current technology aircraft fleet that is capable of accomplishing FAA program requirements in flight inspection, research and development, training, currency, and evaluation. An enhanced AMIS that is capable of efficiently supporting both current aircraft program requirements and new requirements such as interagency N number cost reporting.

Progress/Activity from December 1991:

- Requirements gathering and analysis initiated to define enhancement and/or replacement for the automated AMIS.
- Contract awarded for Phase I flight data recorders for agency aircraft.
- Contract awarded for procurement of flight inspection aircraft digital marker beacon systems.
- Contract awarded for procurement of engine trend monitoring systems for Beech 300 flight inspection aircraft.
- Specifications developed for digital radio altimeter systems for Beech 300 flight inspection aircraft.
- Specifications developed for precision distance measuring equipment for Beech 300 flight inspection aircraft.

Related Projects/Activities: 56–11 Aircraft Fleet Modernization.

56–12 Aircraft Related Equipment Program



56–15 NAS Spectrum Engineering Sustained Support

Purpose: This project will provide spectrum engineering and frequency management support for programs and facilities that are being implemented under the CIP. Effective management of the radio spectrum, including electromagnetic compatibility (EMC), is vital to the continued operation of the NAS during facility relocation or replacement.

Approach: Assign frequencies to ensure interference–free operation of the NAS. This effort involves EMC analysis, formal spectrum certification required by the National Telecommunications and Information Administration (NTIA), national and international frequency coordinations, and radio propagation studies.

This support will obtain and protect necessary frequencies for relocated or replaced NAS facilities through automated computer techniques. Radio frequency interference (RFI) problems will be investigated and resolved. High–power AM, FM, and TV stations are serious interference sources to both ground and airborne equipment. Resolution and prevention of this type of interference involves close coordination with the broadcasting industry, Federal Communication Commission (FCC), and the International Civil Aviation Organization (ICAO). This project will provide:

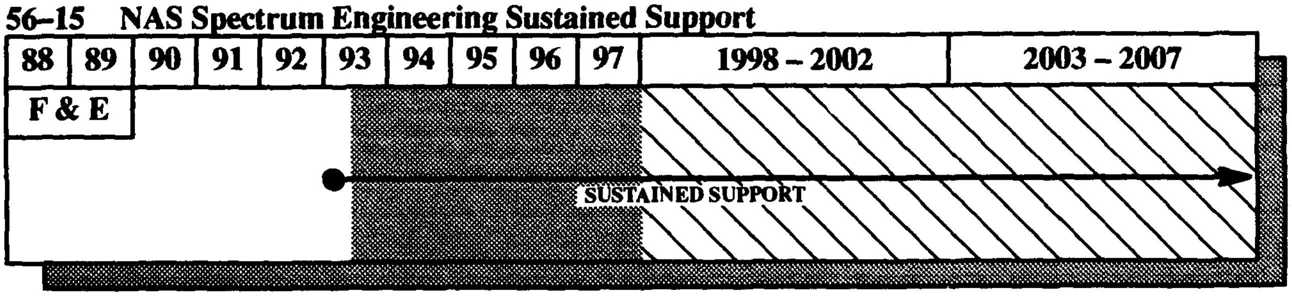
- Facility coverage charts necessary for proper engineering of frequencies for relocated or replaced communications, navigation, and surveillance facilities.
- A source of F&E funding for frequency retrofit of existing equipment replaced or relocated under the CIP.
- United States telecommunications support to international civil aviation as required in the CIP. This involves extensive international coordination on aeronautical mobile service, aeronautical fixed service, aeronautical mobile satellite service, etc.

Products:

- Frequency plans in support of the CIP include MLS, high–altitude EFAS, 25–kHz air–ground communications, radio communications link (RCL), national radio communications system (NARACS), and next generation weather radar (NEXRAD).
- EMC guidelines for facility consolidation.
- Frequency authorization and formal spectrum approval from the NTIA.
- Facility coverage charts.
- Spectrum engineering studies in support of the CIP. These studies include frequency engineering models, RFI suppression devices, investigation of modern technology and procedures for RFI elimination, AM/FM/TV interference evaluation, etc.

Related Projects/Activities: Spectrum engineering facilities and activities at the FAA Technical Center provide the test bed and EMC analysis necessary to accomplish the spectrum management function. 56–26 Frequency Interference Support/Resolutions.

56–15 NAS Spectrum Engineering Sustained Support



56–16 Precision Automated Tracking System (PATS)

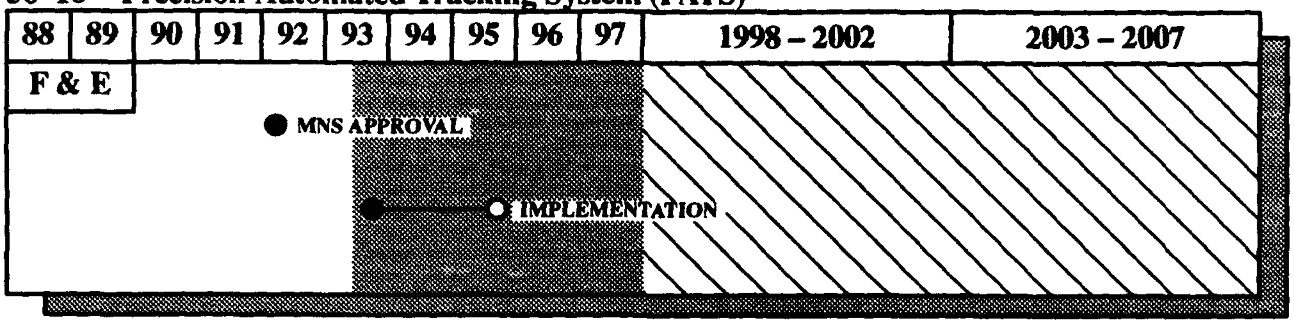
Purpose: To replace the laser-based precision automated tracking system at the FAA Technical Center with a newer and significantly more supportable system. The new system must have increased accuracy and a mobile configuration for planned testing at the Technical Center and field locations.

Approach: This project will replace the PATS which was produced in 1975. The new system must have the capability to track a single target aircraft out to a range of 15 nautical miles and provide time correlated position data with a level of accuracy of better than 20 arc–seconds in azimuth and elevation and 5 feet in range.

Products: A modern laser-based target tracking system. The planned system will provide higher accuracy and significantly improved supportability.

Related Projects/Activities: None.

56–16 Precision Automated Tracking System (PATS)



56–17 System Support Laboratory Sustained Support

Purpose: This project provides facilities and equipment at the FAA Technical Center (FAATC) for test, evaluation, and integration of new systems. To support the FAA test and evaluation policy, the system support laboratory will duplicate future systems, equipment, and interfaces necessary to establish realistic environments for all types of developmental, operational, and production acceptance testing. The testing will ensure that total system requirements are met prior to installation at field facilities. Upon completion of testing, systems will be integrated into the laboratory for direct field support, development and testing of hardware, software, and firmware modifications, and development of system enhancements.

Approach: Upgrade the system support laboratory which is partitioned into six support complexes:

- En route systems.
- Terminal systems.
- Flight service and weather systems.
- Ground–to–air systems.
- Interfacility communications systems.

- Maintenance and operations support systems.

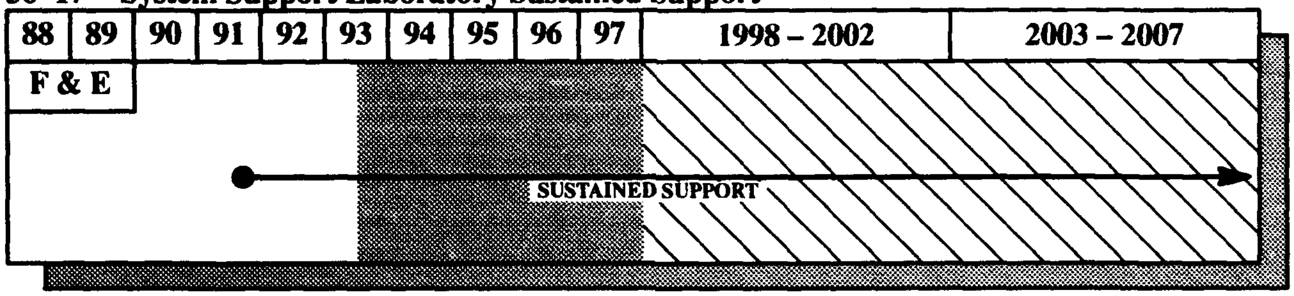
An FAATC transition plan is updated periodically. The plan is consistent with the master transition plan and the master schedule. It identifies space requirements, installation plans, and evolutionary changes that ensure the integrity of the configurations in the system support laboratory. System interdependency and the switching capabilities of system configurations are also defined in the transition plan.

Products: System support laboratory improvements such as:

- NAS laboratory modernization.
- Full fidelity tower simulation facility.
- Replace Elwood radar with ARSR–3.
- ARTS stand–alone assembly system.

Related Projects/Activities: Supports numerous new systems undergoing testing at the FAATC.

56–17 System Support Laboratory Sustained Support



56–18 General Support Laboratory Sustained Support

Purpose: To provide facilities, equipment, aircraft, general computer systems, and necessary enhancements, modifications, or replacements to support the engineering, development, and testing programs assigned to the Technical Center.

Approach: The general support laboratory is partitioned into distinct complexes where resources are shared by systems and projects. The support systems and projects for the complexes are involved with design, research, development, and test and evaluation of advanced concepts, procedures, and systems that are being considered for introduction into the NAS. The complexes provide:

- Airborne support.
- Simulation support.
- Test and evaluation support.
- General purpose data processing support.

Airborne support includes both fixed–wing aircraft and helicopters which are instrumented to provide flight data for projects.

Simulation support is provided for system tests that require both real–time and fast–time simulation of present and future air space environments. The target generation facility replaces the existing NAS simulation support facility to continue providing this function.

Test and evaluation support is provided to both F&E and R,E&D projects requiring facilities of the general support laboratory.

The general purpose data center supports computational models as well as reduction and analysis of data obtained in tests and research.

Plans are being developed to upgrade specific complexes within the general support laboratory. The plans will be responsive to the requirements of the CIP and the R,E&D Plan.

Products: Items in progress include:

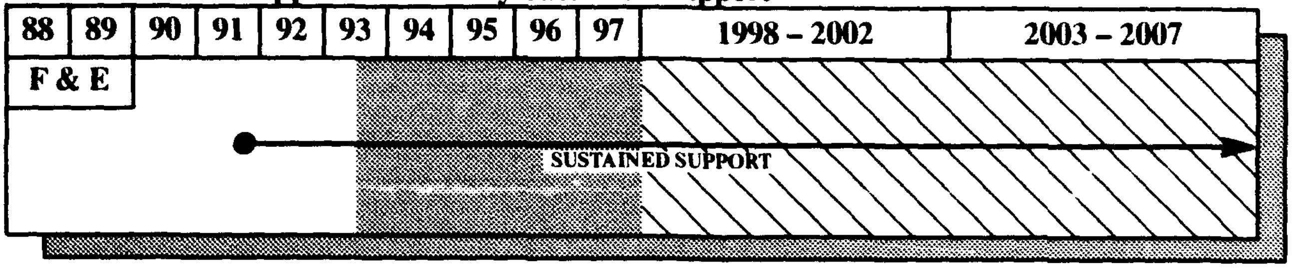
- Turbine rotor burst test facility.
- Special component evaluation facility.
- Technical Center R&D laboratory.
- Communication system modernization.
- Technical Center facilities.
- Continuous airworthiness research facility.
- Fuel research facility.

Items under consideration include:

- Advanced material research facility.
- Fuel release characteristic test unit.
- Propulsion research facility upgrade.
- Flight safety research facility.
- Advanced material research facility.
- National airport test facility.
- Central test range facility.
- Flight simulation visual enhancement.
- Advanced aircraft system evaluation facility.
- ARTS-IIIA system.
- Tilt rotor test unit.
- Technical Center data computer upgrade.
- Provision for antenna farm.
- Target generator facility enhancement.
- Refrigerated pavement test section.
- Test equipment.
- Technical Center fiber data distribution.
- Structures research facility.

Related Projects/Activities: Many of the major CIP projects.

56–18 General Support Laboratory Sustained Support



56–19 FAA Technical Center Building and Plant Support

Purpose: To provide funds for the FAA Technical Center building lease and for the improvement, rehabilitation, or replacement of plant equipment supporting assigned programs but not funded by individual programs.

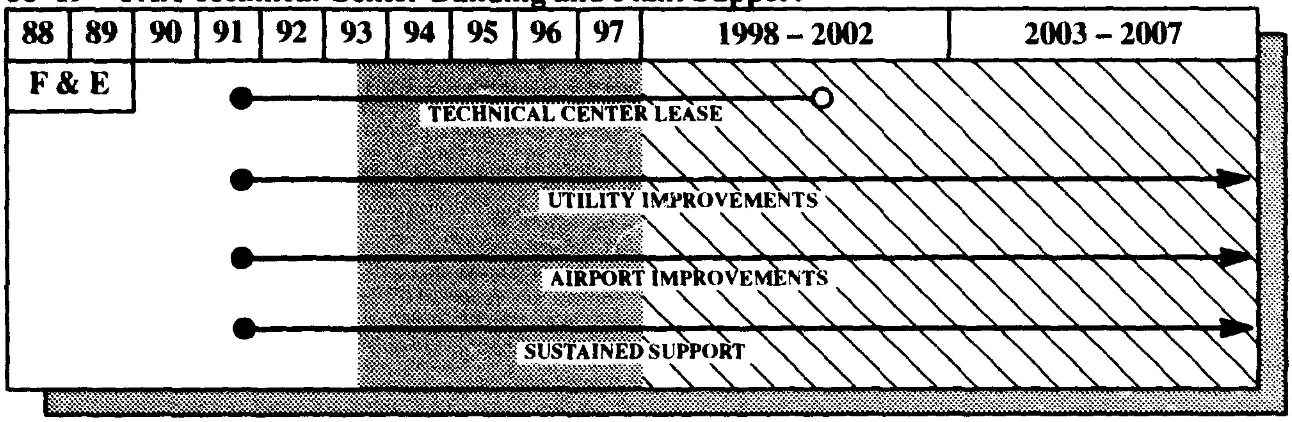
Approach: The FAATC erected a new building in 1980 to accommodate the technical and administrative complex. Most of the utilities (sewer, power, heating, and cooling) supporting the Technical Center buildings and airfield complex were installed prior to 1970. These utilities require rehabilitation and in some cases, complete replacement.

Products: Items planned and/or under consideration include:

- The utility improvement activity includes numerous items including replacement of chiller and boiler units. These units are 20-years old and fail frequently, most often during maximum need, such as extremely hot and humid conditions. The downtime is costly as important testing must frequently be delayed.
- Airport improvements are scheduled to refurbish the runway and taxiway. Taxiway "F" had to be closed due to deterioration of its surface. Refurbishment will eliminate the need to completely replace the deteriorating asphalt and concrete.
- There is an ongoing engineering study of the FAATC waste water collection system to determine and correct any differences in the system.
- A more detailed description of the activities associated with this project are available in the development test and evaluation (DT&E) master planning document available at the FAATC.
- Dismantling of original ATC laboratory.
- Additional office requirements.
- Technical Center support facility–Phase II.
- Security center.

Related Projects/Activities: This project supports all CIP projects assigned to the FAATC.

56–19 FAA Technical Center Building and Plant Support



56–22 Human Resource Management

Purpose: This project develops and implements a long–range integrated FAA process for managing the human resource aspects of the NAS modernization.

The major objective of the Human Resource Management (HRM) Plan is to establish an orderly process for effectively managing such issues as staffing, training, and relocating people so that CIP technology can be used effectively as it is delivered. The program is based on the principle that the FAA's goals for operational effectiveness, high levels of productivity, quality service, and a positive organizational culture can best be achieved by carefully considering and managing the transition of its people.

Approach: The process provides an HRM Plan, updated annually to integrate new or modified requirements. The update process will ensure full support and accountability as affected organizations transition to new systems. The first iteration of the HRM Plan affected the Airway Facilities, Air Traffic, and Technical Center work forces. As the planning process matures, the HRM Plan will expand to include all affected employees and more precise projections over longer time frames.

The first iteration of the plan was developed through a coordinated process between the Air Traffic, Airway Facilities, CIP development, FAA Technical Center, FAA Aeronautical Center, and HRM organizations. Each organization was responsible for production of that portion of the plan that addresses their operations, policies, and human resources. The HRM organization assisted in integration of the input from the other organizations. The annual CIP HRM Plan provides the latest available information on projected operational and transition requirements for new systems and describes human resource plans to meet these requirements.

In Phase I, an action plan was developed to complete the first iteration of the HRM Plan. The action plan:

- Established the administrative processes and systems for management of the human resource planning efforts.

- Defined planning criteria and guidelines.

- Specified types of analyses that will form the basis of the plan.

- Defined specific methodologies and tools to be used for development of plans to ensure consistency of planning objectives and outcomes.

- Established schedules and assigned responsibilities for accomplishment of required actions.

- Detailed funding and other resource requirements and sources to support the planning process.

In Phase II, the initial CIP (NAS) HRM Plan was developed and published. Phase III continues and expands Phase II activities, extending them to new systems and workforces by implementing policies, procedures, and mechanisms to institutionalize an HRM planning process.

The 1990 NAS HRM Plan was developed with the support of, and in coordination with, all operating elements of FAA headquarters, regions, centers, employee participation groups, NAS HRM oversight committees, and labor organizations representing affected employees.

The 1990 NAS HRM Plan addressed requirements for three systems: initial sector suite system (ISSS), peripheral adapter module replacement item (PAMRI), and voice switching and control system (VSCS) in the FY 1991–FY 1995 time frame.

The 1990 NAS HRM Plan identifies:

- Air route traffic control center (ARTCC) transition staffing requirements for Air Traffic and Airway Facilities workforces.

- Transition training requirements for the ARTCC Air Traffic and Airway Facilities workforces.

- Air Traffic, Airway Facilities, FAA Aeronautical Center, and FAA Technical Center human resource plans to address human resource requirements.

- Support requirements for selected work forces at the FAA Aeronautical Center and FAA Technical Center.

Products:

- CIP Human Resource Management Plan.

- Human resource requirements.

- Workforce projections.

- Pipeline capacity and lead time projections.

- Training resource requirements and scheduling data.

- Automated tools to conduct "what–if" analyses of human resource issues.

- Alternative policy/cost analyses.

Progress/Activity from December 1991:

- Refined and expanded initial human resource analysis prototype models.

- Developed databases and associated analysis tools for Airway Facility HRM planning.

- Assisted the five workforces represented in the 1990 and 1991/92 HRM Plans in setting–up their internal HRM planning processes.

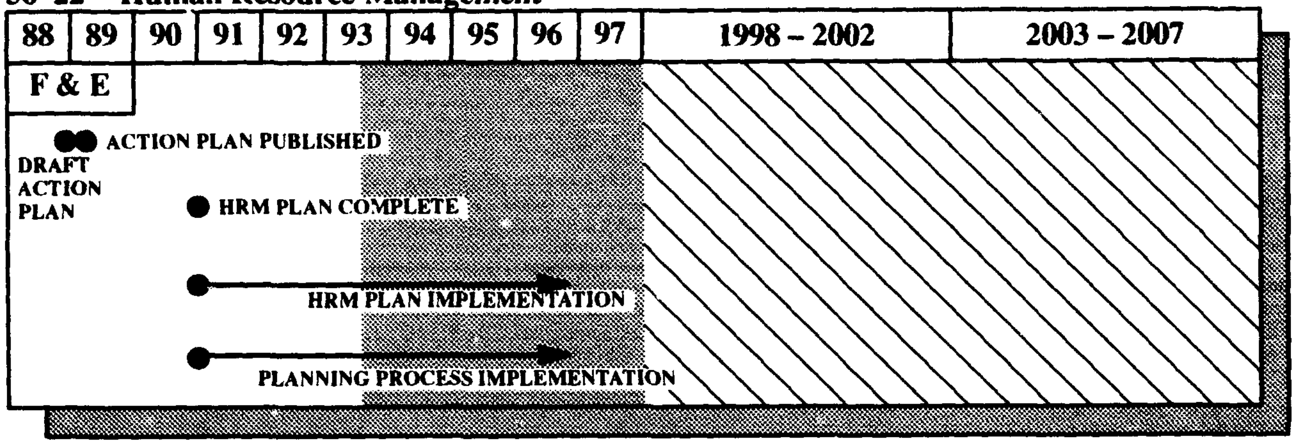
- Mapped the integrated HRM planning process in preparation for formulating detailed FAA-wide planning policy, procedures, and requirements.

Related Projects/Activities: This project supports ongoing F&E and operations activities.

List of Contractors:

- Fu Associates, Limited (HRM plan support) Arlington, Virginia

56–22 Human Resource Management



56–23 Instrument Approach Procedures Automation (IAPA)

Purpose: Provide instrument approach procedure specialists with an automated tool to develop, store, and transmit standard instrument approach procedures (SIAPs). This results in faster SIAP development (25 to 50 percent reduction in time to develop a SIAP) with fewer errors, greater accuracy, and increased standardization.

Approach: The new system meets the requirements for procedures development using standardized data bases which incorporate terminal instrument procedures (TERPS), geodetic calculations, math functions, and graphic display generators. This technology ensures standardized procedures development and decreased response time during a period of increasing requirements. The automated workstations developed for this project consist of graphic workstations, map modeling software, terrain modeling software, specialized printers, and local area networks.

Products: The improved procedures development process provides:

- Standardized development of instrument flight procedures including takeoff minimums/instrument departure procedures, en route (airways) procedures, fixes and holding development and documentation, and instrument approach procedures.

- A capability for electronically transmitting instrument procedures data.

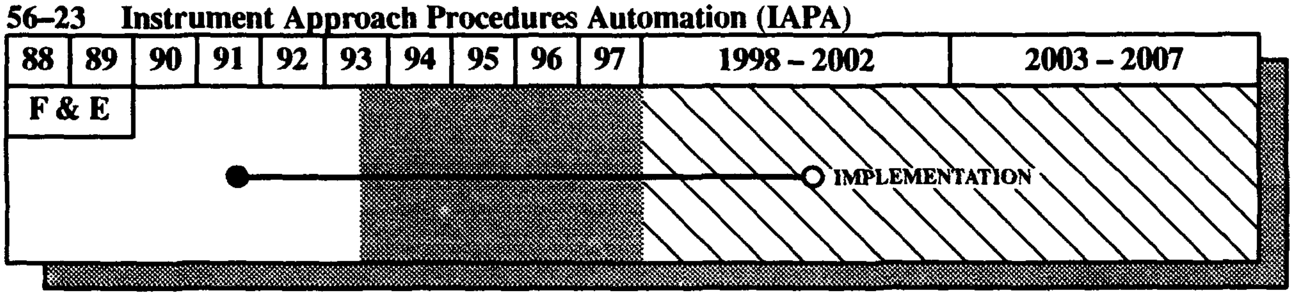
- A mechanism for storing completed instrument procedures with a capability for automatic data retrieval and display.
- Regional flight procedures branches with full hardware and software capabilities of the IAPA system, thereby maximizing regional resources.
- Intra/interservice interface capabilities in support of regional organization projects, ensuring availability of a common database for instrument flight procedures activities.

Progress/Activity from December 1991:

- Completed and released remote altimeter source selection (RASS) criteria for use on IAPA production system.
- Developed evaluation factors for offerers responses to IAPA request for proposal.
- Released IAPA Phase II request for proposal.

Related Projects/Activities: The transition of the components which require procedures development processes (e.g., ILS, MLS, GPS, Loran–C, etc.) are directly dependent on the successful implementation of the automated procedures developmental process.

56–23 Instrument Approach Procedures Automation (IAPA)



56–24 Airmen and Aircraft Registry Modernization

Purpose: To modernize the airmen certification and aircraft registration systems to support changes mandated by the Anti–Drug Abuse Act of 1988, support the operational needs of the Airmen and Aircraft Registry Division, and provide better service to law enforcement agencies and the aviation community.

Approach: The 1988 FAA Drug Enforcement Assistance Act mandated a number of basic record keeping, procedural, and communications changes in the registry. Upgrades of basic document recording, storing, and retrieval are to be accomplished along with faster and better interagency communication of data on airmen and aircraft. The modernization of the registry will provide the capability to address the following:

- Registration of aircraft to fictitious people.
- The use of a post office box or mail drop as a return address by people registering an

aircraft or applying for an airmen certificate for the purpose of evading identification.

- The registration of aircraft to corporations and other entities to facilitate unlawful activities.
- The illegal use of "reserved" registration marking on aircraft.
- The lack of a system to assure timely and adequate notice of the transfer of ownership of aircraft.
- The practice of allowing temporary operation and navigation of aircraft without issuance of a certificate of registration.
- Use of false or nonexistent addresses by people registering aircraft.
- Submission of names of individuals which are not identifiable on applications for registration of aircraft.
- The use of fictitious names and addresses or fraudulent or stolen identification by applicants for airmen certificates.
- The use of counterfeit and stolen airmen certificates by pilots.
- The absence of information concerning physical characteristics of holders of airmen certificates.
- Ability to make frequent legal changes in the registration markings which are assigned to aircraft.
- Use of false registration markings on aircraft.
- The large number of aircraft which are classified as being in "sale-reported" status.

The implementation of these precepts will require the purchase and installation of new equipment. The airmen and aircraft registry is using a mix of old and new technologies. Although information can be accessed by computer, the accuracy of the information, its completeness, and the ability to retrieve historical supporting data will require new automation equipment and document storage facilities.

To accomplish this task, the FAA will procure optical disk systems and document production equipment which will support the following functions:

- Periodic renewal of aircraft registrations and airmen certificates.
- A photograph will be included on a new airmen certificate with features making it less prone to forgery and photographic documentation to validate applicants for aircraft registration.
- Aircraft registration and airmen certificates will be machine readable by the United States Customs Service.
- Verification of original registration applications by an FAA office authorized to perform this function when immediate flight authority is required.

Products: The enhanced registry system will function in accordance with the congressional mandates included in the 1988 FAA Drug Enforcement Assistance Act. The improved systems for registering aircraft, certificating pilots, processing major aircraft repair and alteration forms, and the increased enforcement of requirements will benefit all users (including law enforcement officials) and the general public.

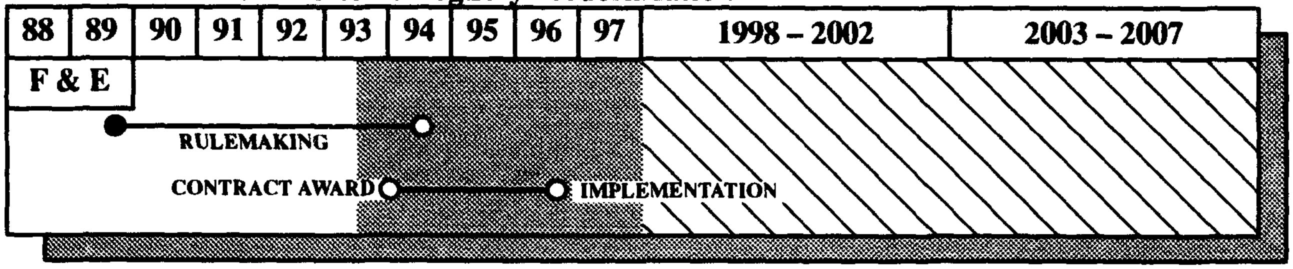
Progress/Activity from December 1991:

- Issuance of an RFP for conversion of airmen and aircraft microform records.

- Approval obtained for a request for delegation of procurement authority from GSA on acquisition of an electronic document management system.

Related Projects/Activities: None.

56–24 Airmen and Aircraft Registry Modernization



56–25 Computer Aided Engineering Graphics (CAEG) Enhancement

Purpose: To provide additional automated graphic workstations to regions, ARTCCs, FAATC, FAAAC, GNAS Sectors, and Level IV/V ATCTs. These workstations will facilitate installation planning, air traffic sector design, and transition planning.

Approach: A considerable portion of CIP projects are being implemented at ARTCCs, FAA headquarters, FAAAC, FAATC, GNAS sectors, and Level IV/V ATCTs. Efforts at these locations include developing the equipment installation plan, converting maps into digital format so data can be accepted by the new system, and air traffic sector design and modifications. Efforts at FAA headquarters include developing the facility master plan to track projects added to each facility and the analysis of each facility's capacity for future growth. Efforts at FAAAC included developing an information model for the FAA Academy to meet future training requirements of CIP projects and streamlining and automating procedures in the FAA Logistics Center. Efforts also include developing 3–dimensional computer models of new and modified FAA facilities and NAS equipment to facilitate transition planning and simulate test scenarios.

Providing CAEG equipment to the above sites will enhance the FAA rapid prototyping capabilities. Linking these facilities with standard communication links already in place will shorten the time needed for approval of any plan modifications and aid in accelerating the implementation of the CIP.

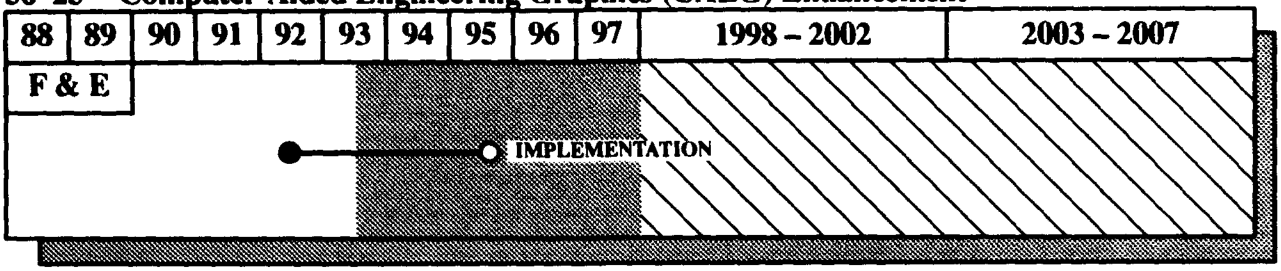
Products: Each of the aforementioned sites will receive one or more CAEG workstations with software and training.

Progress/Activity from December 1991:

- Completed modification which permits implementation of CAEG workstations at all ARTCCs, combined center radar approach (CERAP), and technical support services contract (TSSC) sites.

Related Projects/Activities: 56–56 NASMAP.

56–25 Computer Aided Engineering Graphics (CAEG) Enhancement



56–26 Frequency Interference Support/Resolution

Purpose: This project will provide the sectors with the resources required to independently identify the source of interference problems in a timely manner. With this increased sector–level capability in place, interference problems will be avoided or eliminated in a more efficient manner, reducing the potential for air traffic delays.

Frequency congestion is a growing problem, particularly in areas surrounding major airports. This situation has developed as a result of increased frequency assignments necessitated by the increase in communication and navigational aids required to ensure safe and efficient flow of aircraft.

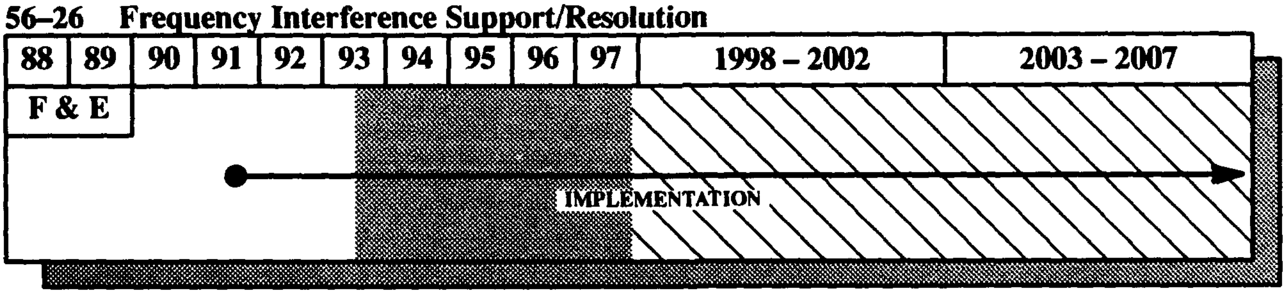
This increase in frequency congestion requires improved efficiency in the identification and resolution of frequency interference problems. Continued reliance on the regional office to support this critical function is no longer efficient or effective in terms of ensuring maximum availability of equipment and services. Timely identification of the source of interference now requires development of sector–level expertise.

Approach: This project will require two additional resources at the sector level. First, the test equipment necessary to identify and eliminate frequency interference problems will be provided to every sector office. Second, the sector's technical support staff personnel will be provided training in this area. Together, these two new sector–level resources will significantly enhance the sectors' ability to independently resolve interference problems.

Products: Modern test equipment will be procured and deployed to all sector offices. Sector office personnel will receive required training.

Related Projects/Activities: 56–15 NAS Spectrum Engineering Sustained Support.

56–26 Frequency Interference Support/Resolution



56–27 Test Equipment Modernization and Replacement

Purpose: This project provides for the acquisition of new test equipment to replace sector test equipment that is no longer repairable, obsolete, and no longer supportable by the manufacturer or the FAA Logistics Center.

Approach: Review the current inventory and provide upgrades by replacing equipment which is difficult to maintain or no longer functional in today's environment. This project will also:

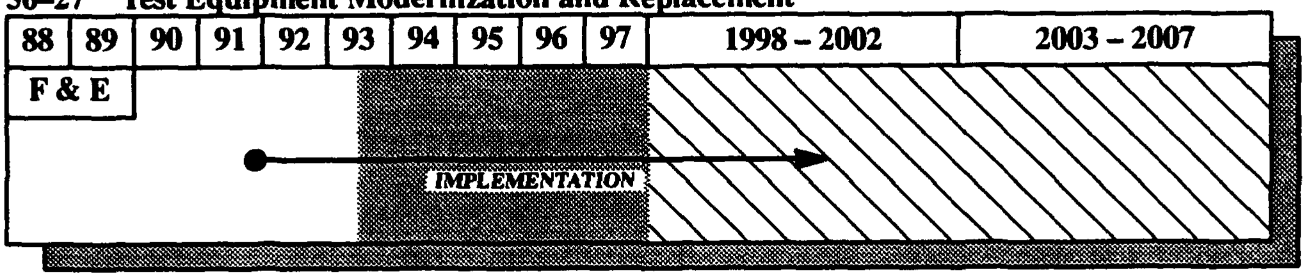
- Provide for test equipment repair and calibration.
- Provide test equipment needed to maintain systems.
- Establish test equipment complements which support the work center concept.

Products: Modern test equipment will be procured and deployed to replace obsolete test equipment as it becomes inefficient to maintain from a cost standpoint or ineffective from a technical utilization standpoint.

Modern telecommunications test equipment will also be procured and deployed to meet the demands of a growing dependence on critical data circuits.

Related Projects/Activities: None.

56–27 Test Equipment Modernization and Replacement



56–28 Computer Resources Nucleus (CORN)

Purpose: This project is supporting the automated data processing (ADP) needs of the FAA by creating a uniform, agencywide computing resource for operational and administrative programs. Through such a resource, the inconsistencies and capacity shortfalls of the current ADP system are being alleviated. To accomplish this, the project is securing ADP services to provide for total facilities management and turnkey operations through contractor–provided facilities, software, and staff. The objectives of this effort are to:

- Provide timely, responsive, and economical general purpose ADP resources to satisfy programmatic needs.
- Increase productivity of FAA programs and personnel.
- Provide uniformity of FAA data processing, facilitating systems integration and ADP standardization.

- Provide backup processing capabilities.
- Reduce frequency of procurement for ADP upgrades, reducing related expenditures.
- Foster utility–like budgeting and usage of computer resources (uniform chargeback mechanisms).
- Devote the FAA's limited ADP staff resources to better satisfying its programmatic requirements.

Approach: The approach is to view the general purpose ADP configurations in FAA headquarters, regions, FAA Aeronautical Center, and FAA Technical Center as a common resource for all FAA elements, and to quantify the current and future demand for such ADP support. Once defined and quantified, the next step is to transfer the operational and technical functions of this ADP support to the commercial arena.

Products: The contract is:

- Furnishing the FAA with contractor–provided computer resources and subsequent upgrades.
- Providing for the conversion of existing ADP workload to the contractor–provided ADP environment.
- Providing all staffing, hardware, systems software, and off–the–shelf package software to meet the requirements for general purpose data processing for all elements (regions, centers, and headquarters) in a timely and economical manner.

Progress/Activity from December 1991:

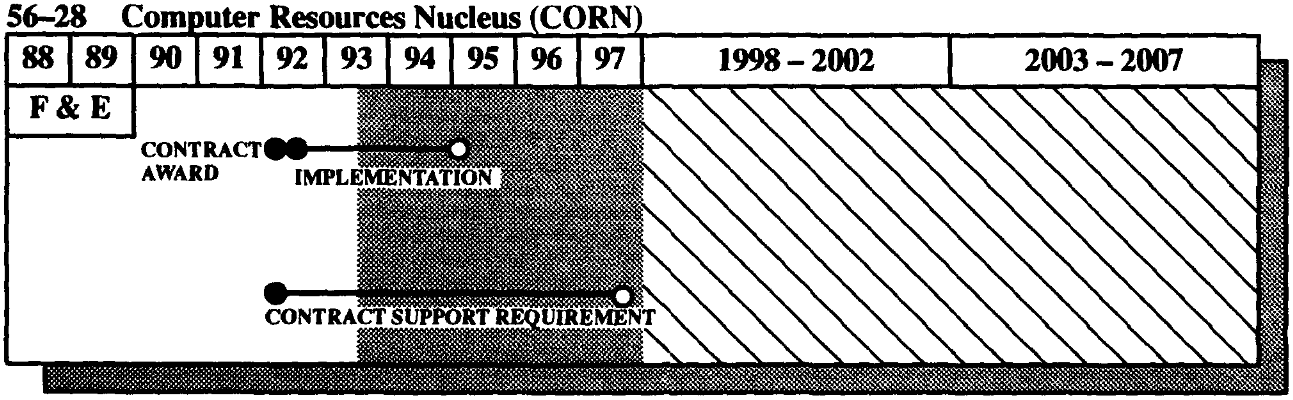
- Contract awarded.
- Started application conversion.
- Primary facility is operational.

Related Projects/Activities: This project supports the activities of the CORN program. It also supports the interface and data interchange requirements of the office automation technology and services (OATS) contract, and interfaces with the administrative data transmission network (ADTN). 33–20 AFSS Support Space is a related project.

List of Contractors:

- Electronic Data Systems (EDS)
  (principal contractor)
  Plano, Texas
- Erekson Associates
  (technical support)
  Arlington, Virginia
- Columbia Services Group
  (technical support)
  Arlington, Virginia

56–28 Computer Resources Nucleus (CORN)



56–29 Onsite Simulation–Based Training Systems

Purpose: This project provides for the development of a number of stand–alone, simulation–based training systems. Simulation–based training devices provide for a safe, efficient, and flexible training environment. The training systems to be developed will provide training for Air Traffic personnel in a realistic environment without taking operating equipment out of service, risking injury to personnel, or damaging the system.

Simulators will:

- Be less costly than operational equipment.
- Allow for the practice of emergency or hazardous situations.
- Allow for flexible training schedules.
- Provide for consistent training.

Approach:

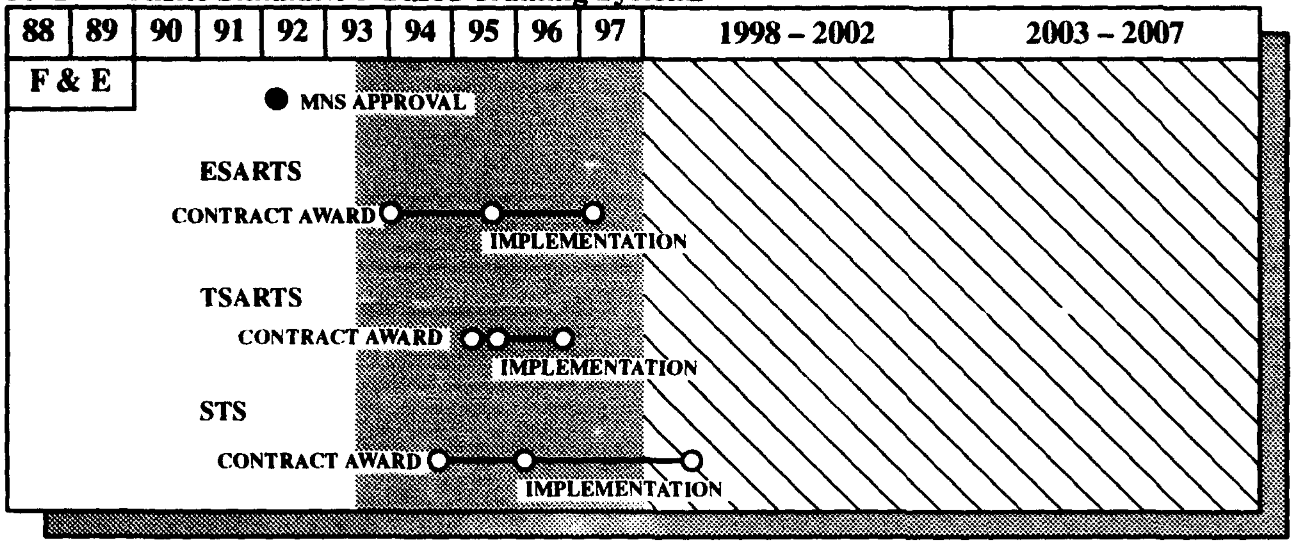
- En Route – The stand–alone radar training will be provided by two separate systems. The primary system is the en route stand–alone radar training system (ESARTS). It will provide full training, and it will use the AAS common consoles for training displays. The secondary system is the supplementary training system (STS). The ESARTS will enable en route facilities to have their controller work force ready to transition to the initial sector suite system (ISSS). Additionally, prior to ISSS, it will replace plan view displays (PVDs) used for dynamic simulation training and allow their use in the operational environment or to train additional employees. The system will operate through the ISSS and provide a base for additions when needed for ACCC.
- Terminal and metroplex control – A terminal stand–alone radar training system (TSARTS) will be developed. It will include capabilities of freeze and playback of scenarios and other needed training improvements. These systems will emulate the current terminal system functionality and will permit NAS terminal automation system displays use in the operational environment.
- Supplemental Training – An STS will be developed and deployed to support en route and terminal training. This system will provide basic training scenarios and will be tailored to specific training needs.

Products:

- ESARTS simulation suites in each center and the MCFs.
- TSARTS training system for the TRACONs.
- STS training simulator workstations for each center, MCF, and TRACON.

Related Projects/Activities: 21–12 AAS, 32–34 Potomac Metroplex, 32–36 Northern California Metroplex, 32–38 Atlanta Metroplex, 32–40 Central Florida Metroplex, and 32–42 New York Metroplex.

56–29 Onsite Simulation–Based Training Systems



56–30 Aeronautical Center Training and Support Facilities

Purpose: This project provides training complexes, support buildings, and the necessary infrastructure to house equipment required for training, logistics, engineering support, and aeromedical research and systems.

Approach: The facilities are being constructed consistent with FAA Aeronautical Center comprehensive land use and space plans. OMB Circular A–94 requires that all leases of capital assets must be justified as preferable to direct Government purchase and ownership. It is anticipated that direct federal construction will clearly be the least costly alternative based on this OMB criterion. Therefore, the funding allocated is for direct federal construction of the proposed facilities on leased Aeronautical Center land. Buildings, enclosures, and related structures will be geographically located and configured to provide for efficient use of training, logistics, engineering, and aeromedical research support functions.

The training complexes, when completed, will meet specific requirements with features such as classrooms, training laboratories, equipment, instructor/administrative support offices and work areas, training/support material space, and courseware/support equipment. They will be configured for maximum flexibility to meet future requirements. The different training complexes will consolidate present training systems and accommodate new systems.

The second level engineering support facility will accommodate engineering support personnel, systems, equipment, and functions for definition and resolution of NAS problems, sustaining engineering functions, and related activities.

The logistics support facilities will provide space for repair, test, quality control, engineering, and supply support functions. These facilities are necessary to provide repair support of NAS programs via contract and in–house organic repair and to provide supply support for hundreds of programs needed to promote air traffic safety. These requirements will be met by (1) performing a study to determine the optimum long–term configuration, costs, and benefits, (2) identifying interim solutions and accomplishing associated projects, and (3) modifying and constructing space and facilities to meet long–term Logistics Center needs.

Products:

- Modern facilities to accommodate general national airspace system (GNAS) training, administrative offices, development and production areas for classroom delivered training materials, and new equipment installations.

- Facilities for aircraft maintenance and shops.

- Facilities to consolidate VOR/TACAN/DME training systems and accommodate the installation of new systems.

- Facilities to consolidate ILS, MLS, and GPS training systems and accommodate the installation of new systems.

- Facilities to consolidate present radar systems and accommodate the installation of new systems.

- Facilities to accommodate second level engineering support personnel, systems, equipment, and functions for definition and resolution of NAS problems, sustaining engineering functions, and related activities.

- Modernization of the Civil Aeromedical Institute infrastructure to include the hypobaric chamber, aircraft cabin evacuation facility, and highbay crashworthiness track and supporting structures and systems.

- Facilities to accommodate both interim and long–term storage, equipment, repair, test, engineering, quality control, administrative support, and related activities necessary for continued Logistics Center support of NAS programs.

- The necessary infrastructure (streets; parking; pedestrian ways; electrical, gas, and water distribution systems; telecommunications; storm and sanitary sewers; general storage and support structures; and other supporting facilities) to serve training, engineering, logistics, aeromedical research, and other existing and planned support complexes.

Progress/Activity from December 1991:

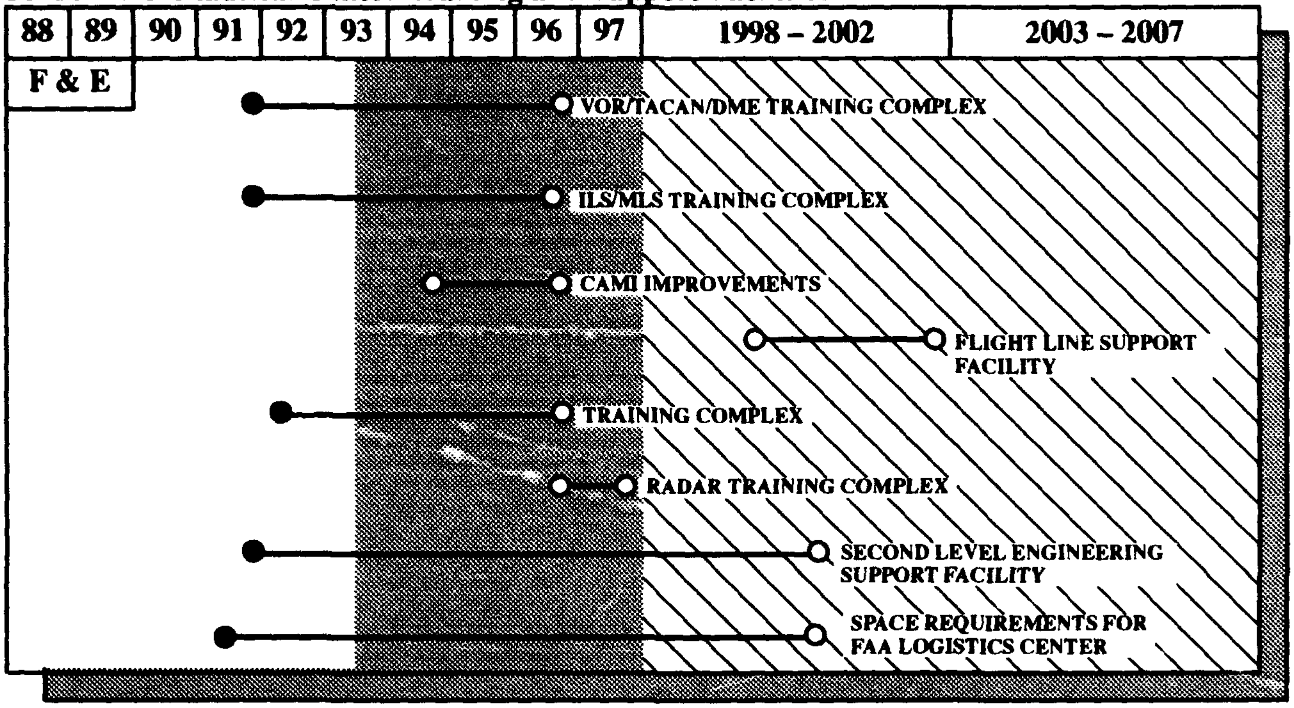
- Initiated engineering studies for ILS/MLS, and VOR/TACAN/DME training complexes.

- Completed construction of the interim second level engineering support facility.

- Continued master planning and space planning activities required to justify and sequence project elements.

Related Projects/Activities: All CIP projects requiring agency training, logistics, and engineering services support.

56–30 Aeronautical Center Training and Support Facilities



56–33 Aeronautical Center Lease

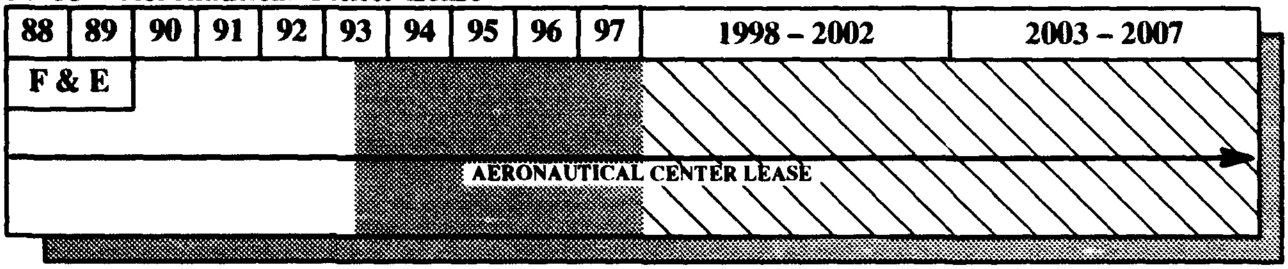
Purpose: This project provides for the lease payments for the land and buildings which house the Mike Monroney Aeronautical Center and tenant Department of Transportation organizational elements.

Approach: The FAA Aeronautical Center is a major organizational complex in Oklahoma City, Oklahoma. It conducts centralized training, aircraft fleet maintenance and modification, central warehousing and supply, and aeromedical research. It also maintains and administers aircraft and airman (including medical) records. The FAA Aeronautical Center manages centralized administrative automatic data processing for national programs and also provides engineering support and technical modification and maintenance field guidance for the operation and maintenance of assigned facilities in the national airspace system. The leased land and buildings which house the Aeronautical Center, as well as tenant organizational elements, provide a cost–effective, midcontinent location for the vital functions described above.

Products: Mike Monroney Aeronautical Center lease.

Related Projects/Activities: This program supports numerous ongoing F&E efforts and operations.

56–33 Aeronautical Center Lease



56–35 National Airspace System Training

Purpose: To procure and install modern training media, automated training development systems, and communications equipment at the FAA Academy and the Center for Management Development. Also, to retrofit or improve FAA Academy classrooms, laboratories, and staff work areas.

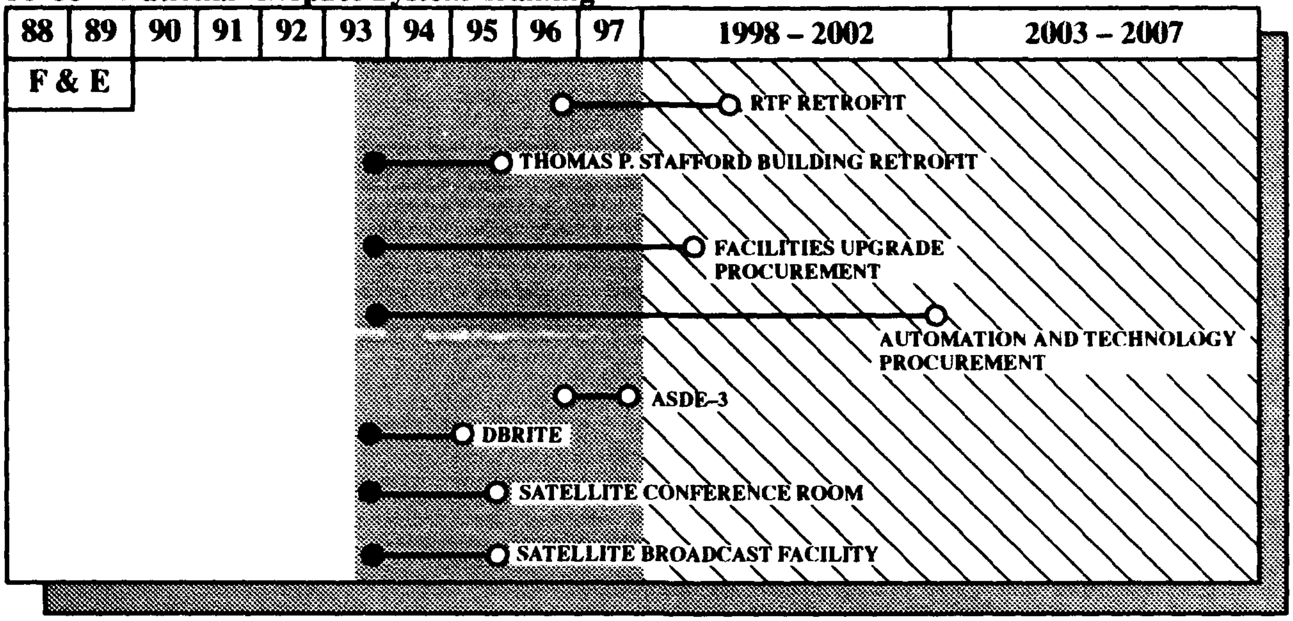
Approach: This project includes activities designed to procure modern training media, simulators, automated training development systems, and communications equipment. Also included are activities to retrofit or improve FAA Academy classrooms, laboratories, and staff work areas to meet the needs of the NAS.

Products:

- Automation and technology procurement for training.
- Radar training facility (RTF) retrofit.
- Thomas P. Stafford Building retrofit.
- Facility upgrade projects.
- Airport surface detection equipment (ASDE–3) simulator procurement.
- Digital bright radar indicator tower equipment (DBRITE) simulator procurement.
- Satellite conference room and broadcast facility, and satellite training capabilities.

Related Projects/Activities: All CIP projects that require training support.

56–35 National Airspace System Training



56–37 Logistics Support Systems and Facilities

Purpose: The implementation of the CIP projects impacts the FAA logistics support functions, particularly in the area of supply support and repair. This project identifies support equipment, facilities, and systems required for CIP project life–cycle support. It also highlights the importance of continued development of the logistics and inventory system/computerized dispatch system (LIS/CDS) to enhance the supply system.

The FAA Logistics Center supports equipment, facilities, and systems that have become obsolete or have significant deterioration leading to sparing/support problems. In addition, the number of spare parts, as a direct result of the CIP project deployment, has increased and the technology for testing and quality checking has changed.

The FAA Logistics Center must provide management and control of operational assets in item identification, requirements determination, acquisition, inventory management, and physical storage or distribution for supply support of existing and new facilities and equipment supporting the NAS.

Approach: To provide responsive life–cycle support, the FAA Logistics Center will identify obsolete/deteriorated parts/equipment and replenish quantities, provide additional materiel handling and testing capability, continue development of the LIS/CDS, and replace the mobile facilities fleet.

Specific items to be addressed are as follows:

- Determination and replenishment of stocks of deteriorated or obsolescent parts/equipment and facilities.
- Determine needs and procure handling equipment.

- Determine needs and provide equipment for automated test equipment and repair of high technology electronic components requiring a clean room environment.
- Determine requirements for demand and forecast of assets supported by the FAA Logistics Center. Determine the modernization requirements for management, control, and handling of these assets.

Products:

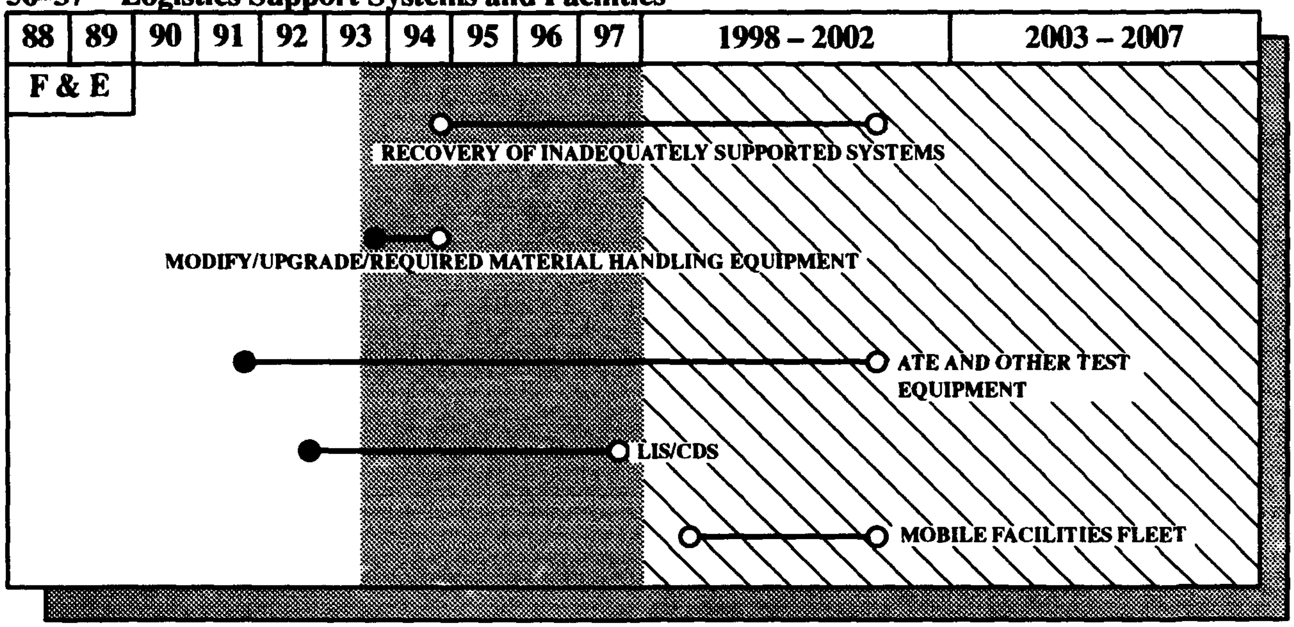
- Adequate spare parts and upgraded unique equipment. In addition, a continuing review will take place for future program actions.
- Modern test equipment.
- Modern systems for the management, control, and handling of FAA assets.
- Replacement of the existing mobile facilities fleet.
- Material handling equipment and upgrade.

Progress/Activity from December 1991:

- Activities providing for LIS/CDS enhancements are underway.
- Material handling equipment and test equipment is being acquired.

Related Projects/Activities: 56–30 Aeronautical Center Training and Support Facilities and 56–58 NAILS.

56–37 Logistics Support Systems and Facilities



56–41 Development of an Enhanced Radar Analysis Tool

Purpose: This project optimizes radar operational performance by providing a tool for automated analysis. While some capability exists today, integration/evaluation/current capabilities are dispersed throughout many incompatible packages, and with the advent of such systems as the Mode S and ASR–9, new requirements exist for capabilities not contained in any existing package.

The radar intelligent tool (RIT) will provide a single, integrated tool for analyses of all FAA radar systems.

Approach: RIT development will be conducted in phases, with the completion of each phase adding new tools and capabilities to the overall package. RIT will be developed cooperatively with the United States Air Force and the European community's EUROCONTROL.

Initially a single, integrated software package consisting of a consolidation of all functions currently available in the dispersed radar analysis packages/systems will be developed. Also included will be support capabilities for the Mode S and ASR–9 radar systems.

- This will permit interfacing the radar analysis tool with any radar digitizer system as well as interfacing with most personal computer systems (Intel 80486 and compatibles, or better), workstations, and the Host system. It is also projected to interface with the AAS.

- The applications software will be developed to be relatively machine/system independent thus assuring the FAA has a common radar analysis tool.

This initial RIT package will permit sophisticated radar analysis support of all existing radar systems, i.e., primary, secondary, terminal, long-range, and/or height systems, including ASR–9, Mode S, ARSR–4, and FPS–117.

Future steps in the evolution of RIT will include a radar simulation capability, playback, weather analysis, radar site modeling, long–term performance analysis, data base management for trend analysis, data archiving, multisensor system performance analysis, tracker evaluation, and clutter analysis.

Products:

- A portable system consisting of a printed circuit card inserted into a portable computer system. This product will be distributed to all FAA regions as well as all field facilities requiring a long–term radar support capability.

- A multisensor system which will be stationed at ARTCCs, ACFs, or other facilities where three or more sensors are in use.

- A software package comprising all of the radar analysis requirements of the FAA. This product will be developed under DOD–STD–2167A using a single, higher–order language and a single operating system.

- A complete RIT software support system, all required documentation, and supporting hardware and software necessary to permit long–term systems maintenance and in–service engineering support of the RIT.

Progress/Activity from December 1991:

- Prototype RIT stations procured and under test.

- Software development contractor work underway.

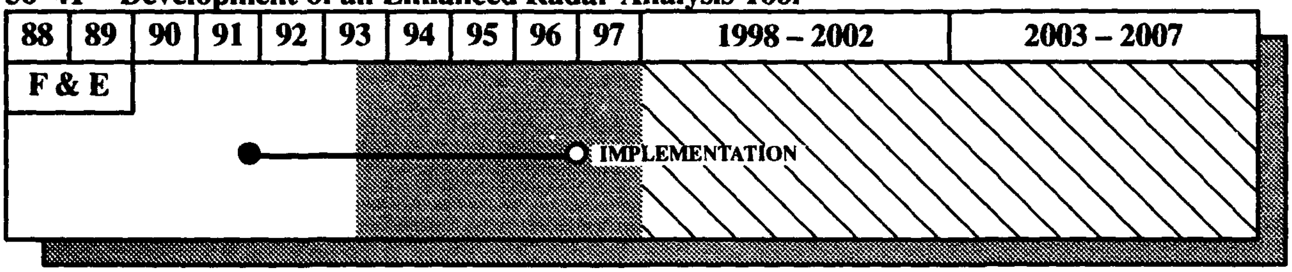
- FAA/EUROCONTROL radar/beacon simulator development underway in the Netherlands.

- Multi–sensor recording and analysis system prototype under test by the Air Force at McClellan Air Force Base.

Related Projects/Activities:

- Long–range radar: provide system optimization, analysis, and performance evaluation tools as well as equipment, including the ARSR–4 and Mode S.
- Terminal radar: provide system optimization, analysis, and performance evaluation tools for the ASR–9 and Mode S systems as well as all other terminal systems equipped with digitizing equipment.
- Secondary radar: provide system optimization, analysis, and performance evaluation tools for all radar beacon interrogation systems, including Mode S.
- The EUROCONTROL radar analysis support system (RASS) portions of the software developed cooperatively between the FAA and EUROCONTROL.
- AAS provides off–line, nonintrusive radar performance and evaluation capabilities for the radar sensors feeding the AAS. The current design philosophy for the AAS does not permit integration of RIT directly into the AAS.

56–41 Development of an Enhanced Radar Analysis Tool



56–47 NAS Implementation Support

Purpose: This project will provide support to the regional offices, major FAA facilities, Aeronautical Center, and FAA headquarters for facility level transition planning, project implementation coordination at the facility, development of facility level operational procedures, and verification tests that integrate the new NAS subsystems with the existing facility environment. Additionally, support will be provided to the regions and facilities in the coordination of the activities of the various CIP contractors with the day–to–day air traffic control operations of the facilities.

Approach: The FAA will procure the required support via a long–term implementation support contract. This support will be furnished directly to the Airway Facilities and Air Traffic organizations at regional offices, facilities, and headquarters.

Products: The contractual support will provide the FAA with:

- Major facility transition plans – Transition plans will be produced and updated for ARTCCs, ATCTs, and other major ATC facilities. Plans will not only address the physical and system changes of the facilities but also the changes the FAA work force at the facilities must undergo.

- Configuration control of major facilities – The contractor will provide the necessary information exchange and status control to ensure the FAA's major facilities install new systems in a similar manner – thereby reducing the individual facility engineering costs for any further changes.

- Supplemental regional project management - The contractor would provide temporary project management support at the regional level for those transition projects for which the FAA has insufficient staffing.

- Facility level CIP project implementation coordination – Contractor provided on–site coordinators will develop installation schedules which minimize the impact to ATC operations at the facility and maximize the time available for installation contractors. Efforts by "turn key" contractors will be monitored and reported to FAA facility and regional staffs.

- Assessments of and recommendations for transition strategies for various systems and equipments.

- Facility level test plans and operating procedures for new NAS sub systems installed at the facilities.

- Documenting site implementation problems and recommending solutions to these problems.

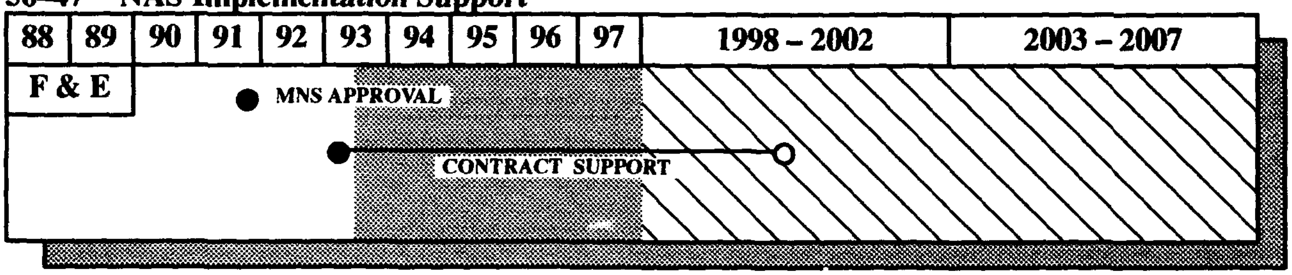
- Review and assessment at the national level of individual facility transition plans and regional transition management plans.

Related Projects/Activities: All projects which are to be installed at FAA ATC facilities.

List of Contractors:

- Martin Marietta Corporation
  (implementation support)
  Bethesda, Maryland

56–47 NAS Implementation Support



56–51 Aviation Safety Analysis System (ASAS)

Purpose: This project facilitates effective management of FAA's safety data resources by providing FAA's safety work force with essential automation tools (i.e., microcomputers and application software).

The primary functions to be supported by the ASAS include the certification of air personnel, aircraft products, operators, and air agencies, as well as automated support to accident investigation, enforcement activities, security, inspections, surveillance, accident prevention, safety analyses, aviation medicine, staffing use, research and development projects, and rulemaking activities.

Approach: The basic design philosophy is to integrate safety related information into a single data structure, provide source– level information capture and dissemination through user– friendly computer terminal interfaces, and provide management with the tools and information necessary to improve both aviation safety and management functions. Extensive help functions and local data editing will be provided to improve the accuracy and completeness of the entered information. The administrative data telecommunications network (ADTN) links field offices with regional and national FAA information processing facilities. This approach is intended to provide field personnel and other Agency organizational elements with improved access to more reliable and timely certification and safety information data, and the capability to retrieve and conduct more effective analysis of potential safety issues.

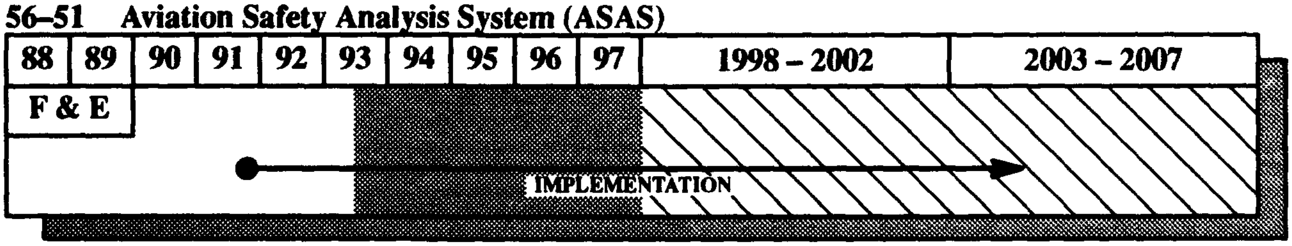
- Through 1996 – During this period the design, development, and implementation of several major ASAS subsystems will be completed. The integrated ASAS prototype will be expanded to include additional subsystem information and a corporate data base structure will be defined. Many internal and external interfaces will be operational. Access to data systems from within the Agency at all appropriate levels will be provided, and external access will be available. Evaluations of subsystems usage, effectiveness, and impacts will be conducted. In addition, data processing equipment currently in the field will gradually be replaced with OATS micro– computer workstations that will afford extensive office automation capabilities as well as access to ASAS data systems.

- Through 2003 – System enhancements necessary to satisfy new data requirements will be designed, developed, and implemented. The single data base structure will be implemented to provide the necessary standardization for all new and changing requirements. An assessment of the functional efficiency and effectiveness of the system in meeting user needs from both within and outside the agency will be completed, and the appropriate revisions or modifications, if needed, will be implemented. New hardware and software enhancements, including new statistical and mathematical techniques and data management systems, will be continuously reviewed for agency application. The capability of the system to meet the increase in aviation activity projected by the NAS forecast will be analyzed, and if necessary, appropriate modifications will be designed and implemented.

Products: The ASAS development process is evolutionary as the system is comprised of numerous data bases, or subsystems, in various stages of development. Many of these subsystems are operational, providing the benefits intended by the ASAS program to users at all organization levels. Commercial hardware and software is also available under the OATS program.

Related Projects/Activities: 56–24 Airmen and Aircraft Registry Modernization.

56–51 Aviation Safety Analysis System (ASAS)



56–52 National Aviation Safety Data Center (NASDC)

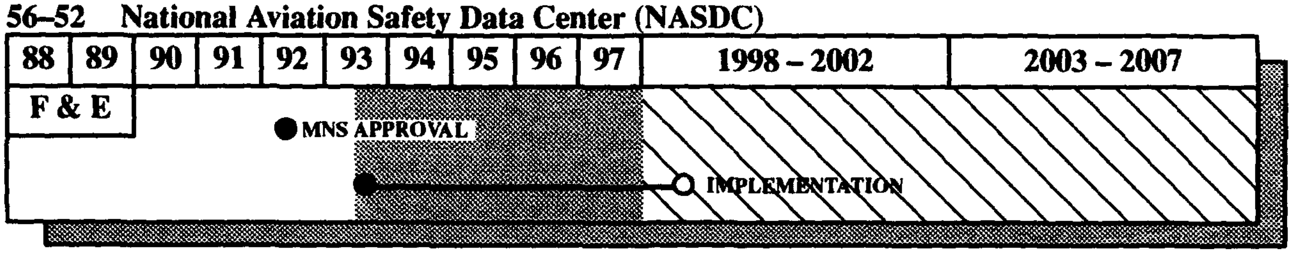
Purpose: A centralized NASDC capability will map selected, existing, safety data bases into a standard format. This will facilitate detailed analysis of previously fragmented data bases in a single, verified, quality controlled manner. The NASDC will function as a partner with existing aviation safety source data systems. Access to resulting analysis and decision support reports will be made available to users.

Approach: The FAA has made large investments in gathering safety related data and needs to automate this capability for analysis and decisionmaking. A central focal point will be established for compilation of safety related information received from numerous safety data bases. This information is currently contained in various systems and different formats. Selected data from these sources will be transferred into one common data base using a standardized definition and event based structure. Strict adherence to quality control will be applied and the centralized data will be strengthened by performing data integrity verifications. Using this value–added data, analysts will be able to perform data analysis across several combined data sets to discover previously hidden indicators and potential trends. Reports and analysis will then be made available throughout the FAA via networking.

Products: An integrated safety data base that has been enhanced by format standardization, data verification, and the inclusion of analysis.

Related Projects/Activities: 56–61 FAA Information System Architecture.

56–52 National Aviation Safety Data Center (NASDC)



56–53 Refurbish AN/FPS–20 Radars

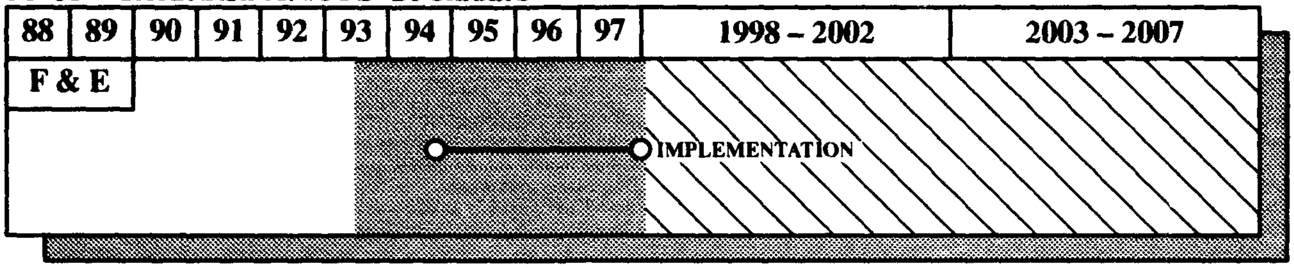
Purpose: This project will provide for the removal and refurbishment of surplus military AN/FPS–20 series long–range surveillance radars for subsequent use by the FAA.

Approach: Decommissioned AN/FPS–20 radars which have been declared surplus by the USAF and made available to the FAA will be removed and sent to the FAA Logistics Center for refurbishment. Solid–state receiver/digital moving target indicator (SSR/DMTI) transmitter modifications and other long–range radar improvements will be used in some of the refurbished radars.

Products: Refurbishment of up to six AN/FPS–20 radars.

Related Projects/Activities: 44–39 Sustained Relocation of ARSR, 24–15 Long-Range Radar Program, and 44–40 Long-Range Radar Improvements.

56–53 Refurbish AN/FPS–20 Radars



56–54 Provide FAA Housing

Purpose: This project provides for the establishment, replacement, and refurbishment of FAA housing units. The FAA currently provides housing for FAA operations and maintenance personnel, and their families, at remote locations where commercial housing is unavailable or inadequate.

The FAA housing program supports the FAA's Human Resource Management (HRM) Plan. The HRM Plan is based on the principle that high levels of productivity, operational effectiveness, quality of service, and positive attitudes can best be achieved when employee needs are carefully considered and addressed in the HRM planning process. The FAA housing project supports this principle by ensuring that adequate housing is available to employees and their families at remote locations.

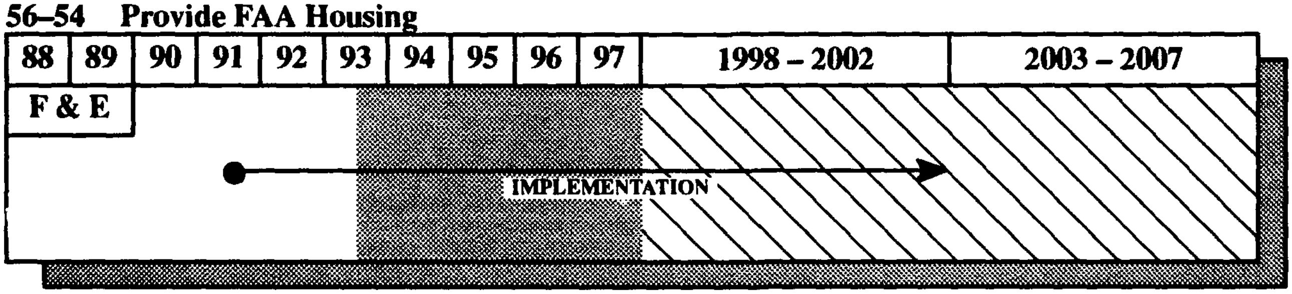
Approach: Establish a multiyear project for the establishment of new FAA housing units, replacement of obsolete housing units, and modernization and refurbishment of existing housing units. This project will provide and support permanent housing for FAA employees and their families at remote locations. It will also provide and support transient quarters for FAA employees at remote locations where commercial housing is unavailable.

Products:

- New housing units where required.
- Repairs and renovations to existing housing in various remote locations in Alaska, Pacific Territories, Caribbean, and Nantucket.

Related Projects/Activities: 46–08 Modernize and Improve FAA Buildings and Equipment Sustained Support and 56–22 Human Resource Management.

56–54 Provide FAA Housing



56–55 Independent Operational Test and Evaluation Oversight

Purpose: This project provides for independent operational test and evaluation oversight of major system acquisitions to ensure their operational effectiveness and suitability, and to reduce deployment risk to the FAA.

Approach: The independent operational test and evaluation (IOT&E) oversight function ensures that requirements are met, and that systems are ready for implementation. The IOT&E Office independently assesses technical and operational performance of major systems in a realistic test environment prior to the full production decision. For certain programs, IOT&E oversight may be extended to the commissioning of the first field site. IOT&E oversight for programs which use an abbreviated acquisition process may also be required. The IOT&E office has the oversight responsibility for other selected FAA programs of significant operational impact.

Products: The extent to which a system increases safety depends on how well the software, hardware, operational procedures, and human factors are integrated in that system. For major system acquisitions and other selected FAA programs, the Office of IOT&E Oversight develops operational readiness criteria and assesses compliance with the system requirements statements. As the Office of IOT&E Oversight identifies operational problems in a system, it reports them to the Executive Director for Acquisition for resolution. Results of the operational test and evaluation are analyzed and will be reported to the Administrator.

Related Projects/Activities: Current/future major system acquisitions and other selected systems.

List of Contractors:

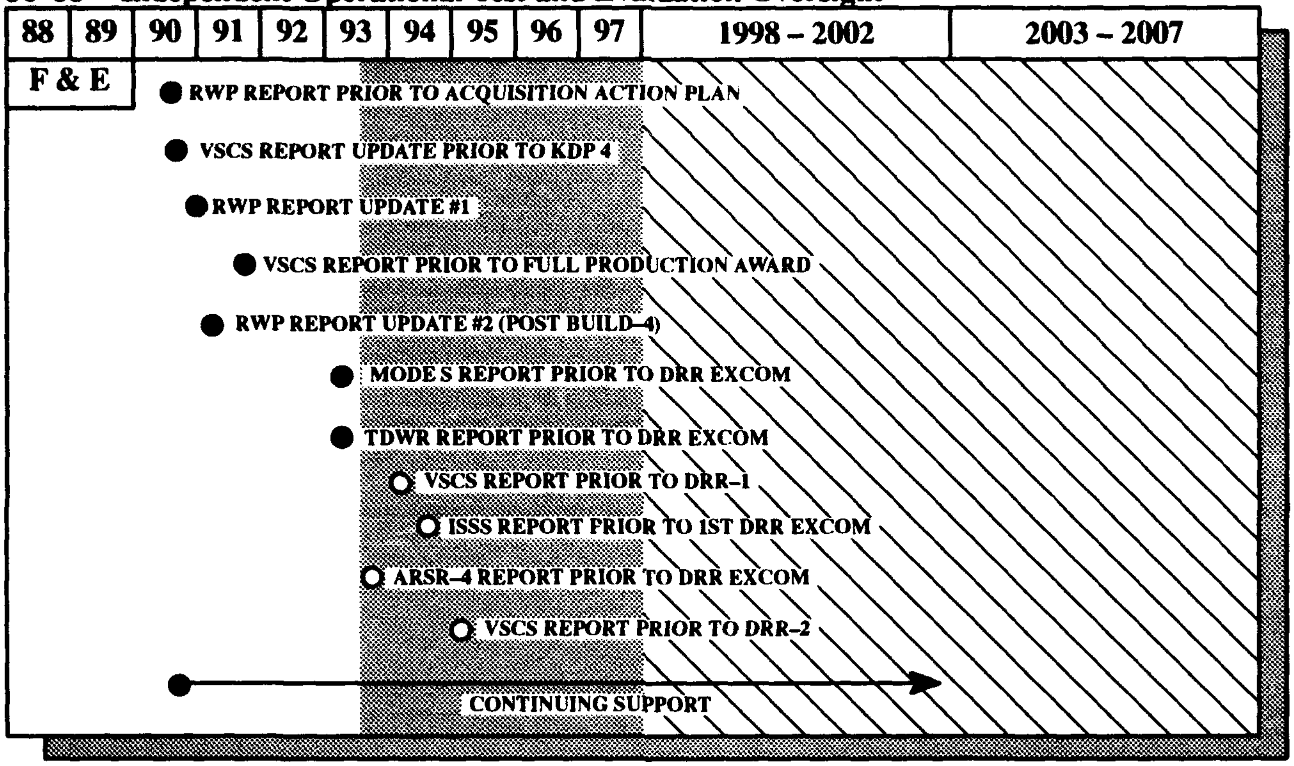
- CRM/Edgewood
  (telecommunications)
  Herndon, Virginia

- CRM/Amalex
  (radar)
  Herndon, Virginia

- Synetics
  (technical expertise for weather and automation)
  Vienna, Virginia

- Technology Planning Incorporated
  (technical expertise for radars)
  Rockville, Maryland

56–55 Independent Operational Test and Evaluation Oversight



56–56 NAS Management Automation Program (NASMAP)

Purpose: This program provides a comprehensive and integrated automated environment using information technology for the Airway Facilities (AF) community, NAS development, and the FAA Technical Center. It uses information technology designed to provide interconnectivity and data exchange capabilities, thus giving planning and implementation organizations access to technical, operational, and administrative systems, and data bases necessary for the management of the NAS.

NASMAP provides the required information technology facilitating access to automated systems and data bases necessary to carry out assigned functions of maintenance operations, engineering, research and development, acquisition of F&E modernization programs, and management of the Airway Facilities, NAS development, and the Technical Center organizations. The NASMAP automation platform will serve as the backbone local area network (LAN) and communications environment that will support common access requirements for a variety of related programmatic efforts within the AF community such as automated documentation development and maintenance (ADDM) and the resource tracking program systems.

NASMAP is targeted to facilitate the planning, scheduling, and tracking of NAS related activities required to implement the program defined in the CIP through 2000. NASMAP addresses a critical need within the FAA to use information technology efficiently and to manage CIP related data and information processing systems effectively.

Approach: Implementation of NASMAP requires establishment of a wide area network providing connectivity and standard applications capability for AF personnel engaged in the management and administration of the NAS. To ensure this standard level of connectivity, NASMAP is being implemented in an incremental process in accordance to a national configuration analysis. The analysis covers integration, upgrade, transition, and implementation plans. The establishment of this environment is targeted for FY 1997.

- Through 1994 – The design, development, and implementation of the existing AF LAN automation environment is being completed. The integrated AF environment is being migrated to address all AF information requirements and the appropriate corporate data base structure is being defined and established. Internal and external interfaces will be established and brought on line. Access to data systems from within the agency is being completed. Evaluations of user requirements, accessibility, usage, effectiveness, and impacts are being conducted. Data processing equipment currently in the field is gradually being replaced with microcomputer workstations which will provide the field access to ADP applications and office automation capabilities.

- Through 2000 – System enhancements necessary to satisfy new data requirements will be designed, developed, standardized, and implemented. Information technology will be reviewed and assessed to ensure new requirements are met.

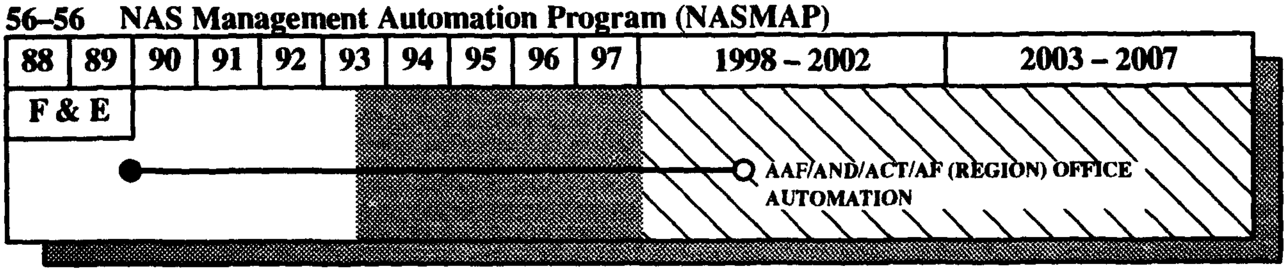
Products: Implementation of NASMAP provides a strategy to produce a comprehensive and integrated information technology environment. NASMAP will provide 81 local area networks, a wide area network, and 5,700 professional workstations distributed throughout headquarters and field organizations. Inter-organization connectivity is being accomplished via the agency's administrative data transmission network (ADTN).

Regional Project Management System (RPMS) provides tools to plan, schedule, budget, estimate resources, and associate cost information with project activities and tasks. Up–to–date project information is accessible on–line for updating, reporting, and inquiry.

ADDM will provide an automated system to produce and update documents at the FAA Technical Center, FAA headquarters, and the FAA Aeronautical Center in digital format for direct transfer to an automated storage retrieval subsystem and publishing system. ADDM will provide storage of technical material in digital format, a central storage location for technical documents, and immediate network distribution. Creating a total system will provide standard, compatible exchange formats with minimal translations to other systems.

Related Projects/Activities: 26–01 RMMS, 26–04 MCC, 46–01 Sustain RMMS, 46–04 MCC Enhancement, 56–02 CBI Expansion, 56–25 CAEG Enhancement, and 56–72 PPSS.

56–56 NAS Management Automation Program (NASMAP)



56–58 National Airspace Integrated Logistics Support (NAILS)

Purpose: This project ensures that predeployment supportability planning is included in all program acquisitions and that this supportability is maintained over the life–cycle of the subsystem. NAILS management support will be provided to minimize total life–cycle costs of major NAS acquisitions.

Approach: A key aspect of pre–deployment supportability planning is the estimation of life–cycle cost components. Support to the NAILS process is being provided through the development of tools, using computer models for estimating these cost components, given various input assumptions. To aid program officials in life–cycle logistics management, information systems are being established to provide precommissioning logistics event scheduling and actual field operations.

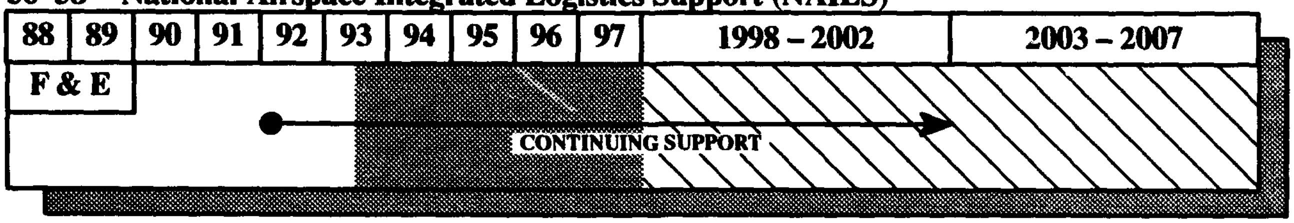
Initial production and subsequent updating of NAILS planning documents and data throughout the subsystem acquisition is being provided by automation of the production and updating process.

Products:

- NAILS cost estimation model.
- NAILS life–cycle cost model.
- Site spares criticality model.
- Level–of–repair analysis models.
- Logistics management information and project tracking system.
- Logistics management decision auditing and feedback system.
- NAILS planning and procurement document automation.
- Logistics data storage, access, and use.
- NAILS technical data system.

Related Projects/Activities: Most CIP projects.

56–58 National Airspace Integrated Logistics Support (NAILS)



56–60 Integrated Security Management System (ISMS)

Purpose: Install a modern ISMS in each air route traffic control center (ARTCC) and area control facility (ACF) that will provide facility management with command and control of all physical security systems from a central location.

Approach: The ISMS will provide a modern control center in each ARTCC and ACF that will enable the facility manager to program the level of security coverage and the degree of control required. This level of security will be achieved by using the automated physical security management systems that provide personnel access control and physical security protection for the facility.

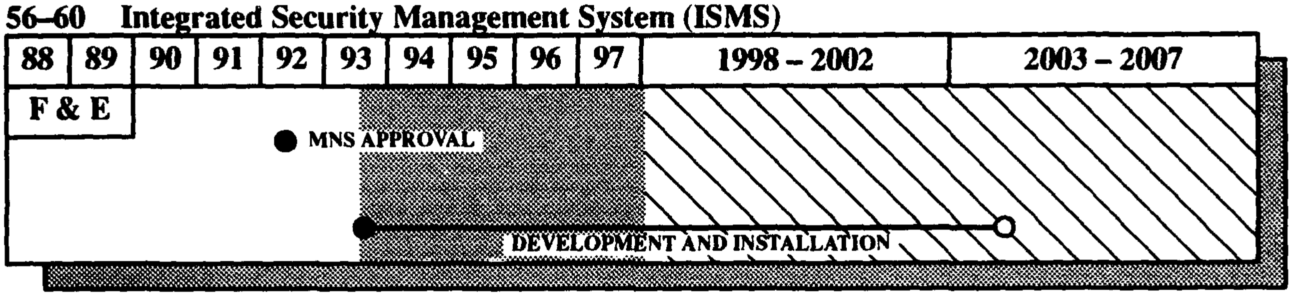
The ISMS is a composite system that uses hardware and integration concepts that are well established in terms of reliability and performance. It will permit ARTCCs and ACFs to incorporate in their design an independent, interactive system for establishing a degree of physical asset control, personnel security safeguards, and responsiveness to varying levels of threat.

The ISMS will establish a security control center (SCC). The SCC is the location of the computer and software resources of the system. The software is programmable by the facility manager to sustain a level of security that is reasonable and appropriate for day–to–day operation of the facility. Security subsystems available to the facility manager would be exterior perimeter alarms, exterior closed circuit television (CCTV), exterior vehicular controls and gates, guard stations, perimeter access controls, interior alarm and CCTV zones, card or biometric access controls in sensitive areas, and other special provisions as required.

Products: This project will provide ISMS installations at ARTCC/ACF facilities, including sufficient spares and accessories.

Related Projects/Activities: ISMS prototype development will be provided by the Technical Center.

56–60 Integrated Security Management System (ISMS)



56–61 FAA Information Systems Architecture

Purpose: This project will establish, maintain, and continue to enhance an Agencywide systems architecture. A systems architecture is defined as a framework for planning, developing, and maintaining Agencywide data processing, information, and communications systems. It will guide, coordinate, and integrate the acquisition, development, and implementation of automated data processing equipment, telecommunications, automated information systems and data bases, and associated support services. The architecture will support missions for program areas such as aviation safety, air traffic management, security, logistics, and maintenance.

Approach: The architecture will offer a framework of government, industry, and FAA standards that will guide the development of agency applications and procurements of hardware and software while acting as the focal point in the development of common linkages among mission applications and data bases. The architecture will permit applications to run on a variety of hardware platforms as well as minimize the cost of incorporating new standards in software and hardware.

Products:

- An FAA corporate systems architecture that defines the relationships of all elements involved in information technology management and use.

- A corporate information repository for defining, storing, and managing information.

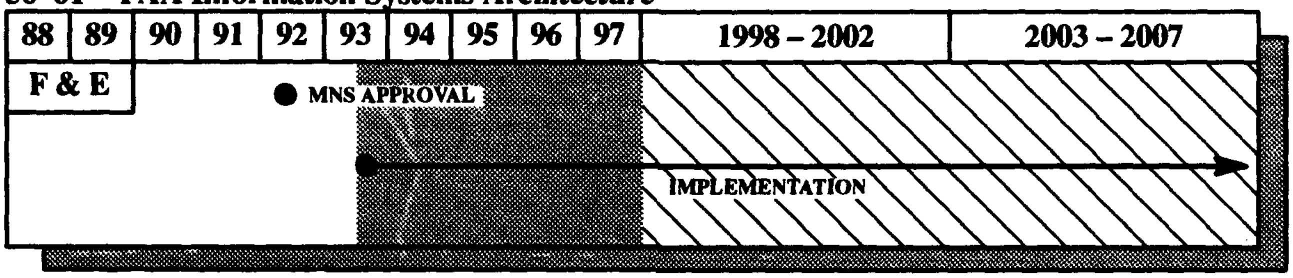
- A standard set of computer–aided software engineering tools for use in development and maintenance of FAA information systems.

- An Agency-wide plan for re-engineering and integration of corporate information and data base systems.

- An Agency-wide strategy and plan for implementing current and evolving standards for electronic data exchange.

Related Projects/Activities: Most CIP projects which involve information technology, including those which involve database development and automated application systems.

56–61 FAA Information Systems Architecture



56–62 Child Care Centers

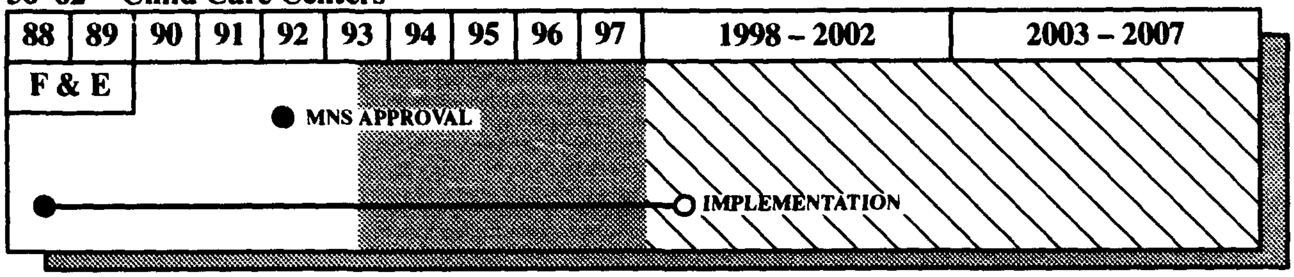
Purpose: The project will provide for the establishment of child care centers at ARTCCs and the expansion of the child care center located at the FAA Technical Center to meet employee needs for on-site child care through the next several years. Available on-site child care greatly enhances the FAA's ability to recruit and retain highly qualified employees in the increasingly technical specializations which are required.

Approach: Federal agencies are authorized to support the provision and furnishing of child care centers under Public Law 99–591. Locations on the ARTCC sites and structure sizes are proposed by the regions and approved and prioritized by headquarters. Sites are determined upon completion of formal needs assessments of employees, surveys of surrounding private child care availability (within five miles of the site as recommended by the Office of the Secretary of Transportation), and employee and management support. Construction is accomplished by regional contracts. National standard designs are available for use where appropriate and may be site modified.

Products: On-site child care centers at the ARTCCs and the Technical Center constructed, furnished, and maintained as necessary to provide for the ongoing, growing needs of employees. Upon completion, the child care centers are managed as nonprofit corporations by boards of directors consisting of agency employees/parents. Tuition and fund raising efforts by the nonprofit corporation pay for the child care center's staff and operational costs (exclusive of maintenance).

Related Projects/Activities: None.

56–62 Child Care Centers



56–68 Safety Performance Analysis Subsystem (SPAS)

Purpose: The FAA has the statutory responsibility to conduct surveillance of air operators, air agencies, aircraft, and airmen to assure conformance with FARs and aviation standards. The NAS safety assurance program provides the infrastructure to support this surveillance. The FAA Strategic Plan includes strategies that help ensure that regulatory standards and FAA surveillance capabilities keep current with the latest technological advances. These capabilities allow the FAA to monitor the status of aging aircraft, to track the growing number of aircraft operations, and to increase industry accountability for aviation safety.

Approach: There are a large number of operators and an extensive amount of industry technical data outside the FAA's system of records. This must be referenced to provide the most comprehensive data possible to support the activities of the FAA inspectors. FAA inspectors must be able to access, review, analyze, and integrate industry proprietary and agency data. Inspectors must be able to rapidly respond to changing technology and international aviation harmonization and safety efforts. Inspectors must also be aware of all types of information that is international in influence, extensive in size and scope, and comprehensive *in complexity.*

Inspectors must be able to:

- Access current data in a user–friendly environment.
- Create, access, and maintain safety performance indicators.
- Access a support tool to plan and report surveillance activities.

Products: F&E costs include program management, system engineering support, vendor contract management, prime mission equipment (PME), hardware and software, installation and testing, initial spares, initial training, and documentation.

Related Projects/Activities: None.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

56–68 Safety Performance Analysis Subsystem (SPAS)

88	89	90	91	92	93	94	95	96	97	1998 – 2002	2003 – 2007
F & E											
					MNS APPROVAL						
					SCHEDULE UNDER DEVELOPMENT						

56–70 Computer Aided Engineering Graphics Replacement

Purpose: Automated graphics support is needed to establish and sustain efforts undertaken at the ARTCCs, FAATC, FAAAC, headquarters, regions, GNAS and sector field offices, and Level 4 and 5 towers. This effort is currently being performed with the existing CAEG system or manually where the CAEG is not available. These efforts include:

- Developing equipment installation plans.
- Developing and revising sector boundry charts for Air Traffic.
- Developing a transition plan for tower equipment.
- Analysis of airframe structural and aircraft electrical systems.
- Developing facility master plans to track new projects.
- Analyzing facilities' future growth capabilities.
- Developing information models for future FAAAC training requirements.

The goal is to provide easy access and ease of operation to the work force. The existing system will be replaced with a new version to take advantage of the technological breakthroughs such as enhanced processing/throughput, iconographic access, and other characteristics. This will support the users of graphics automation with various levels of computer literacy.

Approach: Graphics files will be converted to the standard electronic format and loaded into the system. This will support the graphics workload and the number of case evaluations, which could be significantly aided by graphics simulation and modeling. The graphics workload has been increasing at such a rate that it has completely outstripped systems capabilities.

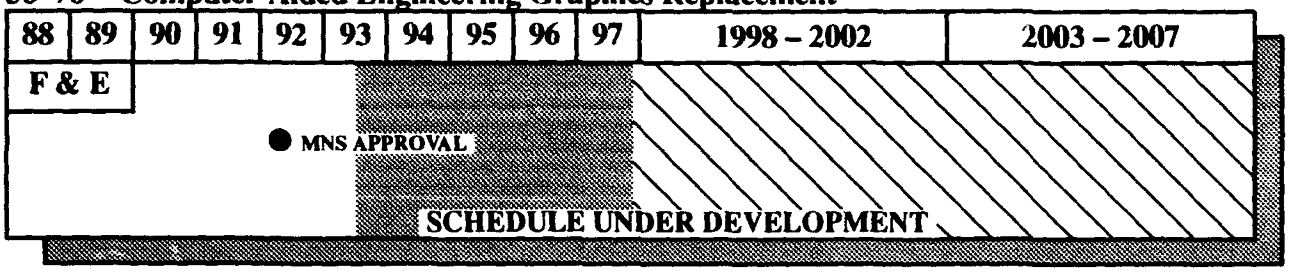
Enhancements to the existing system are planned to extend automated technical graphics support to the sectors and Level 4 and 5 towers while providing object oriented access to less proficient users. This may be accomplished by transporting the existing software to the users' PCs as well as providing additional higher–powered workstations. Furthermore, improved performance of the existing system, and a plan for additional upgrades (increased processing speed, composite file structures, etc) through a modular design concept is necessary to keep pace with the evolving technology as well as to accommodate all users. Other options include the introduction of an electronic data base for common usage and data integrity.

Products: A modern CAEG system that is adaptable to the capabilities of the user while providing adequate capabilities to perform a variety of tasks.

Related Projects/Activities: All CIP projects which use drawings to plan and document construction and require configuration control to describe the facilities and infrastructures. 56–25 CAEG Enhancement.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

56–70 Computer Aided Engineering Graphics Replacement



56–72 Portable Performance Support System (PPSS)

Purpose: Provide aviation safety inspectors in field environments with computer software and hardware to directly access air operator technical and safety data. The inspectors will also be able to collect and store data from the field, "top" analyze, and combine data with cross references to regulations and internal guidance. Using this real–time information, the inspectors will have the capability to make on–site decisions based on this combined information.

Approach: The inspectors will be provided with a field system that will allow them to access central data bases, collect and store field data, synthesize and analyze the collective data, cross reference regulations and internal guidance, and subsequently make more accurate decisions from the field in real–time.

Specifically, the field system supports:

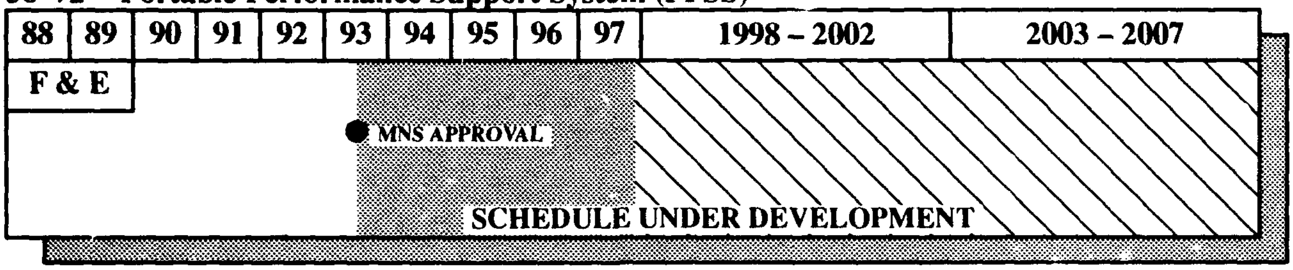
- Access to central FAA industry data bases on a real–time basis.
- Entry of collected data to FAA data bases on a real–time basis.
- Analysis of the combined data, including cross–referenced regulations and guidance, on a real–time basis.
- More accurate and timely decisionmaking, based on the availability of more complete and timely data and supporting analysis.

Products: Portable microcomputer–based system that uses pen–based technology for the operator interface, and includes a modem for data upload/download to FAA mainframes. This system will be equipped with commercial and custom developed software to support the requirements of the aviation safety inspectors.

Related Projects/Activities: 56–51 ASAS, 56–52 NASDC, and 56–56 NASMAP.

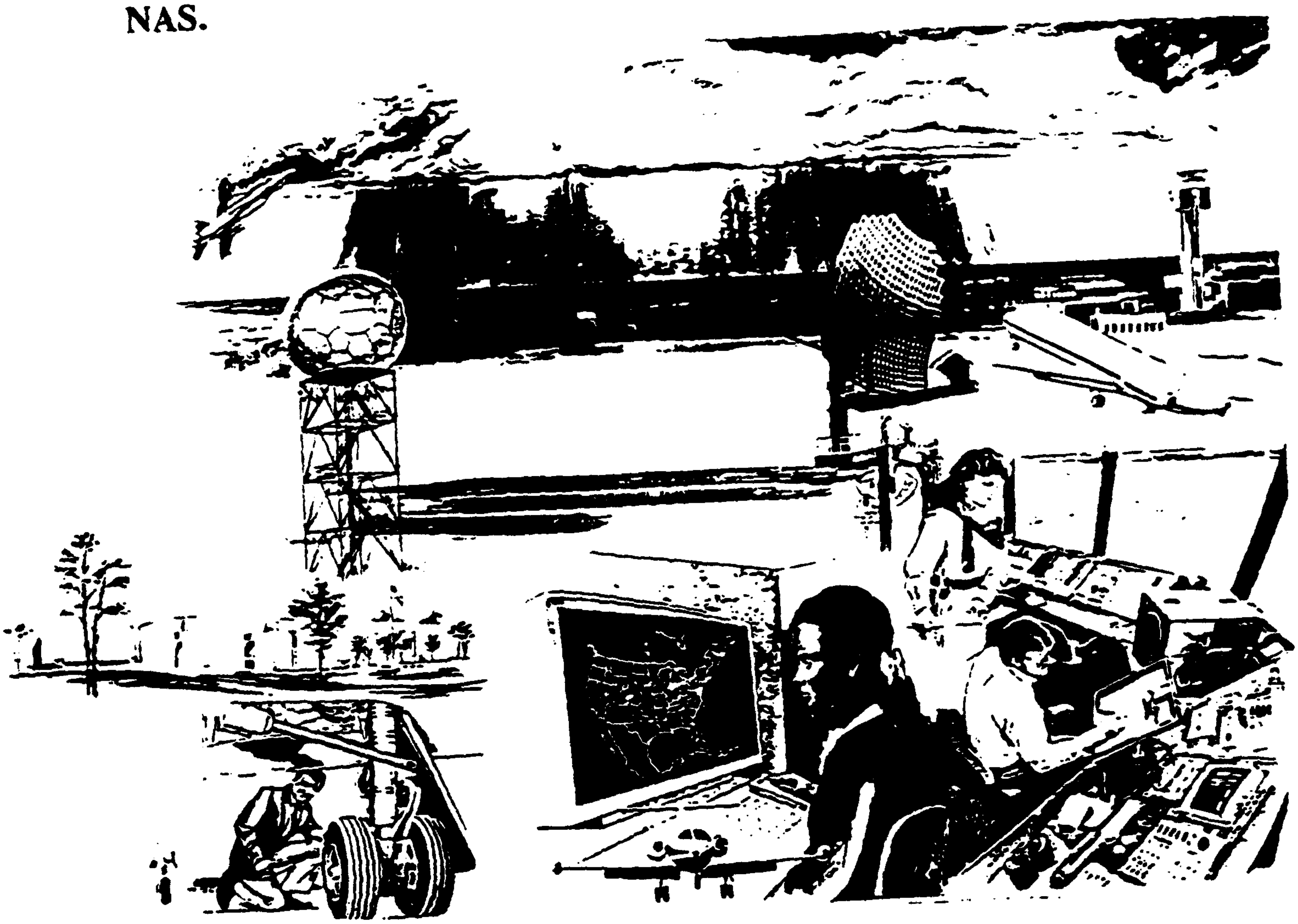
Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

56–72 Portable Performance Support System (PPSS)



Chapter 6: New Capabilities

The last chapter, New Capabilities, addresses new projects which, if implemented, are expected to add significant new capabilities to the NAS.



CHAPTER 6
NEW CAPABILITIES

The national system of airports and airways is expected to accommodate more traffic at increasing levels of safety and efficiency. To accomplish this, it will be necessary to research, develop, procure, install, and operate new hardware and software systems on a continuing basis.

New capabilities will arise from enhancements to current and planned investments, and from new systems being developed through the FAA's Research, Engineering and Development (R,E&D) program. New capabilities are developed in response to user requirements, or arise from technological breakthroughs which are adapted to civil aviation use.

While most of the new capabilities are in response to system growth, the projects discussed in this chapter differ from those in Chapter 3 (Growth) in two important aspects. First, the projects in Chapter 3 are for more of the same kinds of facilities and equipment (F&E) that the FAA has been buying in the past. Some product improvement can be expected in Chapter 3 projects, along with new capabilities, as the technology improves. Projects in this chapter represent capabilities so significantly different they can be treated as new.

The second difference is the degree of uncertainty associated with Chapter 6 projects. Other chapters deal with known products, cost, and production schedules. Projects in this chapter tend to be less certain. Some of the projects have been in the R,E&D pipeline for some time and are well defined with respect to both schedule and cost. Others are not as well defined, and both the timing of implementation and the cost represent best estimates or goals. In some cases, there has not yet been a decision to implement the functionalities or acquire the facilities being developed through the R,E&D program. Decisions about funding and scheduling will be made when these projects become better defined.

A future TRACON automation system will be developed and implemented through a new project in Chapter 6 that relates directly to limited ATC facility consolidation.

All R,E&D projects are described in the FAA's Plan for R,E&D. Only those that have F&E funding are represented in the CIP. As F&E requirements evolve from R,E&D efforts, future editions of the CIP will include them..

61–22 ATC Applications of Automatic Dependent Surveillance (ADS)

Purpose: This project will implement a satellite–based ATC surveillance and communications service to aircraft in oceanic and non–radar environments, in coordination with appropriate ATC authorities. Benefits include an increase in safety and efficiency of flight operations.

Approach: Oceanic ATC operations are conducted manually, with controllers monitoring aircraft flight progress based on high-frequency voice position reports from flight crews. Aircraft must adhere to rigid route structures, and relatively large separations must be maintained to accommodate infrequent position reports and unreliable two–way pilot/controller communications. The resulting airspace capacity limitations, and the inability of controllers to approve flight plan changes, force aircraft to operate on less efficient routes. Similar problems exist for offshore, low–altitude domestic airspace, and other non–radar environments.

The satellite–based ADS system will permit tactical and strategic control of aircraft. Automated position report processing and analysis, along with data–link communications, will result in a precise monitoring of aircraft movement. Automatic flight plan deviation alerts and conflict probes will support increased safety, reductions in separation minima, and increased accommodation of user–preferred routes and trajectories. Graphic display of aircraft movement and automated processing of data messages, flight plans, and weather data will significantly improve the ability of the controller to manage oceanic air traffic.

Products:

- Engineering prototypes.
- Internationally accepted standards and procedures.
- United States oceanic satellite–based ATC system.

Progress/Activity from December 1991:

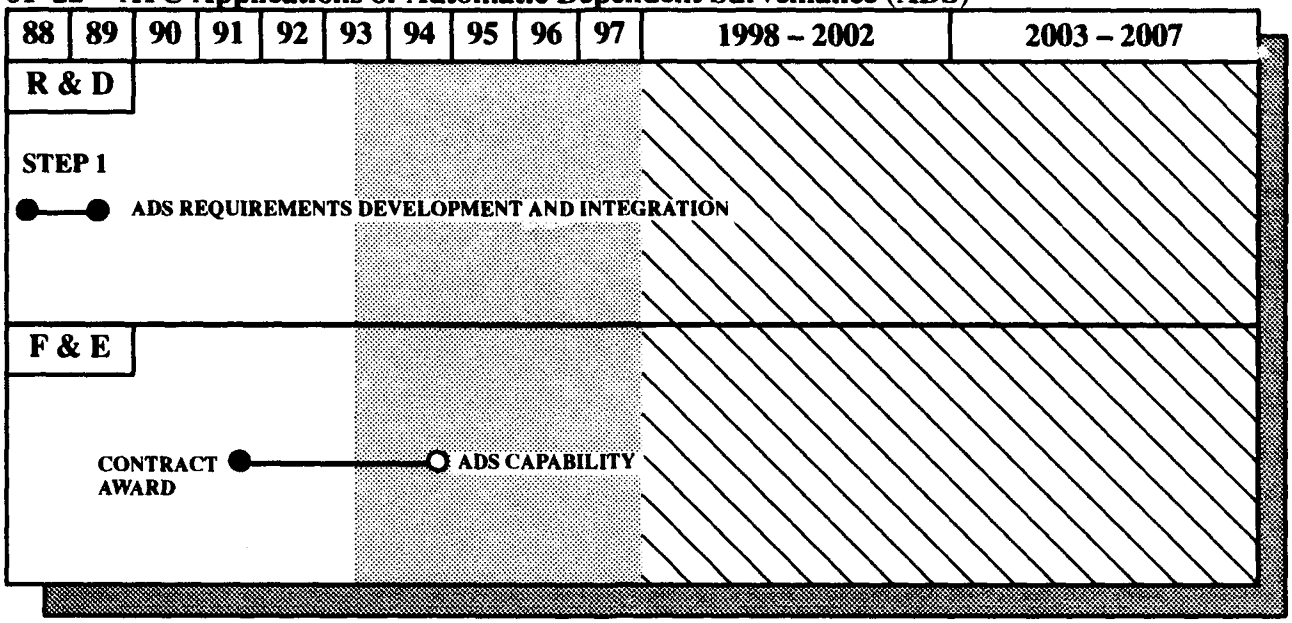
- Completed critical design review.
- Open-systems architecture developed.

Related Projects/Activities: 21–05 ODAPS, 21–12 AAS, 23–05 Aeronautical Data–link, 61–23 OAP for follow–on support, 63–05 Aeronautical Data–link Communications and Application, and R,E,&D Plan Projects 021–150 ADS, 022–140 Vertical Flight Program, 022–150 Flight Operations and Air Traffic Management Integration, 023–120 Separation Standards, 031–120 Satellite Communications Program, 031–130 NAS Telecommunications for the 21st Century, and 032–110 Satellite Navigation Program.

List of Contractors:

- Hughes STX Corporation
  (design/prototype)
  Lanham, Maryland
- MiTech
  (engineering support services)
  Washington, District of Columbia

61–22 ATC Applications of Automatic Dependent Surveillance (ADS)



61–23 Oceanic Automation Program (OAP)

Purpose: The FAA is responsible for providing air traffic services to all aircraft flying in large areas of the Atlantic, Pacific, and Arctic Oceans. The current oceanic ATC system is manual in nature, requiring hourly high-frequency radio relay of position reports to maintain large aircraft separation standards. This operation, and existing system limitations, have resulted in near saturation of existing oceanic ATC system capacity.

Oceanic air traffic is projected to double in the Atlantic and nearly triple in the Pacific over the next ten to fifteen years. New air routes through Russian airspace will further increase Arctic traffic during the same period. Technological breakthroughs in satellite communications and new navigation and automation technology provide the FAA an opportunity to increase system performance and capacity. Close coordination will be needed with foreign civil aviation organizations to develop compatible automation systems, resulting in seamless trans–oceanic capacity increases.

This program will develop interdependent and evolutionary hardware and software development/implementation projects to meet system demand while maintaining the existing level of safety.

Approach: The OAP will develop an advanced oceanic automation system (AOAS) in an evolutionary, low–risk manner, allowing continued safe, reliable system operation while integrating subsystem replacements developed in an open-systems foundation. This development allows the considerable use of nondevelopmental hardware, with custom developed applications software. Once all subsystems are replaced, new capabilities will be introduced in a series of phases. This allows for the continuous insertion of new technologies and systems enhancements.

The initial stage of the OAP replaces two existing oceanic display and planning system (ODAPS) subsystems, the flight data input/output (FDIO) system and the plan view display (PVD) with the telecommunications processor (TP) and the interim situation display (ISD), respectively. These efforts are well underway and result in a transition system referred to as the oceanic automation system (OAS). Concurrently, the FAA is developing an upgrade to the TP, which will result in early implementation of a satellite–based oceanic data-link (ODL) capability, allowing direct pilot-to-controller communications.

The second stage of the program is to complete the New York and Oakland Air Route Traffic Control Center (ARTCC) ODAPS subsystem replacements and Anchorage ARTCC offshore computer system replacement with a new generation oceanic flight data processor. These will be accompanying the advanced conflict probe function, common to all three ARTCCs. Once all subsystems are replaced, the end result will be the AOAS development platform.

The AOAS platform will be enhanced with computer/human interfaces and the integration of satellite–based communication and navigation systems. The AOAS will also interface with the oceanic traffic management system (OTMS) which will provide traffic planning and traffic control information.

Individual contracts will be awarded for the development and implementation of the individual ODAPS replacements in the evolution to OAS. In contrast, a large, single umbrella contract, the oceanic system development and support (OSDS) contract, will be employed in the development and implementation of the AOAS.

Products:

- ODAPS:
  - Conflict Probe
- OAS:
  - Replace FDIO with TP.
  - Replace PVD display with an ISD.
  - Early implementation of ODL.
  - Rehost the Anchorage offshore computer system.
- AOAS:
  - Oceanic flight data processor replacement.
  - Enhanced situation display.
  - Communication console.
  - Advanced conflict probe.
  - ADS position reporting.
  - Dynamic aircraft routing.
  - Electronic flight data.
  - Oceanic conflict resolution advisory.
  - Interface the oceanic traffic management system with the AOAS.

Progress/Activity from December 1991:

- Provided operational support for the ODAPS.
- Completed two oceanic system studies: a system options study and a study for Anchorage oceanic needs.
- Prepared an IV&V disposition team report.
- Initiated procurement planning for the OSDS contract acquisition.
- TP development in process.
- ISD development in process.

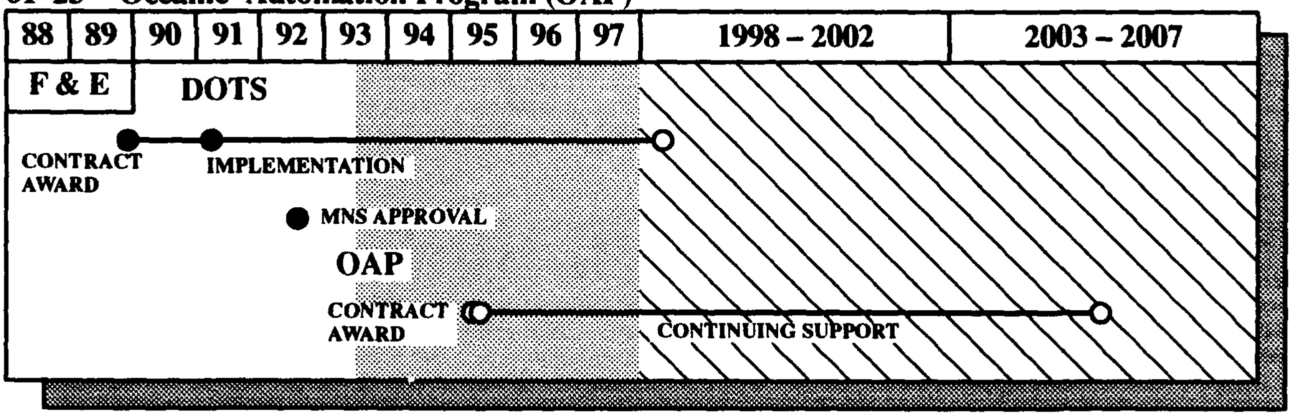
Related P ts/Activities: 21–05 ODAPS, 21–06 TN -12 AAS, 23–05 ADL, 35–07 NADIN II Continuation, 43–02 MWP II, 56–58

NAILS, 61–22 ATC Applications of ADS, 63–05 ADL Communication and Applications, and 64–05 Augmentations for GPS. This project will require interfacility communications services from NICS.

List of Contractors:

- Hughes/STX Corporation
  (engineering support services)
  Lanham, Maryland
- Aviation Technology Systems Corporation
  (engineering support services)
  Arlington, Virginia

61–23 Oceanic Automation Program (OAP)



62–20 Terminal ATC Automation (TATCA)

Purpose: This project will implement ATC automation aids to assist controllers and supervisors to fully use available terminal airspace capacity. TATCA will also increase the safety and efficiency of aircraft operations within terminal areas.

Approach: TATCA will help controller teams handle larger volumes of aircraft arrivals at major airports, particularly under instrument meteorological conditions (IMC). The products being provided are the traffic management advisor, the descent advisor, the final–approach spacing tools, and the expedite departure path.

- The traffic management advisor will display aircraft arrival times and landing sequence to the en route and terminal control team. This will assure a steady flow of traffic to match the available capacity.
- Arrival plans will be updated automatically based on surveillance data–derived changes in aircraft locations and speeds, demand information flight plans, and manual input data (e.g., runway configuration, visibility, and hazardous weather). A plan conformance indicator will display the amount of time each aircraft has deviated from the schedule.
- When demand is heavy under IMC, the traffic planner will suggest aircraft landing sequences that will reduce the average in–trail spacing by using the predictable differences in landing intervals caused by factors such as wake–vortex separation and landing speed.
- TATCA will help controllers by providing speed–control and holding advisories, descent advisories, and final–spacing aids.
- Descent advisories will provide fuel-efficient descents from cruise altitude using aircraft type–dependent fuel utilization models.
- Final spacing aids will suggest specific speed changes or turn–to–final commands for bringing aircraft into compliance with the plan, and for precisely spacing aircraft on final approach. The converging runway display aid (an early version of the final–spacing advisor for the automated radar terminal system (ARTS) environment) will assist controllers in feeding staggered approach streams to converging runways. This will allow beneficial use of converging approaches under IMC.
- The TATCA planning and advisory system will complement the FAA's current en route metering (ERM) system, the planned en route spacing program (ESP), and the arrival sequencing program (ASP). These programs deliver en route aircraft to the TRACON boundary at a manually specified average hourly rate. TATCA, in contrast, will assist controllers and supervisors planning individual trajectories and a specific, efficient landing sequence for aircraft.
- The TATCA functions will be developed incrementally in a laboratory, and prototypes taken to field sites for further development and evaluation. This will minimize technical risk and allow the program to provide early products.
- Operational procedures and guidelines will be established based on test results.

Development steps will include extensive demonstration, evaluation, and validation at the FAA Technical Center and key field sites prior to deploying to selected sites.

Products:

- The center TRACON automation system with four integrated automation tools.
- Specifications and technical support for national implementation.

Progress/Activity from December 1991:

- Completed traffic management advisor (TMA) and final approach spacing tool (FAST) laboratory demonstrations with air traffic controller teams at NASA.
- Established TATCA laboratory at the FAA Technical Center.
- Completed hardware and software interfaces to the ARTS IIA and IIIE for FAST.
- Installed TMA prototype in the field and completed usability field evaluation.
- Demonstrated FAST function on full digital ARTS displays (FDADs) at NASA Ames and established acceptability with controller teams.
- Completed assessments of TMA at Denver.

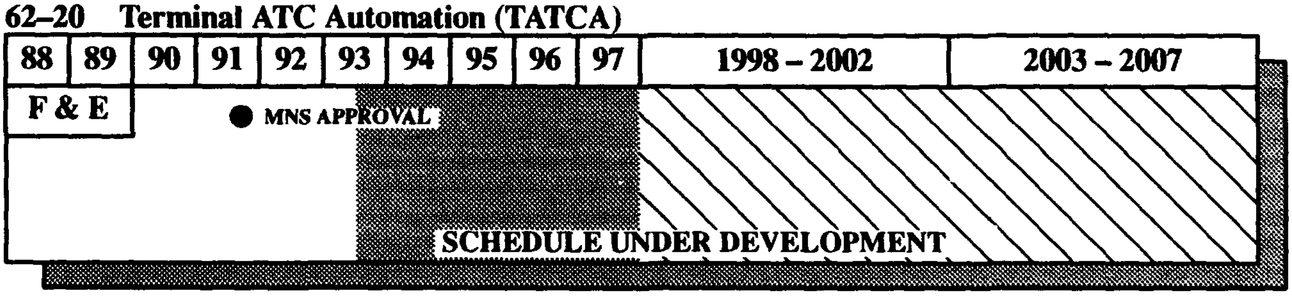
Related Projects/Activities: 21–06 TMS, 21–12 AAS, 21–13 AERA, 24–12 Mode S, 62–21 ASTA, 62–24 National Implementation of the "Imaging" Aid for Dependent Converging Runway Approaches, 63–21 ITWS, and R,E&D Plan Projects 021–180 TATCA, 021–190 ASTA, 021–230 Wake–Vortex Avoidance/Advisory System, 022–150 Flight Operations and Air Traffic Management Integration, 025–120 Operational Traffic Flow Planning, 031–110 Aeronautical Data–Link Communications and Applications, and 031–130 NAS Telecommunications for the 21st Century. Weather projects will provide weather data along the terminal flight path.

List of Contractors:

- Lincoln Laboratory
(developing operational software)
Lexington, Massachusetts
- Center for Advanced Aviation System Development of the MITRE Corporation
(technical support)
McLean, Virginia
- NASA Ames Research Center
(developing prototype software)
Moffett Field, California
- Various support contractors for program/technical support

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

62–20 Terminal ATC Automation (TATCA)



62–21 Airport Surface Traffic Automation (ASTA)

Purpose: This project will provide controllers with aids to help prevent runway incursions. This will include airport surface surveillance, communication, and automation techniques to provide an effective all-weather runway incursion alert and prevention capability, thereby enhancing airport capacity.

Approach: The safety and traffic automation functions of ASTA are based on the development of primary and secondary surveillance techniques (ASDE–3 and AMASS) which provide continuous coverage of surface movement area and short, final-approach airspace. Demonstrations of advanced technologies that might help reduce runway incursions will also be evaluated.

ASTA will combine surveillance information from ASDE–3 radars, other ground movement sensors, and differential GPS with a surveillance data-link, using ASDE–3/AMASS at all airports where installed, and ground sensors at airports not equipped with ASDE–3. Additionally, this combined surveillance data will be used with the appropriate safety logic to provide controllers with prioritized aural and visual warnings, as well as elevation information to prohibit the automatic safety alert generation process from being degraded at airports with significant helicopter/ vertical flight operations. ASTA will also display target locations with alpha–numeric data tags and provide positive target identification for special vehicles (fire, rescue, snow plows, etc.).

Additionally, ASTA will provide surveillance data and interfaces for the runway status lights (RSL) system, providing safety alerts for pilots when a runway is in use. Upgrades to the existing RSL software, and demonstration of commercial–off–the–shelf (COTS) runway incursion systems will also be performed.

This project will begin with technical and operational specification development, and evolve into the production of one preproduction prototype unit, with 40 to 60 production level systems. It will be capable of supporting enhancements, such as traffic planner and cockpit display traffic information (CDTI) surface operations functions. All enhancements will proceed from an approved operational concepts document.

Products: Forty to sixty ASTA systems, produced from operational concepts and procedures, system descriptions, communications architecture, preproduction prototype test bed, data collection and analysis, system evaluations, and system specifications.

Progress/Activity from December 1991:

- Completed critical design review.

Related Projects/Activities: 21–06 TMS, 21–13 AERA, 24–12 Mode S, 24–14 ASDE, 42–20 Tower Integration Program, 44–33 ALSIP Continuation, 62–20 TATCA, 62–23 AMASS, 64–05 Augmentations for GPS, and R,E&D Plan Projects 021–180 TATCA, 021–190 ASTA, 021–200 Surface Movement Safety and Guidance, and 031–110 Aeronautical Data–link Communications and Applications.

List of Contractors:

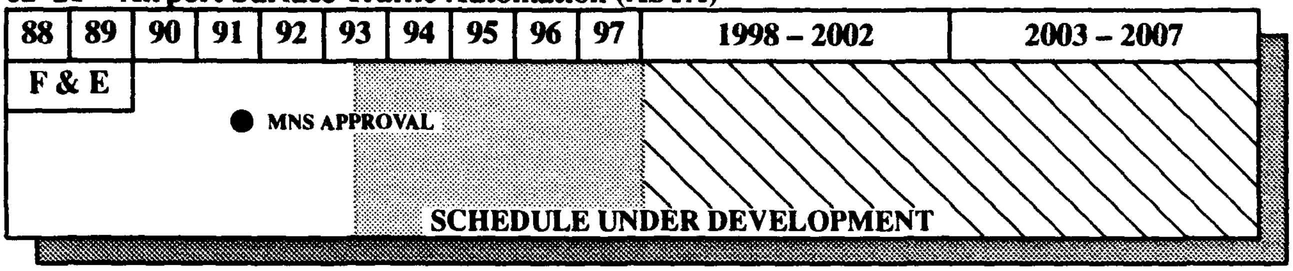
- Lincoln Laboratory
  (design and documentation)
  Lexington, Massachusetts

- MITRE Corporation
  (technical acquisition support)
  McLean, Virginia

- Norden Systems
  (AMASS development organization)
  Melville, New York

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

62–21 Airport Surface Traffic Automation (ASTA)



62–23 Airport Movement Area Safety System (AMASS)

Purpose: This project will implement a near–term solution to provide an interim runway incursion prevention system at airports with ASDE–3 radars.

Approach: AMASS will add an automation enhancement to the ASDE–3 to provide conflict alert algorithms for tower controllers to detect and prevent runway incursions and accidents. The AMASS will be used by local and ground controllers at the 35 operational ASDE–3 sites. The technical approach includes converting ASDE–3 digitally processed target data into target image data as inputs to the runway incursion algorithms. The system also includes a track data interface with the ARTS IIIA to include airborne aircraft on final approach in the conflict alert algorithms. The system uses the ASDE–3 equipment as the display/entry device, requiring no additional displays or entry devices in the tower. Controller entries are not required during normal operations. Entries are required to set the logic at the beginning of each change in runway configuration or operating condition. This will require significant work with controllers to define the human/machine interfaces and air traffic procedures.

Products:

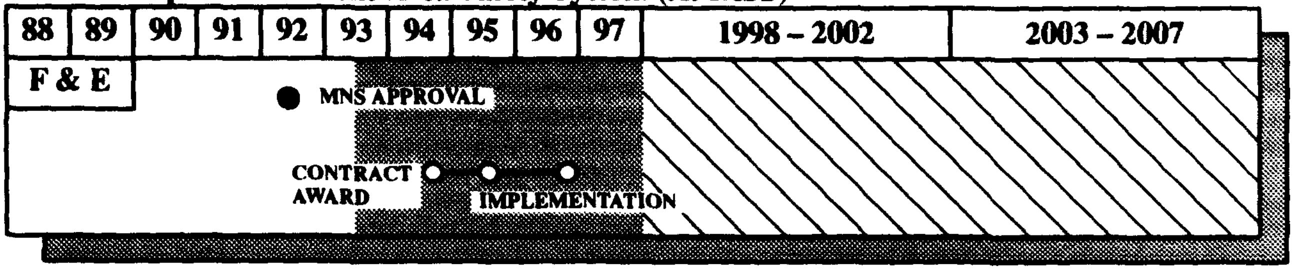
- 38 systems at 35 operational sites.
- Systems at the FAATC and the FAAAC.

Related Projects/Activities: 24–14 ASDE, 42–20 Tower Integration Program, 62–21 ASTA, and R,E&D Plan Projects 021–190 ASTA and 021–210 TIDS.

List of Contractors:

- Norden Systems
  (AMASS algorithms)
  Melville, New York
- MITRE Corporation
  (engineering support services)
  McLean, Virginia

62–23 Airport Movement Area Safety System (AMASS)



62–24 National Implementation of the "Imaging" Aid for Dependent Converging Runway Approaches

Purpose: This project implements the "ghosting" automation aid for dependent converging approaches in Category I instrument flight rule (IFR) conditions at all eligible TRACONs and airports. The effect of this implementation increases the capacity of airports with converging runways in IFR conditions and marginal VFR conditions by allowing continued use of the converging runway. The safety of this operation is maintained by using the "ghosting" automation aid to assist the controllers in setting up an appropriate dependent operation.

Approach: An automation aid, called the "imaging" or "ghosting" aid, has been prototyped and demonstrated in laboratory conditions through controller simulations for facilitating precision approaches to converging runways in Category I IFR conditions. The aid consists of displaying to controllers a reference image or a "ghost" of an aircraft target approaching a runway which is used for facilitating staggered converging operations. The aid will potentially be used at approximately 40 of the top 100 eligible airports in the United States. Modifications to the ARTS code specifications for national implementation, and any changes required in air traffic procedures for a general application at all airports, are being developed.

The project will implement this aid nationally and will include developing and deploying software modifications to the ARTS IIIA and ARTS IIIE systems. The project will provide site–specific guidance for the implementation of the aid and new procedures for dependent/converging, IFR approaches.

Products:

- An operational "ghosting" aid at all eligible terminals. This includes an operational ARTS IIIA or ARTS IIIE code at all eligible sites.
- Guidance and training materials for implementing the aid and conducting dependent converging approaches.

Progress/Activity from December 1991:

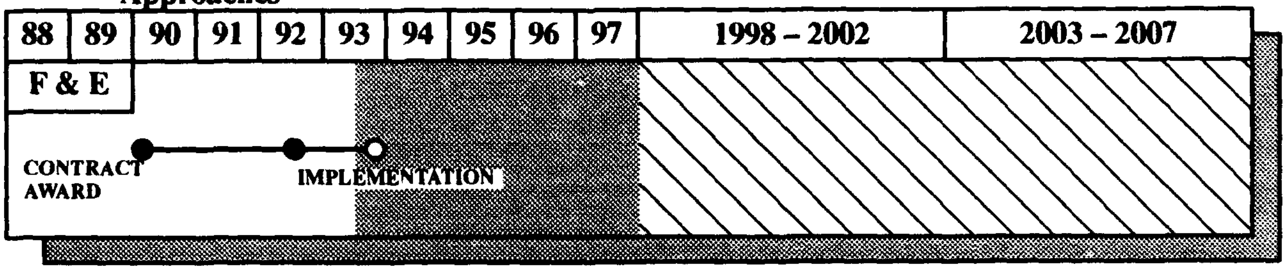
- Completed the four phases of the operational evaluations at St. Louis Lambert International Airport.
- Converging Runway Display Aid (CRDA) functionality was deployed in ARTS IIIA A305 software release.
- National implementation is now taking place in the 62 ARTS IIIA facilities where the software was released.

Related Projects/Activities: 62–20 TATCA, and R,E&D Plan Project 021–180 TATCA.

List of Contractors:

- CTA Inc.
  (engineering support services)
  McKee City, New Jersey
- MITRE Corporation
  (engineering support services)
  McLean, Virginia

62–24 National Implementation of the "Imaging" Aid for Dependent Converging Runway Approaches



62–25 Future TRACON Automation System

Purpose: The current TRACON automation equipment is approaching the end of its intended life cycle. Several sites are projected to require additional capacity, as future terminal automation must support the interfaces and improved capabilities of the new en route and tower systems.

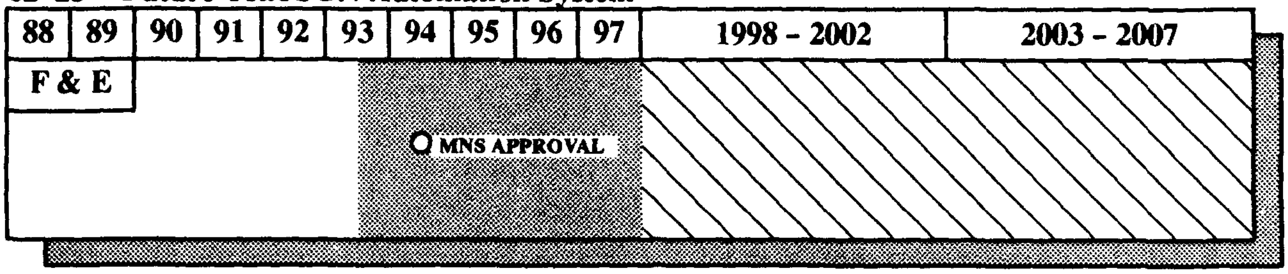
Approach: This project will perform a trade study to determine the system to be provided. A procurement strategy will be developed to create an automation system according to requirements determined in the study.

Products: 170 replacement/upgrade automation systems to support limited ATC facility consolidation.

Related Projects/Activities: 21–12 AAS, 32–16 DBRITE, 42–13 ATCT/TRACON Modernization, and 42–14 ATCT/TRACON Replacement.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

62-25 Future TRACON Automation System



63–05 Aeronautical Data–link Communications and Applications

Purpose: This project will develop an aeronautical data communications infrastructure, with ATC and flight information service (FIS) applications, and will provide communication services to other CIP projects. The communications infrastructure, defined as the aeronautical telecommunications network (ATN), will support air-ground and ground-ground data-link services. The ATN consolidates FAA and privately operated United States data subnetworks, and will ultimately connect to networks in other countries. The ATN will form the basis for all future global aeronautical data communications. Once implemented, the ATN will provide the communications infrastructure for data-link services, enabling this and other CIP projects to accomplish their automation objectives and allow many manual ATC and FIS procedures to be automated. ATC data-link services are being developed in accordance with national standards, and include transfer of communications, altitude assignment, pre-defined ATC instructions, and emergency communications back up. FIS applications include digital automatic terminal information service (ATIS), routine and hazardous weather, and data-link windshear advisories.

Approach: This project will develop and implement an ATN communications capability within the NAS, and an evolutionary set of ATC and FIS applications that will employ ATN.

The ATN communications routing capabilities will be implemented within the data–link processor (DLP) Build-2. The ATN will route messages between aircraft and ground computers. The air-ground communications subnetworks will include the FAA-operated Mode S sensors, as well as industry-operated satellite and VHF data-links. The DLP will support ATN communications services within United States domestic and oceanic airspace. One DLP will be implemented at each ACF. The ATC automation computers will use the ATN router to exchange ATC data-link messages with aircraft. The DLPs will be interconnected to provide for seamless communications coverage within the NAS.

A phased approach for the development of data-link applications is directed at achieving higher productivity, increased efficiency, enhanced safety, and increased system capacity. This project will develop and implement initial en route, terminal, and tower ATC applications, as well as initial FIS applications (e.g., weather). Implementation activities will include: enhancement of the tower data–link services (TDLS) systems to support digital ATIS and windshear advisories, enhancement to the DLP to send TDLS services to aircraft via the ATN (expanding the number of TDLS locations to 60 airports), and implementation of the initial ATC applications at en route and terminal facilities.

Operational requirements for data-link applications are being established with the user community, and studies will be conducted to establish the economic and safety benefits of candidate data-link applications.

Products:

- ATC services, including terminal initial contact, transfer of communications, altitude assignment, emergency voice communications backup, and predetermined ATC instructions such as restricted altitude assignments, speed instructions, and crossing restriction.

- Data-link weather applications, including routine weather reports, route-oriented weather forecasts, and hazardous weather graphical services.

- TDLS enhancements will support digital ATIS and windshear advisories.

- DLP Build-2 will provide the initial implementation of the ATN, support for digital ATIS, windshear, and other near-term FIS applications.

- Requirements will be established to support the migration to a global ATN environment for air-ground as well as ground-ground aeronautical data communications.

- Terminal data for the RTCA process that is developing data-link related minimum operational performance standards (MOPS), data for the development of ICAO standards, and recommended practices and data-link interoperability guidelines.

Progress/Activity from December 1991:

- Began operational evaluation of digital ATIS with pre-departure clearance (PDC) service at Pittsburgh and Baltimore-Washington International Airports.

- Developed an integrated TDLS program to upgrade current 30 PDC systems to incorporate both PDC and digital ATIS. Began deployment process in preparation for TDLS implementation.

- Published initial MOPS for two-way data-link communications through RTCA SC-169.

- Developed functional specifications for terminal ATC data-link services.

- Completed preliminary designs and specifications for en route ATC data-link services.

- Published Version 1 of the ICAO ATN manual.

- Established ATN test bed.

- Completed preliminary design reviews and began critical design reviews for DLP Build-2.

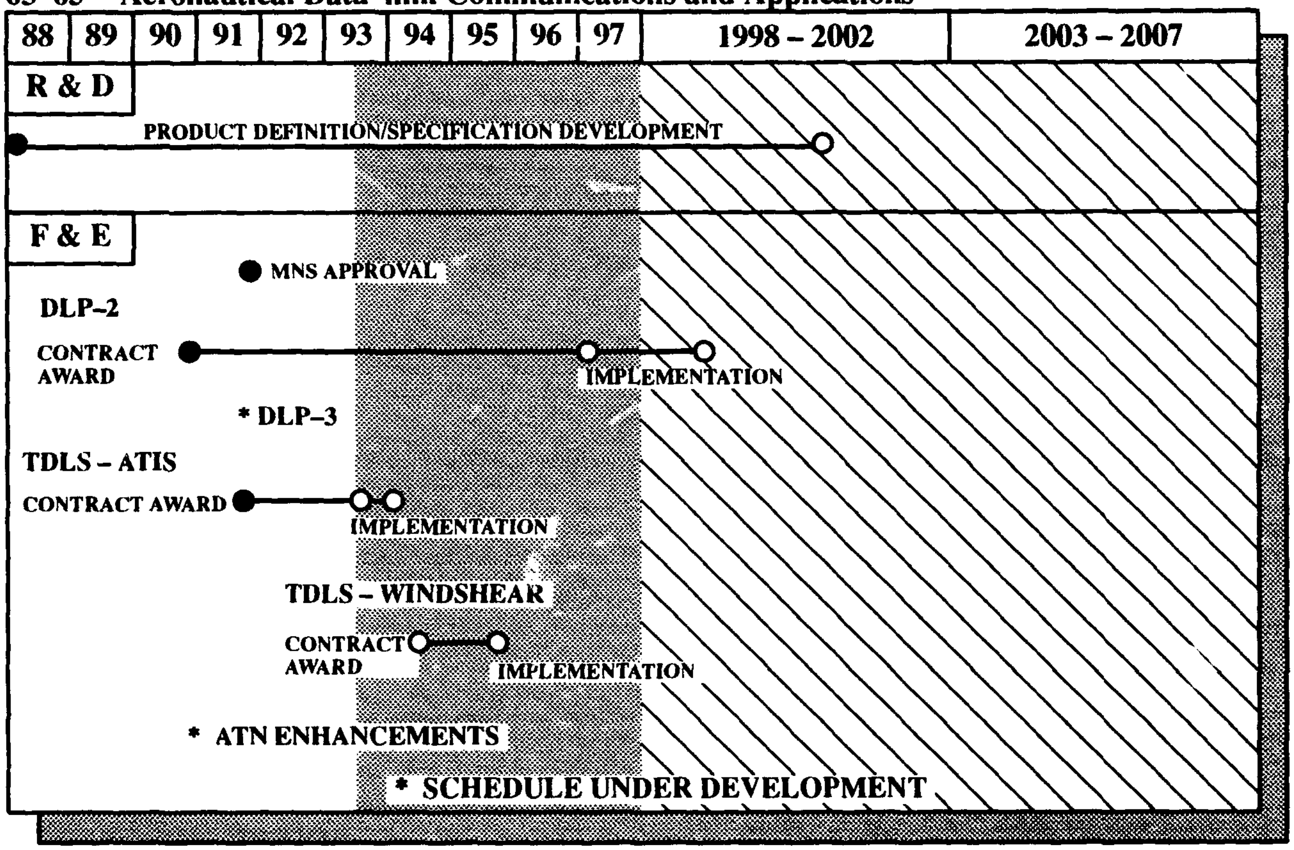
Related Projects/Activities: 21-12 AAS, 21-13 AERA, 23-05 Aeronautical Data-link, 24-12 Mode S, 41-21 En Route Software Development, 45-20 Critical Telecommunications Support, 45-21 Satellite Communication Circuits Systems, 61-22 ATC Applications of ADS, 61-23 OAP 62-20 TATCA, 62-21 ASTA, 63-22 AWPG, and R,E&D Plan Projects 021-150 ADS, 021-180 TATCA, 021-190 ASTA, 022-150 Flight Operations and Air Traffic Management Integration, 031-110 Aeronautical Data-link Communications and Applications (for related United States and international standards activities to assure compliance with the evolving AT-related standards), 031-120 Satellite Communications, 031-130 NAS Telecommunications for the 21st Century, 033-110 Terminal Area Surveillance System, 041-110 Aviation Weather Analysis and Forecasting, 041-120 Airborne Meteorological Sensors, and 042-110 Integrated Airborne Windshear Research.

List of Contractors: These contractors were awarded under project 23–05 and will be continued under this project.

- GTE/Contel FS
  (DLP hardware)
  Chantilly, Virginia
- Computer Sciences Corporation
  (DLP 2 and Host data–link software)
  Calverton, Maryland
- Aeronautical Radio Corporation
  (TDLS)
  Annapolis, Maryland

Project Status: The ATN Enhancements and DLP-3 portions of this project are currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

63–05 Aeronautical Data–link Communications and Applications



63–21 Integrated Terminal Weather System (ITWS)

Purpose: This project will develop a system that will integrate all the terminal weather sensors to provide near-term automated weather information and predictions in easily understood graphical form.

Approach: The ITWS will focus on providing safety and planning products in the near term (up to 30 minutes) to traffic management specialists at air traffic control towers. It will be deployed at 45 large airports that will have a Terminal Doppler Weather Radar (TDWR). It will collect all of the weather data in the airport terminal area from both ground-based and airborne sensors. Besides TDWR, these include NEXRAD, AWOS/ASOS, LLWAS, ASR-9 and aircraft reported data through ARINC communications addressing and reporting system (ACARS).

The ITWS products include windshear and microburst warnings, storm cell information, terminal area winds aloft, runway winds, short-term ceiling and visibility predications, and snowfall rate predictions to assist in ground de-icing decisions.

Initial deployment of the ITWS will provide products available as an initial system capability, followed by enhancement packages when both the required input systems and algorithms become available.

Products: 47 ITWS systems (including 2 support systems).

Progress/Activity from December 1991:

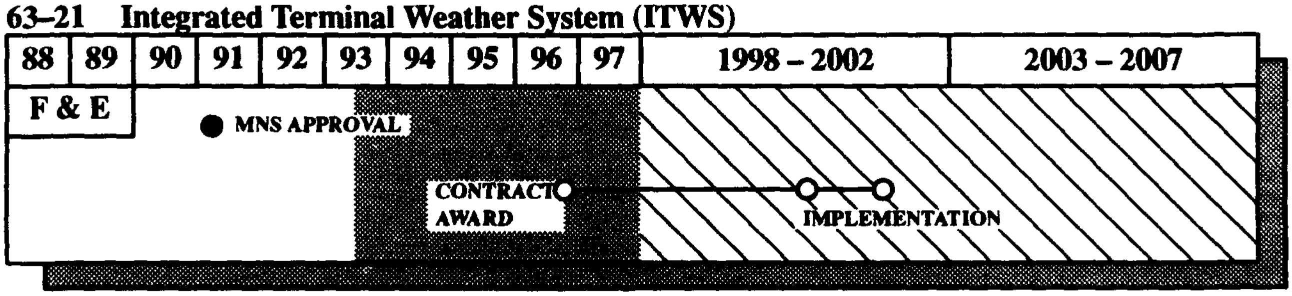
- Integration of weather sensors, radars, and aircraft-provided data to produce real-time 3-D wind data to be used by automation systems for runway management.
- Integration of lightning and radar data to provide thunderstorm forecasts used for operations planning.
- Integration of TDWR and aircraft-provided data to produce microburst predictions.
- Demonstrated sensor integration for detection and prediction of weather-impacted airspace.

Related Projects/Activities: This project will provide centralized functions which will consolidate and use existing and planned FAA weather capabilities, such as 23–09 AWOS, 24–13 ASR, 24–18 TDWR, 63–22 AWPG, 64–13 ASR Windshear Processor, and R,E&D Plan Project 021–180 TATCA. It will also provide an integrated weather data set to meet the weather data requirements of 62–20 TATCA.

List of Contractors:

- Lincoln Laboratory
  (ITWS prototype)
  Lexington, Massachusetts

63–21 Integrated Terminal Weather System (ITWS)



63–22 Aviation Weather Products Generator (AWPG)

Purpose: This project will integrate all NWS and FAA weather sensor data into real-time weather products and generate specific weather observation, warning, and forecast products to air traffic control specialists (ATCSs) in AFSSs, ARTCCs, and the ATCSCC, without intervening meteorological interpretation.

Approach: Weather observation improvements by both FAA and NWS permit higher space and time resolution products for air traffic control. The acquisition of sensor systems like NEXRAD, ASOS, TDWR, wind profilers, and meteorological data collection and reporting system/ARINC communications addressing and reporting system (MDCRS/ACARS) allow the collection of high-density weather data. The acquisition of a Class VII supercomputer by the NWS permits the generation of high-resolution forecasts to support air traffic control functions.

The AWPG is divided into two components: an analysis and forecast component, and a product generation component. The first component is the aviation gridded forecast system (AGFS) that is being developed for the FAA by NOAA's Forecast Systems Laboratory. This will provide the numerical and statistical techniques to automatically generate a high-resolution analysis and forecast of aviation impact variables (AIVs), namely, winds, temperature, icing, turbulence, cloud base height, visibility, hail, and convective precipitation. The AGFS will be incorporated into the NWS supercomputer software for operational generation of the AIVs.

The second component, AWPG product generation software, is being developed to convert the AGFS into user-specific products for use by air traffic controllers, flight service specialists, traffic management specialists, and CWSU meteorologists. As new products are developed and tested, they will be incorporated into existing and planned NAS subsystems as preplanned product improvements (PPPIs). Software will be provided to the private sector for incorporation in existing weather graphic display systems in use at ARTCCs and AFSSs prior to the PPPI of future NAS subsystems.

Products:

- The AGFS, which will be implemented by the NWS in two stages: 30 km resolution analyses and forecasts in 1996, and a higher resolution version around 2000.
- The AWPG product generation software, which will be developed, tested, and implemented into NAS subsystems in stages by PPPI.

Progress/Activity from December 1991:

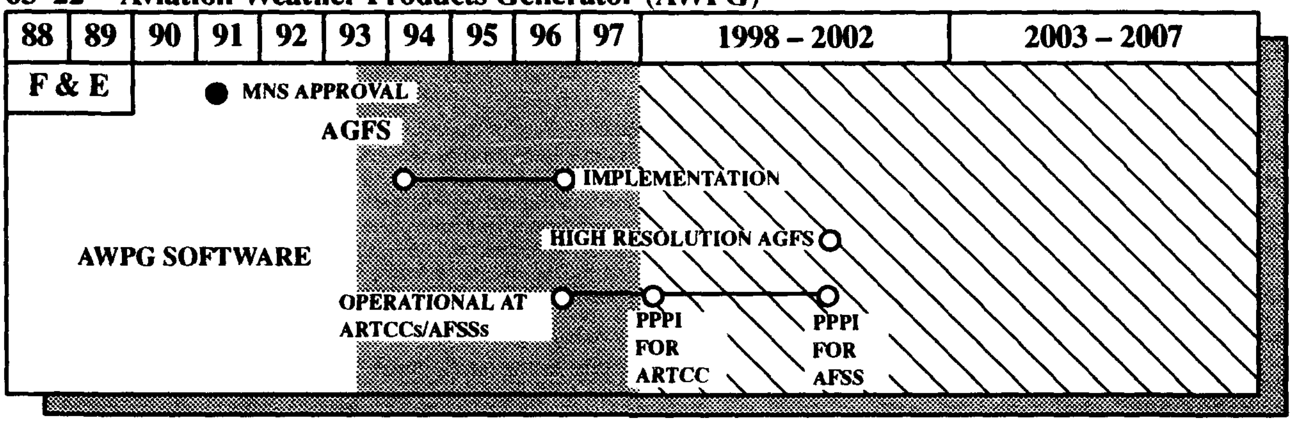
- Established FAA's Aviation Weather Development Laboratory and user product evaluation teams.
- Demonstrated AWPG capabilities at Denver ARTCC, Denver AFSS, and the FAATC.
- Implemented a rapid update cycle (RUC) analysis and forecast, which provides more accurate and higher resolution upper winds data.
- Improved SIGMETS regarding icing forecasts by the national aviation weather advisory unit (NAWAU).
- Started transfer of AWPG software to private industry for early implementation in FAA facilities.

Related Projects/Activities: All FAA and NWS weather projects relating to en route air traffic control, 63-05 Aeronautical Data-link Communications and Applications, 63–21 ITWS, and flight services.

List of Contractors:

- National Center for Atmospheric Research
  Boulder, Colorado
- National Oceanic and Atmospheric Administration (NOAA) Environmental Research Laboratory
  Boulder, Colorado

63–22 Aviation Weather Products Generator (AWPG)



64–05 Augmentations for GPS

Purpose: This project will provide the necessary augmentation equipment which will enable the global positioning system (GPS) to be used in the NAS as the federal aviation radionavigation system for all oceanic and domestic phases of flight. Satellite navigation presents opportunities for standardized, worldwide civil aviation operations using a common navigation receiver, and for significant improvements in safety, capacity, service flexibility, and aircraft operating cost. A satellite navigation system could lead to phase-out of existing NAS ground equipment while maintaining or improving existing service levels. In addition, satellite-based navigation systems provide the potential for new navigation and landing services not currently supported by the existing systems.

Augmentations to the GPS provided by this project will consist of a network of precisely located monitors, reference stations, and master control stations, as well as leased satellites and earth stations. The augmentation equipment will generate error correction data. Using this information from the reference stations, a message is developed by the master control stations that contains signal integrity and position corrections. This message is broadcast to users and monitor stations over geostationary satellites on the same frequency as GPS and is suitable for ranging like another GPS satellite.

Approach: After competitive selection of a contractor, implementation of the GPS integrity broadcast (GIB) wide area differential GPS (WDGPS) will proceed in four contract option phases to provide the required availability, accuracy, and operational integrity of the GPS and its augmentation. This will be a prerequisite to operational acceptance of the augmented system.

- Phase I will provide an integrity broadcast capability down to a nonprecision approach.
- Phase II will add more precise differential corrections to the wide-area software provided in Phase I.
- Phase III will provide capabilities to satisfy supplementary navigation requirements for all phases of flight down to Category I precision approach.
- Phase IV of the WDGPS will provide sufficient satellite navigation for consideration as a sole means aviation radionavigation service, or required navigation performance (RNP), through CAT I precision approach phase of flight.

The final system will provide triple redundancy for management and control, and a fully operational RNP system.

To further improve accuracy and integrity, other augmentations to GPS are being investigated to provide high levels of integrity, accuracy, continuity, and availability required by CAT II/III operation. These investigations may lead to additonal augmentations that will be identified in the future.

Products: The initial product will be a GIB/WDGPS system with a network of 20 monitor stations (including 2 configured as master control stations), and a satellite broadcast system. Other products may be developed based on results of investigations into CAT II/III operations.

GPS Wide-Area Augmentations

	Phase				Total
Equipment	I	II	III	IV	
Master station	3		3		6
Leased earth station	2		2	2	6
Leased satellite transponder	2		2	2	6
Reference station	11		19		30
Monitor station	11		19		30
AT monitor display	11		19		30
AF monitor display	11		19		30
Software (lines of code)	100,000	50,000			150,000
Leased communications system	1		updated	updated	1

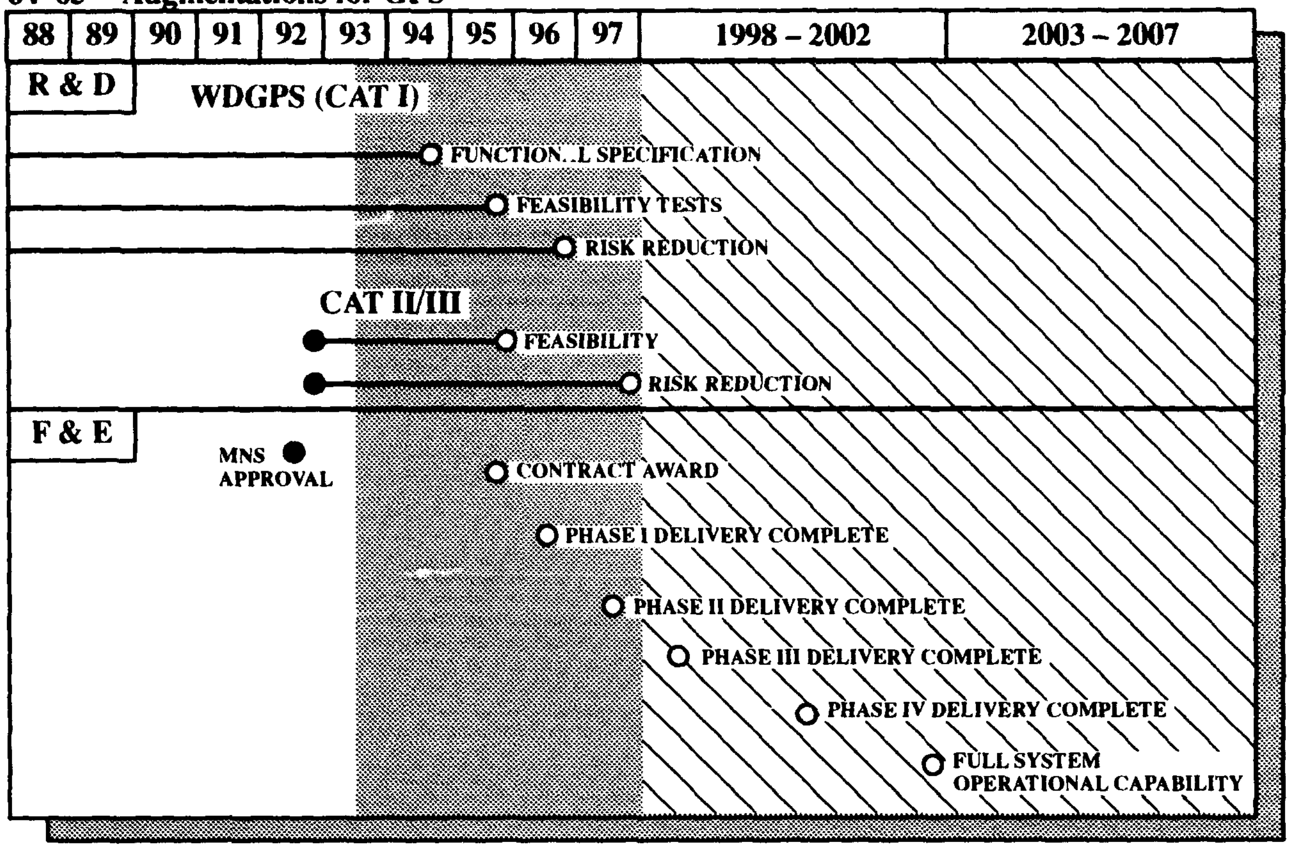
Note: Equipment in option phases are estimates and may change.

Progress/Activity from December 1991:

- Completed working draft of the functional specification.
- Completed preliminary draft Acquisition Plan, Test and Evaluation Master Plan, Integrated Logistics Support Plan, Mission Need Statement, and Operational Requirements document.
- Established an operational WDGPS test bed.

Related Projects/Activities: Many projects will use the improved positioning accuracy of GPS. Examples are the 61–22 ADS, 61–23 OAP and 63–05 Aeronautical Data-link Communications and Applications. This project will also require interfacility communications, ATC displays, and remote maintenance monitoring.

64–05 Augmentations for GPS



64–13 ASR Windshear Processor

Purpose: This project enhances the hazardous weather detection capability of ASR–8 (with digital channel) and ASR–9. Enhancement is accomplished by developing and testing a modular data processing channel for automatic detection of thunderstorm microbursts and gust fronts. This enhancement provides windshear warnings at airports not eligible for TDWR.

Approach: Continue an interagency agreement with the Air Force to have Lincoln Laboratory develop and demonstrate radar modifications, data processing computers, and processing algorithms that enable an ASR–8/9 to detect low–altitude windshear. Techniques will be implemented on a production ASR–9 and demonstrated during tests at the Orlando, Florida, airport. A modified ASR will be integrated with LLWAS–3 at 58 locations.

Products:

- Signal processing algorithms for estimation of low–altitude radial winds using ASR–8/9.
- Microburst and gust front detection algorithms.
- Demonstration of windshear detection on a production ASR–9.

- Specification for radar modifications and windshear processor.
- Production of radar modifications and windshear detection processor on 16 ASR–8's (with digital channel added) and 42 ASR–9's.

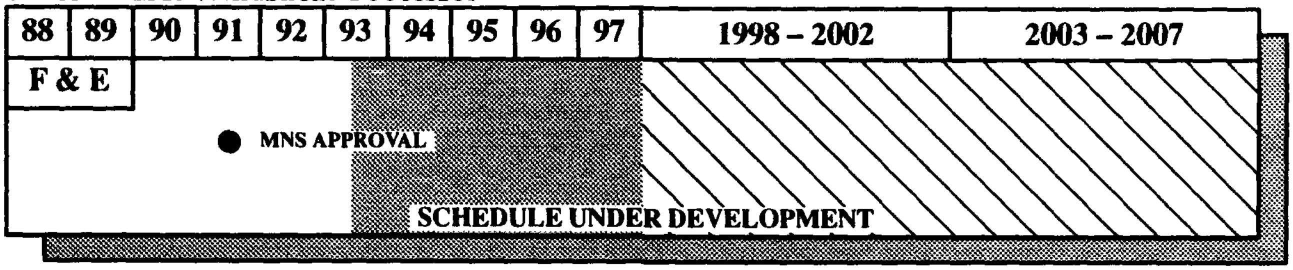
Related Projects/Activities: 23–12 LLWAS, 24–13 ASR Program, 24–18 TDWR System, 34–13 Terminal Radar Digitizing, Replacement, and Establishment, 43–12 Upgrade LLWAS to Expanded Network Configuration, and 63–21 ITWS.

List of Contractors:

- Lincoln Laboratory
  (ASR–9 modifications)
  Lexington, Massachusetts

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

64–13 ASR Windshear Processor



64–17 Gulf of Mexico

Purpose: This project will provide increased system capacity for air traffic operations in the Gulf of Mexico airspace. Capacity shortfalls will be rectified by providing the necessary improvements to the communications, navigation, and surveillance (CNS) services. CNS services are currently provided from land-based facilities and only extend for a limited range into the Gulf.

Approach: Since the shortfall in VHF communications coverage is severe and forces procedural constraints on air traffic operations in the Gulf, the first priority of the program will be to lease extended VHF coverage as an interim measure. Operational requirements will be developed for operating in the Gulf as an offshore control area rather than an oceanic sector. Using the system engineering process, the operational requirements will be translated into a set of alternative solutions, one of which will be selected for implementation based on life-cycle cost, reliability, maintainability, and availability.

This project includes the loran offshore flight following (LOFF) system.

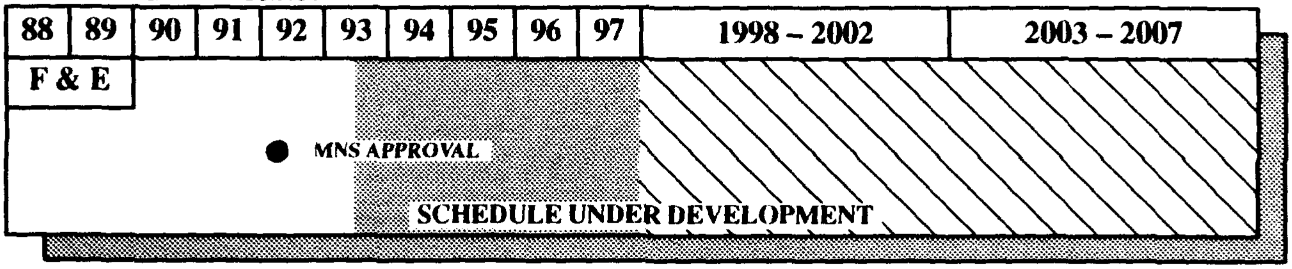
Products:

- An acquisition plan for acquiring and implementing CNS services.
- CNS hardware and software.

Related Projects/Activities: 34–12 ATCBI Establishment, 34–24 Communications Facilities Expansion, and 45–21 Satellite Communications Circuit System.

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

64–17 Gulf of Mexico



64–27 Precision Runway Monitor

Purpose: Develop a high–update–rate radar and computer-predictive displays to allow controllers to monitor aircraft on independent IFR approaches to parallel runways spaced less than 4,300 feet apart (including triple and quadruple runways). Conducting independent radar approaches will enable airports to increase capacity, reduce delays, and save fuel during reduced visibility.

Approach: Precision runway monitor (PRM) demonstrations and simulations were conducted at Memphis and Raleigh–Durham airports using engineering models of a Mode S sensor configured with a back–to–back antenna (B/B Mode S) and an electronically scanned (E–Scan) antenna. These demonstrations provided data used to evaluate changes to surveillance factors affecting the minimum runway separation for dual approaches. Engineering tests, flight data (live and simulator), and air traffic controller evaluations have been completed. The E–Scan antenna system provides a faster update rate than conventional radars because it uses a computer-controlled electronic scanning sensor beam. The update rate requirement for dual parallel runways down to 3,400 feet spacing is 2.4 seconds or less with a capacity of 25 aircraft tracks.

The FAA has awarded a sole–source contract for five limited production E–Scan units.

As part of this project, simulation and demonstration activities will continue to identify criteria for the conduct of safe, independent approaches to parallel runways spaced less than 4,300 feet apart, including offset localizer, variable radar update rates, display monitors, and control procedures.

Products: Five E–Scan antenna systems with options for 1 to 3 additional systems and procedures for conducting operations and evaluation of closely spaced parallel runways below 3,400 feet spacing in IMC. Research and development efforts are continuing to develop air traffic control procedures and surveillance/navigation requirements to support independent approaches to dual, triple, and quadruple parallel runways spaced as low as 3,000 feet apart. Preliminary results from real–time simulations indicated that the use of PRM systems and offset localizer can potentially support independent approaches to dual parallel runways spaced 3,000 feet apart. Additional simulations are planned to investigate the combined use of PRM with more accurate navigation/landing systems such as GPS, MLS, and final monitor aid (FMA) to permit simultaneous approaches to closely spaced parallel runways. Requirements for surveillance and navigation of closely spaced parallel operations will be developed.

Progress/Activity from December 1991:

- The PRM System Specification has been submitted to the Specification Review Board.
- The PRM Acquisition Plan has been approved.
- The Master Test Plan has been approved.
- A sole source contract has been awarded for the hardware and one installation of five limited production PRM systems.

Related Projects/Activities: 24–12 Mode S and R,E&D Plan Project 021–220 Airport Capacity Improvements.

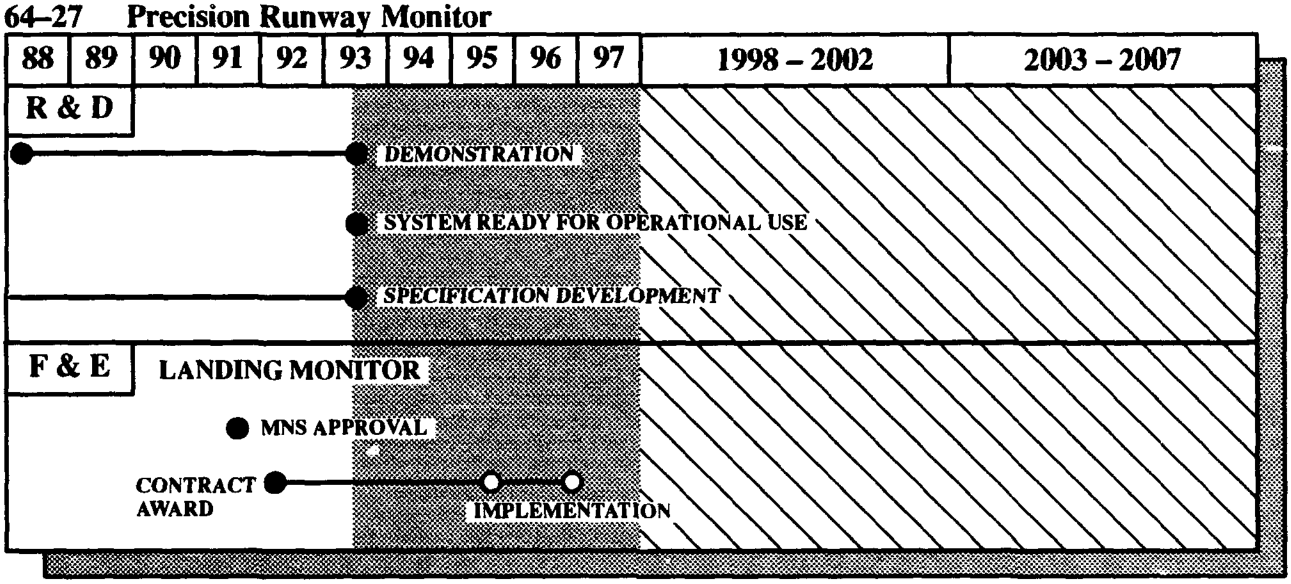
Problems Resulting in Delays: Implementation of four systems is dependent on runway construction, which has been delayed due to lack of region resources.

Delays Minimized by: Air Traffic is working site requirements with regions.

List of Contractors:

- MSI Services, Inc.
  (Raleigh–Durham upgrade)
  Washington, District of Columbia
- Allied–Signal Aerospace Company
  Bendix Communications Division
  (5 E–Scan antennas)
  Baltimore, Maryland
- MITRE Corporation
  (engineering support services)
  McLean, Virginia

64–27 Precision Runway Monitor



No Interfacility Communications Projects in this Chapter

66–21 Integrated Flight Quality Assurance

Purpose: Modern digital aircraft can readily record large amounts of selected data useful for subsystem monitoring, including aircrew performance. Because such data directly reflects operational performance, it provides the best possible basis for validating ground–based support activities, whether the focus is on aircrew qualification, aircraft maintenance, or certification of new aircraft systems. This project will provide a future FAA capability to acquire and analyze digital data recorded during airborne operations for program validation purposes.

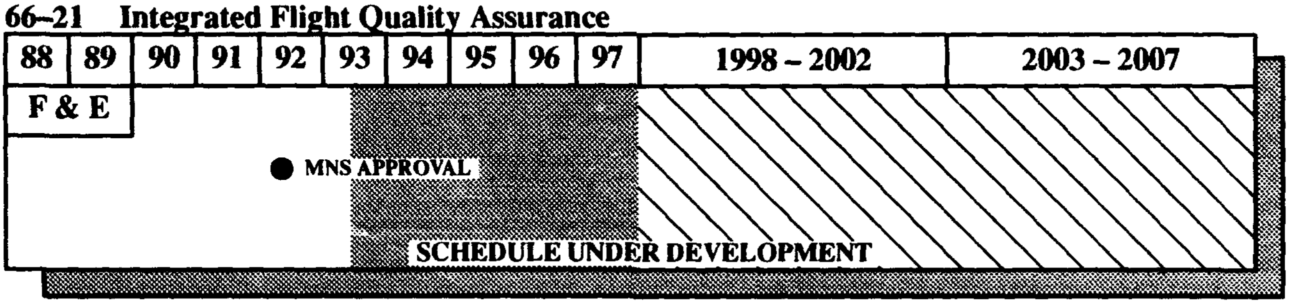
Approach: Airborne digital data acquisition procedures will be developed in cooperation with the airline industry. A centralized FAA data storage and analysis capability will be established. Customer software, tailored to FAA program validation purposes, will be created to support (large-scale) automated analyses.

Products: Centralized computer resources, including custom developed software.

Related Projects/Activities: Flight Operational Quality Assurance Study (FAA Flight Safety Foundation Contract DTFA01–91–C–00016), Safety Performance Analysis System, and the Advanced Qualification Program (AQP).

Project Status: This project is currently in the advance planning and engineering phase where alternatives are being considered and requirements are being established, reviewed, and validated.

66–21 Integrated Flight Quality Assurance



Appendix A

GLOSSARY OF ACRONYMS

AAS	advanced automation system
AC	advisory circular or alternating current
ACCC	area control computer complex
ACF	area control facility
ADAP	Airport Development Aid Program
ADAS	AWOS data acquisition system
ADDM	automated documentation development and maintenance
ADL	aeronautical data–link
ADP	automated data processing
ADS	automatic dependent surveillance
ADTN	administrative data transmission network
A&E	architectural and engineering
AERA	automated en route air traffic control
AF	Airway Facilities
AFB	Air Force Base
AFSS	automated flight service station
A/G	air–to–ground
AIP	Airport Improvement Program
ALSF	approach lighting system with sequenced flashing lights
ALSIP	approach lighting system improvement program
AM	amplitude modulation
AMASS	airport movement area safety system
AMCC	ACF/ARTCC maintenance control center
ANICS	Alaskan NICS
APS	Airway Planning Standard
ARINC	Aeronautical Radio, Incorporated
ARSR	air route surveillance radar
ARTCC	air route traffic control center
ARTS	automated radar terminal system
ASAS	aviation safety analysis system
ASDE	airport surface detection equipment
ASOS	automated surface observing system
ASP	arrival sequencing program
ASR	airport surveillance radar
ASTA	airport surface traffic automation
AT	Air Traffic
ATC	air traffic control
ATCBI	air traffic control beacon interrogator
ATCRBS	air traffic control radar beacon system
ATCSCC	air traffic control system command center
ATCT	airport traffic control tower
ATE	automatic test equipment
ATIS	automatic terminal information service
ATN	aeronautical telecommunications network
AVS	Aviation Standards
AWOS	automated weather observing system

AWP	aviation weather processor
AWPG	aviation weather products generator
BRITE	bright radar indicator tower equipment
BUEC	backup emergency communications
CA	conflict alert
CA/MSAW	conflict alert/minimum safe altitude warning
CAEG	computer aided engineering graphics
CAT	Category
CBI	computer based instruction
CD	common digitizer
CDC	computer display channel
CDR	critical design review
CDS	computer distribution system
CERAP	combined center radar approach control
CFCF	central flow control function/ facility
CFMWP	central flow meteorologist weather processor
CFWSU	central flow weather service unit
CHI	computer/human interface
CIP	Capital Investment Plan
CNS	communications, navigation, and surveillance
CONUS	continental, contiguous, or conterminous United States
CORN	computer resources nucleus
COTS	commercial–off–the–shelf
CRA	conflict resolution advisory
CTAS	center TRACON automation system
CWP	central weather processor
CWSU	center weather service unit
CY	calendar year
DARC	direct access radar channel
DASI	digital altimeter setting indicator
DBRITE	digital BRITE
dc	direct current
DCC	display channel complex
DF	direction finder
DFW	Dallas/Fort Worth
DLP	data–link processor
DME/P	precision distance measuring equipment
DMN	data multiplexing network
DOD	Department of Defense
DOT	Department of Transportation
DOTS	dynamic ocean track system
DRR	deployment readiness review
DSB	double sideband
DTDM	deterministic time division multiplexing
DVOR	Doppler very high frequency omni–directional range
EARTS	en route automated radar tracking system
EMC	electromagnetic compatibility
EPA	Environmental Protection Agency
ERM	en route metering
ESARTS	en route stand-alone radar training system
ESMMC	enhanced SMMC
ESP	en route spacing program

ETMS	enhanced traffic management system
ETVS	enhanced terminal voice switch
FAA	Federal Aviation Administration
FAAAC	FAA Aeronautical Center
FAATC	FAA Technical Center
FAR	Federal Aviation/Acquisition Regulations
FAST	final approach spacing tool
F&E	facilities and equipment
FM	frequency modulation
FPS	military primary radar
FSAS	flight service automation system
FSDPS	flight service data processing system
FSS	flight service station
FY	fiscal year
GMCC	general NAS maintenance control center
GNAS	general NAS
GPS	global positioning system
GSA	General Services Administration
GWDS	graphic weather display system
HF	high frequency
HRM	human resource management
HVAC	heating, ventilating, and air conditioning
IAPA	instrument approach procedures automation
ICAO	International Civil Aviation Organization
ICSS	integrated communications switching system
IFR	instrument flight rules
IFSS	international flight service station
ILS	instrument landing system
IMC	instrument meteorological conditions
IMCS	interim MCS
IOPB	input/output processor, Model B
IOT&E	integrated operational test and evaluation
IPCSS	in–plant contract support services
ISMS	integrated security management system
ISP	interim support program
ISSS	initial sector suite system
ITWS	integrated terminal weather system
JSS	joint surveillance system
kHz	kilohertz
LAN	local area network
LDRCL	low density RCL
LFME	local flow management enhancements
LLWAS	low–level windshear alert system
Loran	long–range navigation
LRR	long–range radar
MAD	MDARC architecture software – Rev D
MAE	MDARC architecture software – Rev E
MALSR	medium–intensity approach lighting system with runway alignment indicator lights
MAR	minimally attended radar

MCC	maintenance control center
MCF	metroplex control facility
MCI	Mode C intruder
MCS	monitor and control software
MDARC	mosaic tracking direct access radar channel
MLS	microwave landing system
MMS	maintenance management system
MNS	mission need statement
MOA	memorandum of agreement
Mode C	altitude reporting mode of secondary radar
Mode S	mode select; discrete addressable secondary radar system with data–link
modem	modulator–demodulator
MPS	maintenance processor subsystem
MSAW	minimum safe altitude warning
MWP	meteorologist weather processor
NADIN	national airspace data interchange network
NAILS	national airspace integrated logistics support
NARACS	national radio communications system
NAS	national airspace system
NASDC	National Aviation Safety Data Center
NASMAP	NAS management automation program
NEXRAD	next generation weather radar
NICS	NAS interfacility communications system
NOTAM	notice to airmen
NPIAS	National Plan of Integrated Airport Systems
NWS	National Weather Service
OAP	oceanic automation program
OASIS	operational and supportability implementation system
OATS	office automation technology and services
ODALS	omnidirectional approach lighting system
ODAPS	oceanic display and planning system
ODMS	operational data management system
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
OT&E	operational test and evaluation
PAM	peripheral adapter module
PAMRI	peripheral adapter module replacement item
PAPI	precision approach path indicator
PAR	precision approach radar
PATS	precision automated tracking system
PCS	power conditioning system
PDC	pre-departure clearance
PIP	Project/Program Implementation Plan
PM	preventive maintenance
RAPCON	radar approach control
RCAG	remote center air/ground
RCE	radio control equipment
RCF	remote communication facility

RCL	radio communications link
RCO	remote communications outlet
RCOM	recovery communication
RCR	routing and circuit restoral
R&D	research and development
R,E&D	research, engineering and development
REIL	runway–end identification lights
RF	radio frequency
RFI	radio frequency interference
RFP	request for proposal
RML	radar microwave link
RMM	remote maintenance monitoring
RMMS	remote maintenance monitoring system
RMS	remote monitoring subsystem
RTCA	Radio Technical Commission for Aeronautics
RTR	remote transmitter/receiver
RVR	runway visual range
RWP	real–time weather processor
SAFE	safety activity functional evaluation
SEIC	system engineering and integration contractor/contract
SMMC	system maintenance monitor console
SSALF	simplified short approach lighting system with sequenced flashing lights
SSALR	simplified short approach lighting system with runway alignment indicator lights
SSR	secondary surveillance radar
SSR/DMTI	solid–state receiver/digital moving target indicator
STDM	statistical time division multiplexing
STEP	service test and evaluation program
TAAS	terminal advanced automation system
TACAN	tactical air navigation
TATCA	terminal air traffic control automation
TCCC	tower control computer complex
TDLS	tower data–link services
TDWR	terminal Doppler weather radar
TML	television microwave link
TMS	traffic management system
TMU	traffic management unit
TNA	thermal neutron analysis
TRACON	terminal radar approach control
TSSC	technical support services contract
TVSR	terminal voice switch replacement
UHF	ultra high frequency
UPS	uninterruptible power system
USAF	United States Air Force
VFR	visual flight rules
VHF	very high frequency
VOR	VHF omnidirectional range
VORTAC	VOR collocated with TACAN
VSCS	voice switching and control system
WMSC	weather message switching center

Appendix B

INACTIVE PROJECTS

Projects that have been completed, renumbered, combined, or withdrawn are listed below by functional area. Projects with only a date in the last activity column were completed in the year indicated.

PROJECT NUMBER	PROJECT TITLE	LAST ACTIVITY
	En Route	
21-01	En Route Automation Hardware Improvements and Enhancements	1986
21-02	Flight Data Entry and Printout Devices	1991
21-03	Direct Access Radar Channel (DARC)	1992
21-04	EARTS Enhancements	1991
21-07	Modern ATC Host Computer	1988
21-08	En Route Metering (ERM)	Combined With 21-06
21-10	Conflict Alert IFR/VFR Mode C Intruder	1988
21-14	Integration of Nonradar Approach Control Into Radar Facilities	1987
21-15	Area Control Facilities (ACF)	1993
21-16	Offshore Flight Data Processing System (OFDPS)	1991
41-22	Relocate Air Traffic Control System Command Center	Withdrawn 1991
51-16	Oceanic Support	Combined With 61-23
51-20	Data System Specialist Support	1987
61-06	Local Flow Management Enhancements (LFME)	Withdrawn 1993
61-20	Dynamic Ocean Track System (DOTS)	Combined With 61-23
61-21	National Control Facility (NCF), formerly called National Airspace Management Facility (NAMFAC)	Withdrawn 1991
	Terminal	
22-01	Enhanced Terminal Conflict Alert	1989
22-02	ARTS IIIA Assembler	1983
22-03	Enhanced Target Generator (ETG) Displays (ARTS III)	1988
22-04	Additional ARTS IIIA Memory	1986
22-05	Additional ARTS IIIA Support at the FAA Technical Center	1986

PROJECT NUMBER	PROJECT TITLE	LAST ACTIVITY
22-08	ARTS II Interfacility Interface	1986
22-10	Automatic Terminal Information Service (ATIS) Recorders	1989
22-13	ATCT/TRACON Establishment, Replacement, and Modernization	1992
22-14	VFR ATCT Closures	1987
22-15	Combine Radar Approach Control into ARTCC	Withdrawn 1985
22-17	TPX-42 Replacement	1990
22-18	Sustain the New York TRACON	1991
32-23	Chicago Area Improvements	Withdrawn 1990
32-25	New Austin Airport	Withdrawn 1991
32-31	Base Buildings for Airport Traffic Control Towers (ATCT)	Combined With 42-13
32-32	New Airport and Other Facility Planning	Withdrawn 1993
62-01	Terminal Intrusion Function	Combined With 42-21
62-22	National Airspace Management Facility (NAMFAC)	Renumbered To 61-21 which was withdrawn in 1991
	Flight Service and Weather	
23-03	Consolidated NOTAM System (CNS)	1986
23-06	Interim Voice Response System (IVRS)	1985
23-07	High-Altitude En Route Flight Advisory Service (EFAS) Frequencies	1989
23-08	Hazardous In-Flight Weather Advisory Service (HIWAS)	1989
23-10	Radar Remote Weather Display System (RRWDS)	1984
23-11	Geostationary Operational Environmental Satellite (GOES) Recorders	1985
33-01	Direct User Access Terminal (DUAT) Service Geographic Expansion	Withdrawn 1991
33-07	High-Altitude En Route Flight Advisory Service (EFAS) Expansion	Withdrawn 1990
33-08	Hazardous In-Flight Weather Advisory Service (HIWAS) Expansion	Withdrawn 1992

PROJECT NUMBER	PROJECT TITLE	LAST ACTIVITY
	Flight Service and Weather (continued)	
43-09	Upgrade Commercial Automated Weather Observing System (AWOS)	Withdrawn 1991
43-20	Automated Flight Service Station (AFSS) Support Space	Renumbered To 33-20
63-02	Central Weather Processor (CWP) Interfaces	Combined With 43-02
63-12	Low-Level Windshear Alert System (LLWAS) Enhancements	Combined With 43-12
63-20	Weather Enhancements	Combined With 63-21
	Ground-to-Air	
24-01	Air/Ground (A/G) Communications Equipment Modernization	1987
24-02	Communications Facilities Consolidation/Network	1992
24-04	Nondirectional Beacon (NDB)	1988
24-05	Global Positioning System (GPS) Monitors	Renumbered To 64-05
24-06	Instrument Landing System (ILS)	1989
34-04	Establish Locator Outer Markers (LOM)	Withdrawn 1992
34-07	Microwave Landing System (MLS) - Production Phase II	Withdrawn 1993
34-14	Additional Airport Surface Detection Equipment (ASDE) Establishment	Withdrawn 1993
34-21	Advanced Format for Radar/Beacon Target Reports	Combined With 34-20
34-22	Oceanic Satellite Communications	Combined With 61-23
44-04	A/G Radio Replacement	Withdrawn 1993
44-08	Radio Control Equipment (RCE) Enhancements	Withdrawn 1991
44-38	Long Range Radar (LRR) Replacement and Networking	Withdrawn 1990
44-48	AN/FPS-117 Beacon Improvement	Withdrawn 1993
64-16	Weather Enhancements	Renumbered To 63-20
64-20	National Implementation of the "Imaging" Aid for Dependent Coverging Runway Approaches	Renumbered To 62-24
64-28	Improve Capacity of Closely Spaced Parallel Runways	Combined With 64-27
64-29	ATC Applications of Automatic Dependent Surveillance (ADS)	Renumbered To 61-22

PROJECT NUMBER	PROJECT TITLE	LAST ACTIVITY
	Interfacility Communications	
25-01	RML Trunking	1986
25-02	Data Multiplexing Network	1993
25-03	RML Replacement and Expansion	1993
25-04	Television Microwave Link (TML)	Combined With 22-16
25-05	Airport Telecommunications	1987
25-06	National Airspace Data Interchange Network (NADIN) IA	1988
25-07	National Airspace Data Interchange Network (NADIN) II	1992
25-09	Teletypewriter Replacement	1986
65-03	Network Management and Control Equipment (NMCE)	Combined With 45-06
65-07	Conversion of NADIN IA Message Network Users to the NADIN II Packet Switched Network	Combined With 35-07
65-22	Aeronautical Telecommunications Network (ATN)	Combined With 63-05
	Maintenance and Operations	
26-02	Computer Based Instruction (CBI)	1991
26-03	Central Repair Facility (CRF)	Withdrawn 1985
26-05	Large Airport Cable Loop Systems	1993
26-06	Power Conditioning Systems for Automated Radar Terminal Systems III (ARTS III)	1989
26-07	Power Systems	1992
26-08	Modernize and Improve FAA Buildings and Equipment	1992
26-11	Aircraft Fleet Conversion/Flight Inspection Modernization	1988
26-12	Aircraft and Related Equipment	1992
26-14	National Radio Communications System (NARACS)	1991
26-15	NAS Spectrum Engineering	1992
26-17	System Support Laboratory	1992
26-18	General Support Laboratory	1992
56-13	Aircraft Flight Simulators	Withdrawn 1993
56-20	Automated Documentation Development and Maintenance (ADDM)	Combined With 56-56
56-21	Aeronautical Center Centralized Integrated Logistics Support (ACCILS) Plan	Withdrawn 1990
66-20	FAA National Simulation Laboratory	Withdrawn 1991

Appendix C

ALPHABETICAL LISTING OF PROJECTS

Title	Page

Title	Page

For information on the subjects discussed in this document, contact the Manager, NAS Planning Division, APM-300, NAS Program Management Service, Federal Aviation Administration, 800 Independence Avenue, Washington, D.C. 20591.

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