List of System Mechanisms in the NAS Architecture 6 database

Grouped by Domain

Domain: Air Traffic Control Automation

Application

Mechanism: Advanced Dynamic Airspace Management R1 (ADAM R1) [8003]

Initial capabilities for Advanced Dynamis Airspace Management. Provide capability to reserve, deconflict, manage and distribute altitude reservations (Formerly CARF).

Mechanism: Advanced Dynamic Airspace Management R2 (ADAM R2) [8004]

Mid-level capabilities for Advanced Dynamic Airspace Management. Integrated TRF and SUA management. Development of initial airspace analysis tool for facilities.

Mechanism: Advanced Dynamic Airspace Management R3 (ADAM R3) [8005]

Final capabilities for Advanced Dynamic Airspace Management. Full static and dynamic airspace creation and evaluation. Integration with automation systems. Digital data.

Mechanism: Advanced Electronic Flight Strip (AEFS) [7412]

The Advanced Electronic Flight Strip (AEFS) system is only at the Chicago O'Hare Int. Airport Traffic Control Tower (ATCT), ICAO Code KORD, and at the Chicago Terminal Radar Approach Control (TRACON) facility. It provides digitized flight progress information; prototyping an electronic flight strip capability.

Mechanism: CAASD Analysis Platform for En Route (CAPER) [2278]

The CAASD Analysis Platform for En Route (CAPER) formerly known as the Collaborative Routing and Coordination Tool (CRCT) consists of the hardware and software required to designate areas of severe weather or congestion as Flow Constrained Areas (FCA), identify flights predicted to enter the FCA, and assess the impact of rerouting flights identified on the en route traffic control center sector loading. This is a prototype system located in the ATSCC and ZKC (Kansas City)ARTCC. The results of this protoype will be software releases in the ETMS System. Flow Constrained Area/Flow Evaluation Area (FCA/FEA) functionality was added to ETMS by software version v7.6 in May 2003.

Mechanism: Center Terminal Radar Approach Control Automation System Build 1 (CTAS Build 1) [176]

The Center Terminal Radar Approach Control (TRACON) Automation System Build 1 (CTAS Build 1) includes Traffic Management Unit (TMU) capabilities (timelines, load graphs, automated miles-in-trail, and the situation display) and single center metering using miles-in-trail (MIT) or time-based scheduling and meter lists (TBM) on en route displays. A portion of the CTAS system has been implemented as Traffic Management Advisor (TMA).

Mechanism: Collaborative Air Traffic Management Technologies Work Package 1 (CATMT WP1) [6331]

Using the current Enhanced Traffic Management System (ETMS) functionality as a baseline and leveraging the hardware technology refresh provided under the "ETMS - HW Upgrade" mechanism, Collaborative Air Traffic Management Technologies (CATMT) WP 1 will evolve to a new open systems software architecture. This new architecture is expected to lower the life cycle cost of software maintenance, the development and integration of existing and future functionality and capabilities, and interface to other domain automation systems.
Traffic Flow Management System Work Package 1 (TFMS WP1), is the system that will result from the program CATMT-WP1, and this system will be an integrated system used in Traffic Flow Management (TFM) and developed for TFM modernization, by traffic management specialists (TMS) and coordinators to track and predict traffic flows; analyze effects of ground or weather delays; evaluate alternative routing strategies; improve collaborative decision making (CDM) among users; plan traffic flow patterns; and assess daily and long-term traffic flow performance in the National Airspace System (NAS) to better balance capacity and demand requirements for all users.
The Airspace Flow Program (AFP) falls under the CATMT program. The FAA has established processes to interact with the users that didn't exist before TFM. AFP is a good example of how these processes work.

The AFP, rolled out on June 6, 2006. AFPs have been issued within saved scenarios — preset sectors of airspace — in the Northeastern part of the United States. AFPs have been validated by FAA and commercial carriers to have saved the airlines about 2 million dollars per AFP issued.

Phase one is focused on a Severe Weather Avoidance Program (SWAP) within saved scenarios. Phase two will expand its use to more than just weather. It will be used to meter aircraft into any piece of airspace controllers designate to control volume, with the possibility to decrease the number of ground stops.

A training module titled "ETMS 8.2 Training - Principles of Airspace Flow Programs" provides an introduction to the concept of Airspace Flow Programs and the effects of these programs on NAS customers. It is designed for FAA Traffic Flow Management personnel and NAS customers from commercial, business, military, and general aviation communities who will be affected and who need to comply with new Airspace Flow Program procedures beginning in Spring 2006. It can be downloaded from http://www.fly.faa.gov/Products/Training/AFP/AFP_Training.jsp

A Service Level Agreement (SLA) with ATO-E will synchronize enhancements in CATMT WP 1 with: (1) En Route Automation Modernization (ERAM), (2) Electronic Flight Strip Transfer System (EFSTS) and (3) Airport Surface Detection Equipment (ASDE) modernization efforts.

For the most recent information check the Service Level Review Briefings and Minutes which are located at URL http://ipm.faa.gov/jrc/decisions_minutes/SLRmins.cfm

Additional information in June 2007 Operational Evolution Partnership (OEP), Version 1.0 at URL http://www.faa.gov/about/office_org/headquarters_offices/ato/publications/oep/version1/reference/tfm/

Mechanism: Collaborative Air Traffic Management Technologies Work Package 2 (CATMT WP2) [6310]

The Traffic Flow Management (TFM) System is a key element of the FAA's automated air traffic management environment focused specifically on strategic traffic flow problem identification and resolution, and is focused on providing efficient and equitable solutions to National Airspace System (NAS) capacity constraints. TFM seeks to minimize delays and disruptions to aircraft operators and their customers, while maintaining the highest levels of safety.

The Collaborative Air Traffic Management Technologies Work Package 2 (CATMT WP2) is the program name encompassing developments to enhance the TFM System during the timeframe FY11-FY15, and will continue toward the new capability requirements identified in "Traffic Flow Management (TFM) Mission Need Statement (MNS), Revalidated," MNS-307, dated March 31, 2003.

TFM as enhanced by CATMT WP2 is called TFMS-WP2. Flagship enhancements planned in WP2 are: Weather Integration (WxInt), and Airborne Reroutes (ARR).

In the WP2 timeframe, weather-related presentations and data which currently are not integrated within the TFM automation will be integrated with other TFM automation, capabilities and decision support tools. Weather Integration (WxInt) assumes that the assimilation and processing of weather information at traffic management units and facilities is critical to accomplish accurate planning of traffic management initiatives (TMIs) and strategic prediction of congestion, both of which will increase efficiency in the NAS and decrease air traffic delays.

Currently, the planning and execution of reroutes is encumbered by the lack of automated support to: perform modeling and impact assessment of proposed route options for airborne flights, automate the coordination and execution of a resolution of airborne routing, and disseminate and share implementation details among FAA personnel and NAS users. ARR will automate the planning, coordination, and communication of reroutes required for flights which have already departed. Current shortfalls include the lack of an automated data exchange capability of reroute information between TFM and En Route automation, and limited ability for NAS uses to submit their reroute preferences. ARR will address both of these shortfalls, by including capabilities to automate data exchange of reroutes between ARTCCs and the ATCSCC, and allowing NAS users to submit multiple reroute preferences, improving communications between NAS users and the ARTCC.

Mechanism: Common Automated Radar Terminal System Software (CARTS S/W) [2261]

Provides maintenance of the Common Automated Radar Terminal System Software (CARTS S/W) for ARTS IIE and ARTS IIIE automation platforms. CARTS S/W provides continuous real-time support to air traffic controllers at terminal sites including surveillance/tracking, controller data entry and display, aircraft separation assistance (safety functions), flight plan processing, data recording, external data publishing, and system monitoring and control functions. CARTS S/W also provides support functions for data reduction, system evaluation, software development, and hardware and software maintenance. The functions include radar data processing (RDP), Minimum Safe Altitude Warning (MSAW); controller automated spacing tool, Converging Runway Display Aid (CRDA), and other tools to assist the terminal and tower controllers to manage the air traffic in the terminal area.

Mechanism: Departure Spacing Program (DSP) [2274]

The Departure Spacing Program (DSP), sometimes called the Departure Sequencing Program, is deployed in the Northeastern U.S. Air Traffic Corridor. DSP evaluates aircraft departure flight plans at participating airports, models projected aircraft demand at departure resources such as first and second departure fixes, and provides windows of departure times to controllers. DSP displays current and predicted departure fix demand as well as allows traffic managers to make departure fix flow rate adjustments. The Flow Forecast Display indicates the number of aircraft projected to cross each DSP departure flow fix for the next one-hour period in 15-minute increments. It also provides information on any fix flow rate restrictions in effect. DSP interfaces with Flight Strip Printer (part of the Display System Replacement (DSR)) in New York ARTCC "Pit" in order to obtain full flight strip information for display in DSP to air traffic controllers. Also, DSP has a KVDT emulation program whereby air traffic controllers in the NY ARTCC Pit can amend flight plans using the Supervisor's KVDT function. KVDT stands for Keyboard Video Display Terminal.
DSP provides information (recommended departure time, etc.) to controllers to allow for sequenced departures from multiple airports in the New York metropolitan area. New York traffic is displayed in the Washington and Boston facilities to better enable coordination with New York air traffic management facilities. The DSP utilizes graphical user interfaces (GUI) and near real-time electronic information exchange to evaluate aircraft flight plans, model projected aircraft demand, and provide departure window times to controllers at participating airports. The result is to eliminate or reduce contention for airspace at terminal-en route terminal boundary and departure fix points. DSP is also a potential source of surface data that may be useful to the Enhanced Traffic Management System (ETMS).

Mechanism: Direct User Access Terminal Service (DUATS) [6]

Direct User Access Terminal Service (DUATS) is a vendor-provided service giving pilots convenient access to pre-flight aeronautical and weather information for flight planning purposes. It allows pilots to input instrument flight rules (IFR), International Civil Aviation Organization (ICAO), and visual flight rules (VFR) flight plans into the system. An advanced graphical interface for the DUATS system is downloadable from the vendor website at www.duats.com. The current contract extension can provide DUATS through February 2013.

Mechanism: Dynamic Ocean Tracking System (DOTS) [650]

The Dynamic Ocean Tracking System (DOTS) automation system is located in each of the three Oceanic Air Route Traffic Control Centers (ARTCCs), (Anchorage, Oakland, and New York) and in the David J. Hurley Air Traffic Control System Command Center (ATCSCC). The DOTS, upgraded and frequently referred to as "DOTS +", permits airlines to save fuel by flying random routes, in contrast to structured routes, and permits the air traffic controller to achieve lateral spacing requirements more efficiently. The DOTS generates flexible oceanic tracks that are optimized for best airspace utilization and best time/fuel efficiency. Flexible tracks are updated twice a day using forecasted winds aloft and separation (vertical and lateral) requirements. The DOTS oceanic traffic display gives a visual presentation of tracks and weather. The DOTS sends traffic advisories and track advisories to users and receives aircraft progress reports from the commercial communications service providers (CCSP). These external data exchanges are achieved through interfaces with the National Airspace Data Interchange Network (NADIN) Packet Switch Network (PSN) for Position Reports, Air Traffic Management (ATM) messages, Pilot Reports (PIREPS), and the Anchorage FDP2000. An interface to the Enhanced Traffic Management System (ETMS) will improve coordination between the oceanic and domestic Traffic Flow Management (TFM) systems/activities. The DOTS Weather Server, installed at the ATCSCC, receives National Weather Service (NWS) wind and temperature data via the Weather and Radar Processor / Weather Information Network Server (WARP/WINS) system. The weather data is then distributed to the ARTCCs via commercially provided Integrated Services Digital Network (ISDN) telephone lines. DOTS Plus supports separation reduction initiatives as stipulated in RNP-10 (Required Navigation Performance) for decreasing lateral separation from 100 nautical miles to 50 nautical miles.

Mechanism: Electronic Flight Strip Transfer System (EFSTS) [6671]

The Electronic Flight Strip Transfer System (EFSTS) is a system that transfers flight status (departure, arrival) times from the Airport Traffic Control Tower (ATCT) facility to the Terminal Radar Approach Control (TRACON) facility. The EFSTS in the ATCT accepts flight strip data from the Flight Data Input/Output (FDIO) system and prints the strips with a bar code. When an aircraft departs, for example, the air traffic controller swipes the bar-coded strip through the bar code reader, which time stamps the event, and the EFSTS transfers the event data to the TRACON. Although the EFSTS interfaces with the FDIO system, it is a closed system in the sense that no feedback is provided by the EFSTS through the FDIO to update the Host Computer System (HCS).

Mechanism: En Route Monitor and Control (EMAC) [6952]

The En Route Monitor and Control (EMAC) project will consolidate the Monitor & Control (M&C) functions of legacy Air Route Traffic Control Center (ARTCC) systems into open system architecture. The EMAC system will reduce the size of the area needed for displaying system status of separate systems and provide a common human-computer interface (HCI) functionality among them. The EMAC will include power system displays and will support prioritization of operational equipment maintenance and restoration efforts along the lines of the classification categories of critical, essential, and routine systems. The EMAC will reduce the number of ARTCC M&Cs located in the ARTCC Monitor and Control Center (AMCC) and will be compatible with the National Airspace System (NAS) Infrastructure Management System (NIMS), which alternatively refers to AMCC as the Service Operation Center (SOC). The EMAC will reduce M&C software development and training costs and, based on use of a common HCI, will ensure uniformity of functions performed by Airway Facilities specialists.
The EMAC functionality is an application in the En Route Automation Modernization (ERAM) program.

Mechanism: En Route Software (ER S/W) [2366]

En Route Software (ER S/W) resides on the Host Computer System (HCS). The software provides the functions required to safely and efficiently monitor and manage air traffic in the en route domain. Functionality includes: radar data processing, flight data processing, target acquisition and tracking, "handoff" execution, Flight Data Input/Output (FDIO), etc. Problem Trouble Reports (PTRs) and National Airspace System (NAS) Change Proposals (NCPs) to the current software are resolved through incremental software releases at approximately 18-month intervals. All such resolutions are reviewed and approved through the Fielded Automation Requirements Management (FARM) Team, which is the control board for En Route resources. This basic Jules Own Version of the International Algebraic Language (JOVIAL)/BAL software was first instantiated in the very early 1970s and has been continuously modified since that time.

Much of the tasking for this mechanism resides in the En Route Software Development Support (ERSDS) contract.

Mechanism: Enhanced Traffic Management System (ETMS) [2077]

The Enhanced Traffic Management System (ETMS) application is at the heart of the Traffic Flow Management (TFM) system. The ETMS at the David J. Hurley Air Traffic Control System Command Center (ATCSCC) located in Herndon, Virginia, is used to deal with the strategic flow of air traffic at the national level.

The ETMS at remote facilities is used for local airspace management within the local facility's (ARTCCs and TRACONs, etc)own area of responsibility. To facilitate coordination between the Traffic Management Coordinators (TMC) at remote Traffic Management Units (TMUs) and the Traffic Management Specialists (TMS) at the ATCSCC, each local ETMS can also view the national composite picture of traffic for which the ATCSCC has responsibility. The ETMS enables TMS and TMC personnel to track and predict traffic flows, analyze effects of ground delays or weather delays, evaluate alternative routing strategies, and plan traffic flow patterns.

The ETMS central hub is located at the Volpe National Transportation System Center in Cambridge, Massachusetts. The hub collects flight schedules, and revisions, from National Airspace System (NAS) users, and collects actual traffic updates from local NAS Host computers. One capability of the ETMS system is to generate Ground Delay Program (GDP) Aggregate Demand List (ADL). The ADL contains predicted traffic at individual airports. NAS users, e.g., air carriers, can access the ADL data via the Flight Schedule Monitor (FSM)system to plan and revise their flight schedules to work more efficiently with planned traffic initiatives. This interactive process of flight planning gives users more input to TMCs on how traffic initiatives will affect them and is the heart of the Collaborative Decision Making (CDM) process.

Traffic Management Units (TMUs) are located throughout the NAS and help to perform local flow control management functions. TMUs exist in all Air Route Traffic Control Centers (ARTCCs), 35 high activity Terminal Radar Approach Control (TRACON) facilities, 8 Airport Traffic Control Tower (ATCT) facilities, 3 Center Radar Approach (CERAP) facilities, and the FAA William J. Hughes Technical Center (WJHTC). TMU hardware suites are automated workstations that include computer entry/readout devices, network communications, a Flight Strip Printer (FSP), and a Traffic Situation Display (TSD).

NAS users are responsible for providing their own connectivity to the ETMS hub for CDM purposes. The various connective user networks are collectively referred to as the CDM Network (CDMnet), which provides two-way connectivity to TFM. Non-FAA users do not have access to all TFM data and processing tools, and instead have critical data on sensitive flights filtered out.

Mechanism: Flight Object Management System - En Route (FOMS - ER) [6317]

The Flight Object Management System (FOMS) - En Route (ER) processes flight data received from multiple sources via the System Wide Information Management (SWIM) Management Unit. The FOMS also receives track data from the Surveillance Data Processor (SDP) and associates tracks with flight data, producing the flight object, which is published to SWIM for subscriber use. Flight plan support functionality includes end-to-end profile evaluation in all phases of flight and evaluation against static and dynamic constraints (terrain, obstacles, airspace restrictions, etc.). The FOMS supports flight planning up to 180 days prior to day of flight. A user can access the flight object from initial to closeout in the same manner. The FOMS provides end-to-end flight data management from preflight to post analysis. Ownership of the flight object begins and ends with Traffic Flow Management and transitions during the flight to clearance delivery, ramp, surface, departure, transition to cruise, cruise, transition to arrival, and ramp. Flight data management is based on trajectory, assigned volumes, and "necessary" route structure. The FOMS is a component of the future Common Display Subsystem (CDSS) Phase 1 which will eventually become attached to and subsumed by Release 1 of the NextGen Automation Platform (NAP). The CDSS will provide the controller interface to the FOMS and SDP.

Mechanism: Flight Object Management System - Terminal (FOMS - Term) [6316]

Flight Object Management System - Terminal (FOMS - Terminal) is a component of the future Common Display Subsystem (CDSS) Phase 2 which will eventually become attached to and subsumed by Release 2 of the NextGen Automation Platform (NAP). The FOMS processes flight data received from multiple sources via the System Wide Information Management (SWIM) Management Unit. The FOMS also receives track data from the Surveillance Data Processor (SDP) and associates tracks with flight data, producing the flight object, which is published to SWIM for subscriber use. Flight plan support functionality includes end-to-end profile evaluation in all phases of flight and evaluation against static and dynamic constraints (e.g., terrain, obstacles, airspace restrictions) published via SWIM by the Aeronautical Information Management (AIM) system. The FOMS supports flight planning up to 180 days prior to day of flight. A user can access the flight object from initial to closeout in the same manner. The FOMS provides end-to-end flight data management from preflight to post analysis. Ownership of the flight object begins and ends with Traffic Flow Management (TFM) and transitions during the flight to clearance delivery, ramp, surface, departure, transition to cruise, cruise, transition to arrival, and ramp. Flight data management is based on trajectory, assigned volumes, and the "necessary" route structure.

Mechanism: Flight Schedule Analyzer (FSA) [2367]

The Flight Schedule Analyzer (FSA) is part of the Traffic Flow Management (TFM) operational infrastructure. It contains post analysis (PA) and real-time (RT) components. The PA FSA graphically shows data and analysis results on how well a Ground Delay Program (GDP) performed and what factors affected performance. The RT FSA generates a collection of reports that allow the specialists at Airlines and the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC) to monitor GDPs of specific flights as they are being executed. Real-time FSA may also be used to monitor "Pop Ups" (flights for which the Enhanced Traffic Management System (ETMS) has no scheduling data) to airports. Airlines use FSA data to internally address situations to assess the effectiveness of a GDP and to improve demand predictions. RT FSA is accessible from the ATCSCC intranet web page and generates reports including: (1) Performance, (2) Flight Status, (3) Compliance, (4) Cancelled flights that operated, (5) Pop-up flights, (6) Time-out delayed flights, and (7) GDP Program events. Real-time FSA is accessed from the ATCSCC Intranet web site by all users at all locations both within FAA and outside the FAA by airspace users who have signed an agreement for Collabortive Decision Making (CDM).

Mechanism: Flight Schedule Monitor (FSM) [2277]

The Flight Schedule Monitor (FSM) is the main tool for the traffic management specialist at the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC) to monitor, model, and implement Ground Delay Program (GDP) operations. FAA and airlines use FSM to monitor demand through receipt of FSM demand pictures of airports updated every 5 minutes. FSM constructs "what if" scenarios for best options (i.e., best parameters) prior to making a GDP decision. Modeling may be used by: (1) the ARTCC Traffic Management Coordinator (TMC) to request ATCSCC implementation of a GDP in the event of significant congestion or if a demand/capacity imbalance is projected at an en route fix, route, or sector; (2) the ATCSCC to determine Air Route Traffic Control Center (ARTCC) start/end times, Airport Arrival Rate (AAR), and other parameters for a particular GDP scenario; and (3) the Airlines to see the effects of canceling or delaying a specific flights under a GDP. Flight Schedule Monitor Enhanced (FSM Enhanced) augments the existing FSM system by incorporating distance-based Ground Delay Programs (GDP), multiple-fix GDPs, airport GDPs, and playbook-based GDPs. Playbook refers to the National Playbook, which is a collection of Severe Weather Avoidance Plan (SWAP) routes that are pre-validated and coordinated with impacted ARTCCs. It is designed to mitigate the potential adverse impact to users and the FAA during periods of severe weather or other events that affect the National Airspace System (NAS).

Reports from the FSM modeling tool for each GDP include: (1) Carrier Statistics showing total minutes of delay for each flight, (2) Airborne Holding Flight Lists of arrival slots, (3) FSM Slot list, (4) Surface Delay histograms, (5) Control by Time of Arrival (CTA) Compliance Alarms for violations of arrival compliance, (6) Control by Time of Departure (CTD) Compliance Alarms for violation of Departure compliance, (7) Estimated Time En Route (ETE) on significant differences between actual vs ETMS estimated times, and (8) Spurious Flight Alarms triggered upon cancellation of false flights in a substitution stream.

Mechanism: Ground Delay Program (GDP) [725]

Ground Delay Program (GDP), enhanced, provides the following functionality: (1) A capability for both the FAA and airlines to exchange airline schedule changes in both real-time and days in advance of being effective; (2) A new ground delay program algorithm, Ration by Schedule, to eliminate penalties that were a disincentive to airlines who submitted schedule changes earlier than existing procedures allowed; and (3) The same situational awareness of traffic problems to both the FAA and the airlines. These enhancements were achieved through the Flight Schedule Monitor (FSM), the Collaborative Decision Making Network (CDM Net) and modifications to the Enhanced Traffic Management System (ETMS). The Ground Delay Program (GDP) itself is a software subsystem of ETMS.

Mechanism: Integrated Departure/Arrival Capability (IDAC) [7411]

Integrated Arrival/Departure Capability (IDAC), formerly called Departure Flow Management (DFM), is a proposed system and process concept seeking to increase departure flow efficiency by streamlining the coordination of departures from multiple airports over shared and congested NAS resources through automation, decision support, and communication capabilities. The IDAC concept provides flexible and reactive tools and procedures to account for uncertainty on the surface and in the en route airspace. The initial concept of operations (CONOPs) and high-level functional requirements have been developed, along with an initial software laboratory prototype for the high priority functional requirements such as automation of the departure release process and electronic communications with the Towers. IDAC prototype will expand this functionality by possibly including rerouting, monitoring, reporting and delay planning.

Mechanism: National Airspace System Resources System (NASR System) [69]

The National Airspace System (NAS) Resources (NASR) system is a relational data management system that collects, processes, and distributes aeronautical data in the form of electronic files, publications, and reports. NASR supports the day-to-day management of data about airports, runways, navigational aides, instrument landing systems, fixes, airways, military training routes, towers, and other fixed assets of the NAS. NASR is used to produce various aeronautical publications including the Airport/Facility Directory ("green book").

NASR, developed in 1999, is installed at the National Flight Data Center (NFDC -HQ 6th floor) and consists of a NASR processor and NFDC Workstations including the Temporary Flight Restriction (TFR) Builder. Backup (replication) systems are installed at the National Geodetic Survey (NGS) Office of NOAA and at the Technical Center. The NASR system at the Technical Center is used together with another system, the NAS Adaptation Service Environment (NASE) where the latter system performs filtering and adaptation of data to support software releases to major automation systems (e.g., STARS, ARTS, Host).

Web service access to NASR was introduced as eNASR in October 2005, hosted by a DMZ server.

Mechanism: Oceanic Flight Data Processing System (OFDPS) [635]

The Oceanic Flight Data Processing System (OFDPS) is a flight data processing system located at Combined Center and Radar Approach Control (CERAP) sites. It uses modified Oceanic Display and Planning System (ODAPS) software to provide limited flight data processing including providing paper flight strips for the Micro-EARTS system at the CERAP. OFDPS was rehosted onto new hardware using the existing OFDPS application software as part of the En Route Host/Oceanic Computer System Replacement (HOCSR) program. The OFDPS functionality will be sustained until 2011 when it may be replaced by Flight Data Processing (FDP) 2000 to achieve a common platform for future system integration.

A study of the requirements for the off-shore sites is being conducted to determine future plans for the automation. The results of the study are expected in early CY2009.

Mechanism: Operations Information System (OIS) [2329]

The Operations Information System (OIS) is an intranet processor (like the Route Management Tool (RMT)) located at the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC) and outlying Traffic Management Units (TMUs) including Air Route Traffic Control Centers (ARTCCs) and Terminal Radar Approach Control (TRACON) facilities for displaying current delay information, airport closures, significant weather information and additional National Airspace System (NAS) information that could affect the efficient flow of air traffic nationwide. Up to the minute ground delay, ground stop, deicing, and general airport delay information received from the above FAA facilities is publicly displayed via a web-based application.

Mechanism: Post Operations Evaluation Tool (POET) [2401]

The Post Operations Evaluation Tool (POET) is an analysis system that allows users of the National Airspace System (NAS), the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC), Air Route Traffic Control Centers (ARTCC), and other FAA facilities to review the functional status of the National Airspace System (NAS) and help analyze collaborative routing problems in identifying areas of NAS congestion or inefficiency. A variety of performance metrics (e.g., departure, en route, and arrival delays as well as filed versus actually flown tracks) are calculated by POET to support the analysis.

By spring 2002 POET had been deployed at 21 ARTCC facilities and participating Collaborative Decision Making (CDM) Airline Operations Centers (AOCs)/Flight Operations Centers (FOCs)

Mechanism: STARS - Terminal Enhancements (TAMR Phase 1) (STARS - Term Enhance (TAMR Phase 1)) [7169]

The Terminal Automation Modernization and Replacement (TAMR) Program provides a phased approach to modernizing the automation systems at the FAA's Terminal Radar Approach Control (TRACON) facilities and their associated Airport Traffic Control Towers (ATCT). There are three phases and this project deals with Phase 1, which is to tech refresh and enhance the automation systems at the sites with Standard Terminal Automation Replacement System (STARS). STARS - Terminal Enhancements are software modifications to improve operational use at select STARS sites. For some sites, a STARS Technical Refresh of the processor may be necessary prior to installing the software modifications.

Additional information in June 2007 Operational Evolution Partnership, Version 1.0 at URL http://www.faa.gov/about/office_org/headquarters_offices/ato/publications/oep/version1/reference/tamr/

Mechanism: Sector Design Analysis Tool (SDAT) [6340]

The Sector Design Analysis Tool (SDAT) Enterprise is an FAA owned decision support tool for post-operation analysis and engineering of airspace and traffic flows. The tool suite is primarly focused on supporting the various activities undertaken by FAA Airspace Offices at local, regional and national levels. SDAT applications include airspace visualization, traffic flow analysis, and model integration.

SDAT provides multi-facility display and analysis of the interactions between airspace and traffic. The system includes full support for FAA data sources, project management and airspace modification/design. SDAT performs analysis of potential conflicts, traffic density and traffic loading in air traffic control sectors, military airspace and other airspace volumes.

The Sector Design and Analysis Tool runs on a PC workstation. The SDAT Enterprise tool suite currently consists of three components: SDAT, the high-end visualization and analysis tool; SDAT Construct, for data and project management; and AT Vista, an air traffic control (ATC) display emulator.

Mechanism: Severe Weather Avoidance Program Enhancements (SWAP Enhancements) [736]

The Severe Weather Avoidance Program Enhancements (SWAP Enhancements) provides the initial severe weather rerouting planning capability. It also provides the weather specialists in the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC) with an automated tool that provides suggested reroutes around severe weather. One of the enhancements is to exempt facilities from a Ground Delay Program (GDP) implementation of a SWAP to prevent circumvention by substitution. SWAP Enhancements have been incorporated into TFMS-WP1 and continue to be developed.

Mechanism: Standard Terminal Automation Replacement System Software (STARS S/W) [6350]

The Standard Terminal Automation Replacement System Software (STARS S/W) provides enhanced software capabilities to safely and efficiently monitor and manage air traffic in the terminal domain. Enhancements are provided in 4 general categories as follows: (1) Interface and integration of external systems including: Precision Runway Monitor (PRM), Surface Movement Advisor (SMA), passive Final Approach Spacing Tool (pFAST), Airport Movement Area Safety System (AMASS), Noise Abatement Monitoring (NAM), Automated Barometric Pressure Entry (ABPE), active Final Approach Spacing Tool (aFAST) and Tower systems, (2) Surveillance Data Processing (SDP) enhancements including: SDP Upgrades that enhance precision and accuracy, data transfer using the All-purpose Structured EUROCONTROL Radar Information Exchange (ASTERIX) protocol, Automatic Dependent Surveillance-Broadcast (ADS-B) integration, ADS-B applications (including Surface Conflict Probe), safety function enhancements to Conflict Alert (CA) and Minimum Safe Altitude Warning (MSAW), and Ground Initiated Communications Broadcast (GICB), (3) Flight Data Processing (FDP) enhancements including: STARS to STARS interfacility and STARS flight data processing (FDP) upgrades.

Mechanism: Terminal Flight Data Manager Phase 3 (TFDM3) [7857]

TBD

Mechanism: Tower Flight Data Manager Phase 1 (TFDM1) [7520]

The Tower Flight Data Manager Phase 1 (TFDM1) implements a new Terminal local area network (LAN)-based infrastructure targeting reduction of redundancies, integration of flight data functions, and providing System Wide Information Management (SWIM) enabled flight data exchanges with other National Airspace System (NAS) subsystems. TFDM1 is the initial capability that will integrate Flight Data Input/Output (FDIO), Advanced Electronic Flight Strip (AEFS) and Electronic Flight Strip Transfer System (EFSTS), while TFDM2 will integrate the Airport Resource Management Tool (ARMT) and the Tower Data Link Services (TDLS) function.

Terminal will determine through trade studies if additional elements will be integrated, such as Departure Spacing Processor/Departure Flow Management (DSP/DFM), Automated Surface Observing System (ASOS) Controller Equipment-Information Display System (ACE-IDS), and System Atlanta Information Display System (SAIDS).

Mechanism: Tower Flight Data Manager Phase 2 (TFDM2) [7522]

The Tower Flight Data Manager Phase 2 (TFDM2) mechanism will follow TFDM1 and integrate the Airport Resource Management Tool (ARMT) and Tower Data Link Services (TDLS) functions. Terminal will determine through trade studies if additional functions will be integrated, such as Departure Spacing Program/Departure Flow Management (DSP/DFM), Automated Surface Observing System (ASOS) Controller Equipment-Information Display System (ACE-IDS) and System Atlanta Information Display System (SAIDS).

Mechanism: Traffic Management Advisor (TMA) [701]

Traffic Management Advisor (TMA) computes flight arrival sequencing, scheduled time of arrival (STA), and estimated time of arrival (ETA) at various points along the aircraft flight path to an airport. These points include an outer meter arc, the meter fix, the final approach fix, and runway threshold. In response to changing events and controller inputs, TMA provides results to the en route sector team to maintain optimum flow rates to runways. It does this by providing continual updates of meter fix STA and delay information at a speed comparable to the live radar update rates. The team defines maneuvers and issues clearances so aircraft cross the meter fixes at the STA. Since TMA calculates a schedule for arriving aircraft to meet Terminal Radar Approach Control (TRACON) facility acceptance rates set by Traffic Management Specialists (TMSs), selected airports must be the basis for a TMA deployment plan. TMA also maintains statistics on the traffic flow and the efficiency of the airport and displays them to TMSs. TMA system came online at Indianapolis and Kansas City Centers August 22, 2007, completing the system's deployment at all the centers in the continental United States.

A paper Joint Resources Council (JRC) decision was approved on 01 May 2007 and a Record of Decision (ROD) was issued.

Additional information in June 2007 Operational Evolution Partnership (OEP), Version 1.0 at URL http://www.faa.gov/about/office_org/headquarters_offices/ato/publications/oep/version1/reference/tma/

Mechanism: Traffic Management Advisor - Multi-Center Prototype (TMA-MC Prototype) [2286]

The Traffic Management Advisor - Multi-Center Prototype (TMA-MC Prototype) mechanism was designed, integrated, and deployed by the National Aeronautics and Space Administration (NASA) to the Air Route Traffic Control Center (ARTCC) facilities in the Northeast U.S. plus the Terminal Radar Approach Control (TRACON) facility at Philadelphia, Pennsylvania. The TMA-MC retains the functions of a TMA Single Center (TMA-SC) standalone mechanism, but the MC mechanism provides the additional capability to share data between facilities for automation and collaboration. In addition to each Center's TMA processor receiving data directly from their respective Host Computer System (HCS), they also exchange data via a TMA network with each other.

Each TMA within the MC network has a defined role, and each function as the Controlling, the Arrival, or the Adjacent Center TMA (or any combination thereof). The Controlling Center TMA controls the Dynamic Planner scheduler, which generates Scheduled Times of Arrival (TOA). The Arrival Center controls the meter fix that feeds the aircraft into the TRACON and airport. The Adjacent Center feeds aircraft into the Controlling and Arrival Centers. In effect, TMA MC extends the aircraft prediction and controllability horizon into upstream Centers to prevent congestion or contention on arrival paths.

The TMA-MC project was not separately funded for inclusion in the National Airspace System (NAS) but research into its functionality related to time-based metering continues.

Mechanism: Traffic Management Advisor Display (Free Flight Phase 1) (TMA Display (FFP1)) [2031]

The Traffic Management Advisor Display (Free Flight Phase 1) (TMA Display (FFP1)) is located at the Traffic Management Unit (TMU) and displays two views: The Timeline Graphical User Interface (TGUI) (TMA timeline data), and the Plan Graphical User Interface (PGUI) (Plan View Display). Separate from the TMA Display in the TMU, TMA meter list data is passed from the TMA workstation to the Host Computer System (HCS) for display on the Display System Replacement (DSR) console.

Mechanism: Traffic Management Advisor Upgrades (TMA Up) [7560]

Provides for as yet undefined upgrades for Traffic Management Advisor (TMA) supportive of the Point in Space Metering enhancements needed for NextGen. Potential enhancements include: TMA scheduling to Dynamic Metering Points with manual input, TMA scheduling to Dynamic Metering Points with automated input; and end-to-end metering.

Mechanism: Traffic Situation Display (TSD) [796]

The Traffic Situation Display (TSD) is a computer system that receives radar track data from Air Route Traffic Control Centers (ARTCCs), organizes this data into a mosaic display, and presents it on a computer screen to monitor any number of traffic situations or system-wide traffic flows. The display allows the traffic management coordinator (TMC) multiple methods of selection and highlighting of individual aircraft or groups of aircraft. The user has the option of superimposing these aircraft positions over any number of background displays. These background options include ARTCC boundaries, any stratum of en route sector boundaries, fixes, airways, military and other special use airspace (SUA), airports, and geopolitical boundaries. Comments in Quantity section indicates that these TSDs are the separate displays in FAA facilities for showing nation-wide traffic views generated by the ETMS system rather than the TSD displays which are part of ETMS itself.

Mechanism: Unified Decision Management System (UDMS) [6309]

The Unified Decision Management System (UDMS) is a program construct that carries operational enhancements to the Collaborative Decision Making (CDM) process between National Airspace System (NAS) users and the FAA. These operational enhancements are thought to be needed to share flight schedules, plan traffic management initiatives (e.g., Ground Delay Programs), provide advanced traffic flow predictions, and other NAS data electronically. NAS users need to gain access to more sophisticated graphical and textual traffic flow predictions, as well as automated planning and analysis tools than is available now. The UDMS construct will provide the framework to develop and document these needed operational enhancements for collaborative decisions. UDMS is not a planned future stand-alone system.

Mechanism: User Request Evaluation Tool Core Capability Limited Deployment (URET CCLD) [307]

As of June 2006 the FAA had deployed its URET (user request evaluation tool) at Miami's Air Route Traffic Control Center, making the conflict probe operational at all 20 FAA ATC centers around the 48 contiguous states.

The User Request Evaluation Tool Core Capability Limited Deployment (URET CCLD) provides conflict probe capabilities to the data controller display in Air Route Traffic Control Center (ARTCC) facilities. URET combines real-time flight plan and radar track data with site adaptation, aircraft performance characteristics, and winds and temperatures aloft to construct four dimensional flight profiles, or trajectories, for pre-departure and active flights. For active flights, it also adapts itself to the observed behavior of the aircraft, dynamically adjusting predicted speeds, climb rates, and descent rates based on the performance of each individual flight as it is tracked through en route airspace, all to maintain aircraft trajectories to get the best possible prediction of future aircraft positions. URET uses its predicted trajectories to continuously detect potential aircraft conflicts up to 20 minutes into the future and to provide strategic notification to the appropriate sector. URET enables controllers to "look ahead" for potential conflicts through "what if" trial planning of possible flight path amendments. URET enables controllers to accommodate user-preferred, off-airway routing to enable aircraft to fly more efficient routes, which reduce time and fuel consumption.

URET CCLD communicates with the controller at the Display System Replacement (DSR) D-position by means of a gateway to the DSR local area network (LAN). It obtains flight plan and track data from the Host Computer System (HCS) by direct connection, and it obtains wind, temperature and pressure data from Weather and Radar Processor Weather Information Network Server (WARP WINS) by means of a gateway. URET CCLD is deployed to six (6) sites and will be expanded to 20 under the URET National Deployment activity of Free Flight Phase 2 (FFP2).

Mechanism: User Request Evaluation Tool National Deployment (URET National Deployment) [687]

On 01 June 2006 the FAA announced the final deployment of the User Request Evaluation Tool (URET). With initial daily use (IDU) at Miami Air Route Traffic Control Center (ARTCC), ICAO Code KZMA, URET is now operational at all 20 FAA Air Route Traffic Control Centers (ARTCC) in the 48 contiguous states.

The User Request Evaluation Tool (URET) is a conflict probe decision support system. URET provides four key capabilities to Air Route Traffic Control Center (ARTCC) facilities: (1) Aircraft-to-aircraft conflict detection, (2) Aircraft-to-airspace conflict detection, (3) Evaluation of user or controller request for flight plan amendments or route changes; and (4) Enhanced flight data management. This tool allows controllers to determine whether requests for direct routes can be approved without conflicting with other flights or airspace restrictions.

URET began deploying nationally in FY 2003. No software builds are contemplated after FY 2006.

LAN

Mechanism: Air Traffic Operations Management System (ATOMS) [284]

The Air Traffic Operations Management System (ATOMS) consists primarily of two essential operational support programs, the National Offload Program (NOP) and the Workforce Management Toolset (WMT). NOP collects National Airspace System (NAS) data from over 300 field sites and makes it available both internal and external customers for analysis and decision support. WMT provides an integrated tool set to address needs such as hiring, training, scheduling, staffing, performance measurement, and decision support. ATO managers, including headquarters, Service Area, District Offices, and service delivery point managers, are responsible for making strategic business, and tactical operational decisions based on timely, accurate, and consistent information, as well as efficiently managing and capital resources. The Workforce Management Toolset is a comprehensive, resource management toolset that relies on a standardized, best practice approach for the determination of requirements and the procurement or development of software applications. Unlike many legacy systems within the ATO that are stand-alone applications, targeted to a limited audience, do not share data, redundant to other systems, costly to change, and do not offer standardized information delivery, WMT will consolidate many legacy systems within a common suite of applications. These applications will utilize web technology and web services to share both common application code and data. Reduced user logons and passwords would allow all ATO employees to securely access their customized applications, datasets, and reports.

Mechanism: Host Interface Device/National Airspace System Local Area Network (HID/NAS LAN) [80]

The Host Interface Device/National Airspace System Local Area Network (HID/NAS LAN) is a two-way high-bandwidth LAN connection to the Host Computer System (HCS) to support network capable processing and processes. In short, legacy systems exchange data with HCS via the En Route Communications Gateway (ECG), while systems with network interfaces use HID. The data exchanged by the HCS through HID is all inclusive (surveillance and flight data) and consist of two types of users: those that incorporate the HID Application Protocol Interface (API) and use the Point of Presence database system called the Host ATM Data Distribution System (HADDS) and all others, which use their own API and don't use the HADDS. One system that doesn't use the HID API or HADDS is the Store and Forward Application (SAFA). SAFA is part of the FAA's National Offload Program (NOP), which collects data from all En Route automation systems for strategic analysis. The HID also distributes HCS data directly (not via HADDS) to two remote external locations: U.S. Customs and Border Protection agency of the Department of Homeland Security (DHS) and the North Atlantic Treaty Organization (NATO).

HADDS exchanges messages using a common format called the Common Message Set (CMS), which is designed for use by the Traffic Management Advisory (TMA) and the Enhanced Traffic Management System (ETMS) (being transitioned from the En Route Communications Gateway (ECG). It is anticipated that the En Route Automation Modernization (ERAM) infrastructure will include a LAN replacement of the HID/NAS LAN. ERAM will also include a new Point of Presence processor, similar to HADDS, and will continue to use CMS, but an extended version of it called CMA+.

Mechanism: Terminal Data Distribution System (TDDS) [7556]

The Terminal Data Distribution System (TDDS) is part of the new Terminal local area network (LAN) based architecture implemented by System Wide Information Management (SWIM) to facilitate flight message exchange with other National Airspace System (NAS) systems. The TDDS attaches to the Terminal Flight Data Manager (TFDM), which collects and formats flight messages using the Common Message Set (CMS) format, and functions as the Point of Presence (POP) database system to enable SWIM message exchanges between Tower Flight Data Manager (TFDM), En Route Automation Modernization (ERAM), Traffic Management Advisor (TMA), and Traffic Flow Management System (TFMS).

Mechanism: NOTAMs Distribution Program (NDP) [6966]

The Notice to Airmen (NOTAMs) Distribution Program (NDP) provides a standardized, automated NOTAMs distribution system that ensures that NOTAMs are delivered to FAA Air Traffic Control (ATC) facilities in a timely, accurate, and reliable manner. NOTAMs inform pilots of changes in conditions in the National Airspace System (NAS). The program originated from a June 2001 FAA memorandum which identified weaknesses in the then current NOTAMs distribution method, emphasizing the urgent need for a replacement system to help ensure that critical safety information reaches the pilot and other system users. NDP deployments are dependent upon the availability of FAA Telecommunications Infrastructure (FTI) Internet protocol services at facilities that will receive the NOTAMs Distribution System (NDS).

The NDP will automate, standardize, and provide centralized NOTAMs dissemination to approximately 700 FAA facilities by the end of FY 2010, using reliable telecommunications provided by the FTI network.

Processor

Mechanism: Advanced Technologies & Oceanic Procedures NextGen (ATOP NG) [7852]

TBD

Mechanism: Advanced Technologies & Oceanic Procedures/Offshore Automation (ATOP/Offshore Automation) [7853]

TBD

Mechanism: Advanced Technologies and Oceanic Procedures (ATOP) [1737]

The Advanced Technologies and Oceanic Procedures (ATOP) program replaced oceanic air traffic control systems and procedures and modernized the Air Route Traffic Control Center (ARTCC) facilities at Oakland, New York, and Anchorage. The ATOP program fully integrated flight and radar data processing, detects conflicts between aircraft, provides data link and surveillance capabilities, and automated the manual processes used previously. ATOP also reduced the workload on controllers through the use of electronic flight strips instead of the paper strip method used for decades to track trans- oceanic aircraft.

ATOP achieved full operating capability (FOC) at the New York, Oakland, and Anchorage ARTCCs in March 2005, October 2005, and April 2007, respectively.

The program provided the FAA the automation, Automatic Dependent Surveillance-Contract (ADS-C), and conflict resolution capability required to reduce aircraft separation from 100 nautical miles (nmi) to 30 nmi. ATOP also allows the FAA to meet international commitments and helps the FAA avoid losing delegated airspace used by air carriers and military flights.

Since the ATOP hardware was procured in 2001 many components have reached end of life. The present contract has provisions for technology refresh in FY 2008 to initiate ATOP hardware technology refresh at the FAA William J. Hughes Technical Center (WJHTC) and Oakland Air Route Traffic Control Center (ARTCC). This is part of the plan to implement a total system upgrade midway through the planned ATOP system life cycle. The refresh is scheduled to replace operating systems and all major system components (e.g., servers, workstations, communications switches, and interface gateways) with state-of-the-art components available at that time.

The technology refresh is planned for 2008-2009.

Mechanism: Aeronautical Information Management Modernization Segment 1 (AIM Modernization Segment 1) [6327]

The Aeronautical Information Management (AIM) system represents the evolution of the acquisition, storage, processing, and dissemination of aeronautical information (AI) in the National Airspace System (NAS). AI is defined as any information concerning the establishment, condition, or change in any component (facility, service, or procedure, or hazard) of the NAS. AI comes in two types with one being a somewhat static type, and the other being a more dynamic type. The static portion represents the AI baseline as of a particular date, while the dynamic portion updates particular aspects of the static portion due to system impacts or events. The static portion represents data that NAS automation systems and other users use to adapt their software to properly operate. The dynamic portion represents information typically contained in Notices to Airmen (NOTAMs) that indicate short-term changes to the static data.

Many NAS systems support the acquisition, generation, and dissemination of the static AI. Information of this type includes airspace structures, airways, locations of NAS facilities, inter-facility letters of agreement, and memorandums of understanding, obstructions, standard procedures, airspace charts, etc.

Several NAS systems also support the acquisition, generation, processing, and dissemination of the dynamic AI. Information of this type includes, facility outages, runway closures, temporary flight restrictions (TFR), airspace constraints, Significant Meteorological Advisory (SIGMETs), etc. This information must be disseminated to users and providers of air traffic services in a timely and efficient manner.

The Federal NOTAM System (FNS) will provide a single, central point for the dissemination of high quality, configuration controlled, information to NAS systems, service providers, and users of the NAS. The AI servers at the Air Traffic Control System Command Center (ATCSCC) and the National Network Control Center (NNCC) will undergo a technical refresh and backup sites will be established for failover and load balancing.

The FNS will then be enhanced to disseminate data based on the Aeronautical Information Exchange Model (AIXM) protocols. AIXM will comply with and extend SWIM Service Oriented Architecture (SOA) governance enabling the acquisition, management, and distribution of the digital NOTAM. Additionally, AIM Modernization complies with SWIM Governance in the area of SAA information distribution which is a SWIM Segment 1 System Integration Program (SIP). SAA information is constructed from MAMS, SAMS and CARF data and represents both FAA and DoD special use area restrictions.

Mechanism: Aeronautical Information Management Modernization Segment 2 (AIM Modernization Segment 2) [7603]

Aeronautical Information Management (AIM) Modernization Segment 2 expands the Federal NOTAM System (FNS) capabilities established in AIM Modernization Segment 1 and enables additional System-Wide Information Management (SWIM) users to obtain Aeronautical Information (AI) using the AIXM standard. The AI interfaces will be modified to comply with SWIM Segment 2 Governance and be extended, as necessary, to provide advance dynamic airspace management (ADAM) capabilities. ADAM capabilites included in AIM Modernization Segment 2 are distribution of: airport Geographic Information System (GIS) and other fixed assets from the National Airspace System Resource (NASR) system. [Beginning in FY 08 all airport and aeronautical surveying projects sponsored or funded by the FAA will be required to meet the standards and processes spelled out in the Airport-GIS program (https://airports-gis.faa.gov/airportsgis/).]

The Federal Aviation Administration's (FAA) temporary flight restriction (TFR) NOTAM prototype project demonstrated that AIXM Features could be used to encode and transmit NOTAM information in a GIS format. The output from the TFR NOTAM prototype project leverages ESRI ArcGis technology to produce text and map representations of NOTAMS on the FAA's official TFR web site. [Please refer to http://tfr.faa.gov for details.] Alternatively, the Geography Markup Language (GML), an open systems standards-based approach to representing geometries in XML, could be used to reduce the need to customize interfaces to Commercial Off-the-Shelf (COTS) packages such as ArcGis.

Mechanism: Aeronautical Information Management Modernization Segment 3 (AIM Modernization Segment 3) [7604]

Aeronautical Information Management (AIM) Modernization Segment 3 continues with the integration of Aeronautical Information (AI) capabilities of AIM Modernization Segment 2 with the addition of airspace design and analysis products. Capabilities and interfaces will also be extended to comply with SWIM Segment 3 Governance and to uplink AI to suitably equipped aircraft using the Aeronautical Telecommunication Network (ATN), Next Generation Air/Ground Communications (NEXCOM), Satellite Communications, or Flight Information Service-Broadcast (FIS-B) via Ground Based Tranceivers (GBT). Funding has not been forecast for AIM Modernization Segment 3.

Mechanism: Aeronautical Information System Replacement (AISR) [2379]

The Aeronautical Information System Replacement (AISR) is a web-based replacement system for the obsolete, maintenance intensive, non-Year 2000 (Y2K) compliant Leased A and B service (LABS) GS-200 system. AISR provides a workstation to: (a) process flight plans (file, amend, cancel, store, and transmit) including International Civil Aviation Organization (ICAO) flight plans, (b) retrieve aeronautical weather from the Weather Message Switching Center Replacement (WMSCR) system, and (c) process Notice to Airmen (NOTAM) (collect and distribute). The AISR uses the FAA Internet Protocol (IP) Routed Multi-user Net (FIRMNet) for access by 60+ flight data (FD) specialists in Air Route Traffic Control Centers (ARTCCs), 60+ in Automated Flight Service Stations (AFSSs), and 10+ in FAA Regional Offices (ROs). It uses Non-classified IP Router Network (NIPRNet) for access by 60+ Military Base Operations (MBOs), dedicated lines for access by 20+ Meteorological Weather Processing Centers and National Airspace Data Interchange Network (NADIN) Packet-Switched Network (PSN) for access to the WMSCR system. Alternate access is available via toll free service to a local service provider. The primary AIS server is located in the National Network Control Center (NNCC) Salt Lake City facility and the back-up server is located in Chantilly Virginia.

The NAS Aeronautical Information Management Enterprise System (NAIMES) was an "enabler" providing customers and stakeholders with "one-stop" access to critical aeronautical information products and services. NAIMES concepts facilitate the transition of NAS operations from the legacy system-centric (point-to-point) to network-centric (point-to-cloud) by utilizing both new and existing infrastructure, and developing associated policies and standards. As of the spring of 2007 NAIMES is now called Aeronautical Information Management (AIM). It is in the Air Traffic Organization (ATO) System Operations' Airspace and Aeronautical Information Organization. AIM is the data steward for critical NAS aeronautical information including Notices to Airmen (NOTAM) messages, graphical Temporary Flight Restrictions (TFRs), flight plans, and alphanumeric weather products.

AIM Modernization will upgrade and enhancement seven existing systems: NAS Resources (NASR), the U.S. NOTAM System (USNS), the Defense Internet NOTAM service (DINS), the NAS operational Internet Access Point (IAP) service, the Central Altitude Reservation Function (CARF), Aeronautical Integrated Data Access Portal (AIDAP), and the Aeronautical Information System Replacement (AISR).

Initial policy changes were made in October 2007. Effective February 2008 a General Notice aligns NOTAM D criteria with ICAO NOTAM criteria and eliminates L NOTAMs (except for military base operations). By 2009 the goal is to have a single federal NOTAM system that is ICAO compliant. The next decade should see the system have digital and graphical capabilities – which will be required for the Next Generation Air Transportation System (NextGen).

For the most recent information check the Service Level Review Briefings and Minutes which are located at URL http://ipm.faa.gov/jrc/decisions_minutes/SLRmins.cfm

Mechanism: Airport Movement Area Safety System (AMASS) [228]

The Airport Movement Area Safety System (AMASS) with Airport Surface Detection Equipment (ASDE) provides controllers with automatically generated visual and aural alerts of potential runway incursions and other potential unsafe conditions. AMASS includes the Terminal Automation Interface Unit (TAIU) that processes arrival flight data from the Terminal Approach Control (TRACON) automation system and beacon target data from the Airport Surveillance Radar (ASR) and generates a track. The track is compared with the movement of aircraft and ground vehicles on the airport surface based upon surveillance data from the Airport Surface Detection Equipment (ASDE-3). AMASS adds to the ASDE-3 by presenting alarms to the tower controllers when evasive action is required. AMASS integrates and displays data from ASDE-3 and the ASR. The FAA has installed AMASS at the nation's top 34 airports.

Mechanism: Airport Resource Management Tool (ARMT) [6937]

The Airport Resource Management Tool (ARMT) incorporates flight status data from the Atlanta Surface Movement Advisor (SMA), a prototype developed for use at the Hartsfield-Jackson Atlanta International Airport (KATL) by the National Aeronautics and Space Administration's (NASA) Ames Research Center in conjunction with the FAA and the major airline users at Atlanta. The ARMT gathers additional flight information from the Atlanta Common Automated Radar Terminal System (CARTS) IIIE and the manual scanning of bar coded paper flight strips at the Atlanta Airport Traffic Control Tower (ATCT). This manual bar code scanning is used to produce a near real-time recording of taxi clearance and takeoff clearance times. The ARMT also captures the traffic flow management (TFM) constraints, airport configuration and weather conditions currently in effect. The ARMT prototype system is also in the Potomac TRACON and the Chicago TRACON.

Mechanism: Alaska Flight Service Station Modernization (Alaska FSS Mod) [7286]

The Alaska Flight Service Modernization (AFSM) initiative consists of three parts: (1) automation system modernization including voice switches at the Automated Flight Service Stations (AFSS), (2) facility modernization, and (3) redundant operations/business continuity. The program objectives include increasing the margin of general aviation (GA) safety in Alaska through modernization of systems and facilities, providing capacity to meet growing air traffic technology/modernization demands, expanding accessibility of services to Alaska aviation users, and providing productivity increases while reducing operational costs. System automation upgrades are planned to be accomplished with three Work Packages.

The program provides funding to modernize the FAA Flight Service Station (FSS) capabilities in Alaska in order to provide the same level of flight services as in the conterminous United States (CONUS). As an interim measure, the FAA implemented the Operational and Supportability Implementation System (OASIS) at the three AFSS facilities and 14 Alaskan Flight Service Stations during the spring of 2007. Fielding OASIS in Alaska enabled the FAA to replace the aging Model 1 Full Capacity at the AFSS facilities and the Flight Service Data Processing System at the Anchorage Air Route Traffic Control Center (ARTCC) as both were becoming unsupportable. The non-National Airspace System (NAS) baselined legacy systems will also be removed. Moreover, OASIS enables the FAA to both upgrade and sustain Alaskan flight services until a longer-term AFSM solution can be fielded via the FAA acquisition process.

Mechanism: Automated Radar Terminal System - Model IIIA (ARTS IIIA) [1]

The Automated Radar Terminal System - Model IIIA (ARTS IIIA) provides radar data processing (RDP) and decision support tools to the controller in the terminal environment. STARS and CARTS IIIE have replaced the ARTS IIIA at all sites except for the Dayton, OH TRACON. That system will remain in use until replaced by STARS. The Dayton, OH TRACON facility upgrade is scheduled to be completed in 2010.

ARTS provides continuous real-time support to air traffic controllers at terminal sites including surveillance/tracking, controller data entry and display, aircraft separation assistance (safety functions), flight plan processing, data recording, external data publishing, and system monitoring and control functions. The system processes and tracks primary and secondary radar (beacon) derived aircraft data and displays it on an air traffic situation display together with broadband video. The processed data is automatically and semi-automatically displayed in the form of symbology and alphanumerics representing aircraft position, identification, Mode C pressure altitude, target velocity and radar beacon code readout. The system permits the operator (air traffic controller) to enter or retrieve data and selectively display, alter or delete data consistent with operational needs, In addition, it provides the capability for intra-facility communication of stored and active air traffic control information as well as data/message interchange with ARTCC computer systems. An on-line capability to generate and control simulated aircraft targets for training purposes is also be available.

Mechanism: Collaborative Air Traffic Management Technologies Work Package 3 (CATMT WP3) [6601]

The Collaborative Air Traffic Management Technologies Work Package 3 (CATMT WP3) segment will accommodate the development of Integrated Departure/Arrival Capability (IDAC), Collaborative Information Exchange (CIX), and other functions needed for NextGen.

IDAC is planned to be a collection of functions which manage aircraft departures from multiple airports over shared and congested National Airspace System (NAS) resources via improved decision support capabilities and information exchange.

Collaborative Information Exchange is a package of enhancements focused on better sharing of information with NAS customers to improve their flight planning, and is expected to allow NAS customers to submit their intent options to satisfy traffic management contraints imposed to manage congestion, while meeting the business objectives of the NAS customer.

TFMS remote site re-engineering is also planned to be included in this Work Package. TFMS hub site re-engineering has been completed as part of CATMT-WP1. Goal of the re-engineering efforts overall is to integrate TFMS subsystems, and to facilitate integration of TFMS with other FAA systems using modern software architecture and components. Previous infrastructure was introduced in the early 1980's, and until it is replaced, current obsolete technology cannot accommodate functional improvements. Proposed effort in this work package would complete TFM-Moderniation by extending re-engineering to remote sites.

Mechanism: Collaborative Air Traffic Management Technologies Work Package 4 (CATMT - WP4) [7884]

CATMT-WP4 will consist mainly of software releases that will provide the necessary functionalities to integrate the modernized TFMS with the Next Generation Air Traffic System (NextGen).

Mechanism: Common Automated Radar Terminal System - Model IIE (CARTS IIE) [286]

The Common Automated Radar Terminal System - Model IIE (CARTS IIE) provides radar data processing (RDP) and decision support tools to the controller in the terminal environment. Utilized at low to medium-size Terminal Radar Approach Control (TRACONs) facilities the ARTS IIE is capable of receiving input from up to two sensors, can process up to 256 tracks simultaneously, and support up to 22 displays. CARTS provides continuous real-time support to air traffic controllers at terminal sites including surveillance/tracking, controller data entry and display, aircraft separation assistance (safety functions), flight plan processing, data recording, external data publishing, and system monitoring and control functions.

CARTS performs the following functions:
a. Track Processing (TP) – tracks aircraft and provides track and radar data to the LAN
b. Common Processing (CP)- provides flight plan processing, safety functions [Minimum Safe Altitude Warning (MSAW), Conflict Alert (CA), Mode C intruder alert, Converging Runway Display Aid (CRDA), and Controller Automation Spacing Aid (CASA)], ARTCC interface processing, keyboard functional processing, Digital Altimeter Setting Indicator (DASI) interface processing, and ETMS interface processing
c. Display Processing (DP)- provides controller display and keyboard functions and provides the interface to tower displays
d. System Monitoring Console (SMC)- provides system management for CARTS hardware and software
e. ARTS Gateway Processing (AGW)- shares data with external systems
f. ARTS Radar Gateway (RGW)- provides most CARTS functions on an independent LAN for backing up the primary LAN functions
g. Subsystem Interface Subsystem (SSI)- provides the LAN

The TP, CP, and SMC functions can be combined into one processing element or each subsystem can be a separate processing element.

Mechanism: Common Automated Radar Terminal System - Model IIIE (CARTS IIIE) [11]

The Common Automated Radar Terminal System - Model IIIE (CARTS IIIE) consists of the hardware platform and software required providing radar data processing (RDP) and decision support tools to the controller in the terminal environment. The ARTS IIIE is used at consolidated Terminal Radar Approach Control (TRACON) facilities. The Common ARTS program provided an ARTS IIIE capable of receiving input from up to 15 sensors, the ability to process up to 10,000 tracks simultaneously, and support up to 223 displays. CARTS provides continuous real-time support to air traffic controllers at terminal sites including surveillance/tracking, controller data entry and display, aircraft separation assistance (safety functions), flight plan processing, data recording, external data publishing, and system monitoring and control functions.

CARTS performs the following functions:
a. Track Processing (TP) – tracks aircraft and provides track and radar data to the LAN
b. Common Processing (CP)- provides flight plan processing, safety functions [Minimum Safe Altitude Warning (MSAW), Conflict Alert (CA), Mode C intruder alert, Converging Runway Display Aid (CRDA), and Controller Automation Spacing Aid (CASA)], ARTCC interface processing, keyboard functional processing, Digital Altimeter Setting Indicator (DASI) interface processing, and ETMS interface processing
c. Display Processing (DP)- provides controller display and keyboard functions and provides the interface to tower displays
d. System Monitoring Console (SMC)- provides system management for CARTS hardware and software
e. ARTS Gateway Processing (AGW)- shares data with external systems
f. ARTS Radar Gateway (RGW)- provides most CARTS functions on an independent LAN for backing up the primary LAN functions
g. Subsystem Interface Subsystem (SIS)- provides the LAN

The TP, CP, and SMC functions can be combined into one processing element or each subsystem can be a separate processing element.

Mechanism: Common Automated Radar Terminal System IIIE (CARTS IIIE) - TAMR Phase 2 (CARTS IIIE - TAMR Phase 2) [7645]

Although STARS is intended eventually to replace the Common ARTS systems, the FAA has decided to defer that transition further until they can determine what smaller terminal facilities, if any, might best be consolidated into larger area facilities in the future. This redirected program is called Terminal Automation Modernization and Replacement (TAMR).

The Common Automated Radar Terminal System (CARTS) IIIE - TAMR Phase 2 program segment has two parts. The first part will replace the aging Full Digital Automated Radar Terminal System (ARTS) Displays (FDAD) at four CARTS IIIE FDAD sites (Chicago, Denver, Minneapolis, and St. Louis) with ARTS Color Displays (ACD) and local area networks upgrades. These new color displays will help controllers better discern weather intensity, thereby improving safety.

In addition, CARTS sites have insufficient computer memory and data processing capability to accommodate implementation of the additional functionality required to support the predicted air traffic growth requirements. The second part of the CARTS IIIE - TAMR Phase 2 program segment is a technology refresh (TR) to prepare these 4 CARTS IIIE systems for future implementation of FAA strategic initiatives.

[Note that the TAMR Phase 3 program is intended to enhance the services provided to the remaining 106 CARTS sites by replacement with newer state-of-the-art digital, radar and flight data processing and display systems (STARS or CARTS with an ARTS Color Display).]

Mechanism: Common Automated Radar Terminal System IIIE (CARTS IIIE) - TAMR Phase 3 (CARTS IIIE - TAMR Phase 3) [7642]

Although STARS is intended eventually to replace the Common ARTS systems, the FAA has decided to defer that transition further until they can determine what smaller terminal facilities, if any, might best be consolidated into larger area facilities in the future. This redirected program is called Terminal Automation Modernization and Replacement (TAMR).

Standard Terminal Automation Replacement System (STARS) - Terminal Automation Modernization and Replacement (TAMR) Phase 3 will enhance STARS Terminal Radar Approach Controls (TRACONS) and/or replace Common Automated Radar Terminal System (CARTS) at the 106 TRACONS not yet modernized. The 106 sites include 7 CARTS IIIEs and 99 CARTS IIEs. The 7 CARTS IIIE sites represent some of the largest and busiest commercial and general aviation facilities in the NAS. The CARTS IIIE - TAMR Phase 3 segment, if implemented, would upgrade the CARTS IIIE systems to meet future operations.

A goal of TAMR Phase 3 will be to contribute to the decision to identify common front end display hardware beginning in 2010. The program would enhance the services provided to these locations by capitalizing on existing and new to state-of-the-art digital, radar and flight data processing and display systems.

The FAA will continue to sustain the automation systems at these sites while monitoring system performance to identify any risk to service presented by these systems. Modernization or replacement of these systems will be evaluated and performed incrementally on a risk-to-service basis and will be aligned with other Air Traffic Control Tower (ATCT) and TRACON replacement and improvement program activities. Other Agency strategic initiatives, such as Data Communications (DATACOMM) Segment 2 and the Next Generation (NextGen) Automation Platform (NAP), may also require the modernization or replacement of these systems.

Mechanism: ERAM Program Baseline (ERAM) [8053]

tbd

Mechanism: En Route Automation Modernization Release 1 (ERAM R1) [6685]

The En Route Automation Modernization System Release 1 (ERAM R1) replaces aging Air Route Traffic Control Center (ARTCC) automation systems at 20 operational locations, which support air traffic control (ATC) in designated sectors, typically of high altitude traffic. ERAM R1 is the first of several incremental releases planned for ARTCC modernization that will employ a new infrastructure, supporting an evolution through multiple subsequent baselines: ERAM Program Baseline (also including ERAM-R2 and ERAM-R3), Post ERAM R3 Work Package, En Route Automation NextGen Mid-Term Work Package, and En Route Automation NextGen Far-Term Work Package. The ERAM R1 will replicate the functionality of the following systems: (a) Host Computer System (HCS), (b) Enhanced Backup Surveillance (EBUS) which replaced the Direct Access Radar Channel (DARC) backup system, (c) Host Interface Device NAS LAN (HNL), and (d) the En Route Application Infrastructure (EAI), otherwise known as User Request Evaluation Tool (URET). In addition to outright replacement of these four systems, ERAM's tight design coupling with the Display System Replacement (DSR) essentially renders DSR to be henceforth included as part of the ERAM system. Although URET is replaced, the functionality of Conflict Probe is retained in ERAM.

Legacy systems being retained are: En Route Communications System (ECG), and En Route Information Display System (ERIDS). Other than requiring interface modifications, the functions of ECG remain unchanged, while the functions of HADDS are incorporated into ERAM R1. ECG will exchange surveillance (serial) data and flight/flow (serial and parallel) data. However, the goal is to have systems exchange flight/flow data directly using standard formatting and application protocol.

Once ERAM-R1 is installed, an end-to-end national adaptation can be applied to each ARTCC rather than individual facility adaptations being used, as is the case now. By making flight data available for flights within proximity to (but not necessarily within) an ARTCC's airspace, Area of Interest (AOI) processing can increase situational awareness by one ARTCC into another ARTCC's airspace.

ERAM is a dual-redundant (primary and backup) system with identical functionality on both operational "channels". It provides a separate on-site Training system for on the job training of both Air Traffic and Airways Facility personnel. In addition to equipping the 20 ARTCCs in the continental United States, it will provide equipment to the FAA William J. Hughes Technical Center and to the FAA Academy.

ERAM and its associated hardware, software and backups will be the backbone of En Route operations. The enhanced infrastructure is designed to support the evolution to the Next Generation Air Transportation System. The FAA has identified this program as a 'contributor' technology for NextGen. It is expected to increase system capacity in order to meet projected demand. Using ERAM, the number of aircraft that each center can track is expected to rise from 1,100 to 1,900 and the number of radars each center can support will increase from 24 to 64.

ERAM- R1 systems have been installed and accepted by the Government beginning with Salt Lake City ARTCC in April 2008, and continuing through the following operational ARTCCs: Seattle, Denver, Albuquerque, Kansas City, Minneapolis, Memphis, Indianapolis, Jacksonville, and Cleveland. The installation/Government Acceptance waterfall will continue with all remaining ARTCCs into early 2009. Projected actual date for Initial Operational Capability (IOC) begins in February 2009, again with Salt Lake City ARTCC.

Mechanism: En Route Automation Modernization Release 2 (ERAM R2) [6699]

En Route Automation Modernization Release 2 (ERAM R2) continues the evolution ramp by adding more new high-level functionality inherent in ERAM and by taking advantage of new capabilities being developed in parallel (Surveillance and Broadcast Services (SBS), System Wide Information Management (SWIM), Traffic Flow Management System (TFMS)).

Depending on the progress of these separate developments, the following capabilities are planned for synchronization with ERAM R2 but may slip to ERAM R3:

(a) Accept, process, and display SBS (Segment 1) surveillance data from aircraft operating in the Gulf of Mexico (GoMex) area [and possibly in the Rocky Mountain area] where no radar data are available. The SBS position data will be accepted in either All-purpose Structured EUROCONTROL Radar Information Exchange (ASTERIX) or common digitizer model 2 (CD-2) format but will be limited to display purposes only (ERAM R2 will not fuse SBS data with other sensor data and will not use SBS to reduce separation to 3-miles);

(b) Use SWIM Seg 1 to exchange flight/flow data with TFMS (SWIM replaces ERAM Host Air Traffic Management Data Distribution System (HADDS)). This will enable exchange of pre-flight flight plans and amendments, to include flight data ownership;

(c) Use SWIM Seg 1 to accept reroute amendments for pre-departure aircraft from TFMS;

(d) ERAM R2 will use SWIM's Weather Message Switching Center Replacement (WMSCR) capability to receive pilot report (PIREP) data from aircraft and display it to the air traffic controller, who will forward it to other aircraft;

(e) Accept icing, turbulence, and lightning weather products from the Weather and Radar Processor (WARP) system.

In addition to the above dependent capabilities, ERAM will add new functionality for Enhanced Required Navigation Performance (RNP) filing and assignment of adapted RNP routes and initial controller conflict resolution aids. This is intended to resolve speed and altitude conflicts from the D-side and will be based on the MITRE Center for Advanced Aviation System Development (CAASD) research on Problem Analysis, Resolution, and Ranking (PARR) capability.

Mechanism: En Route Automation Modernization Release 3 (ERAM R3) [7401]

En Route Automation Modernization Release 3 (ERAM R3) is the last of the three software releases intended to exploit the Initial Baseline of ERAM. In addition to planned R3 capabilities, any external capabilities upon which ERAM R2 was dependent but which failed to be implemented as planned, will be absorbed into ERAM R3. These new capabilities being developed in parallel consist of the following: Surveillance Broadcast Services (SBS), System Wide Information Management (SWIM), Traffic Flow Management System (TFMS), and Tower Flight Data Manager (TFDM).

The following capabilities are planned for ERAM R3:

(a) Subject to SBS Segmt. 2 program implementation success, process and display Automatic Dependent Surveillance-Broadcast (ADS-B) Segmt. 2 surveillance data from aircraft throughout the National Airspace System (NAS) where no radar data are available.

(b) Subject to the approval of Reduced Separation Standards (process to be initiated by the SBS program office) and the availability of ADS-B data from aircraft, provide reduced separation service from 5-miles to 3-miles.

(c) Use SWIM Segmt. 1 to accomplish the following: (1) Accept automated execution of Traffic Flow Management (TFM) Reroutes (and controller interfaces thereof) from the Traffic Flow Management System (TFMS), (2) Accept aircraft status data from Terminal, (3) Send Pre-Departure Clearance (PDC) data to Terminal, and (4) Exchange flight data with Terminal in lieu of flight data input/output (FDIO), i.e., replace FDIO in those facilities. Note: Terminal will employ two new systems to exchange data via SWIM between ERAM, TFMS, and Terminal: the Tower Flight Data Manager (TFDM) to collect aircraft status data, which replaces EFS, and the Terminal Data Distribution System (TDDS) for exchanging data.

Mechanism: En Route Automation Modernization Release 4 (ERAM R4) [7402]

Following completion of the En Route Automation Modernization (ERAM) Baseline, which focused primarily on implementing the System Wide Information Management (SWIM) Segmt. 1 standards for flight data processing, the evolution continues with the Post ERAM Baseline releases. Two of the three releases are additional capability combined with a hardware technology refresh. ERAM Release 4 (ERAM R4) will add major new scope to ERAM and serve as a testbed to support research and FAA Joint Resources Council (JRC) decisions for the Mid Term ERAM that will follow. All of the Post ERAM Baseline releases support SWIM Segment 2 and DataComm Segment 1 which may affect the hardware significantly.

ERAM R4 capabilities consist of the following:

(a) Begin to use DataComm to provide the following: (1) controller/pilot communications, and (2) clearance delivery and controller/pilot communications in support of pre-departure amendments,

(b) Continue to accept Automatic Dependent Surveillance-Broadcast (ADS-B) data from ADS-B Segment 2 for target display purposes only,

(c) Begin to convert external interfaces to Internet Protocol (IP) and accept data directly into ERAM (leading to removal of the En Route Communications Gateway (ECG),

(d) Improve Conflict Resolution Aids for controllers,

(e) Accommodate the common interface following the planned integration of Weather and Radar Processor (WARP) and the Corridor Integrated Weather System (CIWS). Note that in May 2007 it was decided to fund and develop each program separately.

(f) Use SWIM Segment 2 to exchange the following data via Terminal Flight Data Manager 2 (TFDM2): Tower Data Link Services (TDLS) and possibly ASOS Controller Equipment-Information Display System (ACE-IDS). Note: TFDM1 & ERAM R3 accomplished removal of Flight Data Input Output (FDIO), Advanced Electronic Flight Strip (AEFS), and Electronic Flight Strip

Transfer System (EFSTS).

[NOTE: The contents of future ERAM workpages (ERAM releases 4 through 9) are dependent upon the NextGen Implementation Plan, the development of enabling technologies, and the ERAM acquistion strategy.]

Mechanism: En Route Automation Modernization Release 5 (ERAM R5) [7403]

En Route Automation Modernization (ERAM) Release 5 (ERAM R5) will complete integration of System Wide Information Management (SWIM) Segment 2, continue integration of Automatic Dependent Surveillance-Broadcast (ADS-B) Segment 1 capabilities, and demonstrate Next Generation Air Transportation System (NextGen) capabilities.

ERAM R5 capabilities consist of the following:

(a) Continue from ERAM R4 to expand the use of DataComm to provide the following: (1) controller/pilot communications, (2) clearance delivery and controller/pilot communications in support of pre-departure amendments, and (3) begin evaluation and test beds for automation-to-automation capabilities to provide data exchanges between ground based air traffic control (ATC) and the cockpit, transmission of aircraft state and intent data, and exchange of trajectory data,

(b) Continue from ERAM R4 converting interfaces to Internet Protocol (IP) and accept data directly into ERAM and thus eliminate the En Route Communications Gateway (ECG),

(c) Subject to SWIM Segment 2, begin implementing ERAM to Automated Radar Tracking System/Standard Terminal Automation Replacement System (ARTS/STARS) data exchanges,

(d) Begin to integrate enhanced trajectory based operations (TBO) with Traffic Based Flow Management (TBFM),

(e) Continue to accept and process Automatic Dependent Surveillance-Broadcast (ADS-B) data made available under ADS-B Segment 2. Use ADS-B to create track vectors across the National Airspace System (NAS) regardless of whether target have radar returns or not (prior to R5, ADS-B was used only for targets without radar coverage), and

(f) Improve Conflict Resolution Aids for controllers.

[NOTE: The contents of future ERAM workpages (ERAM releases 4 through 9) are dependent upon the NextGen Implementation Plan, the development of enabling technologies, and the ERAM acquistion strategy.]

Mechanism: En Route Automation Modernization Release 6 (ERAM R6) [7404]

En Route Automation Modernization (ERAM) Release 6 (ERAM R6) will primarily serve as a testbed to support research and FAA Joint Resources Council (JRC) decisions for the NextGen Baseline that follows. In addition, ERAM R6 will continue introducing capabilities provided in parallel by the System Wide Information Management (SWIM) Segment 2 and DataComm Segment 1 as they become available.

ERAM R6 capabilities consist of the following:

(a) Continue expanding the use of DataComm to provide the following: (1) continue from ERAM R5 automation-to-automation capabilities that will provide data exchanges between ground based air traffic control (ATC) and the cockpit, transmission of aircraft state and intent data, and exchange of trajectory data,

(b) Assess the creation of an Terminal/En Route ATC common ATC display system as well as Information Display System (IDS),

(c) Continue from ERAM R5 to integrate enhanced trajectory based operations (TBO) with Traffic Flow Management (TFM) capabilities,

(d) Continue to accept and process Automatic Dependent Surveillance-Broadcast (ADS-B) data made available via ADS-B Segment 2. Continue using ADS-B data to create track vectors across the National Airspace System (NAS), not just limited to targets for which radar data is not available,

(e) Subject to NextGen planning: (1) implement Trajectory-Based Operations (TBO), (2) implement High Density Arrival/Departure airspace concepts, and (3) implement Collaborative Air Traffic Management (ATM) concepts (Special Use Airspace (SUA), Letters of Agreement (LOAs), Standard Operating Procedures (SOPs), Flow Constrained Areas (FCAs), etc),

(f) Improve Conflict Resolution Aids for controllers,

(g) Subject to SWIM Segment 2, continue implementing ERAM to Automated Radar Tracking System/Standard Terminal Automation Replacement System (ARTS/STARS) data exchanges,

(h) Subject to SWIM Segment 2, continue exchanges with Tower Flight Data Manager Phase 2 (TFDM2), which enables removal of the following Terminal systems: Airport Resource Management Tool (ARMT), Automated Surface Observing System (ASOS) Controller Equipment-Information Display System (ACE-IDS), Systems Atlanta Information Display System (SAIDS), and possibly the Departure Spacing Processor (DSP).

(i) Subject to DataComm Segment 1 implement Airborne SWIM data exchanges for TBO.

[NOTE: The contents of future ERAM workpages (ERAM releases 4 through 9) are dependent upon the NextGen Implementation Plan, the development of enabling technologies, and the ERAM acquistion strategy.]

Mechanism: En Route Automation Modernization Release 7 (ERAM R7) [7405]

Having completed integration of Post En Route Automation Modernization (ERAM) baseline capabilities across the NAS (e.g., SWIM Segment 2, DataComm Segment 1, and ADS-B Segment 2), ERAM Release 7 (ERAM R7) initiates the Mid Term (NextGen Implementation) solution set through a combined Tech Refresh and software release.

ERAM R7 integrates refinements to previously introduced new capabilities (e.g., SWIM Segment 3, DataComm Segment 2). Additionally, it introduces some new NextGen capabilities (e.g., TFMS WP3 and Virtual Tower). Finally, ERAM R7 will become the key automation platform to implementing FAA combined facilities in the 2018-2021 timeframe.

[NOTE: The contents of future ERAM workpages (ERAM releases 4 through 9) are dependent upon the NextGen Implementation Plan, the development of enabling technologies, and the ERAM acquistion strategy.]

Mechanism: En Route Automation Modernization Release 8 (ERAM R8) [7406]

En Route Automation Modernization Release 8 (ERAM R8) is a maintenance and upgrade software release planned for NextGen capabilities. ERAM continues to interface with ADS-B, SWIM, DataComm and other systems referenced in ERAM R7. However, other than DataComm no new capabilities or impacts to ERAM are anticipated from those systems.

For additional information consult the "En Route Evolution Plan (EREP)."

[NOTE: The contents of future ERAM workpages (ERAM releases 4 through 9) are dependent upon the NextGen Implementation Plan, the development of enabling technologies, and the ERAM acquistion strategy.]

Mechanism: En Route Automation Modernization Release 9 (ERAM R9) [7407]

En Route Automation Modernization Release 9 (ERAM R9) is a maintenance and upgrade software release planned for 2019. The emphasis of ERAM R9 is to prepare to serve as a common platform, replicating the capabilities of Terminal platforms (Standard Terminal Automation Replacement System (STARS) and/or Common Automated Radar Terminal System (CARTS) Model IIIE (CARTS IIIE).

[NOTE: The contents of future ERAM workpages (ERAM releases 4 through 9) are dependent upon the NextGen Implementation Plan, the development of enabling technologies, and the ERAM acquistion strategy.]

Mechanism: En Route Automation NextGen Far-Term WP (TBD) [7874]

The En Route Automation NextGen Farterm WP will combine capabilities of the En Route Automation NextGen Midterm WP into a common platform, along with the capabilities of Terminal platforms (Standard Terminal Automation Replacement System (STARS) and/or Common Automated Radar Terminal System (CARTS) Model IIIE (CARTS IIIE). Requirements for the Common Automation Platform will be those which are En Route domain-derived.

Mechanism: En Route Automation NextGen Mid-Term WP (TBD) [7877]

En Route Automation NextGen Midterm WP is based upon the assumption that en route automation has been consolidated into one system encompassing ERAM and its enhancements, the portions of TMA/TBFM allocated to en route, and ERIDS, into one hardware and software baseline (even if this consists of incorporating separate systems into a common funding line, without completely integrating all software and hardware components).

Enhancements contemplated for inclusion in this Work Package are as follows:
- Trajectory coordination across ATC and TFM systems
- Trajectory data communications between ATM and cockpit automation including aircraft state and intent data
- Enhanced conflict probe and conflict resolution aids for controllers
- Facility consolidations resulting in potentially fewer centers, larger airspaces, where possible
- En Route, Terminal and/or Oceanic Operations using some common automation platforms, where possible

Mechanism: Enhanced Back-up Surveillance (EBUS) [6335]

Update: On March 31, 2006 the ARTCC facilities in New York, Miami and Los Angeles achieved full operational status for the EBUS system. This completed the deployment of EBUS to all 20 ARTCCs in the continental United States.

The Enhanced Back-Up Surveillance (EBUS) system replaced the Direct Access Radar Channel (DARC) system in use at the 20 Air Route Traffic Control Centers (ARTCC) in the contiguous United States (CONUS), the FAA William J. Hughes Technical Center (WJHTC), and the FAA Academy. The EBUS design employs the existing FAA-certified software of the Microprocessor En Route Automated Radar Tracking System (MEARTS) application to provide radar data processing (RDP) services for the replacement legacy backup system. MEARTS provides key capabilities not supported by the DARC legacy system it replaces, among which are the safety functions of Conflict Alert (CA), Mode C Intruder (MCI), and Minimum Safe Altitude Warning (MSAW). The EBUS also provides Next Generation Radar (NEXRAD) weather data to R-position users via the Display System Replacement (DSR) Backup Communications Network (BCN). The EBUS makes the R-position functionality on the backup channel more comparable to that of the primary channel.

The EBUS application (MEARTS) and the En Route Communications Gateway (ECG) backup gateway application will coexist together in the ECG backup gateway platform, renamed the Backup Interface Processor (BIP).

Mechanism: Enhanced-Advanced Technologies and Oceanic Procedures (E-ATOP) [6312]

Advanced Technologies and Oceanic Procedures (ATOP) allows the FAA to discontinue the use of the difficult communications and intensively manual processes that limit controller flexibility in handling airline requests for more efficient tracks over long oceanic routes. ATOP fully integrates flight and radar data processing, detects conflicts between aircraft, provides data link and surveillance capabilities, and automates the previous manual processes. The program provides the automation, Automatic Dependent Surveillance-Contract (ADS-C), and conflict resolution capability required to reduce oceanic aircraft separation from 100 nautical miles to 30 nautical miles. The Enhanced-Advanced Technologies and Oceanic Procedures (E-ATOP) project will facilitate seamless aircraft transitions and data transfers between domestic and oceanic airspace by adding MEARTS software to the system for radar processing.

This mechanism is funded through the Oceanic Automation System program with Facilities and Equipment (F&E) dollars out to FY 2013 according to the Aug 2008 NAS Capital Investment Plan (CIP).

Mechanism: Evaluator (Evaluator) [6545]

In aircraft Trajectory-Based Operations (TBO) the "Evaluator:" (1) integrates/communicates weather, security, defense, environmental, safety, international considerations, and other information; (2) allows users to "post" or update desired 4-Dimensional (4-D) trajectories in a common system that continuously evaluates mutual compatibility; (3) predicts potential "over demand" situations, in multiple "capacity dimensions"—traffic density, environmental, security, etc.; (4) works across all time horizons from days/weeks/months prior to flight up to separation management (20 minutes or less), and (5) supports a distributed decision-making environment where players have clear, agreed-upon roles and interactions.

Description is from Concept v4.8c - JPDO Working Document dated February 2006. Evaluator is still in research and engineering development. It has potential as a future demonstration program supporting NextGen.

Mechanism: FAA Information Superhighway for Training (FIST) [2192]

The FAA has unique technical training requirements due to the specialized nature of the National Airspace System (NAS). The FAA Academy conducts technical training for air traffic controllers, airway facilities technicians, inspectors, and other specialists, and is responsible for the internal training infrastructure. Training on the new systems being installed as the result of NAS modernization requires updated simulators, training media, and communications equipment.

Automated data systems to support training include the Instructional Resource Information System (IRIS) and the FAA Instructional Superhighway for Training (FIST). The FIST is an efficient, secure, platform-independent tool with continuous access to FAA users. Built at the FAA Academy, FIST is used as a consolidated centralized site for distributing training information and related resources to FAA students and employees. The primary purpose of this system is to service the following areas: Clip Media Reference, Automated Forms, Courseware Mass Storage, and the Training Bulletin Board. FIST may be accessed at "http://fist.faa.gov".

Mechanism: Flight Data Processing 2000 (FDP2000) [2000]

The Flight Data Processing 2000 (FDP2000) system replaced the oceanic flight data processing capability provided by Offshore Computer System (OCS) at the Anchorage Air Route Traffic Control Center (ARTCC). FDP2000 provides new hardware and software with added capabilities. The added capabilities include winds aloft modeling for improved aircraft position extrapolation accuracy, and support of Air Traffic Services Inter-facility Data Communications Systems (AIDC) ground-to-ground data link with compatible Flight Information Regions (FIRs). The OCS software was re-hosted from the Hewlett-Packard (HP) 1000 platform to the HP 9000 platform. FDP2000 provides flight data to the Microprocessor-En Route Automated Radar Tracking System (Micro-EARTS) radar data processing system. FDP2000 also integrates the existing Controller Pilot Data Link Communications (CPDLC) functions for data link communications with Future Air Navigation System 1/A (FANS 1/A)-equipped aircraft.

Mechanism: Flight Information System (FIS) [2464]

The Flight Information System (FIS) will provide the automated means for collecting and distributing weather (Service A messages), flight plan data, Pilot Report messages, and other operational information (Service B messages). The Flight Information System (rehosted) will provide a web-enabled means for collecting and distributing the above information to all air traffic facilities.

Mechanism: Flight Services Automation (FSA) Work Package (WP) 1 (FSA WP1) [7630]

An Integrated Enterprise Solution (IES), combining the functionality from the Alaska Flight Service Modernization (AFSM), CONUS, and DUATS systems. Work Package (WP) 1 is the first segment of integrated flight services and capabilities.

Mechanism: Flight Services Automation (FSA) Work Package (WP) 2 (FSA WP2) [7631]

An Integrated Enterprise Solution (IES), combining the functionality from the Alaska Flight Service Modernization (AFSM), CONUS, and DUATS systems. Work Package (WP) 2 is the second segment of integrated flight services and capabilities.

Mechanism: Flight Services Automation (FSA) Work Package (WP) 3 (FSA WP3) [7633]

An Integrated Enterprise Solution (IES), combining the functionality from the Alaska Flight Service Modernization (AFSM), CONUS, and DUATS systems. Work Package (WP) 3 is the third segment of integrated flight services and capabilities.

Mechanism: Flight Services Evolution Integrated Services and Capabilities (TBD) [7878]

The Integrated flight Services Enterprise Solution Composite Platform will combine CONUS Flight Service (AFSS Service Contract), Web-Based Flight Service Capabilities (DUATS), Alaska Flight Service, and Alaska Flight Service Modernization (AFSM), and will be enabled by ADS-B, AIM, SWIM, NAS Voice Switch, NNEW, and DataComm.

Design concept for Flight Services automation would allow pilots to continue to initiate services, but, in addition, Flight Service automation would "push" advisory information to the pilot in time for them to make rational, safety-related decisions about their flight. These automatic updates would only send information pertinent to the route of flight, before or during its operation, and would eliminate redundant information. With NextGen enhancements, this system would be built around an integrated global database network capable of generating, manipulating, and disseminating weather and aeronautical data to provide single-source, NAS consistent information, accessible through Internet connectivity.

Flight Service NextGen automation enhancements are an interim step towards the composite automation system envisioned as the end state FAA NextGen system, allowing early benefits to airspace users in the General Aviation community in addition to those using major airports with highly equipped commercial aircraft.

It will be possible to reduce the number of flight service facilities through NextGen enhancements. Workload reductions will occur as the pilot community gains experience in the automatic procedures, more services become automated, and advanced networking of centralized systems is established.

The cost of additional cockpit equipment will have a major impact on the level of service available to the GA community. However, the flight service system and specialist will be provided with increased surveillance and weather data, which then can be transmitted to the non-equipped aircraft by voice or through commercial carrier to a hand-held communications device as advisory material.

Mechanism: Host Computer System/Oceanic Computer System Replacement (HOCSR) [2293]

The Host Computer System and Oceanic Computer System Replacement (HOCSR) program was implemented because of potential year 2000 (Y2K) hardware issues with previous hardware. Accordingly, the HOCSR provided a new hardware platform, new peripherals (printers and Keyboard Video Display Terminals (KVDT), a new Direct Access Storage Device (DASD), and new OS-370 software extensions to control the new hardware using legacy National Airspace System (NAS) software applications. Hardware was replaced in both the En Route and Anchorage Oceanic automation environments. The HOCSR did not modify the legacy software functions of either the HCS system (e.g., flight data processing, radar data processing) or the Ocean Display and Planning System (ODAPS) automation systems (e.g., flight data processing). Likewise, HOCSR did not impact Host Interface Device National Airspace System (NAS) Local Area Network (HID/NAS LAN), User Request Evaluation Tool (URET), Display System Replacement (DSR) or the Peripheral Adapter Module Replacement Item (PAMRI).

Phase 1 and 2 (mainframe and software extension replacements) were completed prior to 2000. Phase 3 (DASD replacement) was completed in 2003. Phase 4 (peripheral replacement) was completed in 2004. Enhancements planned for 2005 and beyond were cancelled as the En Route Automation Modernization (ERAM) program overtook them. Each phase has its own waterfall, and consequently no waterfall can be provided in the location section below.

The Host Computer System (HCS) receives and processes surveillance reports, and flight plan information. The HCS sends search/beacon target, track and flight data, surveillance and alphanumeric weather information, time data, traffic management advisories and lists to the DSR. The HCS associates surveillance-derived tracking information with flight-planning information. The DSR sends requests for flight data, flight data updates, and track control messages to the HCS. HCS-generated display orders are translated for use within the DSR workstation. While radar data processing is distributed between the terminal and En Route computer resources, the HCS performs virtually all of the flight data processing for its entire geographical area of responsibility. Every tower (Airport Traffic Control Tower - ATCT) and Terminal Radar Approach Control (TRACON) facility relies exclusively on its parent HCS for flight data.

The HCS also runs algorithms that perform aircraft to aircraft (conflict alert (CA)) and aircraft to terrain (Minimum Safe Altitude Warning - MSAW) separation assurance. The HCS algorithms provide visual and audible alerting to the controller when conflicts are identified. The HCS receives aeronautical and adapted data from an external system, the NAS Adaptation Services Environment (NASE), via an internal component, the Adaptation Controlled Environment System (ACES), which feeds data to the HCS (data files) offline.

The HCS presently supplies real time surveillance, flight data, and other information to several decision support tools housed in collocated outboard processors connected via two-way high bandwidth links to the HCS and DSR. These are the URET and the Traffic Management Advisor (TMA). URET performs probing of tentative flight plan changes to determine their viability. TMA provides sequencing and spacing information to align the aircraft in En Route airspace for approach.

Mechanism: Instrument Flight Procedures Automation (IFPA) [7386]

Instrument Flight Procedures Automation (IFPA) is an automation system used to create new Instrument Flight Procedures (IFPs) and to maintain existing IFPs.

IFPs provide pilots with approach paths clear of obstacles such as cell towers, buildings and trees into and out of an airport. Procedures define the operational rules for executing defined maneuvers. Procedure information includes approaches, holding, departures, arrivals, routes and minimum altitudes. Procedures are developed to dictate the execution of certain National Airspace System (NAS) operations under specified conditions or avionics equipage use in the cockpit. Effective procedures management requires periodic procedure reviews due to the impact of obstacles. Short-term notices to pilots called Notices-to-Airmen (NOTAMs) are also developed and issued.

IFPA is comprised of four key components, each with functional sub-components called modules, some of which are operational already. They are: (1) Instrument Procedures Development System (IPDS) - 1st module slated for Initial Operational Capability (IOC) in FY 2009, (2) IFP - IOC FY 2006; Standard Instrument Approach Procedures (SIAP) module; (3) Aviation System Standards Process Tracking System (APTS) - IOC FY 2007 – NOTAM (Notice to Airmen) Tracking System (NTS) module, Reporting module (4) Airports and Navigation Aids System (AIRNAV) - First module slated for IOC in FY 2009.

There is an presently an agreement in place, eventually to be a Memorandum of Agreement (MOA), for the Department of Defense (DoD) to share the annual cost of maintenance for IFPA beginning in FY 2009.

Mechanism: Microprocessor-En Route Automated Radar Tracking System (MEARTS) [219]

The Microprocessor-En Route Automated Radar Tracking System (MEARTS) is a radar processing system implemented with commercial off-the-shelf (COTS) equipment, for use in both En Route and Terminal environments. It provides single sensor and a mosaic display of traffic and weather using long- and short-range radars. At Anchorage, Alaska, the MEARTS also provides Automatic Dependent Surveillance-Broadcast (ADS-B) surveillance and display. The MEARTS interfaces with multiple types of displays, including Display System Replacement (DSR)(modified), and the flat panel tower controller displays.

Mechanism: Military Airspace Management System (MAMS) [323]

The Military Airspace Management System (MAMS) is an automated system that schedules and documents over 4500 Special Use Airspace (SUA) and other related airspace utilization within the U.S. Department of Defense (DoD) - approximately 25 percent of the conterminous U.S. airspace. It receives airspace schedule messages (ASM) from local DoD airspace scheduling agencies. The MAMS Central Facility, located at Tinker Air Force Base, Oklahoma, transmits ASMs and utilization data to the FAA Special Use Airspace Management System (SAMS) Central Facility, located at the David J. Hurley Air Traffic Control System Command Center (ATCSCC). The MAMS receives airspace response messages from the SAMS.

Mechanism: NOTAM Distribution System (NDS) [2466]

The Notice to Airmen (NOTAM) Distribution Program (NDP) provides a standardized, automated NOTAM distribution system that ensures that NOTAMs are delivered to FAA Air Traffic Control (ATC) facilities in a timely, accurate, and reliable manner. NOTAMs inform pilots of changes in conditions in the National Airspace System (NAS). The program originated from a June 2001 FAA memorandum which identified weaknesses in the then current NOTAM distribution method, emphasizing the urgent need for a replacement system to help ensure that critical safety information reaches the pilot and other system users. NDP deployments are dependent upon the availability of FAA Telecommunications Infrastructure (FTI) Internet protocol services at facilities that will receive the NOTAM Distribution System (NDS).

The NDS will automate, standardize, and provide centralized NOTAMs dissemination to approximately 700 FAA facilities using reliable telecommunications provided by the FTI network. NOTAM data from the United States NOTAM System (USNS) central database in Herndon, Virginia will be transmitted to FAA's Airport Traffic Control Towers (ATCTs), Terminal Radar Approach Control (TRACON) facilities, Air Route Traffic Control Center (ARTCC) facilities, Federal Contract Tower (FCT) facilities, and Flight Service Station (FSS) facilities. In addition, the system provides for NOTAM receipt acknowledgement and an evolutionary path for the eventual distribution of all classes of NOTAMs (Domestic, Flight Data Center, International Civil Aviation Organization (ICAO), Military and Local).

Accomplishments included a Final Requirements Document for NDS production software client enhancements in January 2005. A finalized task order for NDS software client enhancements was completed in April 2005. In the summer of 2005 electric power and Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) compatibility testing were completed. Finally, the program was on schedule to complete user testing at the FAA William J. Hughes Technical Center (WJHTC) in January 2006.

When the NDP was zeroed out of the FY07 budget, the Air Traffic Organization, System Operations Services assumed the action to develop the necessary documentation to proceed to the Joint Resources Council (JRC) to baseline the NDP requirement and secure funding for future years. The NDS is included in Segment 1 of the Aeronautical Information Management (AIM) Modernization program - Federal NOTAM System (FNS).

For the most recent information check the Service Level Review Briefings and Minutes which are located at URL http://ipm.faa.gov/jrc/decisions_minutes/SLRmins.cfm

Mechanism: NextGen Automation Platform Release 1 (NAP R1) [6643]

The NextGen Automation Platform Release 1 (NAP R1) develops and deploys common hardware and air traffic control (ATC) applications software for ATC in the En Route domain.

Mechanism: NextGen Automation Platform Release 2 (NAP R2) [7408]

The NextGen Automation Platform Release 2 (NAP R2) develops and deploys common hardware and air traffic control (ATC) applications software for ATC in the Terminal, En Route, and Oceanic domains.

Mechanism: NextGen Mid-Term Work Package (TBD) [7860]

NextGen Mid-Term Work Package will include all Terminal Automation changes in the Mid-Term devoted to NextGen. System/hardware requirements will be determined by TAMR3. However, additional application development will proceed through the mid-term to address NextGen mid-term requirements for Terminal Automation, in parallel with En Route Automation NextGen Mid-Term WP:
Enhancements contemplated for inclusion in this Work Package are as follows:

- Trajectory coordination across ATC and TFM systems
- Trajectory data communications between ATM and cockpit automation including aircraft state and intent data
- Enhanced conflict probe and conflict resolution aids for controllers
- Facility consolidations resulting in potentially fewer centers, larger airspaces, where possible
- En Route, Terminal and/or Oceanic Operations using some common automation platforms, where possible

Mechanism: Operational and Supportability Implementation System (OASIS) [42]

Operational and supportability implementation system (OASIS) is the improved automated flight service station system that integrates flight data processing with new weather graphics and interactive briefings. The modular design of OASIS allows growth to support future requirements. OASIS incorporates the functions provided by the direct user access terminal (DUAT) service and the graphics weather display system (GWDS). Like the DUAT service, OASIS allows pilots to self-brief and file flight plans. OASIS will be integrated into the NAS-wide information service to receive weather and notices to airmen (NOTAM).

On February 1, 2005, the FAA awarded a contract for the services provided by the 58 Automated Flight Service Stations (AFSSs)in the Continental United States (CONUS), Puerto Rico, and Hawaii to Lockheed Martin Corporation. Called Flight Service 21 (FS21), Lockheed Martin FS21 began a phased-in responsibility for providing flight services on October 4, 2005.

In the fall of 2007, Lockheed Martin assumed full responsibility for providing flight services with the exception of Alaska. With continued FAA oversight, Lockheed Martin will maintain delivery of flight services including personnel and hardware systems as part of the FS21 contract. Additional information can be found at http://www.lmafsshr.com. As a result of FS21, OASIS was no longer required in CONUS, and the last OASIS was de-installed in late 2007. The phase out of the OASIS consisted of removal of all hardware from the 16 operational CONUS AFSS sites and the FAA Academy.

However, in January 2007, OASIS was installed at the 3 AFSSs and 14 FSSs in Alaska to resolve legacy system data integrity and security issues. The OASIS contract is being extended pending a full and open competition for system development under the Alaska Flight Service Modernization (AFSM) program. OASIS will be used in Alaska until a replacement system is deployed.

Mechanism: Post ERAM R3 WP (ERAM) [8054]

tbd

Mechanism: Post ERAM R3 Work Package (TBD) [7880]

Candidate Post ERAM R3 WP capabilities consist of the following:

(a) Use DataComm to provide the following: (1) controller/pilot communications, and (2) clearance delivery and controller/pilot communications in support of pre-departure amendments, (3) automation-to-automation capabilities to provide data exchanges between ground based air traffic control (ATC) and the cockpit, transmission of aircraft state and intent data, and exchange of trajectory data,

(b) Use ADS-B to create track vectors across the National Airspace System (NAS) regardless of whether target have radar returns or not .

(c) Convert external interfaces to Internet Protocol (IP) and accept data directly into ERAM (leading to removal of the En Route Communications Gateway (ECG),

(d) Improve Conflict Resolution Aids for controllers,

(e) Accommodate the common interface following the planned integration of Weather and Radar Processor (WARP) and the Corridor Integrated Weather System (CIWS).

(f) Use SWIM Segment 2 to exchange data via Terminal Flight Data Manager (TFDM).

(g) Integrate trajectory based operations with Time Based Flow Management (TBFM).

(h) Implement ERAM to Automated Radar Tracking System/Standard Terminal Automation Replacement System (ARTS/STARS) data exchanges via SWIM Segment 2.

(i) Publish and subscribe Flight Information Services (FIS) as a SWIM Implementation Program (SIP)

Mechanism: Power Systems (Technology Refresh) (Pwr Sys Tech Refresh) [6353]

The Power Systems Technology Refresh (Pwr Sys Tech Refresh) mechanism provides for the conditioning of commercial power, including uninterruptible power systems (UPS), to eliminate voltage dropouts, surges, and voltage sags caused by sources outside the facility. Power distribution, grounding, bonding, and shielding of electrical system within the facility is also part of the mechanism. The mechanism provides for the following tasks: (1) Air Route Traffic Control Center (ARTCC) Critical/Essential Power System (ACEPS), (2) training facility, (3) Critical Power Distribution System (CPDS), (4) battery replacements, (5) direct current (DC) Systems, (6) emergency generators (EG), (7) lightning protection, grounding, bonding, and shielding (LPGBS), (8) power cables, (9) uninterruptible power systems (UPS), and (10) contract support.

Power Systems Sustained Support (Power Systems, Mechanism 1425) and Power Systems Technology Refresh (Mechanism 6353) are both funded out of single NAS project F11.00-00, Power Systems, currently funded through FY-2021.

Mechanism: Special Use Airspace Management System (SAMS) [324]

The Special Use Airspace Management System (SAMS) is an automated system that supports integrated Special Use Airspace (SUA) schedule operations within the FAA and between the FAA and the U.S. Department of Defense (DoD). The SAMS consists of the SAMS Central Facility (i.e., the SAMS processor), located at the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC), and SAMS Workstations located at the ATCSCC, Air Route Traffic Control Centers (ARTCCs), Towers, Terminal Radar Approach Control (TRACON) facilities, and Combined Center and Radar Approach Control (CERAP) facilities. The SAMS processor receives airspace schedule messages from the Military Airspace Management System (MAMS) Central Facility and transmits them to the SAMS Workstations. The SAMS processor transmits airspace response messages to the MAMS.

Mechanism: Standard Terminal Automation Replacement System (STARS) [91]

The Standard Terminal Automation Replacement System (STARS) is a digital radar/flight data processing and display system for use by terminal air traffic controllers. Controllers use STARS to ensure the safe separation of military and civilian aircraft throughout the nation's airspace. STARS is capable of tracking up to 1350 airborne aircraft simultaneously within a terminal area. The color displays are specially developed for air traffic control and are capable of displaying six distinct levels of weather data (identified by different colors) simultaneously with air traffic, allowing controllers to direct aircraft around bad weather. The system interfaces with multiple radars (up to 16 short and long range), 128 controller positions, 20 remote towers, and a 400 by 400 mile area of coverage. STARS has two separate, fully redundant automation systems running in parallel providing an instantaneous back-up service to controllers. STARS technology is open, expandable and able to accommodate future growth as well as new hardware and software.

The STARS investment replaced aging air traffic control equipment at 47 (43 ARTS IIIA sites and 4 CARTS IIE sites) of our nations terminal radar approach control facilities (TRACONs) and air traffic control towers. The development phase is complete and all hardware has been purchased.

Although STARS is intended eventually to replace the Common ARTS systems, the FAA has decided to defer that transition further until they can determine what smaller terminal facilities, if any, might best be consolidated into larger area facilities for future operations. This redirected program is called Terminal Automation Modernization and Replacement (TAMR). Phase 2 of the TAMR program is intended to enhance the services provided to high-risk CARTS sites and to prepare terminal automation for agency strategic initiatives. In FY 2006, Congress approved a reprogramming request to fund nine high-risk TAMR Phase 2 sites from the STARS (TAMR Phase 1) line item replacing 5 CARTS IIE systems with STARS and enhancing the CARTS IIIE equipment.

As of June 2008 STARS systems were operational at 49 FAA TRACONs (including 2 funded through TAMR Phase 2) and 50 Department of Defense (DoD) sites (including 5 outside the conterminous United States). Additionally, there are 8 STARS systems at WJHTC, 13 STARS systems at the Academy and 10 STARS systems at the OSFs supporting the operational FAA sites and 10 STARS systems at DoD facilities supporting the operational DoD sites. Also, the STARS FMA capability is operational at the Denver TRACON. STARS hardware has been delivered to the Dayton, OH TRACON but that facility is not expected to replace its existing ARTS IIIA system until construction is complete in 2010.

Mechanism: Standard Terminal Automation Replacement System (STARS) - TAMR Phase 2 (STARS - TAMR Phase 2) [7644]

Although STARS is intended eventually to replace the Common ARTS systems, the FAA has decided to defer that transition further until they can determine what smaller terminal facilities, if any, might best be consolidated into larger area facilities for future operations. This redirected program is called Terminal Automation Modernization and Replacement (TAMR).

The Terminal Automation Modernization and Replacemnet (TAMR) Phase 2 program segment has two segments. The Standard Terminal Automation Replacement System (STARS) segment will replace the Common Automated Radar Terminal System IIE (CARTS IIE) at Anchorage, Corpus Christi, and Wichita with STARS (West Palm Beach and Pensacola are also currently scheduled) . The CARTS IIE requires upgrades to both the communications infrastructure and displays. STARS were procured in October 2005, deliveries commenced in June 2006, and installations to improve these five high-risk sites began in FY2007.

The TAMR program is intended to enhance the services provided to high-risk CARTS sites and to prepare terminal automation for agency strategic initiatives. In FY 2006, Congress approved a reprogramming request to fund the nine high-risk sites that are part of the TAMR Phase 2 effort from the STARS (TAMR Phase 1) line item.

[Note that TAMR Phase 3 will address the needs of another 106 CARTS sites by replacement with newer state-of-the-art digital, radar and flight data processing and display systems (STARS) or by enhancements to CARTS.]

Mechanism: Standard Terminal Automation Replacement System (STARS) - TAMR Phase 3 (STARS - TAMR Phase 3) [7641]

Although STARS is intended eventually to replace the Common ARTS systems, the FAA has decided to defer that transition further until they can determine what smaller terminal facilities, if any, might best be consolidated into larger area facilities in the future. This redirected program is called Terminal Automation Modernization and Replacement (TAMR).

Standard Terminal Automation Replacement System (STARS) - Terminal Automation Modernization and Replacement (TAMR) Phase 3 will enhance STARS Terminal Radar Approach Controls (TRACONS) and/or replace Common Automated Radar Terminal System (CARTS) at the 106 TRACONS not yet modernized. The 106 sites include 7 CARTS IIIEs and 99 CARTS IIEs. The 7 CARTS IIIE sites represent some of the largest and busiest commercial and general aviation facilities in the NAS. The 99 ARTS IIEs include medium to small facilities from coast to coast.

TAMR Phase 3 is in the planning stage. A goal of TAMR Phase 3 will be to contribute to the decision to identify common front end display hardware beginning in 2010. The program would enhance the services provided to these locations by capitalizing on existing and new to state-of-the-art digital, radar and flight data processing and display systems.

The FAA will continue to sustain the automation systems at these sites while monitoring system performance to identify any risk to service presented by these systems. Modernization or replacement of these systems will be evaluated and performed incrementally on a risk-to-service basis and will be aligned with other Air Traffic Control Tower (ATCT) and TRACON replacement and improvement program activities. Other Agency strategic initiatives, such as Data Communications (DATACOMM) Segment 2 and the Next Generation (NextGen) Automation Platform (NAP), may also require the modernization or replacement of these systems.

Mechanism: Standard Terminal Automation Replacement System (STARS) - Technology Refresh (TR) (TAMR Phase 1) (STARS - TR (TAMR Phase 1)) [7155]

The Terminal Automation Modernization and Replacement (TAMR) Program provides a phased approach to modernizing the automation systems at the FAA's Terminal Radar Approach Control (TRACON) facilities and their associated Airport Traffic Control Towers (ATCT). There are three phases and this project deals with Phase 1, which is to tech refresh and enhance the automation systems at most Standard Terminal Automation Replacement System (STARS) sites. Support systems at the WJHTC, the Academy and the OSFs will also need to undergo tech refresh. Processor replacement will be accomplished in two phases. First replace front room STARS Sun Ultra 5 processors with a pre-qualified refurbished Blade 1500/V210 processor at approximately one half of the existing STARS sites. Then retrofit the second half of the existing STARS sites and the backroom equipment of the first half sites with a new processor.

[Note that the Norfolk ORD was late enough in the waterfall to include the V210 processor.]

Mechanism: Surface Management System Prototype (SMS Proto) [331]

The purpose of the Surface Management System (SMS) is to provide airport configuration, aircraft arrival/departure status, and airfield ground movement advisories to controllers, dispatchers, and traffic flow managers. SMS will interface with the airport movement area safety system (AMASS) and the terminal automation system to help controllers coordinate arrival/departure flows with surface movements. SMS will increase surveillance information available to planning tools for airport traffic control tower (ATCT), terminal radar approach control (TRACON), ramp control, and the airport.

The Surface Management System Prototype (SMS Proto) will provide surface management data feeds via the Enhanced Traffic Management System (ETMS) interfaces to Airline Operational Centers (AOCs). The SMS Prototype main servers will be located at ATCT and TRACON facilities, with feeds to separate display processors located in the Traffic Management Unit (TMU) at Air Route Traffic Control Center (ARTCC) and TRACON facilities, and ground and ramp areas of ATCT facilities. SMS data will include surface surveillance data, flight plan data, gate assignment information, downstream restrictions and air carrier predictions of flight pushback times.

Mechanism: Surface Movement Advisor (Atlanta) (SMA (Atlanta)) [2392]

The Surface Movement Advisor (SMA) was implemented in 1998 as part of Collaborative Decision Making (CDM) and Free Flight Phase 1. SMA provides aircraft arrival information to airline ramp towers and AOCs. This includes aircraft identification and position in TRACON airspace, and which can be used to compute an aircraft's estimated time to touchdown. The shared situational awareness provided by SMA affords airline greater efficiency and productivity with respect to aircraft arrivals in terminal airspace and on the airport surface.

Goals:

- Provide Gate Resource Optimization
- Balance Taxi Departure Loads
- Improve Gate Rescheduling
- Facilitate Airport Operations Analysis
- Improve Crew Scheduling
- Improves recovery from missed approaches
- Reduces diversions during periods of inclement weather
- Improve planning, movement, and decision-making through shared situational awareness of surface operations.

Surface Movement Advisor increases awareness of traffic flow into the airport, giving ramp control operators precise touchdown times. This updated information helps airlines manage ground resources at the terminal more efficiently: gates, baggage handling, food services, refueling, and maintenance. Informed of aircraft identification and position in the terminal airspace, gate and ramp operators using SMA have enhanced ability to reduce taxi delays.

The ATL SMA system is based on a client-server architecture running in a UNIX environment. A fiber backbone between the airlines, the airport management, the ramp towers and the FAA Control Tower links the ATL SMA together. The system collects and manages various traffic data inputs from sources such as ARTS IIIE Air Traffic Control System AGW/TIA (TRACON RADAR data), OAG, FIDS, and ACARS in real time by the ATL SMA server and auxiliary network computer clients. The ATL SMA integrates the airline schedules, gate information, flight plans, radar feeds, and runway configuration (departure split and landing direction). The system then retransmits this integrated information over the network between ramp operators, airport managers, airline operators, and FAA controllers and supervisors.

Mechanism: Surface Movement Advisor (Free Flight Phase 1) (SMA (FFP1)) [78]

The Surface Movement Advisor (Free Flight Phase 1) (SMA FFP1) is located at Terminal Radar Approach Control (TRACON) facilities and Airport Traffic Control Tower (ATCT) facilities, has displays located at Airline Operations Centers (AOCs), and SMA and AOC's share information using the Enhanced Traffic Management System (ETMS) and the ETMS Hub Site. The SMA obtains aircraft arrival information, including aircraft identification and position, from TRACON automation and provides SMA information to airline ramps at towers and AOCs. Continual updates of touchdown times generated by SMA help airlines manage ground resources at the terminal more efficiently.

The SMA system is based on a client-server architecture running in a UNIX environment. A fiber optic backbone between the airlines, the airport management, the (Airline) ramp towers and the FAA Control Tower links the SMA together. The system collects and manages various traffic data inputs from sources such as Common Automated Radar Terminal System (CARTS) IIIE and Standard Terminal Automation Replacement System (STARS), TRACON Radar, Official Airline Guide (OAG), and Aircraft Communications and Reporting System (ACARS) in real time by the SMA server and auxiliary network computer clients.

AOCs provide the SMA with information such as flight readiness status within minutes of departure. The SMA generates messages when a flight: (a) transitions from an Air Route Traffic Control Center (ARTCC) to a TRACON, (b) is on final approach, and (c) has touchdown. SMA calculates estimated taxi time to the gate, time of arrival at the gate, and taxi time to take-off; and SMA uses historical data to project true demand on airport departure capacity.

Mechanism: Surface Traffic Management System (STMS) [702]

The Surface Traffic Management System (STMS) enhancement provides flight and track data for surface management, combining the functions of SMA (Free Flight Phase 1 (FFP1)) and Surface Management System (SMS) prototype systems. Similar to the SMS, the STMS servers and display processors will be located at the same facilities and, in addition, display processors will be located at the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC) and Traffic Flow Management (TFM) hub site at the Volpe National Transportation Systems Center (VNTSC). STMS data will include gate assignment information, downstream restrictions and air carrier predictions of flight pushback times.

STMS will enable users and providers to have access to flight planning, traffic management, arrival/departure, and weather information, giving a complete picture of airport operations. Using a perimeter "look-ahead" feature, the enhanced multi-functional displays will show conflict predictions between arriving aircraft and surface aircraft/vehicles. The goal is to have all airport operations, including air traffic control, aircraft, airline and airport operations centers, ramp control, and airport emergency centers, receiving and exchanging common surface movement data. STMS may also add communications via data link to the cockpit.

Mechanism: TFDM2 (TFDM) [8055]

tbd

Mechanism: Time Based Flow Management (TBFM) [7881]

Time Based Flow Management (TBFM) will close the performance gap in transitioning the legacy Traffic Management Advisor (TMA) system to deliver NextGen Trajectory Based Operations (TBO) capabilities. TMA's scheduling capability will be applied to departure, en route, and arrival phases of flight.

TBFM will address following NextGen Operational Improvement (OI) capabilities in the Midterm (2012-2018):

-Initiate Trajectory Based Operations
- -Flexible Airspace Management
- -Increase Capacity and Efficiency Using RNAV/RNP
- -Point-in-Space Metering

-Increase Arrivals/Departures at High Density Airports
- -Acceleration of Integrated Arrival/Departure Management at New York airports (2009).
- -Demonstrations:
    - -Continuous Descent Arrivals (CDA)
    - -Tailored Arrivals (TAs)
    - -3D Path Arrival Management (3D PAM)
- -Integrated Arrival/Departure Airspace Management (beyond New York)
- -Time Based Metering Using RNP and RNAV Route Assignments

-Increase Flexibility in the Terminal Environment
    -Use Optimized Profile Descent
-Reduce Weather Impact
    -FY09 Activity Demonstration – Improved Weather Detection/Prediction Integrated with TMA
-Increase Safety, Security, and Environment Performance
    -FY09 Activity Demonstration – Under the Atlantic Interoperability Initiative to Reduce Emissions (AIRE): Conduct CDA/TA demonstrations at Atlanta and Miami International airports.

Mechanism: Time Based Flow Management - Integrated Enterprise Solution (TBFM-IES) [7883]

Time Based Flow Management - Integrated Enterprise Solution (TBFM-IES) provides for allocation of functionality developed under Time Based Flow Management (TBFM) among the Traffic Flow Management System, En Route Automation, its own stand-alone system, or as combinations of those. TBFM-IES will be supportive of the Point in Space Metering enhancements needed for NextGen. Potential enhancements include: TMA scheduling to Dynamic Metering Points; and end-to-end metering.

Mechanism: Traffic Flow Management System - Enhanced Traffic Management System Hardware Upgrade (TFMS - ETMS HW Up) [165]

The Traffic Flow Management System - Enhanced Traffic Management System Hardware Upgrade (TFMS - ETMS HW Up) mechanism is a technology refresh of existing equipment and workstations at the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC), the hub at the John A Volpe National Transportation Systems Center (Volpe Center), and Traffic Management Units (TMUs) located at Air Route Traffic Control Centers (ARTCCs), Terminal Radar Approach Control (TRACON) facilities and some Airport Traffic Control Towers (ATCTs).

As a program under the Traffic Flow Management-Modernization (TFM-M) program and Collaborative ATM (CATM) Segment, the TFMS-ETMS Hardware Upgrade will prepare the Traffic Flow Management Infrastructure for the software upgrade described under "TFMS-CATM-T Apps Upgrade".

The hardware refresh on the ETMS was completed at the Volpe Center Hub Site in June 2003 and at 77 remote FAA sites by December 2004.

A System Design Review (SDR) for the TFM-M was held in April 2005 and a Preliminary Design Review (PDR) TFM-M was held in September 2005. A build-out of TFM Enhanced Disaster Recovery Capability at the FAA William J. Hughes Technical Center (WJHTC) began in January 2006.

Additional information in June 2007 Operational Evolution Partnership (OEP), Version 1.0 at URL http://www.faa.gov/about/office_org/headquarters_offices/ato/publications/oep/version1/reference/tfm/

Mechanism: U.S. Notice to Airmen System (USNS) [2319]

The NAS Aeronautical Information Management Enterprise System (NAIMES) was an "enabler" providing customers and stakeholders with "one-stop" access to critical aeronautical information products and services. NAIMES facilitated the transition of NAS operations from the legacy system-centric (point-to-point) to network-centric (point-to-cloud) by utilizing both new and existing infrastructure, and developing associated policies and standards. As of the spring of 2007 NAIMES is now called Aeronautical Information Management (AIM). It is in the Air Traffic Organization (ATO) System Operations' Airspace and Aeronautical Information Organization.

AIM is the data steward for critical NAS aeronautical information including Notices to Airmen (NOTAM) messages, graphical Temporary Flight Restrictions (TFRs), flight plans, and alphanumeric weather products.

AIM provides upgrades and enhancements for seven primary systems: NAS Resources (NASR), the U.S. NOTAM System (USNS), the Defense Internet NOTAM service (DINS), the NAS operational Internet Access Point (IAP) service, the Central Altitude Reservation Function (CARF), Aeronautical Integrated Data Access Portal (AIDAP), and the Aeronautical Information System Replacement (AISR).

It was planned to have initial policy changes made in February 2008 when a General Notice will be issued to align NOTAM D criteria with ICAO NOTAM criteria and eliminate L NOTAMs. By 2009 the goal is to have a single federal NOTAM system that is ICAO compliant. The next decade should see the system have digital and graphical capabilities – which will be required for the Next Generation Air Transportation System (NextGen).

For the most recent information check the Service Level Review Briefings and Minutes which are located at URL http://ipm.faa.gov/jrc/decisions_minutes/SLRmins.cfm

Workstation

Mechanism: Advanced Technologies and Oceanic Procedures Controller Work Station (ATOP Controller WS) [2185]

The Advanced Technologies and Oceanic Procedures Controller Work Station (ATOP Controller WS). The ATOP Controller Workstation is part of a non-developmental item (NDI) automation, training, maintenance, installation, transition, and procedures development support acquisition. The workstation will interface with the integrated Flight Data Processing (FDP). At Anchorage, where flight and surveillance data are integrated, the workstation will contain displays for information from primary and secondary radar, Automatic Dependent Surveillance (ADS), Controller Pilot Data Link Communications (CPDLC) position reports, and relayed pilot reports from High Frequency (HF) voice service provider. The ATOP workstation will support radar and non-radar procedural separation, tracking clearances issued via CPDLC or messages through the HF radio service provider, conflict detection/prediction capabilities through the use of controller tools, and coordination via Air Traffic Services Interfacility Data Communications System (AIDCS). Additionally, it is expected to support operations in which the information and primary capabilities required for the controller to maintain situational awareness and provide procedural separation services are available on the display (rather than paper flight strips).

The technology refresh is planned for 2008-2009.

Mechanism: Automated Radar Terminal System Color Display (ACD) [757]

The Automated Radar Terminal System (ARTS) Color Display (ACD) is a high performance, full function, color display that replaces the Full Digital ARTS Display (FDAD) and the Data Entry and Display Subsystem (DEDS). The ACD supports keyboard and trackball functions for the ARTS IIIA, ARTS IIE, and ARTS IIIE. A primary and secondary radar data path to the ACD is provided by a radar gateway function incorporated in the event of a failure of either the ARTS IIE and ARTS IIIA processing systems.

Mechanism: Common Display Subsystem - Remote Phase 2 (CDSS-R Phase 2) [6300]

Provides Technical Refresh of Common Display Subsystem (CDSS) Remote Phase 1. CDSS-R Phase 2 provides the controller in the tower and the specialist in Flight Advisory Services an interface to the Flight Object Management System (FOMS) and the Surveillance Data Processor (SDP). The workstation additionally provides the tower controller a display of arrival/departure surveillance data.

Mechanism: Common Display Subsystem Phase 1 (CDSS Phase 1) [6306]

The Common Display Subsystem (CDSS) provides the controller interface to processing for the Flight Object Management System (FOMS) and the Surveillance Data Processor (SDP). The CDSS will be installed in En Route and Arrival/Departure facilities. The FOMS performs flight plan processing, associates flight and track data, and publishes the Flight Object on the System Wide Information Management (SWIM) network. In the future, it will provide surveillance data processing and tracking for Surveillance Data Objects received from the NextGen Automation Platform (NAP), to which it will be attached.

Mechanism: Common Display Subsystem Phase 2 (CDSS Phase 2) [6299]

The Common Display Subsystem Phase 2 (CDSS Phase 2) mechanism provides funding for a technical refresh of the Common Display Subsystem Workstation developed in Phase 1. In the future, the CDSS will exchange data with the NextGen Automation Platform (NAP), which combines Flight Object and Surveillance Data Processing (SDP). The CDSS will be installed in En Route and Arrival/Departure facilities and will perform display of surveillance data processing and tracking. The CDSS is a workstation that provides the controller interface for the Flight Object Management System (FOMS), as well as the SDP functions.

Mechanism: Common Display Subsystem Remote Phase 1 (CDSS R Phase 1) [6307]

The Common Display Subsystem Remote (CDSS R P1) provides the controller in the tower and the specialist in Flight Advisory Services an interface to the Flight Object Management System (FOMS) and Surveillance Data Processor (SDP). The workstation additionally provides the tower controller a display of arrival/departure surveillance data.

Mechanism: Data Entry and Display Subsystem (DEDS) [285]

The Data Entry and Display Subsystem (DEDS) is the Air Traffic Controller workstation for the Automated Radar Terminal System (ARTS), Model IIIA. DEDS is being replaced by the Full Digital Automated Radar Terminal System Display (FDAD)and ARTS Color Display (ACD) at Common ARTS (CARTS) sites and by the Standard Terminal Automation Replacement System (STARS) Terminal Controller Workstation (TCW) at STARS sites. An ARTS IIIA system with a DEDS continues to operate at the Dayton, OH TRACON.

Mechanism: Digital Altimeter Setting Indicator (DASI) [65]

The Digital Altimeter Setting Indicator (DASI) is a system that measures station/airport atmospheric pressure and converts the measured pressure value into the actual sea level pressure based on the United States (U.S.) Standard Atmospheric Table. The value then computed is known as the Altimeter Setting Indicator (ASI) value and is presented to the operator, who is air traffic control (ATC), in a digital format, e.g., 29.50 inches of mercury (in Hg). The ASI value is then transmitted by the air traffic controller to an aircraft pilot for use in setting the altimeter in the aircraft. If a perfectly calibrated altimeter is set to the ASI value existing at any given station whose elevation is designated as Hp, the pointer of the altimeter instrument will indicate an altitude of Hp when the instrument is at the altitude of the sensor in the DASI system. (Hp is an elevation in geopotential meters above mean sea level of the altimeter setting indicator pressure sensor.)

JRC Decision scheduled 2009 to SLEP/Replace DASI

Mechanism: Digital Bright Radar Indicator Tower Equipment (DBRITE) [2]

The Digital Bright Radar Indicator Tower Equipment (DBRITE) is a tower display system that provides a raster scan presentation of radar/beacon videos and automation system alphanumeric data. The system accepts radar, beacon, external map, analog data, and automation system data. The DBRITE is a certified tower radar display (CTRD).

Mechanism: Display System Replacement (DSR) [5]

The Display System Replacement (DSR) provides continuous real-time, automated support to air traffic controllers for the display of surveillance, flight data and other critical control information. This information is processed by the Host and Oceanic Computer System Replacement (HOCSR) and the Enhanced Direct Access Radar Channel (EDARC) subsystems. The DSR provides controller workstations, displays, and input/output devices and a communications infrastructure to connect the DSR with external processing elements of the en route air traffic control (ATC) automation system.

Mechanism: Display System Replacement - Console Reconfiguration Monitor Replacement (DSR-CRMR) [2469]

The Display System Replacement - Console Reconfiguration Monitor Replacement (DSR-CRMR) replaced the R-position cathode ray tube (CRT) with a 20 x 20-inch square flat panel liquid crystal display (LCD). Replacement of the large CRT with a LCD freed up space in the rear of the DSR console for relocating Voice Switching and Control System (VSCS) equipment. Relocating the VSCS Electronic Module (VEM) and the VSCS Training and Backup System (VTABS)--formerly known as VEM/PEM)--was part of this activity and improved equipment efficiency, packaging, and the productivity of maintenance personnel.

Mechanism: Display System Replacement - D-position Technology Refresh (DSR - D-posit TR) [6370]

The Display System Replacement D-position Technology Refresh (DSR D-posit TR) replaces the legacy D-position cathode ray tube (CRT) with a 20 1/4-inch diagonal square flat panel liquid crystal display (LCD). It also replaces the D-position DSR processor and DSR local area network (LAN) with a new processor and the User Request Evaluation Tool (URET) LAN. This will establish a new DSR infrastructure for the URET National Deployment. It will also simplify the future transition from the URET LAN infrastructure to the En Route Automation Modernization (ERAM) LAN infrastructure, by means of which the DSR processor and Conflict Probe (CP) processor will be attached for data exchanges. The legacy D-posit Tech Refresh on the primary channel will be augmented with a backup channel D-position by ERAM.

Mechanism: Display System Replacement - R-position Technology Refresh (DSR - R-posit TR) [2470]

The Display System Replacement R-position Technology Refresh (DSR R-posit TR) replaces the processor and local area network (LAN) infrastructure for the R-position in preparation for the En Route Automation Modernization (ERAM) system. The replacement display will provide full and equivalent functionality (flight and surveillance data) on both the primary and backup ERAM channels. The R-position display processor will have direct data exchange capability with each of the ERAM LAN attached processors, including the Surveillance Data Processor (SDP), Flight Data Processor (FDP), Conflict Probe Processor (CPP), Traffic Management Advisor (TMA), and Controller-Pilot Data Link Communications (CPDLC).

Mechanism: En Route Information Display System (ERIDS) [6336]

As of November 2007 the En Route Information Display System (ERIDS) is operational at all of the Air Route Traffic Control Centers (ARTCCs). A waterfall schedule is shown below.

The ERIDS provide real-time access to air traffic control information not currently available from the Host Computer System (HCS) and makes this auxiliary information readily available to controllers. ERIDS is installed at various positions, including the Traffic Management Units (TMU), Center Weather Service Units (CWSU), and ARTCC Monitor and Control (M&C) Centers. ERIDS is integrated into the display system consoles at each sector, uses the center's airspace configuration for sector assignments, and allows changes in sector assignments. ERIDS displays graphic and text data products, including air traffic control documents, Notices to Airmen (NOTAMS), and general information. The ERIDS exchanges information with other systems (e.g., U.S. NOTAM System, and in other facilities via FTI.

Mechanism: Enhanced Debrief Station (EDS) [2188]

The Enhanced Debrief Station (EDS) system is a personal computer (PC)-based, medium fidelity, simulation, and training system, located at the FAA Academy, that works hand-in-hand with the Tower Simulation Systems (TSS), also located at the FAA Academy, by preparing the students in part-task functions of terminal air traffic control before they begin training in the TSS environment. The EDS provides medium fidelity simulation for local or ground control tasks. It uses a three-screen presentation of the tower cab environment.

A technology refresh is planned for FY2009.

Mechanism: Final Monitor Aid (FMA) [68]

The Final Monitor Aid (FMA) is a high resolution radar display providing controllers an increased ability to control multiple simultaneous approaches to parallel runways under instrument flight rule (IFR) conditions. When feed by high precision secondary surveillance data, such as from the Precision Runway Monitor (PRM), increased definition for maintaining aircraft separation is achieved. The FMA system may also extract radar data from the Common Automated Radar Terminal System (CARTS) or the Standard Terminal Automation Replacement System (STARS) and enhance this data when presented on the FMA displays.

Mechanism: Flight Data Input/Output (FDIO) [63]

The Flight Data Input/Output (FDIO) system provides flight progress information for use by the Tower, Terminal Radar Approach Control (TRACON) and Air Route Traffic Control Center (ARTCC) controllers. The FDIO system allows Air Traffic Control (ATC) specialists to input automated flight data, perform data manipulation, and print flight strips.

Mechanism: Flight Data Input/Output Modification (Technology Refresh) (FDIO Mod (TR)) [1716]

The Flight Data Input/Output Modification (Technical Refresh) (FDIO Mod (TR)) mechanism replaces components that are uneconomical to maintain in the system providing an interface between the air traffic controller (terminal or en route) and the center computer. The FDIO system provides flight plan data in printed form for Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) controllers.

The FDIO Mod (TR) program replaces end-of–life, obsolete FDIO equipment with modern COTS equipment, thereby reducing potential outages and delays. It is intended to sustain adjusted operational availability at 99.5 percent for the reportable facilities that support the 35 OEP airports through FY 2015.

Mechanism: Full Digital Automated Radar Terminal System Display (FDAD) [79]

The Full Digital ARTS Display (FDAD) is the fully digital Automated Radar Terminal System (ARTS) display system that provides the display and data input devices for terminal controllers using ARTS IIIE and ARTS IIIA. The FDAD can work in analog video time-share mode or full digital mode. The present application is analog video time-share mode.

Mechanism: Integrated Display Systems (IDS) – Technology Refresh and Sustainment (IDS TR & Sustain) [7567]

The Integrated Display System Version 4 (IDS-4) integrates several National Airspace System (NAS) data weather sensors and operational data onto a single display platform. The information is used by several thousands of air traffic controllers.

This segment funds the replacement of approximately 120 IDS-4 workstations at two of the largest Operational Evolution Partnership (OEP) airports and their respective Terminal Radar Approach Control (TRACON) networks. This will mitigate the risk of a catastrophic failure at these sites, and provide test, training, and second level engineering support. The replaced IDS-4 workstations will be provided to the FAA Logistics Center to enable their assets to prolong Sustainment of the remaining IDS-4 systems to the maximum extent possible. This initiative will be a stopgap action necessary to provide the FAA time to develop and deploy the Terminal Flight Data Manager (TFDM) system as defined in the FAA Enterprise Architecture Automation Roadmap. The TFDM system implementation is currently planned in the Roadmap from 2015-2020.

The funding requested for FY 2009 is to replace approximately 120 of the 2,230 workstations at the key site, one of the largest and oldest FAA networks. Subsequent finding has been requested to replace the remaining IDS-4 systems from FY10 through FY14.

Mechanism: Operational and Supportability Implementation System Work Station (OASIS WS) [398]

The Operational and Supportability Implementation System - Work Station (OASIS WS) is a MS Windows ™-based personal computer (PC) located at each specialist position. It includes commercial off-the-shelf (COTS) software applications to provide the Automated Flight Service Station (AFSS) specialist with an integrated view of flight data, alphanumeric weather, and graphic weather data. Pre-Flight and in-flight service functions are also available from these workstations.

Note that on February 1, 2005, the FAA awarded a contract for the services provided by the 58 Automated Flight Service Stations (AFSSs) in the Continental United States (CONUS), Puerto Rico, and Hawaii to the Lockheed Martin Corporation. Lockheed Martin assumed responsibility for providing AFSS flight services on October 4, 2005. The program is called Flight Service 21 (FS21). With continued FAA oversight, Lockheed Martin will maintain deliverance of flight services. Additional information can be found at http://www.lmafsshr.com.

The transition to FS21 service is complete and OASIS has be moved to the Alaskan FSS's to sustain the Flight Services in Alaska until a longer term solution is obtained.

Mechanism: Radar Automated Display System (RADS) [81]

The Radar Automated Display System (RADS) is the air traffic controller workstation for the Automated Radar Terminal System Model IIE (ARTS IIE).

Mechanism: Remote Automated Radar Terminal System Color Display (R-ACD) [6352]

The Remote - Automated Radar Terminal System (ARTS) Color Display (ACD) is a high performance, full function, and color display providing air traffic controllers with the functionality of the Digital Bright Radar Indicator Tower Equipment (DBRITE). This display supports keyboard and trackball functions for the CARTS IIE and CARTS IIIE systems. A radar gateway function may be incorporated to provide a primary and secondary radar data path to the R-ACD in the event of failure of the ARTS processing systems.

Mechanism: Standard Terminal Automation Replacement System Early Display Configuration (STARS EDC) [756]

The Standard Terminal Automation Replacement System, Early Display Configuration (STARS EDC) provided STARS workstations at a limited number of Automated Radar Terminal System Model IIIA (ARTS IIIA) facilities to replace aging Data Entry and Display Subsystems (DEDS) and provide validation of the STARS workstation design before the complete STARS is implemented. STARS EDC included updates to ARTS software for life cycle maintenance, additional human-machine interface (HMI) requirements for both tower and Terminal Radar Approach Control (TRACON) facilities, and ARTS IIIE human factors validation.

Mechanism: Standard Terminal Automation Replacement System Tower Display Workstation (STARS TDW) [6351]

The Standard Terminal Automation Replacement System Tower Display Workstation (STARS TDW) provides the interface between the Airport Traffic Control Tower (ATCT) controller and the STARS processing unit.

Mechanism: Surface Movement Advisor (Atlanta) Workstation (SMA (Atlanta) Workstation) [2393]

The Surface Movement Advisor (Atlanta) Workstation (SMA (Atlanta) Workstation) mechanism provides Arrival and Departure data displayed to users. Airline and FAA users are given varying levels of access to make inputs to the SMA (Atlanta) system via this workstation. Airline users in the Ramp Control Operations area are provided the ability to enter aircraft pushbacks to taxi status, gate arrivals and return to gate messages. Other airline users FAA users are provided options to enhance surface traffic movement by using automated data to optimize runway balancing.

Mechanism: Surface Traffic Management System Workstation (STMS WS) [2391]

The Surface Traffic Management System Workstation (STMS WS) provides for the display and operator entry of STMS data. The STMS WS will be located at both FAA and airline facilities. STMS WS user capabilities will vary based upon the user. FAA users may have the ability to change configuration information, while airline users do not. Full operational capability (FOC) for this mechanism extends beyond that of STMS because the WS is being installed at multiple Airline Operational Centers (AOCs).

Mechanism: Systems Atlanta Information Display System (SAIDS) [386]

A Systems Atlanta Information Display System (SAIDS) enables users to collect and/or input, organize, format, update, disseminate, and display both static (e.g., approach plates, charts) and real-time data regarding weather and other rapidly changing critical information to air traffic controllers and Air Traffic Control (ATC) supervisors/Managers. SAIDS is installed at Airport Traffic Control Tower (ATCT) facilities, Terminal Radar Approach Control (TRACON) facilities, Air Route Traffic Control Center (ARTCC) facilities, Combined Center and Radar Approach Control (CERAP) facilities, FAA regional offices, Airports, Airline Operations Centers (AOCs), and military facilities. SAIDS is also known as Information Display System 4 (IDS-4). IDS-4 workstations include 135 systems at 390 facilities, including 25 of the 35 Operational Evolution Plan (OEP) airports.

Mechanism: TFDM3 (TFDM) [8056]

tbd

Domain: Air Traffic Control Communication

Data Communication

Mechanism: Aeronautical Telecommunication Network Air to Ground Router (ATN A/G Router) (ATN A/G Router) [6458]

The ATN Air-to-Ground (A/G) Router is used to provide A/G interconnection between an Aeronautical Telecommunication Network (ATN) Airborne Router and an ATN Ground Mobile Subnetwork.

The ATN A/G Router will utilize the ICAO Standards and Recommended Practices (SARPs). The ICAO is currently collaborating on an agreed set of protocol standards for International implementation.

Source: WJHTC ATN ICAO Lead.

Mechanism: Aeronautical Telecommunication Network Ground to Ground Router (ATN G/G Router) [642]

The Aeronautical Telecommunication Network (ATN) is an evolving global data Internet infrastructure developed by the International Civil Aviation Organization (ICAO). The ATN will be comprised of an interconnection of computers with gateways or routers via real sub-networks. This allows the construction of a homogeneous virtual data network in an environment of administrative and technical diversity.

The ATN design allows communications services for different user groups; i.e., Air Traffic Services (ATS), Aeronautical Operational Control (AOC), Aeronautical Administrative Communications (AAC), and Aeronautical Passenger Communications (APC). The design provides for the incorporation of different air-to-ground sub-networks and different ground-to-ground sub-networks (e.g., AFS, Aerospace Medical Certification Subsystem (AMCS)), resulting in a common data transfer service. These two aspects are the basis for interoperability of the ATN and will provide a reliable data transfer service for all users. The design is such that user communications services can be introduced in an evolutionary manner.

The ground-to-ground application adopted by the ICAO member states, the ATS Message Handling System (AMHS), replaced the existing Aeronautical Fixed Telecommunication Network (AFTN) which interfaced with the NADIN Message Switching Network (MSN).

AMHS is currently using the ATN A/G Router in implemented with the Japanese Civil Aviation Bureau (JCAB), and upgrades of AFTN are taking place with Australia, Fiji, New Zealand and other states in the Caribbean/South America (CAR/SAM) region.

Mechanism: Airspace Resource Management System (ARMS) [6321]

The ARMS, as part of the NEXGEN concept, is recommended to subsume the functionality originally allocated to the Communications Management System (CMS) of the Target System Description (TSD) development effort. The specific new functions of ARMS are being determined and will be incorporated when finalized. For now, The dates for ARMS are TBD.

Historical Trailer:

The CMS conceptual system was a planned development as part of the Target System Description (TSD) project during the FY02-03 timeframe. The intent of the CMS was to do the following:

The Communications Management System (CMS) was to manage NAS voice and data-link communication links. CMS was to manage ground to ground as well as air to ground communications.

It was also envisioned that the CMS would include a reconfiguration control function (ReConFig) in support of reconfigurable airspace assignments, data routing, and digital recording for both voice and data. A concept was also developed to integrate functions inherently provided by the voice switches, the voice recorders, and the Aeronautical Telecommunications Network (ATN) Router. The CMS was to provide a routing function that provided the means to transport data communications among ATC facilities and users of System-Wide Information Management (SWIM).

As the NAS transitioned to the current state (CY08), the data recording function has been assumed by the En Route Automation Modernization (ERAM) program via standard automation platform (SAP) and the voice recording function is performed by the Digital Voice Recorder System (DVRS).

Ref: NAS Target System Description (TSD), John Scardina, May 7, 2003., NAS Communications Roadmaps, Version 2.0.

Mechanism: Data Communications Segment 1 (DataComm Segmt 1) [7547]

Datacomm Segment 1 will provide initial capabilities in the Terminal and En Route environments and will serve as the initial building block for trajectory based operations.

In the Terminal environment, specifically in the Tower, Segment 1 will implement data communications capabilities that will provide for new methods for delivery of departure clearances, revisions, and taxi instructions. In the En Route environment, Segment 1 will provide the basic capabilities for controllers and flight crews to transfer ATC clearances, requests, instructions, notifications, voice frequency communications transfers, and flight crew reports as a supplement to voice. Subsequently, initial 4-D routes to manage continuous descent approaches will be implemented on a limited basis at certain airports with aircraft meeting capability requirements.

The DataComm Segment 1 application will interface with ERAM Segments 1, 2, and 3 for content generation and utilize the Digital VHF Aeronautical Mobile Communications Infrastructure for delivery to the Aeronautical System (aircraft).

Mechanism: Data Communications Segment 2 (DataComm Segmt 2) [7548]

Datacomm Segment 2 extends data communications capabilities to the TRACON facility in the Terminal domain. These data capabilities will not only provide a more efficient means to support strategic communication within traditional terminal airspace but will also support the expansion of NextGen trajectory based operations into other portions of terminal airspace.

Data communications capabilities will be expanded to include 4-D trajectory agreements in performance-based airspace. The initial portion of the 4-D trajectory is agreed to be stable and conflict free and will only change for exceptions, while subsequent portions of the trajectory may be updated as necessary.

Segment Two also adds trajectory conformance management to monitor the trajectory based clearances. Data communications facilitates conformance management by providing the means for the aircraft and the ground system to exchange the detailed data necessary to perform conformance management without the direct involvement of the flight crew or controller. Three types of conformance management agreements are envisioned: periodic, event-based, and on-demand. The aircraft's capability to accurately fly its cleared route of flight and improvements in conformance predictability, either through ground automation improvements, interaction with traffic flow management and flight operations centers, or through the provision of aircraft intent data, will increase the precision of trajectory modeling and enable new concepts in separation assurance.
A regulatory strategy will become effective requiring data communications capabilities to be part of the aircraft's minimum equipment requirements for access to performance-based airspace. The regulatory strategy will ensure a level of aircraft equipage such that the benefits of data communications in performance-based airspace will be realized. This expansion, including the regulatory strategy and implementation of enhanced data communications, provides the basis for evolving the NAS from tactical control to management-by-planning and intervention-by-exception. This is also the time when traffic levels are projected to rise to the point where voice communications are anticipated to restrict air traffic growth, and therefore data communications will evolve to become the necessary means of air-ground communications.

The DataComm Segment 2 application will interface with ERAM Segments 4, 5, 6, and 7 for content generation and utilize the Digital VHF Aeronautical Mobile Communications Infrastructure for delivery to the Aeronautical System (aircraft).

Mechanism: Data Communications Segment 3 (DataComm Segmt 3) [7549]

DataComm Segment Three will add data communications capability that will support delegation of separation responsibility to the flight crew and increased situational awareness through distribution of aircraft specific route of flight environmental characteristics to include weather, NAS status, system constraints, and collaborative decision making information. Ground automation enhancements will have expanded the time horizon for detection of conflicts beyond that available in Segment Two. This will provide even longer term predictability to the 4-D trajectory agreements which are now commonplace. Performance-based airspace has been expanded to include lower altitudes in the en route domain connecting to super-density TRACON airspace at selected regional airport domains.

The DataComm Segment 3 application will interface with ERAM Segments 8, and 9 for content generation and utilize the Digital VHF Aeronautical Mobile Communications Infrastructure for delivery to the Aeronautical System (aircraft).

Mechanism: Data Multiplexing Network (DMN) [13]

The Data Multiplexer Network (DMN) provides efficient transport for low speed data (2.4 kbps – 19.2 kbps). This network consists of DMN multiplexers and multiplexer-modems interconnected by telecommunication services provided by FTI, RCL, LDRCL, and SATCOM. Additionally, clock boxes (clocking and signal splitting) and A/B switches are an integral part of this network.

DMN Model 6250 multiplexers, which are located primarily at ARTCCs, have 48 input ports and 5 composite links. These composite links are implemented by 64 kbps, 128 kbps, or 256 kbps DDC services. These ARTCC to ARTCC connections are used primarily for transporting such critical data as Host to Host Interfacility Data (IDAT), and for providing a diverse path for Radar Data (RDAT). These connections are also used for non-critical traffic such as Remote Maintenance Monitoring System (RMMS) and Computer Based Instruction (CBI).

DMN 3600 multiplexers and multiplexer-modems have 8 input ports and one composite link. The composite link is implemented by a DDS 56 kbps service for the multiplexers and by a VG-8 service for multiplexer-modems.

DMN 3600 multiplexer-modems are used to transport radar data from an ARSR site to two ARTCCs. (The clock box provides the required signal splitting.) At the ARTCCs, this radar data is ported to a DMN 6250 to provide for the full dual-routing and dual-homing of radar data. A/B switches are used to switch to the backup path if the primary path fails. The DMN 3600 multiplexer-modems are also used to transport non-critical data (e.g., Automated Surface Observing System (ASOS) weather data).

DMN 3600 (digital) multiplexers are typically used to provide ARTCC to TRACON and ARTCC to ATCT connections. ARTCC to TRACON connections are used to transport IDAT, Flight Data Input/Output (FDIO), CBI, RMMS, and ASOS data. ARTCC to ATCT connections are used to transport FDIO, CBI, RMMS, and ASOS data.

Mechanism: Flight Information Service - Data Link (FISDL) [746]

The Flight Information Service - Data Link (FISDL) provides pilots weather, Notices to Airmen (NOTAMs), airfield information, and other types of aeronautical information through Very High Frequency (VHF) utilizing a commercial communications service provider (CCSP).

The FISDL service is being facilitated through a Government-Industry Project Performance Agreement (G-IPPA) allowing a commercial weather service provider (CWSP) to offer graphical and textual FIS/weather products to the cockpit of properly equipped aircraft. This commercially-operated service is being provided as a near-term capability consistent with the FAA FIS Policy Statement of 1998.

This CCSP service will be phased out when the FAA is able to offer similar FISDL services through FAA operated data link resources (e.g., via the universal access transceiver (UAT) link using the Broadcast Services Ground Station (BSGS) and Traffic Information Service (TIS)-FIS Broadcast Server mechanism).

Mechanism: High Frequency Data Link (HF Data Link) [698]

The High Frequency Data Link (HF Data Link) provides two-way, low-speed, analog data communications over HF radios. A Commercial Communications Service Provider (CCSP) in the transoceanic domain provides HF Data Link.

Mechanism: NADIN MSN Rehost (NMR) [7856]

NMR provides the rehosting of NADIN MSN and adds an IP in addition to an X.25 interface. (NADIN MSN only has an X.25 interface.)

Mechanism: Satellite Telecommunications Data Link (SATCOM DL) [786]

Oceanic Centers have the option to utilize Satellite Telecommunications Data Link (SATCOM DL) from a Commercial Communications Service Provider to transfer data between ground stations and aircraft. For this service, the FAA contracts for the satellite communications service and the aviation community contracts for the Future Air Navigation System 1/A (FANS-1/A) applications service delivery in the Oceanic domain.

The FAA has no plans to develop its own SATCOM air-to-ground communications system.

Mechanism: System Wide Information Management Segment 1 (SWIM Segmt. 1) [7367]

The System Wide Information Management (SWIM) program provides for National Airspace System (NAS)-wide transport and sharing of information between the Federal Aviation Administration (FAA) systems and between FAA and external users. SWIM is a uniform single point of entry for Communities of Interest (COI) to publish and subscribe to NAS Services and NAS data. SWIM Segement 1 will implement four key services and capabilities.

The Interface Management (IM) Service enables Service Providers to expose NAS Services and enables Service Consumers to discover services in a service registry. IM also provides support for managing metadata.

The Messaging Management (MM) Service provide support for service invocation styles such as publish/subscribe, request/reply, message routing, queuing, and quality of Service (QoS) priority.

The Security Management (SM) Service implements mechanisms to enforce security policies at the application level (services and messages) to ensure confidentiality and integrity are maintained.

The Enterprise Service Management (ESM) Service provides Governance to manage services across all service lifecycle phases based on QoS and key requirements. ESM also provides monitoring of system service performacne and usage.

SWIM Core Services will be implemented using Commercial Off The Shelf (COTS) software and existing NAS infrastructure.

The SWIM Core Services support three key doman areas and Community of Interest (COI) capabilities in the areas of Aeronautical Information Management (AIM), Weather, and Flight & Flow Management (FFM).

AIM includes Special Use Airspace (SUA) automated data exchange. The Weather area includes Corridor Integrated Weather System (CIWS) Publication, Intergated Terminal Weather System (ITWS) Publiction, and Pilot Reports (PIREP) Data Publication.

The FFM area includes Flight Data Publication, Terminal Data Distribution, Flow Information Publication, Runway Visual Range (RVR) Publication, and Reroute Data Exchange.

SWIM Service Container:
• SWIM core services technology application software that resides on NAS System SWIM Servers and provides an environment in which the NAS Air Traffic Management (ATM) Service Endpoint software can operate. Utilizing the Service Container, ATM application interfaces are standardized and decoupled with message brokering services enabling application to application binding and information exchanges.

The SWIM Implementation Programs (SIPs) are implementing the SWIM Service Container to provide the intial delivery of SWIM Core Services for messaging and security services.

Design-time Registry/Directory:
• The technology used to capture the metadata characteristics and designed of SWIM executable services. The Design-time Registry/Directory contains service contract specification, service interface specification, content specification, and configurations for service discovery and exposure.

The FAA Joint Resources Council (JRC) approved the System Wide Information Management (SWIM) Segment 1 initial investment decision (JRC 2A) on 17 July 2006 and a final investment decision (JRC 2B) on 21 June 2007.

SWIM Segments Historical Trailer:

The SWIM program is headed by ATO-W Ahmad Usmani.

SWIM implementation in FY08 will be limited to two WJHTC Laboratory sites for testing and development purposes only.

The WJHTC is implementing a SWIM Design-time Registry/Directory is support of the SWIM Service Container System implementation by the SIPs.

Mechanism: System Wide Information Management Segment 2 (SWIM Segmt. 2) [6302]

System Wide Information Management (SWIM) Segment 2 is in the process of being defined.

Current planning activities are incorporating additional SWIM Core Services for definition, development and deployment into the NAS environment. Also, the Communities of Interests (COIs) from Aeronautical Information Management, Weather, and Flight and Flow Management are planning further application of the SWIM Core Services engine.

SWIM Segment 2 represents all of SWIM Segment 1 Core Services in addition to the new Core Service and COI content integration.

The SWIM program underwent a major realignment in the spring 2006 and had a successful Joint Resources Council (JRC) initial investment decision on 17 July 2006 and a final investment decision on June 21, 2007. The SWIM Segment 2 system will leverage the SWIM Segment 1 system.

SWIM Segmt. 2 will provide Enterprise Aeronautical Information Management (AIM), Enterprise NAS Status Information, and NextGen 4-D Wx Cube information distribution.

SWIM Segment 2 Enterprise Governance

• Policies, standards, and procedures that provide the guidance and execution of SWIM end-to-end lifecycle services and management. Criteria includes the Policy Management, Service Level Agreements (SLAs), Auditing, Registration, Design-time and Run-time Support Services.

SWIM Segment 2 Administrative Services

• Includes network and database administrative services such as directory and identity services to support SOA services. Provides process and support Services for service provisioning management.

SWIM Segment 2 Enterprise Service Bus (ESB)

• The ESB application technology extends the core services and capabilities of the SWIM Service Container. The ESB is a separate deployment with centralized service management capabilities, improved messaging services, security services, interface management services, and enterprise service management.

Implementation of the Enterprise Service Bus (ESB) will add and enhance SWIM Core Services in support of new information distribution.

Mechanism: System Wide Information Management Segment 3 (SWIM Segmt. 3) [6303]

System Wide Information Management (SWIM) Segment 3 will be defined once the SWIM Segment 2 is defined for SWIM Implementation Programs (SIPs) capabilities.

Current planning activities are incorporating additional SWIM Core Services for definition, development and deployment into the NAS environment. Also, the COIs from Aeronautical Information Management, Weather, and Flight and Flow Management are planning further application of the SWIM Core Services engine.

SWIM Segment 3 represents all of SWIM Segment 1 and Segment 2 Core Services in addition to the new Core Service and SIPs content integration.

SWIM Segment 3 Enterprise Governance

• Policies, standards, and procedures that provide the guidance and execution of SWIM end-to-end lifecycle services and management. Criteria includes the Policy Management, Service Level Agreements (SLAs), Auditing, Registration, Design-time and Run-time Support Services. Continuation of SWIM Segment 2 Enterprise Governance to include extensions in the management of additions SWIM service offerings, policies, standards, and procedures.

SWIM Segment 3 Enterprise Service Bus (ESB)

• The ESB for SWIM Segment 3 incorporates additional core services, additional publication of NAS Mission Content, and ESB technology refreshment of IT infrastructure.

• The ESB application technology extends the core services and capabilities of the SWIM Segment 2 ESB. The ESB is a separate deployment with centralized service management capabilities, improved messaging services, security services, interface management services, and enterprise service management.

Mechanism: Tower Data Link System (TDLS) [686]

The Tower Data Link System (TDLS) automates tower-generated information for transmission to aircraft via data link. The TDLS interfaces with sources of local weather data and flight data and provides pilots with Pre-Departure Clearance (PDC), Digital-Automatic Terminal Information System (D-ATIS), and emulated Flight Data Input/Output (FDIO). The PDC helps tower clearance delivery specialists compose and deliver departure clearances. The Digital Automatic Terminal Information Service (D-ATIS) provides high reliability messages of runway and taxiway instructions, information on avionics equipment, frequency outages, and local weather conditions worldwide. The TDLS data is transmitted in text form via the Aircraft Communication and Reporting System (ACARS) to an ACARS-equipped aircraft for review and acknowledgment by the flight crew.

Incorporating D-ATIS into TDLS allows: (1) Real-time ATIS updates throughout the National Airspace System (NAS), (2) Text message printouts, vice hand written recordings, (3) Pilots to receive destination ATIS information, prior to take-off.

In the current system configuration, the FAA supplies the TDLS service application system (server) and a Commercial Communications Service Provider (CSSP) (i.e., ARINC) provides the communications delivery. Terrestrial communications delivers the messages to a gate printer and radio frequency communcations delivers the messages to the aircraft cockpit.

In the far-term, the TDLS server will be replaced by the "Terminal Flight Data Manager" server and DataComm is projected to provide radio communications delivery to the aircraft.

Video Communication

Voice Communication

Mechanism: Air/Ground Communications RFI Elimination (RFI ELIM) [1394]

The Radio Frequency Interference (RFI) Elimination Program supplies equipment and implementation funds to assist the regions in preventing, reducing or eliminating interference problems in the air-to-ground (A/G) communications environment. Products include linear power amplifiers (LPA), transmitter combiners, and receiver multicouplers.

In addition, funds are provided to the regions to purchase a variety of filters needed to reduce or eliminate RFI. The RFI Elimination Program is a collection of projects to improve communications for operational needs. These projects are mainly for correction of site specific deficiencies such as interference from amplitude modulation/frequency modulation (AM/FM) broadcast stations, and plastic welders. The reliability of communications for air traffic controllers to pilot and air traffic controller to air traffic controller is vital to the safe operation of the air traffic control.

RFI will not be segmented, since this project addresses RFI requirements as they surface across all domains.

Mechanism: Backup Emergency Communications (BUEC) [625]

The Backup Emergency Communications (BUEC) sustains and replaces the existing analog BUEC systems. BUEC provides backup air-to-ground (A/G) communications services for Remote Communications A/G (RCAG) Very High Frequency (VHF) and Ultra High Frequency (UHF) communications channels (radio equipment) for the Air Route Traffic Control Centers (ARTCCs) facilities and En-Route domains.

The system consists of remotely controlled equipment, and several VHF and UHF transceivers.

Mechanism: Command and Control Communications (C3) [23]

The Command and Control Communications (C3) (formerly NAS Recovery Communications (RCOM))provides the FAA the minimum command and control communications capability necessary to direct the management, operation, and reconstruction of the National Airspace System (NAS) during regional or local emergencies. C3 provides back-up communications services when normal common carrier communications are interrupted. C3 program also provides minimum capabilities for Continuity of Operations for the FAA.

C3 encompasses fourteen individual program elements, divided into phases. Phase I of the C3 program was for the High Frequency Single Side-Band (HF/SSB) upgrade which has been completed. Phase II focuses on the Defense Messaging System (DMS) and Secure Telephone Equipment (STE). Phase III encompasses the replacement of the Very High Frequency/Frequency Modulated (VHF/FM) system. And Phase IV will initiate the upgrade and maintenance of other critical communications, which includes HF radio equipment, secure conferencing system equipment, automated notification system replacement/upgrade, and satellite telephone network enhancements.

Other efforts within the C3 program revolve around national security and are classified.

Mechanism: Communications Facilities Enhancement - Expansion (CFE - Expansion) [6867]

The growth in air traffic operational requirements has dictated the need for increased air-to-ground (A/G) communications coverage. The CFE - Expansion provides additional A/G communications frequencies by establishing new, relocating existing, and/or expanding remote communications facilities (RCF) to increase National Airspace System (NAS) capacity and improve NAS efficiency. The Communications Facilities Enhancement (CFE) program conducts communications facilities work, purchases required equipment, and implements grounding, bonding, and testing to meet FAA facility specifications. The CFE program is responsible for establishing, expanding, or relocating air-ground radio communication facilities.

Mechanism: Conference Control System (CCS) [2453]

The Conference Control System (CCS) is a replacement system for the legacy Operational Telephone System (OTS). The CCS is a telecommunications conferencing system that provides voice connectivity, switching, and teleconferencing capabilities for the Traffic Management Specialists and the National Airspace System (NAS) Operations Manager, at the FAA David J. Hurley Air Traffic Control System Command Center (ATCSCC). CCS enables collaborative communication with the ATCSCC Traffic Management Specialist, Traffic Management Units (TMUs) at Air Route Traffic Control Center (ARTCC), Terminal Radar Approach Control (TRACON) facilities, the Severe Weather Group at ARTCCs, FAA Regional Offices, FAA Headquarters, Airline Operations Centers (AOCs), and the general aviation (GA) community.

NOTE: If you are interested in the history of OTS, the predecessor, please enter mechanism ID #: 26 as the search term on the mechanism page.

Mechanism: Digital Voice Recorder System (DVRS/DVR2) [15]

The Digital Voice Recorder System (DVRS) is a 16-channel multichannel modular digital voice recorder and reproducer system. The digital voice recorder is utilized to record all air-to-ground (A/G) voice communications between air traffic controllers and pilots, and ground-to-ground (G/G) intrafacility and interfacility communications between air traffic controllers.

The reproducer is designed for playback of call files and reproducing call files that have been recorded on digital audio tape (DAT) onto a standard cassette tape. Call files can be searched for playback using channel, time/date, or a combination of both parameters. The reproducer provides the capability to playback-selected recordings from the digital voice recorder for transcription, evaluation and training purposes.

The digital voice recorder consists of a digital recorder unit (DRU), control workstation, two speakers, external alarm with optional Navstar Global Positioning System (GPS) antenna receiver, uninterruptible power supply (UPS), and an alternating current (AC) line conditioner (if required).

Digital Voice Recorder 2 (DVR2) utilizes 24-channel capacity analog to digital interface (ADIF) and audio line interface (ALI) boards in the DRU chassis. This system eliminates one DAT drive, incorporates a mirrored hard drive configuration of dual 8 Gigabyte hard drives, and contains a mirroring device for mirroring control. The DVR2 increases the central processing unit (CPU) memory to 16 Megabyte (MB) and adds new cabling within the chassis for connection of the new channel capacity board and mirroring device with hard drive configuration. The DVR2 includes upgrades to the NICE Systems Inc. software and workstation operating system.

Mechanism: Digital Voice Recorder System Replacement (DVRS Repl) [103]

The Digital Voice Recorder System Replacement (DVRS Repl) is a modern digital system used to record all communications by air traffic controllers in Airport Traffic Control Tower (ATCT) facilities, Terminal Radar Approach Control (TRACON) facilities, Automated Flight Service Station (AFSS) facilities, and Air Route Traffic Control Center (ARTCC) facilities.

Voice communications between controllers, pilots, and other ground-based air traffic facilities are recorded for legal and accident investigation purposes.

In the spring of 2007 the FAA awarded NICE Systems Inc. a contract to enhance air traffic recording capability at up to 850 FAA and Department of Defense DoD) sites. The contract is part of FAA's VRRP (voice recorder replacement program), which is part of the agency's larger initiative to modernize the U.S. air traffic control system. The FAA will be replacing its existing digital voice recording systems with NICE Systems' Inform Multimedia Incident Information Management solution, which will enable a more rapid and thorough review of ATC incidents.

Dictaphone 9800 recorders in mobile air traffic control towers will also be replaced by new digital voice recorders.

Mechanism: Emergency Transceiver Replacement (ETR) [134]

The Emergency Transceiver (ETR) provides portable dual-band Ultra High Frequency/Very High Frequency (UHF/VHF) air-to-ground (A/G) radios for back-up communications at Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) facilities. The radios provide at least 30-minutes of operation on their battery pack. In addition, they can operate from a 12-volt direct current (DC) vehicle power source and also from an alternate 120-volt alternating current (AC) source. When connected to an external antenna, they can be used from the controller position in case of catastrophic communications or power failure. They can also be carried out of the facility and operated with their own antennas when fire or some disaster forces building evacuation.

A five-year contract was awarded to Motorola in June 1994 for new Portable Emergency Transceiver Model 2000, (PET-2000) to replace a variety of obsolete, unsupportable radios that did not meet operational or spectral emission requirements. The radios were purchased with a ten-year warranty, training and logistic documentation. A total of 1,309 PET-2000s were delivered to the FAA Logistics Center (FAALC) from where they were shipped to locations throughout the National Airspace System (NAS). In addition to the radios, some of the regions were provided with antennas and limited funding to cover the installation.

Mechanism: Emergency Voice Communications System (EVCS) [783]

The Emergency Voice Communications System (EVCS) was activated under a presidential mandate as a result of an NAS emergency situations and the lack of dedicated emergency telecommunications required for such events. The EVCS makes use of designated communications channels using the Federal Telecommunications Services (FTS) 2001 T1 services contract to provide "dedicated outgoing service channels" for emergency traffic management. In rare instances, a dedicated FTS central office telephone lines, bypasses the private branch exchange (PBX) to provide EVCS services. All current Voice Telephone System locations have EVCS connectivity but, there are no plans to expand EVCS beyond the current configuration.

The EVCS is located at Headquarters (HQ), Regional Offices, several Air Route Traffic Control Centers (ARTCCs), Level 5 Terminal Radar Approach Control (TRACON) facilities, and other selected sites. EVCS uses two (2) dedicated FTS2001 dial access channels at most FAA locations. Dedicated dial lines using the Public Switched Telephone Network (PSTN) are used at locations not having direct access to FTS 2001. EVCS operational support for HQ and Regional Communications Command Centers includes such events as accident and incident reports, hijacks, aircraft crashes, aviation security matters, military activities, and natural disasters.

The EVCS can be viewed as a Mission Support service but is not provided by the FAA Telecommunications Infrastructure (FTI) services contract. The FTS 2001 contract vehicle expired during December 06' and was modified and extended 42 additional months. The new contract will awarded in Jan 08' under the DOT Umbrella "Networx" contract.

Mechanism: Enhanced Terminal Voice Switch/Interim Voice Switch Replacement (ETVS/IVSR) [16]

The Enhanced Terminal Voice Switches/Interim Voice Switch Replacement (ETVS/IVSR) are installed at Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) facilities and can be configured up to 80 air traffic controller positions. The ETVS is a modular system. The size of the switch is based on the number of controller positions in the facility.

The ETVS (installed in the ATCT) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications intraconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between ATCT controllers and pilots is also supported by the ETVS.

The ETVS (installed in the TRACON) provides the ATC operational G/G voice communications intraconnectivity between controllers within a TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/ARTCC controllers/FSS specialists/ATCSCC specialists. A/G radio connectivity between TRACON controllers and pilots is also supported by the ETVS.

A refined set of ETVS products is being procured through the Interim Voice Switch Replacement (IVSR) contract until 2010.

Mechanism: GSA 400/466 (GSA 400/466) [7736]

The GSA Model 400/466 is developed by Litton/Amecon and acquired through a National Program/Contract. This solid-state voice switch supports small to medium terminal facilities with up to 4-air traffic controller positions for air-to-ground (A/G) and ground-to-ground (G/G) voice communications connectivity.

The GSA 400/466 (installed in the ATCT) provides the air traffic control (ATC) operational ground-ground voice communications intraconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Ground-air radio connectivity between ATCT controllers and pilots is also supported by the GSA 400/466.

The GSA 400/466 (installed in the TRACON) provide the ATC operational ground-ground voice communications intraconnectivity between controllers within TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/ARTCC controllers/FSS specialists/ATCSCC specialists. Ground-air radio connectivity between TRACON controllers and pilots is also supported by the GSA 400/466.

Mechanism: High Frequency Communications (HF Communications) [2345]

High Frequency (HF) voice communications is used by oceanic and en route facilities that support air traffic control (ATC) services for aircraft flying over oceanic airspace. A commercial communications service provider (CCSP) provides the HF communications service as a contracted service to the FAA.

Mechanism: Integrated Communications Switching System Type I (ICSS I) [18]

The Integrated Communications Switching System Type I (ICSS I) are installed at Airport Traffic Control Tower (ATCT) facilities, Terminal Radar Approach Control (TRACON) facilities, and Automated Flight Service Station (AFSS) facilities.

The ICSS I (installed in the ATCT) provides the air traffic control (ATC) operational ground-ground voice communications intraconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Ground-air radio connectivity between ATCT controllers and pilots is also supported by the ICSS I.

The ICSS I (installed in the TRACON) provide the ATC operational ground-ground voice communications intraconnectivity between controllers within TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/ARTCC controllers/FSS specialists/ATCSCC specialists. Ground-air radio connectivity between TRACON controllers and pilots is also supported by the ICSS I.

The ICSS I installed in the AFSS (Alaska) provides the ATC operational ground-ground voice communications intraconnectivity between specialists within an AFSS (intercom), interconnectivity between specialists in separate AFSSs (interphone), and interconnectivity between FSS specialists and ARTCC controllers/TRACON controllers/ATCT controllers/ATCSCC) specialists. Ground to-air radio connectivity between AFSS specialists and pilots is also supported by the ICSS I. ICSS I located in AFSS outside of Alaska are under the management of the Flight Services 21 contract.

Mechanism: Integrated Communications Switching System Type II (ICSS II) [2312]

The Integrated Communications Switching Systems Type II (ICSS II) are installed at Airport Traffic Control Towers (ATCT), Automated Flight Service Stations (AFSS), and Terminal Radar Approach Control (TRACON) facilities.

The ICSS II (installed in the ATCT) provides the air traffic control (ATC) operational ground-to-ground voice communications intraconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Ground-to-air radio connectivity between ATCT controllers and pilots is also supported by the ICSS II.

The ICSS II (installed in the TRACON) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications intraconnectivity between controllers within TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/Air Route Traffic Control Center (ARTCC)) controllers/Flight Service Station (FSS) specialists/ATCSCC specialists. Ground-to-air radio connectivity between TRACON controllers and pilots is also supported by the ICSS II.

The ICSS II operating in the Alaska AFSS is owned and operated by the FAA and will transition to the Interim Voice Switch Replacement. All other ICSS II in AFSS are apart of the Flight Services 21 (FS21) leased services contract.

Mechanism: Integrated Communications Switching System Type III (ICSS III) [2313]

The Integrated Communications Switching System Type III (ICSS III) is installed at Automated Flight Service Stations (AFSS). The ICSS III (installed in the AFSS) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications intraconnectivity between specialists within an AFSS (intercom), interconnectivity between specialists in separate AFSSs (interphone), and interconnectivity between Flight Service Station (FSS) specialists and Air Route Traffic Control Center (ARTCC) controllers/Terminal Radar Approach Control (TRACON) controllers/Airport Traffic Control Tower (ATCT) controllers/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between AFSS specialists and pilots is also supported by the ICSS III.

The ICSS III operating in the Alaska AFSS is owned and operated by the FAA and will transition to the Interim Voice Switch Replacement. All other ICSS III in AFSS are apart of the Flight Services 21 (FS21) leased services contract. Additional information can be found at http://www.lmafsshr.com.

Mechanism: Multi-Mode Digital Radios (MDR) [2014]

Multi-Mode Digital Radios (MDRs) are ground-based very high frequency (VHF) air traffic-control (ATC) radios that can operate in several configurations: (1) analog voice with 25 kHz channel spacing; (2) analog voice with 8.33 kHz channel spacing; and (3) VHF Data Link (VDL) Mode 3 which consists of two-way digital voice and data communication.

4,200 radios are acquired for productions and 1,200 for spares and replacement (Ref: FY 2010 OST Budget Submission).

Mechanism: NAS Voice Switch (NVS) [6328]

The National Airspace System (NAS) Voice Switch (NVS) program will replace legacy voice switches in the Tansit (EnRoute) and Arrival/Departure (Terminal) domains. NVS will incorporate a networking capability to enable the voice switch to connect to extended resources for air-to-ground (A/G) communications.

The new modern digital voice switches consisting of digital interfaces will be the common platform and baseline voice switch for all NAS domains with modularity and scalability to meet communications connectivity requirements. Additionally, this switch will be expandable to accommodate growth capacity requirements and able to support NAS Modernization needs as described in various Operational Improvements (OIs).

Operationally, the NVS supports (ATC) operational ground-to-ground (G/G) voice communications intraconnectivity between controllers within ATC facilities (i.e., Air Route Traffic Control Centers (ARTCCs), Terminal Radar Approach Controls (TRACONS), Air Traffic Control Towers (ATCTs), and new muti-purpose NextGen facilities) for "intercom" communications. The NVS also enables operational communications and interconnectivity between ATC controllers in separate ATC facilities including interconnectivity to Flight Service Station (FSS) specialists and the David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between Controllers and pilots is also supported by the NVS systems.

Additional information in June 2007 Operational Evolution Partnership, Version 1.0 at URL
http://www.faa.gov/about/office_org/headquarters_offices/ato/publications/oep/version1/reference/nvs/

Mechanism: Rapid Deployment Voice Switch Type I (RDVS I) [19]

The Rapid Deployment Voice Switch Type I (RDVS I) is installed at Airport Traffic Control Towers (ATCT) and Terminal Radar Approach Control (TRACON) facilities with more than four air traffic controller positions. The RDVS is a modular system. The size of the switch is based on the number of controller positions in the facility. The RDVS I (installed in the ATCT) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications intraconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between ATCT controllers and pilots is also supported by the RDVS I.

The RDVS I (installed in the TRACON) provides the ATC operational G/G voice communications intraconnectivity between controllers within an TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/ARTCC controllers/FSS specialists/ATCSCC specialists. A/G radio connectivity between TRACON controllers and pilots is also supported by the RDVS I.
Note: There are two flavors of the RDVS - RDVS Type I - Litton and RDVS Type I - Denro.

Mechanism: Rapid Deployment Voice Switch Type II (RDVS II) [24]

The Rapid Deployment Voice Switch Type II (RDVS II) is installed at Airport Traffic Control Towers (ATCT) and Terminal Radar Approach Control (TRACON) facilities with more than four air traffic controller positions. The RDVS is a modular system. The size of the switch is based on the number of controller positions in the facility. The RDVS II (installed in the ATCT) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications intraconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists.

Air-to-ground (A/G) radio connectivity between ATCT controllers and pilots is also supported by the RDVS II. The RDVS II (installed in the TRACON) provides the ATC operational G/G voice communications intraconnectivity between controllers within an TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/ARTCC controllers/FSS specialists/ATCSCC specialists. A/G radio connectivity between TRACON controllers and pilots is also supported by the RDVS II.
Note: There are two flavors of the RDVS II - RDVS Type II - Litton and RDVS Type II - Denro.

Mechanism: Rapid Deployment Voice Switch Type IIA (RDVS IIA) [2315]

The Rapid Deployment Voice Switch Type IIA (RDVS IIA) is installed at Airport Traffic Control Tower (ATCT) facilities, Terminal Radar Approach Control (TRACON) facilities and can be configured for up to 192 air traffic controller positions. The RDVS IIA is a modular system. The size of the switch is based on the number of controller positions in the facility.

The RDVS IIA (installed in the ATCT) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications intraconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists.

The RDVS IIA also supports air-to-ground (A/G) radio connectivity between ATCT controllers and pilots. The RDVS IIA (installed in TRACON facilities) provides the ATC operational G/G voice communications intraconnectivity between controllers within a TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/ARTCC controllers/FSS specialists/ATCSCC specialists. A/G radio connectivity between TRACON controllers and pilots is also supported by the RDVS IIA.

Mechanism: Satellite Communications (SATCOM) [2346]

Satellite Communications (SATCOM) is used by oceanic and en route facilities to support an alternative means of tactical air traffic control (ATC) voice communications between ground controllers and pilots in aircraft over the ocean. Oceanic air-to-ground satellite communications is provided via a Commercial Communications Service Provider (CCSP). The FAA currently has no plans to develop or implement its own oceanic air to ground SATCOM service.

There are also satellite transceivers installed at FAA regional facilities and used as an alternate means of back-up communications in case of total ground communications failure. For FAA locations in mountainous terrain SATCOM is also used to provide primary and secondary communications were needed.

Mechanism: Small Tower Voice Switch (STVS) [25]

The Small Tower Voice Switch (STVS) is an integrated air-to-ground (A/G) and ground-to-ground (G/G) voice switching system.

The STVS provides for the selection, interconnection, and activation of communications connectivity for the following connection types for Air Traffic Control Towers (ATCTs), Terminal Radar Approach Controls (TRACONs) and Flight Service Station (FSS):
- among operating air traffic control (ATC) positions within an ATC facility (intra-facility via intercom)
- between separate ATC facilities (inter-facility via interphone) including interfaces to Air Route Traffic Control Center (ARTCC), the David J. Hurley Air Traffic Control System Command Center (ATCSCC), and local and/or remote radio systems.

The STVS is specially designed for low activity operations. The STVS accommodates up to four positions and 12 radio/interphone (telephone) channels.

Mechanism: Ultra High Frequency Ground Radios (UHF Ground Radios) [2243]

Ultra high frequency (UHF) Ground Radios are analog UHF amplitude modulation (UHF - AM) radio devices operating in the 225 - 400 MHz frequency band. The radios are also single channel transmitters and receivers (transceivers)operating in a main/standby configuration. These ground-based devices support tactical air traffic control (ATC) voice communications and coordination between the ground-based controller and the aircraft pilot for all phases of flight and in all flight domains (i.e., Oceanic, En Route, Terminal, and Flight Service Station (FSS).

Mechanism: Ultra High Frequency Ground Radios - Replacement (UHF Ground Radios - Repl) [626]

The Ultra High Frequency Ground Radios-Replacement (UHF Ground Radios-Repl) mechanism represents analog, ultra high frequency, amplitude modulation (UHF-AM) radio devices operating in the 225-400 MHz frequency band. The radios are also single channel transmitters and receivers (transceivers) operating in a main/standby configuration. These ground-based devices support tactical air traffic control (ATC) voice communications and coordination between the ground-based controller and the aircraft pilot in all phases of flight and in all flight domains (i.e., Oceanic, En Route, Terminal, and Flight Service Station).

The replacement UHF Radios replace the legacy radios with Model CM-300 from General Dynamics.

Mechanism: VSCS Control Subsystem Upgrade (VCSU) [2460]

The Voice Switching and Control System (VSCS) Control Subsystem Upgrade (VCSU) is a replacement of the Tandem computers that perform the logical switching and control for the VSCS system. The upgrade replaces the program's original control subsystem computers and software with modern, commercial off-the-shelf (COTS) servers running Microsoft Windows 2000® advanced server software. The FAA plans to merge the VCSU with other software enhancements prior to beginning a national rollout of the upgrade to the nation's 21 Air Route Traffic Control Center (ARTCC) facilities. These upgrades will ensure that the air-to-ground and ground-to-ground communications capabilities are reliable and available for separating aircraft, coordinating flight plans, and transferring information between air traffic control (ATC) facilities in the en route environment. Harris Corporation completed the functional acceptance test (FAT) of the VCSU in November 2001.

By the end of fiscal year 2004 the VCSU was operational at all 21 ARTCC facilities. The FAA also procured equipment to replace the contractor traffic simulation unit (CTSU) test bed located at the FAA William J. Hughes Technical Center (WJHTC), which is used to perform system-loading requirements for all formal baseline verifications of VSCS functions.

The VCSU is transitioned to the VSCS TR P1 systems mechanism in NAS 6.

Mechanism: VSCS Technology Refresh Phase 1 (VSCS TR P1) [2253]

The VSCS technology refresh (TR) phase 1 (VSCS TR P1) provides for a service life extension of the VSCS. The TR P1 encompassed (1) video display module replacement (VDMR) - procurement and installation, (2) power supply refurbishment - ongoing depot repair actions, and (3) workstation upgrade - production and installation. The VSCS TR P1 is a modular system installed in Air Route Traffic Control Center (ARTCC) facilities. The size of the switch is based on the number of controller positions in a given ARTCC.

The VSCS TR P1 provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications intraconnectivity between controllers within an ARTCC (intercom), interconnectivity between controllers in separate ARTCCs (interphone), and interconnectivity between ARTCC controllers and Terminal Radar Approach Control (TRACON) controllers/Airport Traffic Control Tower (ATCT) controllers/Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between ARTCC controllers and pilots is also supported by the VSCS TR P1.

The VSCS TR P1 system is transitioning to the VSCS TR P2 system.

Software development demonstration and system expansion are being considered for the 2008 timeframe in VSCS TR P2. VSCS TR P2 was approved by the Joint Resources Council (JRC) in August 2006.

Mechanism: VSCS Technology Refresh Phase 2 (VSCS TR P2) [7382]

The VSCS technology refresh (TR) phase 2 (VSCS TR P2) provides for a service life extension of the VSCS. The TR P2 continues any uncompleted work of TR P1 – encompassing (1) video display module replacement (VDMR) - procurement and installation, (2) power supply refurbishment - ongoing depot repair actions, and (3) workstation upgrade - production and installation. VSCS TR P2 is also targeted for software development demonstration and system expansion. The VSCS TR P2 is a modular system installed in Air Route Traffic Control Center (ARTCC) facilities. The size of the switch is based on the number of controller positions in a given ARTCC.

The VSCS TR P2 provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications intraconnectivity between controllers within an ARTCC (intercom), interconnectivity between controllers in separate ARTCCs (interphone), and interconnectivity between ARTCC controllers and Terminal Radar Approach Control (TRACON) controllers/Airport Traffic Control Tower (ATCT) controllers/Flight Service Station (FSS) specialists/David J. Hurley Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between ARTCC controllers and pilots is also supported by the VSCS TR P2.

The VSCS TR P2 system is planned to transition to the NAS Voice Switch program and systems in future years. In August 2006 the Joint Resources Council (JRC) approved the funding for the VSCS TR P2.

Delivery of VSCS display module replacements was scheduled for 11 sites in FY 2007. Installation of a third module for a work station upgrade was scheduled for completion during May 2007.

Other system upgrades includes ground-to-ground (G/G) and VSCS Control Equipment Programming Langauge for Microcomputers (PLM) conversion to 'C" programming language.

Depot test equipment refurbish/upgrade, enhanced VSCS diagnostics, and repeater/LAN redesign are also activities for technology refreshment.

Mechanism: VSCS Training and Backup Switches (VTABS) [1736]

Voice Switching and Control System Training and Backup Switch (VTABS) was developed to meet AT requirements for a separate standalone VSCS Backup and Training System. VTABS can be configured as a 50-position switch with the capability to support air traffic operations in the event of VSCS failure, hardware and software maintenance or power loss.

The VSCS Technology Refreshment Phase 2 upgrade funding will replace the VTABS with modern power equipment.

Mechanism: Very High Frequency Ground Radios (VHF Ground Radios) [303]

Very High Frequency (VHF) Ground Radios are analog VHF amplitude modulation (VHF - AM) single-channel transceiver radio devices operating in the 118 - 137 MHz frequency band. The VHF ground-based radios directly support tactical air traffic control (ATC) voice communications and coordination between the ATC controllers and pilots in all flight domains (EnRoute, Arrival/Departure, and Surface).

Additionally, there are analog VHF frequency modulation (VHF - FM) radio devices operating in the 161 - 174 MHz frequency band that are multi-channel transceivers. These transceivers are used by Flight Inspection, Aviation Security, and Airway Facilities specialists supporting local airport operations and maintenance, and operational mission activities in support of the National Airspace System (NAS). Emergency situations and disaster recovery operations are also supported by the VHF - FM radios.

Mechanism: Voice Switching and Control System (VSCS) [7354]

The Voice Switching and Control System (VSCS) provides the Air Route Traffic Control Center (ARTCC) air traffic controller with ground/ground voice switching intrafacility (intercom) and interfacility communications and remote control access to air/ground radio equipment for controller-to-pilot communications. The VSCS replaced the aging ground-to-ground switching equipment and the air-to-ground circuits with a single integrated, computer-controlled, digital voice switching system, which greatly improves air traffic safety with clearer voice communications. The VSCS provided as government furnished property (GFP) communications requirement for inclusion in the common console in the Display System Replacement (DSR). Delivery and implementation of the VSCS Training and Backup System (VTAB) and VSCS Console Equipment (VCE) will be completed.

Note:
This VSCS mechanism was transitioned to the VSCS Tecnology Refresh Phase 1 (VSCS TR P1) mechanism.

WAN Communication

Mechanism: Alaska Satellite Telecommunications Infrastructure (ASTI) [7539]

Key Note: The Alaskan National Airspace System (NAS) Interfacility Communications System (ANICS) program and system have been renamed to Alaska Satellites Telecommunication Infrastructure (ASTI) during Concept and Requirements Definition (CRD) phase of the Acquisition Management System (AMS). The Investment Analysis Readiness Decision (IARD) was approved on March 19, 2008.

ASTI is an FAA-owned satellite-based infrastructure that carries reliable voice/data communications in support of air traffic management (ATM) and air traffic control (ATC) between FAA facilities (i.e., Air Route Traffic Control Center (ARTCC), Airport Traffic Control Tower (ATCT), and Automated Flight Service Station (AFSS) facilities). The satellite portion of the wide area communications service is a leased service.

ASTI provides communications connectivity for critical, essential, and routine air traffic control services. Two satellite relay services provide air-to-ground primary and backup alternate communications connectivity diversity.
The network can be expanded as needed to provide service to new NAS facilities.

ASTI Modernization will be focused on making improvements to ASTI Phase 1 and ASTI Phase 2 roll-outs - correcting ASTI operational availability degradation that is caused by equipment obsolescence and weather related damage and deterioration.

On the 2007 Communications Roadmap, the "Tech Refresh" mechanism represents ASTI Modernization.

Additional Information: http://download.harris.com/app/public_download.asp?fid=416

Mechanism: Alaskan NAS Interfacility Communications System (ANICS) [12]

Key Note: The Alaskan NAS Interfacility Communications System (ANICS) program has been renamed to Alaska Satellites Telecommunication Infrastructure (ASTI) during Concept and Requirements Definition (CRD) phase of the Acquisition Management System (AMS). The Investment Analysis Readiness Decision (IARD) was approved on March 19, 2008.

ANICS provides wide area NAS telecommunication services within the state of Alaska and connectivity to NAS facilities within Alaska from NAS facilities outside of Alaska.

ANICS service is provided by FAA-owned satellite earth stations and leased transponders on two communications satellites. NAS facilities are connected to ASTI demarcation points through access circuits. These access circuits may be implemented by a copper or fiber optic cable, microwave radio, or leased services. Communications interfaces provide for Voice Grade (VG) services (VG1, VG2, VG3, VG5, VG6, VG7, VG8, VG10) and for digital services for data rates from 300 bps to 1.544 Mbps.

The ANICS equipment provides remote maintenance monitoring and control. The equipment is controlled and operated from the Network Control Center (NCC) using the Harris Corporation Air Traffic Network Manager (ATNM), centrally located in the Anchorage (KZAN) Air Route Traffic Control Center (ARTCC).

ANICS Phase 1 (ANICS P1) provides critical communications with 99.99% availability at 52 sites by using two sets of ground segment equipment and two satellite transponders to create two parallel communication paths with switchover capability.

ANICS Phase 2 (ANICS P2) sites provide essential communications with 99.9% availability at 12 sites by using one set of ground segment equipment and one satellite transponder. Phase 2 ground segment sites are enclosed in radomes that protect the equipment and antenna from the weather.
Additional Information: http://download.harris.com/app/public_download.asp?fid=416

Mechanism: Bandwidth Manager (BWM) [777]

Bandwidth Manager (BWM) provides capacity for multiple communication services and the ability to multiplex voice and data within the National Airspace System (NAS) telecommunications network. The BWM enhanced the NAS network capabilities by providing bandwidth-on-demand, automatic restoration, switching and intelligent routing of services between FAA owned and/or leased interfacility connectivities.

The FTI Service provides the back-bone truncking and connectivity for the BWM. As part of BWM migration, the FTI services contract will also provide bandwidth management services.

Mechanism: Digital VHF Aeronautical Mobile Communications Infrastructure (DVMI) [6895]

The Digital VHF Infrastructure will consist of VDL-2 radios, associated radio control equipment, and VDL Mode-2 network management and control capability. The Digital VHF Infrastructure will be a part of the communication string that allows the exchange of Datacomm Segment 1, 2, and 3 messages between the controller and the pilot. FTI services will provide the connectivity between the ATC facility where Datacomm messages will be generated and the facility housing Datacomm VDL Mode-2 radios and associated control equipment. The VDL Mode-2 radios will provide connectivity to the aircraft.

Mechanism: En Route Communications Gateway (ECG) [382]

The En Route Communications Gateway (ECG) replaces the Peripheral Adapter Module Replacement Item (PAMRI) and provides a modernized local area network (LAN)-based infrastructure capable of accommodating the En Route Automation Modernization (ERAM) program with minimal modifications. The PAMRI functions to be replaced included providing communication interfaces to external systems located in other Air Route Traffic Control Centers (ARTCCs), Terminal Radar Approach Control (TRACON) facilities, Automated Flight Service Stations (AFSSs), David J. Hurley Air Traffic Control System Command Center (ATCSCC), North American Aerospace Defense Command (NORAD), U.S. Law Enforcement, U.S. Customs, Military Base Operations, and international Area Control Centers (ACCs). Other interfaces include the Flight Data Input/Output (FDIO) Central Control Unit, which exchanges FDIO data with FAA and U.S. Department of Defense (DoD) facilities, and the National Airspace Data Interchange Network (NADIN) concentrator, which exchanges data through the NADIN Packet Switched Network (PSN) with the M1FC via the Weather Message Switching Center Replacement (WMSCR). The ECG increases the number of external interfaces to radars from 24 to 36. The ECG provides internal interfaces between the Host Computer System (HCS) and the Direct Access Radar Channel (DARC), or EBUS, and between HCS and traffic flow processors such as the Enhanced Traffic Management System (ETMS) and Departure Spacing Processor (DSP), both of which eventually will transition from ECG to the Host Interface Device/National Airspace System Local Area Network (HID/NAS LAN) system. The ECG Monitor and Control (M&C) subsystem includes a display for monitoring up to two-dozen radars. This display is called the Random Access Plan Position Indicator (RAPPI).

The operational components of ECG consist of: (a) front-end processor (communications and surveillance interfaces), (b) two gateway processors (internal connectivity to HCS and DARC/ Enhanced Backup Surveillance (EBUS)), (c) LANs that communicate between the front-end and gateway processors on the primary and the backup automation systems, and (d) a monitor and control processor. With replacement of DARC by EBUS, the ECG gateway processor is renamed to the Backup Interface Processor (BIP), with the BIP platform housing both the ECG gateway application and the EBUS application.

Mechanism: En Route Communications Gateway Technology Refresh (ECG Tech Refresh) [6389]

The En Route Communications Gateway Technology Refresh (ECG Tech Refresh) will enable ECG to accommodate the En Route Automation Modernization (ERAM) system. It will replace processors previously interfaced to the Host Computer System (HCS) and the Enhanced Backup Surveillance (EBUS) with processors to be interfaced with ERAM primary and backup Application Infrastructure local area networks (LANs). Whereas ECG previously did not pass flight data to the backup channel (Direct Access Radar Channel (DARC)/EBUS), ECG must pass both surveillance and flight data to the backup channel of ERAM to enable full functionality on both channels of ERAM. To assure flight data is directed to only one channel at a time (not both), a new switching capability will be added to control the flow of flight data to either the primary or backup channel.

The ECG Tech Refresh will also accommodate new interfaces, including those previously provided by the Host Interface Device National Airspace System LAN (HID NAS LAN) for Data Link Communications, those previously provided by URET for interfacing with adjacent ARTCCs and with WARP, and those provided for interfacing with the U.S. Customs. Whereas the original ECG maintained legacy serial and parallel interfaces, the ECG Tech Refresh will (where possible) migrate from legacy interfaces to network interfaces, resulting in replacement of some serial and parallel interfaces. The ECG Tech Refresh will also provide a new Monitor and Control (M&C) sub-system for compatibility with the ERAM M&C and to assure successful integration with the future En Route Monitor and Control (EMAC).

Mechanism: FAA Bulk Weather Telecommunications Gateway (FBWTG) [699]

The FAA Bulk Weather Telecommunications Gateway (FBWTG) provides the FAA communications interface to the National Weather Service (NWS) Telecommunications Gateway for the acquisition of gridded model weather products. The FBWTG is a module of the WARP at the ATCSCC.

The weather products are used by the Weather and Radar Processor (WARP), Integrated Terminal Weather System (ITWS). The FBWTG also provides information transfer and delivery for airborne weather observations (from the Meteorological Data Collection and Reporting System (MDCRS)) used by ITWS.

The Aviation Weather Center in Kansas City, MO. uses the communications gateway to delivery weather advisories and information of hazardous products to the NAS.

Mechanism: FAA Telecommunications Infrastructure (FTI) [639]

FTI (FTI-1) is a Leased Telecommunications Services contract that is used to satisfy NAS operational and Mission Support telecommunications requirements. FTI is intended to consolidate FAA's communications networks and leased services. FTI provides the range of services that are equivalent to those provided by Leased Inter-facility Communication System (LINCS), Radio Communications Link (RCL), Agency Data Telecommunications Network 2000 (ADTN 2000), Bandwidth Manager (BWM) network including its FAA IP-Routed Multi-user Network (FIRMNET), and the Data Multiplexer Network (DMN). These networks have been, are in the process of, or eventually will be decommissioned. FTI will not duplicate the X.25 services currently provided by NADIN PSN but will accommodate NADIN PSN users as they develop IP capability and migrate to FTI IP services. This will allow the NADIN PSN to be eventually decommissioned. FTI will not replace NADIN MSN services. NADIN MSN is currently being rehosted and will provide access to its services via both X.25 and IP. FTI will provide the IP access to NADIN MSN.

FTI provides point-to-point and multipoint Voice Grade (VG) analog services, point-to-point digital services, IP network services, and switched circuit services. FTI ALSO provides a range of interface types that includes VG, DDC, DDS, T1, T3, ETHERNET, FDDI, and ISDN. FTI services can be ordered across a range of availability requirements from 0.997 to 0.9999971 and across a range of latency limits from 50 ms to 1000 ms. For Security, FTI provides a range of Security Services that includes Basic security, VPNs, Gateways to non-NAS users, and Dedicated Services for critical NAS operational communications traffic.

For Network Management and Operations (NMO), FTI provides User Interface terminals to Technical Operations Control Centers. NMO terminals provide authorized users in these facilities with access to FTI services real-time status, service alarms and alerts, service performance data, service configuration data and other useful information.

In support of Business Services, FTI provides Integrated Business System terminals. Authorized users will have access through these terminals to the following applications: Cost Estimation, Service Quotation, Service Ordering, and Inventory.

The FAA Telecommunications Satellite (FAATSAT) has been transitioned to the FTI Service Class (SC) 14 for voice air-to-ground (A/G) and SC 41 for surveillance data services.

The Agency Data Telecommunications Network 2000 (ADTN-2000) Contract has also transitioned to the FTI as Mission Support Data Services.

At this point, Harris says it has transitioned more than 90 percent of the FAA's legacy networks to the FTI network. [Flt Tech Online, 12-11-2007.]

Support Activity for SWIM Application Security:
- Demonstration of Enhanced Data Services (ED-X)for NAS Security Application Protection Servies for data information exchanges utilizing SOA security mechanisms.

Mechanism: FAA Telecommunications Infrastructure 2 (FTI-2) [694]

FAA Telecommunications Infrastructure 2 (FTI-2) includes all wide-area-networking (WAN)interfacility communications services. Connectivity is provided for ground-to-ground (G/G) connectivity between FAA Air Traffic Control (ATC) facilities and between FAA ATC facilities and air-to-ground (A/G) system resources point-of-presence.

FTI-2 services will transition the original FTI services when they expire and provide improved services that will meet the future National Airspace System (NAS) networking services in preparation for the Next Generation Air Transportation System (NextGen).

Mechanism: High Frequency Aeronautical Telecommuniction Network Data Link (HF ATN DL) [785]

The High Frequency Aeronautical Telecommunication Network Data Link (HF ATN DL) provides two-way digital data communications over HF radios using International Civil Aviation Organization (ICAO) - compliant ATN digital data link applications in the transoceanic domain. A Commercial Communications Service Provider (CCSP) provides this service. The FAA has no plans to develop its own HF ATN data communications system.

Mechanism: Leased Inter-facility National Airspace System Communication System (LINCS) [67]

The Leased Inter-facility National Airspace System Communication System (LINCS) provides wide area connectivity between FAA ATC facilities for ground-to-ground (G/G) and air-to-ground (A/G) critical and essential network services using industry-standard interfaces between any specified end points. LINCS is used to satisfy all FAA operational and some administrative telecommunication requirements.

LINCS services have now been fully transitioned to FAA Telecommunications Infrastructure (FTI) Contract.

Mechanism: Low-Density Radio Communications Link (LDRCL) [66]

The Low-Density Radio Communications Link (LDRCL) is an FAA owned communications system. Like the Radio Communications System (RCL), LDRCL is also a micro-wave system that satisfies short-haul, low-density communication requirements. It provides user access (via tail circuits) to a Radio Communications Link (RCL) site or connectivity between two operational Air Traffic Control (ATC) facilities.

Mechanism: National Airspace Data Interchange Network Message-Switched Network (NADIN MSN) [61]

The National Airspace Data Interchange Network Message-Switched Network (NADIN MSN) is the portion of the global Aeronautical Fixed Telecommunication Network (AFTN) within the USA domain. As such, it is connected to other countries' AFTN switches and to service providers' message switches (e.g., ARINC, SITA). AFTN enables the exchanges of vital information for aircraft operations such as distress messages, urgency messages, flight safety messages, meteorological messages, flight regularity messages and aeronautical administrative messages.

NADIN MSN (sometimes called NADIN 1A) is a store-and-forward telecommunication network. It provides its users the ability to exchange Service A (weather messages) and Service B (e.g., Flight Plans, NOTAMS) messages. It stores all Service B messages as required by ICAO. It forwards Service A messages to WMSCR. An example of a typical communication involving NADIN MSN is the transmission of Flight Plans from a NAS system like OASIS, or a domestic non-NAS system like Airline or BaseOps terminals, to a Host Computer.

There are two NADIN MSN switches, located at ATL and SLC NNCCs. These switches are interconnected by NADIN PSN. Users that are equipped with X.25 capability can access NADIN MSN through NADIN PSN. Users that are not X.25 capable and rely on legacy protocols need to access NADIN MSN through NADIN MSN concentrators, located at ARTCCs.

NADIN MSN Rehost (NMR) has recently been implemented. NMR allows users to access the MSN with the X.25 or IP protocols. Currently NADIN MSN and the NMR are functioning in parallel as users are being cut over to the NMR. NADIN MSN Concentrators were not involved in the NMR process. They will be decommissioned when their users migrate to IP services.

Mechanism: National Airspace Data Interchange Network Packet-Switched Network (NADIN PSN) [21]

The National Airspace Data Interchange Network Packet-Switched Network (NADIN PSN) (sometimes called NADIN II) is an X.25 packet-switched network that augments and functions in parallel with the NADIN Message-Switched Network (NADIN MSN). Collectively, both networks are known as NADIN. The NADIN PSN is a data communications network composed of packet-switching nodes connected by high-speed digital backbone trunks and controlled by the National Network Control Center (NNCC).

The NADIN PSN is tentatively planned for decommissioning in the 2011 time-frame. The FTI Program Office is working with the NADIN PSN user community to facilitate the migration of end user systems from NADIN PSN X.25 services to FTI IP services.

Mechanism: Radio Communication Link (RCL) [22]

The Radio Communication Link (RCL) is an integrated voice and data microwave transmission system designed to provide the FAA with cost effective and reliable service for its high capacity National Airspace System (NAS) communications routes. The RCL interconnects Air Route Traffic Control Center (ARTCC) facilities with long-range radar installations and other air traffic control (ATC) facilities.

Mechanism: Radio Control Equipment (RCE) [31]

Radio Control Equipment (RCE), located at both air traffic control (ATC) facilities and remote communication sites, control the operation of remotely located ground to air very high frequency/ultra high frequency (VHF/UHF) radios used by air traffic controllers to communicate with pilots. The RCE interfaces with the voice switch at the ATC facility, telephone landlines, and air-to-ground (A/G) radios at the En Route Remote Communications Air/Ground (RCAG) sites, Terminal Remote Transmitter/Receiver (RTR) sites, and Flight Service Station Remote Communications Outlet (RCO) sites.

The RCE Sustainment activities sustains and/or procures RCE to support 600 channels (1,200 units). The initial operational capability (IOC) is 01-Oct-2006 and final operational capability (FOC) is 30-Sep-2009 for sustainment.

The A/G Division anticipates a new RCE Sustainment effort will be needed to fill the gap from FY2015 through FY2025.

Mechanism: Wide Area Augmentation System Telecommunications Subsystem (WAAS TCS) [7068]

The Wide Area Augmentation System (WAAS) Telecommunications Subsystem (TCS) is being upgraded to provide the foundation for future WAAS enhancements. As a part of the upgrade, two new racks of WAAS equipment have been installed at each of the WAAS backbone sites. These sites are located in Air Route Traffic Control Centers (ARTCC) in Chicago, Atlanta, Los Angeles, and Washington, D.C. Additionally, two new racks of WAAS equipment were installed at the Seattle Air Route Traffic Control Center (ARTCC) to establish a gateway between the seven Alaskan Wide-Area Reference Station (WRS) satellite circuits and the existing continental U.S. (CONUS) terrestrial backbone circuits.

This new equipment increases WAAS network capability. This additional capability is needed to support the 13 new WAAS WRS being installed in Alaska, Canada, and Mexico; and the new WAAS Wide-area Master Station (WMS) being installed in Atlanta. The 13 new WRS will be added to the existing 25 operational WRSs during the 2006-2007 time frame. Additionally, the TCS upgrade will handle the four new ground uplink station (GUS) sites required to support two new Geostationary Communication and Control Segment (GCCS) geostationary satellites that will go on line in 2006–2007 to provide the WAAS network with greater availability, reliability and performance.

In addition to increasing network capability, this new TCS equipment: (1) Lowers equipment removal/replacement time; (2) Lessens procedures for fault isolation; (3) Removes the non-procurable power supply from WAAS parts inventory. (4) Provides technicians with a co-located patch panel for troubleshooting.

The WAAS TCS is a physically diverse and secure network used to transfer data between geographically dispersed components of the WAAS. Although most of the network is terrestrial, satellite services are used to reach locations with little or no terrestrial communication infrastructure.

Domain: Air Traffic Control Navigation

Lighting

Mechanism: Approach Light System with Sequenced Flashers Next Generation (ALSF NexGen) [6456]

Approach Lighting System with Sequenced Flashers Next Generation (ALSF NexGen) is a 2400-foot long array of high intensity Light Emitting Diode (LED) lamps and flashers located on the final approach to a runway and are provided to support Category II and III instrument approaches. The ALSF NexGen systems assists pilots transition from low visibility Instrument Meteorological Conditions (IMC) to visual conditions for landing. A row of green lights marks the runway threshold.

These systems are installed at new locations so they will not replace the existing ALSF-2 Tech Refresh systems.

Mechanism: Approach Lighting System with Sequenced Flashers Model 2 (ALSF-2) [214]

Approach Lighting System with Sequenced Flashers, Model 2 (ALSF-2) is a 2400 foot long array of high intensity incandescent lamps and flashers located on the final approach to a runway and are provided to support Catetory II and III instrument approaches. The ALSF-2 assists pilots transition from low visibility Instrument Meteorological Conditions (IMC) to visual conditions for landing. A row of green lights marks the runway threshold.

These ALSF-2 systems represent the current acquisition.

Mechanism: Approach Lighting System with Sequenced Flashers Model 2 First Generation (ALSF-2 First Gen) [6418]

Approach Lighting System with Sequenced Flashers, Model 2 (ALSF-2) First Generation is the older Godfrey, Airflo, and other systems first deployed in the 1970s. It is a 2400 foot long array of high intensity incandescent lamps and flashers located on the final approach to a runway and are provided to support Catetory II and III instrument approaches. The ALSF-2 assists pilots transition from low visibility Instrument Meteorological Conditions (IMC) to visual conditions for landing. A row of green lights marks the runway threshold.

Mechanism: Approach Lighting System with Sequenced Flashers Model 2 Technological Refresh (ALSF-2 Tech Refresh) [216]

Approach Lighting System with Sequenced Flashers Model 2 (ALSF-2) is a dual-mode system with 219 lamps that can be re-configured as a 50-light Simplified Short Approach Lighting system with Runway alignment lights (SSALR) to meet reduced approach lighting requirements. The ALSF-2 will support Category II and Category III precision landings and the SSALR will support Category I precision landings. The ALSF-2 tech refresh will utilize technology available in the procurement timeframe.

Mechanism: Approach Lighting System with Sequenced Flashing Lights Model 1 (ALSF-1) [2212]

The Approach Lighting System with Sequenced Flashing Lights Model 1 (ALSF-1) is a system of high-intensity lights marking the extended runway centerline for 2,400 to 3,000 feet from the runway threshold. A row of green indicators mark the runway threshold.

ALSF-1 are very old systems and, when funded, will be replaced with current technology, Medium Intensity Approach Lighting System; Runway Alignment Indicator Lights (MALSR) or ALSF-2 systems depending on whether the runway will support Cat I instrument approaches (MALSR) or Cat II/III instrument approaches (ALSF-2).

Mechanism: Lead-in-light System (LDIN) [2306]

A Lead-in-light System (LDIN) consists of one or more series of flashing lights installed at or near ground level that provides positive visual guidance along an approach path, either curving or straight, where special problems exist with hazardous terrain, obstructions, or noise abatement procedures.

Mechanism: Medium-Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR) [184]

The Medium-Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR) supports Category I instrument approaches. It is a medium intensity light system that identifies the extended runway centerline from threshold to 2,400 feet before the threshold. The MALSR supports Category I instrument approaches and presents to the pilot the illusion of a ball of light traveling from the outer end of the system to a point approximately 1,400 feet from the end of the runway. A row of green lights marks the threshold of the runway.

The Medium-Intensity Approach Light System Sequenced Flashing Lights (MALSF) and Medium-Intensity Approach Light System (MALS) are subsets of MALSR. A MALSR has 45 lights, 5 flashers, and is 2400 ft in length. A MALSF has 45 lights, 3 flashers, and is 1400 ft in length. MALS has 45 lights, no flashers, and is 1400 ft in length.

Mechanism: Navaid Control, Interlock and Monitoring Equipment (NCIME) [7605]

Navaid Control, Interlock and Monitoring Equipment (NCIME) provides a single display in the Air Traffic Control Tower (ATCT) for the control, status, and remote monitoring of all airfields' Navaid/Visual-aids. These requirements are currently being met through the use of various separate control panels supplied by equipment vendors and with local adaptation by FAA engineers. NCIME reduces the complexity and time involved in changing runway configurations and airport traffic flows. NCIME's single, integrated display eliminates the proliferation of non-standardized equipment and displays in the tower and minimizes ATCT space requirements – an important benefit where new, larger tower complexes and other tower facilities equipment upgrades and expansion projects have made tower equipment space a concern. NCIME also provides the platform for the integration of future systems.

Mechanism: Navaid Control, Interlock and Monitoring Equipment Universal Interlock Controller (NCIME-UIC) [7606]

The Navaid Control, Interlock and Monitoring Equipment (NCIME) Universal Interlock Controller (UIC) provides a standard interlock between airport navigation, landing, and approach lighting systems and the associated remote monitor and interlock equipment. Program benefits include mitigating the hazard of an aircraft simultaneously receiving guidance from two or more Instrument Landing System (ILS) localizers, which could result in controlled flight into terrain (CFIT), and reducing the number of localizer frequencies required at smaller airports, by providing a standardized FAA supported interlock capability at airports with two or more facing localizers.

Mechanism: Omnidirectional Approach Lighting System (ODALS) [185]

The Omnidirectional Approach Lighting System (ODALS) is a system of sequenced flashing lights marking the extended runway centerline for 1,500-feet. Indicators placed at the end of the runway mark each edge of the runway.

Mechanism: Precision Approach Path Indicator (PAPI) [187]

The Precision Approach Path Indicator (PAPI) is a simple visual aid to assist pilots during their approach to landing in Visual Flight Rules (VFR) conditions. It enables pilots to acquire the correct glide slope and subsequently to maintain their position on it, thus ensuring an accurate approach and landing. The PAPI system consists of four sharp transition projector units located at the side of the runway spaced laterally +/- 30 foot intervals. A second complementary set is sometimes provided on the opposite side of the runway. The setting angles of the red/white interfaces of the four units are graded; the differences in angle between the units being typically 20 minutes of arc. The nominal glide slope is midway between the angular settings of the center pair of units and the on-glide-slope signal and is thus two red and two white lights in the bar. If the aircraft goes below the glide slope, the pilot will see a progressively increasing number of red lights. Conversely, if the aircraft goes above the glide slope, the number of white lights seen is increased.

Mechanism: Runway Alignment Indicator Lights (RAIL) [2307]

Runway Alignment Indicator Lights (RAIL) are a series of sequenced flashing lights that are installed only in combination with other lighting systems.

Mechanism: Runway Centerline Lighting (RWCLL) [2305]

Runway Centerline Lighting (RWCLL) consists of flush centerline lights spaced at 50-foot intervals beginning 75 feet from the landing threshold and extending to within 75 feet of the opposite end of the runway.

Mechanism: Runway End Identifier Lighting Next Generation (REIL Nexgen) [2462]

Runway End Identifier Lights (Next Generation) (REIL Nexgen) is the next generation of an airport lighting facility in the terminal area navigation system, consisting of one flashing white high intensity light installed at each approach end corner of a runway and directed towards the approach zone, which enables the pilot to identify the approach end of the runway.

REIL will be installed on frangible mounting systems.

Mechanism: Runway End Identifier Lights (REIL) [188]

Runway End Identifier Lights (REIL) is an airport lighting system consisting of two flashing, white, high intensity lights located at each approach end corner of a runway. The REILs are directed towards the approach zone to enable pilots to identify the end of the runway.

REIL are mounted on frangible mounting systems.

Mechanism: Runway Lights (RL) [2304]

Runway Lights (RL) are lights having a prescribed angle of emission used to define the lateral limits of a runway. Runway lights are uniformly spaced at intervals of approximately 200-feet, and the intensity may be controlled or preset.

Runway lights are procured, installed, and maintained by the airport. The FAA is not involved with these light systems other than publishing the necssary lighting standards which the airport uses for guidance.

Mechanism: Semiflush Ligting Fixtures (Semiflush) [8099]

Semiflush ligting fixtures will be installed for Approach Lighting Systems (ALS) at existing sites and new establishments. An implementation decision will be made at Decision Point 251. Semiflush fixtires will be used until the Next generation of semiflush fixtures using LEDs is available.

Mechanism: Short Approach Lighting System (SALS) [2213]

A Short Approach Lighting System (SALS) is an array of high-intensity lights marking the extended runway centerline for 2,400 to 3,000 feet from the runway threshold. The system presents to the pilot the illusion of a ball of light traveling from the outer end of the system to a point 1,000 feet from the end of the runway. Two additional rows of lights indicate the edges of the runway for the last 1,000 feet with special indicators placed 1,000 feet, 500 feet and at the runway threshold.

Mechanism: Short Approach Lighting System with Sequenced Flashing Lights (SALSF) [2214]

Short Approach Lighting System with Sequenced Flashing Lights (SALSF) is an array of high intensity lights marking the extended runway centerline for 1,500 feet. The system presents to the pilot the illusion of a ball of light traveling from the outer end of the system to a point 1,000 feet from the end of the runway. Indicators placed at the end of the runway mark the center and each edge of the runway. An additional indicator marks a point 1,000 feet from the end of the runway.

Mechanism: Simplified Short Approach Light System with Runway Alignment Indicator Lights (SSALR) [190]

The Simplified Short Approach Light System with Runway Alignment Indicator Lights (SSALR) is a SSALS facility with sequence flashers installed from 1,600 to 2,400 feet from the runway threshold. Normal spacing between lights is 200 feet. This system assists pilots in transitioning from precision approach Instrument Flight Rules (IFR) to Visual Flight Rules (VFR) for landing.

Mechanism: Simplified Short Approach Lighting System (SSALS) [2215]

The Simplified Short Approach Lighting System (SSALS) is an array of medium-intensity lights marking the extended runway centerline for 1,400 feet. A special indicator marks a point 1,000 feet from the end of the runway. A row of green lights indicates the threshold runway.

Mechanism: Simplified Short Approach Lighting System with Sequenced Flashing Lights (SSALF) [2216]

The Simplified Short Approach Lighting System with Sequenced Flashing Lights (SSALF) is a system of medium-intensity lights marking the extended runway centerline for 1,400 feet. The system presents to the pilot the illusion of a ball of light traveling from the outer end of the system (1,400 feet) to a point 1,000 feet from the end of the runway. A special indicator marks a point 1,000 feet from the end of the runway. A row of green lights indicates the threshold runway.

Mechanism: Touchdown Zone Lighting (TDZL) [2308]

A Touchdown Zone Lighting (TDZL) consists of two rows of transverse light bars located symmetrically about the runway centerline normally at 100-foot intervals. The basic system extends 3,000 feet along the runway.

Mechanism: Visual Approach Slope Indicator (VASI) [192]

A Visual Approach Slope Indicator (VASI) system is a light system that is accurately located alongside a runway to provide a visual glide slope to landing aircraft. VASIs radiate a directional pattern of high intensity, red and white focused light beams to form the glide path and are utilized primarily under Visual Flight Rules (VFR) conditions.

Mechanism: Runway Visual Range (RVR) Service Life Extension Program (SLEP) (RVR SLEP) [8086]

The Runway Visual Range (RVR) Service Life Extension Program (SLEP) will sustain RVR operations capability in the National Airspace System (NAS) through 2025 while providing expansions at designated NAS Operational Evolution Partnership (OEP) airports. The RVR SLEP would address system obsolescence, performance and maintenance issues as RVR systems reach the end of their service life.

Background:
The RVR system provides a measure of the distance a pilot can expect to see, in the forward direction, at three points along the runway: touchdown, midpoint, and rollout. Favorable RVR information is required to land during Category II, III conditions and at some Category I runways. The lowest authorized ILS RVR minimums, with all required ground and airborne systems components operative, are: Category I – 2,400-feet to 1,800-feet RVR (landing) and 1,600-feet RVR (takeoff); Category II – 1,600-feet to 1,200-feet RVR (landing) and 600-feet RVR (takeoff); Category IIIa – 700-feet RVR (landing) and 600-feet RVR (takeoff); and Category IIIb – 150-feet RVR (landing) and 600-feet RVR (takeoff).

The complexity of an RVR system varies based on the number of runways being served and the category of instrument approaches at an airport. The nominal RVR system provides sensing for visibility, ambient light and runway light intensity. Currently, RVR interfaces with Airport Traffic Control Tower (ATCT) displays, the Automated Surface Observing System (ASOS), the Traffic Management System, and the Remote Maintenance and Monitoring System.

Signage/Markings Navigation

Mechanism: Runway Visual Range (RVR) [189]

Runway Visual Range (RVR) systems provide support to precision landing and takeoff operations in the NAS. RVR is a system that will measure visibility, background luminance, and runway light intensity to determine the distance a pilot should be able to see down the runway. RVRs consist of visibility sensor, ambient light sensor, runway light intensity monitor, and processing units. The RVR interfaces with the ASOS system as well which enhance safety, increase system capacity, and improve maintenance with in CONUS.

In August 2005 the FAA awarded a contract to Vaisala for up to 77 MIDAS IV Runway Visual Range (RVR) System for its Personal Computer (PC)-based RVR System Program. The contract covers modification and delivery of a commercially available MIDAS IV RVR System, development of Controller Displays, as well as full program support. Delivery and installation of the new systems is anticipated from FY-2006 through FY-2010.

Further information can be found at:
http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/lsg/rvr/

Signal-in-Space Navigation

Mechanism: Aircraft Based Augmentation System (ABAS) [7525]

An Aircraft Based Augmentation System (ABAS) is an augmentation system that augments and/or integrates the information obtained from the other Global Navigation Satellite System (GNSS) elements with information available on board the aircraft.

Mechanism: Approach Lighting System Model I (ALS I) [8087]

The is a lighting system installed on the approach end of an airport runway and consisting of a series of light bars, strobe lights, or a combination of the two that extends outward from the runway end. ALS (I) support Category I operations on runways at airports that have an instrument approach procedure (IAP) and allows the pilot to visually identify the runway environment and align with the runway once arriving at a prescribed point on an approach.

The runway lighting is controlled by the air traffic control tower. At uncontrolled airports, Pilot Controlled Lighting may be installed which can be switched on by the pilot via radio. In both cases, the brightness of the lights can be adjusted for day and night operations.

Depth perception is inoperative at the distances usually involved in flying aircraft, and so the position and distance of a runway with respect to an aircraft must be judged by a pilot using only two-dimensional cues such as perspective, as well as angular size and movement within the visual field. Approach lighting systems provide additional cues that bear a known relationship to the runway itself and help pilots to judge distance and alignment for landing.

Mechanism: Approach Lighting System Model I Service Life Extension Program (ALS (I) SLEP) [8089]

The Approach Lighting System Model I (ALS (I)) Service Life Extension Program (SLEP) will sustain ALS (I) operations capability in the National Airspace System (NAS) through 2025. The ALS (I) SLEP would address system obsolescence, performance and maintenance issues as ALS (I) systems reach the end of their service life.

The Approach Lighting System Model I (ALS (I)) is a lighting system installed on the approach end of an airport runway and consisting of a series of light bars, strobe lights, or a combination of the two that extends outward from the runway end. ALS (I) support Category I operations on runways at airports that have an instrument approach procedure (IAP) and allows the pilot to visually identify the runway environment and align with the runway once arriving at a prescribed point on an approach.

The runway lighting is controlled by the air traffic control tower. At uncontrolled airports, Pilot Controlled Lighting may be installed which can be switched on by the pilot via radio. In both cases, the brightness of the lights can be adjusted for day and night operations.

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Mechanism: Approach Lighting System Model II and Model III (ALS (II/III)) [8088]

The Approach Lighting System Model II and Model III (ALS (II/III)) is a lighting system installed on the approach end of an airport runway and consisting of a series of light bars, strobe lights, or a combination of the two that extends outward from the runway end. ALS (II/III) support Category I operations on runways at airports that have an instrument approach procedure (IAP) and allows the pilot to visually identify the runway environment and align with the runway once arriving at a prescribed point on an approach.

The runway lighting is controlled by the air traffic control tower. At uncontrolled airports, Pilot Controlled Lighting may be installed which can be switched on by the pilot via radio. In both cases, the brightness of the lights can be adjusted for day and night operations.

Depth perception is inoperative at the distances usually involved in flying aircraft, and so the position and distance of a runway with respect to an aircraft must be judged by a pilot using only two-dimensional cues such as perspective, as well as angular size and movement within the visual field. Approach lighting systems provide additional cues that bear a known relationship to the runway itself and help pilots to judge distance and alignment for landing.

Mechanism: Approach Lighting System Model II and Model III Service Life Extension Program (ALS II/III SLEP) [8090]

The Approach Lighting System Model II and Model III (ALS (II/III)) Service Life Extension Program (SLEP) will sustain ALS (II/III) operations capability in the National Airspace System (NAS) through 2025. The ALS (I/II) SLEP would address system obsolescence, performance and maintenance issues as ALS (I) systems reach the end of their service life.

The Approach Lighting System Model II (ALS (II/III)) is a lighting system installed on the approach end of an airport runway and consisting of a series of light bars, strobe lights, or a combination of the two that extends outward from the runway end. ALS (II/III) support Category I operations on runways at airports that have an instrument approach procedure (IAP) and allows the pilot to visually identify the runway environment and align with the runway once arriving at a prescribed point on an approach.

The runway lighting is controlled by the air traffic control tower. At uncontrolled airports, Pilot Controlled Lighting may be installed which can be switched on by the pilot via radio. In both cases, the brightness of the lights can be adjusted for day and night operations.

Depth perception is inoperative at the distances usually involved in flying aircraft, and so the position and distance of a runway with respect to an aircraft must be judged by a pilot using only two-dimensional cues such as perspective, as well as angular size and movement within the visual field. Approach lighting systems provide additional cues that bear a known relationship to the runway itself and help pilots to judge distance and alignment for landing.

Mechanism: Direction Finder (DF) [196]

Direction Finder (DF) is a Very High Frequency/Ultra High Frequency (VHF/UHF) radio receiver equipped with a antenna capable of detecting the direction to an aircraft radiating a Radio Frequency (RF) tone. DFs are used to establish a "direction fix" for pilots requesting orientation assistance.

Additional information can be found in "2001 Federal Radionavigation Systems," U.S. Departments of Defense and Transportation, Washington, DC.
[http://www.navcen.uscg.gov/pubs/default.htm]

Mechanism: Distance Measuring Equipment (DME) [653]

Distance Measuring Equipment (DME) is a UHF (Ultra High Frequency) ground-based navigation aid that responds to aircraft DME avionics interrogations, thereby enabling the avionics to determine the slant range between the aircraft and the ground station. DMEs are typically collocated with a Very High Frequency Omnidirectional Range (VOR) to form a VOR/DME facility for enroute navigation, or with an Instrument Landing System Localizer for precision landing procedures. Slant range data can also be obtained from the DME function of a Tactical Air Navigation (TACAN) system. A navigation facility containing a TACAN and a VOR is termed a VORTAC.

DMEs will be sustained to support en route navigation and precision landings. In the future DME quantities may be expanded to provide a redundant ground-based area navigation (RNAV) capability to supplement GPS procedures.

Separate funding segments and acquisition projects have been established for High power (en route) DMEs, and low power (terminal) DMEs. This mechanism addresses the high power DMEs.

Mechanism: Distance Measuring Equipment Replacement (DME Replacement) [6373]

Distance Measuring Equipment (DME) is a Ultra High Frequency (UHF) ground-based radio navigation aid. DME avionics transmit interrogation pulses, and the ground-based responder sends a reply. The avionics process the reply and determine the slant range between the aircraft and the ground station. Separate funding segments and acquisition projects have been established for two generic classes of DME ground stations: High power (en route) DMEs, and low power (terminal) DMEs. This mechanism addresses only the the high power DMEs.

DMEs may be provided alone, but are more often collocated with a Very High Frequency Omnidirectional Range (VOR) to form a VOR/DME facility, allowing aircraft to determine both the bearing and slant range to the ground station - and hence a navigational position fix. DMEs are approved as a primary navigation system in the NAS. The DME function is frequently provided by the Tactical Air Navigation System (TACAN) system that also provides azimuth guidance to military users. (DME and the distance-measuring portion of TACAN are functionally the same.) When combined with a VOR, these facilities are called VORTACs. The DME network will be sustained to support en route navigation and to serve as an independent backup navigation source to Global Positioning System (GPS) and GPS/Wide Area Augmentation System (WAAS). The DME network may also need to be expanded to provide a redundant area navigation (RNAV) capability for terminal area operations at major airports.

This mechanism replaces aging high power DME facilities through either a service life extension program (SLEP) or outright replacement.

Mechanism: Far-Term Performance Based Navigation (PBN) [7950]

TBD

Mechanism: Frangible Mounting Systems (Frangible) [8098]

FAA developed frangible, or breakaway, mounting fixtures for use in low impact resistant structures to support airport approach navigation and lighting systems.

The frangible mounts are designed for low impact such that when struck by an aircraft or ground vehicle, the mount breaks into pieces without catastrophic damage to the aircraft or other airport vehicle.

Frangible mounts assemble quickly, easily and safely in the field. Taller poles can be lowered for ease of maintenance. Structures are usually weather and corrosion resistant for many years of low maintenance service.

Mechanism: Galileo (Galileo) [6769]

The European Galileo navigation satellite system is shown only for reference. There are no current plans to predicate any NAS capabilities on the use of Galileo signals. U.S. policy prohibits the NAS from being dependent on foreign positioning, navigation, and timing services.

As of about 10 May 2007 a decision was made that Europe's space-based navigation system, Galileo, will be government operated by the European Union (EU). The EU hopes to have the system partially operational by early 2011 and fully operational by 2012.

On 28 December 2005 the European Space Agency (ESA) launched their first test satellite GIOVE A (Galileo In-Orbit Validation Element A) for the Galileo project, which will ultimately comprise a constellation of 30 navigation satellites. A second GIOVE B is scheduled to be launched by the end of 2007. Four in-orbit validation (IOV) spacecraft are to be lofted in 2008 and the full system is to be in operation by 2011-12. Galileo's signals should be compatible with current GPS hardware.

Galileo plans to offer several worldwide service levels, including open access and restricted access for various segments of users. These services include: (1) A basic Open Service (OS), supplied free of charge to the general public; (2) A for-fee Commercial Service (CS) for professional, high-precision applications; (3) A Safety of Life Service (SoL) providing enhanced accuracy and integrity for safety-critical applications such as aircraft approach and landing a Search and Rescue (SAR) service, (4) An encrypted Public Regulated Service (PRS), for military and para-military users. These services are mostly compatible with existing GPS services.

In March 2007 ESA awarded a contract for initial activities leading to the construction of a second spacecraft for the Galileo satellite navigation system. Named GIOVE-A2, the new satellite will be based on the company's proven GIOVE-A technology. The GIOVE-A2 satellite is planned to be ready for launch in the second half of 2008.

In late April 2007 GIOVE-A successfully transmitted its first navigation message, containing the information needed by user receivers to calculate their position. Prior to reaching this milestone, the satellite had been broadcasting only the data needed for measuring the receiver-to-satellite distance. Following this successful test, in the near future GIOVE-A should begin to continuously broadcast the navigation message, with the message content being updated whenever the satellite is visible from the Guildford uplink station. Additionally, the message content will be extended to include the time offset between Global Positioning System (GPS) and the experimental Galileo system. Knowing this offset, the Experimental Galileo-GPS Time Offset (E-GGTO), will allow the user to build a position fix using GPS satellites and GIOVE-A.

Additional information http://www.esa.int/esaNA/galileo.html and http://www.esa.int/esaNA/SEM8LNN0LYE_galileo_0.html

Note the internal FAA linking is a vestige of the database. Galileo is not an FAA system.

Mechanism: Global Navigation Satellite System (GNSS) [7523]

This program provides descriptions of several satellite navigation systems which are in operation or planned on a worldwide basis.

The term Global Navigation Satellite System (GNSS) is a generic term for any of several satellite navigation systems now operational or in the planning and development stages.

The major GNSS as of January 2007 is the United States NAVSTAR Global Positioning System (GPS), which is a (nominal) 24 satellite constellation orbiting at approximately 12,000 miles above the earth in six equally spaced planes. GPS satellites broadcast a precisely timed L-band signal that is received and processed onboard aircraft, in ground vehicles or hand-held receivers to determine the users three-dimensional position (i.e., latitude, longitude and altitude), velocity (if applicable) and the precise time of day. The GPS was developed, and is maintained and operated by the U.S Department of Defense.

Russia has the Global Orbiting Navigation Satellite System, or GLONASS, in operation and Europe is planning to launch the Galileo satellite navigation system within the next few years. Other nations are also planning satellite navigation systems, which could become part of the GNSS

Orbit data and resources on active GNSS Satellites can be found in the Almanac in "GPS World," Vol. 17, No. 12, pp. 55-57, December 2006. www.gpsworld.com. Additional information at www.insidegnss.com

An article discussing GNSS in the year 2017 is at URL http://sidt.gpsworld.com/gpssidt/article/articleDetail.jsp?id=421287

Mechanism: Global Positioning System (GPS) [180]

The NAVSTAR Global Positioning System (GPS) is a (nominal) 24 satellite constellation orbiting at approximately 12,000 miles above the earth in six equally spaced planes. GPS satellites broadcast a precisely timed L-band signal that is received and processed onboard aircraft, in ground vehicles or hand-held receivers to determine the users three-dimensional position (i.e., latitude, longitude and altitude), velocity (if applicable) and the precise time of day. The GPS was developed, and is maintained & operated by, the U.S Department of Defense. GPS equipped aircraft can navigate on published jetways or utilize Area Navigation (RNAV) to fly a desired route between two locations.

Approval has been granted for properly certified GPS avionics to be used as a primary means of navigation in oceanic airspace and in certain remote areas. In July 2003 the Wide Area Augmentation System (WAAS) was commissioned, thereby ensuring GPS/WAAS enabled primary navigation service throughout the NAS. The WAAS ensures that GPS sourced data meets requirements for accuracy, availability, and integrity.

At the current GPS satellite replenishment rate, all three civil signals (L1-C/A, L2C, and L5) will be available for initial operational capability by 2012, and for full operational capability by approximately 2015. For more information on GPS modernization activities, please visit an FAA GPS Modernization page [http://gps.faa.gov/gpsbasics/indexGPSmodernization.htm] and http://pnt.gov.

As of September 2007 there were 30 operational GPS Satellites (Baseline Constellation: 24). They are divided as follows: 15 Block IIA satellites, 12 Block IIR satellites, and 3 Block IIR-M satellites. The 3 Block IIR-M satellites are transmitting a new second civil signal (L2C). Another Lockheed Martin Block IIR-M awaits launch date. Boeing has 12 GPS IIF satellites in production.

The GPS Wing is also modernizing the 6 remaining Block IIR satellites.

Additional Information on GPS is found at (1) http://www.gps.gov/ and (2) FAA Satellite Navigation Product Team: http://gps.faa.gov/

Mechanism: Global Positioning System - Signal Monitoring (GPS - Signal Monitoring) [7358]

As the Navstar Global Positioning System (GPS) constellation is modernized, new civil signals are being added to address civil transportation and safety-of-life requirements but without the ability to monitor their performance or quality. To meet critical transportation requirements a civil signal monitoring capability must be added to the GPS ground control segment hardware and software. This segment funds the FAA's portion of a multimodal (FAA, Federal Railroad Administration (FRA), Federal Highway Administration (FHWA), Office of the Secretary of Transportation (OST)) U.S. Department of Transportation (DOT) budget request to provide the capability to monitor the performance of the GPS civil signal.

Mechanism: Global Positioning System III (GPS III) [6797]

The Navstar Global Positioning System (GPS) is a space-based radio positioning, navigation and timing (PNT) distribution system. GPS sustainment and modernization are crucial to the navigation architecture evolution. The satellite constellation must be sustained to maintain existing capabilities and it must be modernized with the Block IIF and Block III satellites to provide the new L5 civil signal that adds robustness for en route, terminal and nonprecision approach operations and may enable unaugmented (i.e., without Wide Area Augmentation System (WAAS)) Localizer Performance with Vertical Guidance (LPV) approach operations.

Development of the Block III space and control segments includes advanced concept development, systems engineering and analysis, satellite systems development, the study of augmentation systems, control segment development, user equipment interfaces, training simulators, Integrated Logistics Support (ILS) products, and developmental test resources.

GPS Block III will give new navigation warfare (NAVWAR) capabilities to shut off GPS service to a limited geographical location while providing GPS to U.S. and allied forces.

The generation after next will be composed of GPS Block III satellites, which will include all of the legacy capabilities, plus the addition of high-powered, anti-jam military-code, along with other accuracy, reliability, and data integrity improvements. Plans are being formulated to conduct an architecture study for the next-generation satellite navigation system, GPS Block III, capable of meeting military and civil needs through 2030. This jam-resistant, modernized version of GPS will be developed and delivered to ensure that the U.S. has the most precise and secure PNT capability.

The GPS Block III program objective is to develop and deploy an improved systems architecture to assure reliable and secure delivery of enhanced position, velocity, and timing (PVT) signals for the evolving needs of GPS civil and military users. GPS Block III should eliminate numerous existing shortcomings and vulnerabilities inherent in the current GPS architecture that threaten to severely impact vital civil commerce, transportation, public safety, as well as military operations in the future.

As of July 2007 the GPS Block III contract award is anticipated for early in Fiscal Year (FY) 2008. The U.S. Air Force announced that it wants to pursue the development and production of eight GPS Block IIIA satellites for a planned initial launch in 2013.

Additional Information: http://www.globalsecurity.org/space/systems/gps_3.htm

Mechanism: Global Positioning System L5 (GPS L5) [6783]

The GPS L5 signal improves the user's ability to correct for ionospheric propagation errors. This additional capability adds robustness for en route, terminal and nonprecision approach operations, and may enable unaugmented Localizer Performance Verticle Guidance (LPV) approach operations.

GPS has been recognized as the future of navigation for most military and civil applications, including those for various modes of transportation. The civil aviation community has been one of the main benefactors of GPS due to its flexibility and worldwide applicability. In 1999, as a direct result of these benefits to the civil community, Vice President Gore announced that the U.S. would embark on a GPS modernization effort to extend the capabilities of GPS even further than those of the existing constellation.

One of the main components of this modernization is the addition of two new navigation signals for civil use. These signals will be in addition to the existing civilian service broadcast at 1575.42 MHz (L1). The first of these new signals will be a new civil code, called L2C, which will be added on the existing L2 carrier, located at 1227.60 MHz. It will be available for general use in non-safety critical applications. The Block IIR-M satellite, the first to add his capability, was launched September 25, 2005.

A third civil signal, located at 1176.45 MHz (L5), will be provided initially on GPS Block IIF satellites beginning in 2007, and continuing with the Block III satellites scheduled for launch beginning in 2012. This new L5 signal is protected worldwide for aeronautical radio-navigation use, and will support aviation safety-of-life applications. The addition of L5 will make GPS a more robust radio-navigation service for many aviation applications, as well as all ground-based users (maritime, railways, surface, shipping, agriculture, recreation, etc.)

At the current GPS satellite replenishment rate, all three civil signals (L1-C/A, L2C, and L5) will be available for initial operational capability by 2012, and for full operational capability by approximately 2015.

L5 will provide significant benefits above and beyond the capabilities of the current GPS constellation, even after the planned second civil frequency (L2) becomes available. Benefits include precision approach navigation worldwide, increased availability of precision navigation operations in certain areas of the world, and improved interference mitigation.

In late April 2007, the U.S. Air Force awarded Lockheed Martin a $6M contract to develop and demonstrate a payload that will temporarily transmit a third civil signal, on the L5 frequency at 1176MHz, from a Block IIR-M satellite.

Previous plans called for the L5 civil signal, aimed principally at safety requirements in civil aviation, to appear on the Block IIF satellites. Early speculation posits that the Air Force may want to conduct some signal testing before the IIFs are launched, or secure the frequency according to ITU requirements, as GIOVE-A did for Galileo.

Lockheed Martin and its navigation payload supplier ITT will provide an in-orbit demonstration of the new civil signal.

Additional Information: http://gps.faa.gov/gpsbasics/GPSmodernization-text.htm

Mechanism: Ground Uplink Station (GUS) [7054]

The FAA Wide Area Augmentation System (WAAS) uses a network of precisely located ground reference stations, called Wide Area Reference Stations (WRS), which monitor Navstar Global Positioning System (GPS) satellite signals. These stations are located throughout the continental U.S., Hawaii, Puerto Rico, Alaska, Canada, Mexico, and several other international locations. The stations collect and process GPS information and send the information to two WAAS Master Stations (WMS).

The WMSs develop a WAAS correction message that is sent via Ground Uplink Stations (GUS) to user receivers via navigation transponders on geostationary satellites (GEO). Ground uplink stations (GUSs) were installed to transmit the WAAS signal to the new GEOs. The GUS pair for the PanAmSat Galaxy 15 satellite are located in Napa, California and Littleton, Colorado. The GUS pair for the Telesat Anik F1R satellite are located at Brewster, Washington and Woodbine, Maryland.

The WAAS message improves the accuracy, availability, and safety of GPS-derived position information. Using WAAS, GPS signal accuracy is improved from 20 meters to approximately 1.5 – 2 meters in both the horizontal and vertical dimensions.

Additional information at http://gps.faa.gov

Mechanism: Initial Performance Based Navigation (PBN) [7968]

tbd

Mechanism: Instrument Landing System Category I (ILS CAT I) [199]

Category (CAT) I Instrument Landing Systems (ILS) support precision landing operations for visibility conditions equal to or greater than a 200 feet decision height above the runway threshold and a touchdown zone runway visual range of at least 1,800 feet.

All ILS radiate runway approach guidance, i.e., alignment and descent information, to aircraft on final approach to a runway. An ILS consists of a highly directional localizer located at the far end of the runway, a glide slope located near, and offset from, the approach end of the runway. Marker beacons located along the runway's approach course provide visual and aural indications in the cockpit that indicate the aircraft's distance from the runway threshold. Marker beacons can be supplanted or replaced by Distance Measuring Equipment (DME) that is typically co-located with the localizer station. The presence and utilization of a DME to aid in making a precision approach is included in the approach procedure for the runway.

ILS feature integral monitoring of the radiated signals to ensure that the radiated guidance is within specified operating tolerances to ensure the signal-in-space approach guidance is safe. They also possess remote maintenance monitoring (RMM) to support remote access and monitoring of the operating status of each ILS station.

Mechanism: Instrument Landing System Category I Replacement (ILS CAT I Rpl) [6347]

Instrument Landing System Category I Replacement (ILS CAT I Rpl) provides lateral (azimuth) and vertical (glide slope) guidance to aircraft during precision approach and supports Category I (CAT I) aircraft landing operations.

CAT I service may eventually be provided by Wide Area Augmentation System (WAAS) and/or Local Area Augmentation System (LAAS) at many airports. Until then, service will continue to be provided by ILS technology. This program replaces aging ILS systems through either Service Life Extension Program (SLEP) or outright replacement.

Mechanism: Instrument Landing System Category II/III (ILS CAT II/III) [200]

Category (CAT) II Instrument Landing Systems (ILS) support precision landing operations for 100 foot decision heights and a touchdown zone runway visual range (RVR) of at least 1200 feet. CAT III ILS support precision approaches with decision heights of 50 or less feet and touchdown zone RVR less than 700 feet.

All ILS radiate runway approach guidance, i.e., alignment and descent information, to aircraft on final approach to a runway. Equipment-wise an ILS consists of a highly directional localizer located at the far end of the runway, a glide slope located near, and offset from, the approach end of the runway, and marker beacons located along the approach course that provide visual and aural information on how far the aircraft is from the runway threshold. ILS marker beacons can be supplanted or replaced by Distance Measuring Equipment (DME) that is typically co-located with the localizer station. The presence and utilization of a DME to aid in making a precision approach is included in the approach procedure for the runway.

ILS feature integral monitoring of the radiated signals to ensure that the radiated guidance is within specified operating tolerances to ensure the signal-in-space approach guidance is safe. They also possess remote maintenance monitoring (RMM) to support remote access and monitoring of the operating status of each ILS station.

The Local Area Augmentation System (LAAS) may eventually support CAT II/III service. In the interim precision landing services will continue to be provided using ILS technology, which requires that the older population of the current ILS inventory must be either replaced or upgraded (modernized) via a service life extension program.

Mechanism: Instrument Landing System Category II/III Replacement (ILS CAT II/III Rpl) [6348]

Instrument Landing System Category II/III Replacement (ILS CAT II/III Rpl) provides lateral (azimuth) and vertical (glide slope) guidance to aircraft during precision approach and supports Category II/III (CAT II/III) aircraft landing operations.

CAT II/III service may eventually be provided by Local Area Augmentation System (LAAS). Until then, service will continue to be provided by ILS technology. This program replaces aging ILS systems through either Service Life Extension Program (SLEP) or outright replacement.

Mechanism: L5 Design (L5 Design) [7748]

TBD

Mechanism: L5 Implementation (L5 Implementation) [7749]

TBD

Mechanism: Local Area Augmentation System Category I (LAAS CAT I) [181]

Update: Airservices Australia (AsA) has announced that a recent Qantas flight, QF flight 513 from Brisbane, flew into the history books, as the first commercial flight to use satellite data for its approach to Sydney. Chief Executive Officer Greg Russell said; "In late November 2006, flight QF513 landed on Sydney Airport's Runway 16 Left using the satellite landing system installed by Airservices Australia."

"This historic event was the first time an aircraft with fare paying passengers has landed with the Ground Based Augmentation System (GBAS), referred to as a Local Area Augmentation System (LAAS) in the United States, that could eventually replace Instrument Landing Systems (ILS) around the world. "

Allowing commercial flights to fly the GBAS CAT I prototype system is a world first. This approval is the result of over 18 months of international industry cooperation involving Airservices, Qantas and Sydney Airport Corporation Ltd, Honeywell and Boeing.

GBAS provides augmentation of Global Navigation Satellite Systems (GNSS) such as the Navstar Global Positioning System (GPS) and transmits information to aircraft every second providing the accuracy and integrity needed for precision approach and landing. Unlike current ILS, which has to be in-place and working for every runway end, a single GBAS covers all nearby runways.

The LAAS Category I (LAAS CAT I) is a safety-critical precision navigation and landing system that augments GPS range data to provide aircraft position accuracy necessary for CAT I precision approaches; i.e., 200 foot decision height and one-half mile visibility. LAAS will provide service to suitably equipped users for runways equipped with required peripheral systems; e.g., approach zone Runway Visual Range (RVR) and Approach Lighting System (ALS). The LAAS signal-in-space will provide: (1) local area differential corrections for GPS satellites and Wide Area Augmentation System (WAAS) Geostationary Earth Orbit (GEO) satellites; (2) the associated integrity parameters; and (3) the path points that describe the final approach segment.

The LAAS CAT I will utilize multiple GPS reference receivers and their associated antennas, all located within the airport boundary, to receive and process the GPS and WAAS GEO range measurements and navigation data. The LAAS information is broadcast to aircraft operating in the local terminal area (nominally 20 nautical miles) via a very high frequency (VHF) data broadcast (VDB) transmission.

As of April 2006 the FAA, Honeywell and the LIP (LAAS Integrity Panel) are making progress on LAAS integrity issues. By the fall of 2006 the FAA and FedEx aircraft plan to fly tests to validate the technical and operational performance of the LAAS prototype installed in Memphis, Tennessee. Following those tests, the processing architecture will be upgraded and a complete set of prototype software functions to host all International Civil Aviation Organization (ICAO) SARPs (Standards And Recommended Practices) CAT I functions will be integrated at Memphis and also at a second new LAAS facility at the FAA's William J. Hughes Technical Center in Atlantic City, New Jersey. This is scheduled to be accomplished by December 2007.

Information on the Memphis Plan at http://gps.faa.gov/programs/laas/memphis.htm

The GBAS program office is executing a plan to approve a LAAS CAT I system at Memphis Tennessee airport in late 2008. The system developed under the AsA-Honeywell contract will be SARPs compliant and will be implemented in Memphis under FAA Non-Fed FAR Part 171.

Additional information in June 2007 Operational Evolution Partnership, Version 1.0 at URL
http://www.faa.gov/about/office_org/headquarters_offices/ato/publications/oep/version1/reference/laas/

Note: System name GBAS/GLS (Global Navigation Satellite System Landing System) in CAT I section is used in Navigation Roadmap graphic linked to this Mechanism Data Report.

Mechanism: Local Area Augmentation System Category I Technology Refresh (LAAS CAT I TR) [2063]

Local Area Augmentation System Category I Technolgy Refresh (LAAS CAT I TR) periodically (5-7 years) replaces Line Replaceable Units (LRUs) that life cycle engineering analyses determine will become unsupportable. Techology refreshes will not increase the LAAS functionality.

Mechanism: Local Area Augmentation System Category II/III (LAAS CAT II/III) [500]

The CAT II/III Local Area Augmentation System (LAAS) will provide guidance that meets the accuracy, integrity and availabililty requirements for CAT II and III precision approaches. The Wide Area Augmentation System (WAAS) and LAAS together will provide a seamless satellite-based navigation capability for all phases of flight.

CAT II/III LAAS is an ongoing R&D effort which, if successful, is envisioned to lead to a follow-on development and procurement program. CAT II/III LAAS installations might ultimately complement or replace the CAT II/III Instrument Landing Systems (ILS) that are currently in the NAS.

LAAS consists of a precisely surveyed ground station with multiple Global Positioning System (GPS) receivers, a very high frequency (VHF) radio data broadcast (VDB), and possibly one or more pseudolites to increase availability. The LAAS ground station will receive, process, and communicate differential correction information, together with an integrity message, to aircraft avionics within a nominal radius of 20 to 30 nautical miles from the airport.

Pseudolites are ground-based transmitters that broadcast GPS-like signals. Although not currently envisioned as part of the LAAS architecture, pseudolites may be required to ensure that LAAS meets CAT II/III requirements. Pseudolites can be used as a data link to transmit differential corrections and integrity status to aircraft avionics and as a supplementary ranging source. When used as ranging sources, pseudolites can improve system accuracy by improving the local constellation geometry and system availability.

Schedule shown below is notional & will need to be definitized once the strategy is determined for achieving GLS (GNSS Landing System) performance (i.e., equivalent to Category II/III Instrument Landing System) with satellite-based navigation.

Note: System name GBAS/GLS (Global Navigation Satellite System Landing System) in CAT II/III section is used in Navigation Roadmap graphic linked to this Mechanism Data Report.

Mechanism: Local Area Augmentation System Category II/III Technology Refresh (LAAS CAT II/III TR) [2130]

Local Area Augmentation System Category II/III Technology Refresh (LAAS CAT II/III TR) periodically (5-7 years) replaces Line Replaceable Units (LRUs) that lifecycle engineering analyses determine will become unsupportable. Technology refreshes will not increase the LAAS functionality.

Mechanism: Localizer (LOC) [2183]

The component of an Instrument Landing System (ILS) that provides lateral course guidance to the runway. Localizer (LOC) will provide non-precision approach capability with appropriate lead-in lights.

Mechanism: Localizer Type Directional Aid (LDA) [2326]

Localizer-type Directional Aid (LDA) is of comparable use and accuracy to a localizer but is not part of a complete Instrument Landing System (ILS). The LDA course usually provides a more precise approach course than the similar Simplified Directional Facility (SDF) installation, which may have a course width of 6 or 12 degrees.

The LDA is not aligned with the runway. Straight-in minimums may be published where alignment does not exceed 30 degrees between the course and runway. Circling minimums only are published where this alignment exceeds 30 degrees.

Mechanism: Loran-C (Loran-C) [182]

Loran-C is a low frequency (LF), long-range, ground-based radionavigation aid operated by the U.S. Coast Guard. Loran-C transmitting stations broadcast a series of precisely timed pulses. Loran-C avionics measure the time difference between pulses received from three or more ground stations and determine the two-dimensional position (i.e., latitude and longitude) and velocity of the aircraft. Loran-C avionics provide an Area Navigation (RNAV) capability that permits operation on any desired course within the coverage area of the stations being used.

Loran-C is currently approved as a supplemental system in the National Airspace System (NAS), meaning that it must be used in conjunction with a primary system. Current Loran-C avionics support en route navigation but do not support instrument approach operations.

Operation of Loran-C beyond 2008 will be based upon a determination by the Department of Transportation and the Department of Homeland Security whether the system is needed as a backup the Global Navigation Satellite System (GNSS) for transportation and timing applications.

However, recently Loran-C has been upgraded to enhanced Loran or eLoran. eLoran is entirely new — at the transmitters, in its operating concepts and capabilities, and in its user equipment. The transmitters are all solid-state, "soft fail" devices that continue to operate for months or years without being turned off for maintenance, and even then, most repairs are made while the signals remain on air. They are driven by new frequency standards, three state-of-the-art Cesium beam standards operated as an ensemble at each transmitter, and the ensemble is steered to universal time coordinated (UTC or in other words, steered to Global Positioning System (GPS) time) as maintained by the U.S. Naval Observatory. Finally, the entire transmitter and timing system operates on an uninterruptible power supply (UPS), which ensures that even with loss of commercial power, there will be no momentary interruption of signals while the generators come on line.

As of March 2007 a decision had not been made and an eLoran website has been developed at http://www.navcen.uscg.gov/eLORAN/overview.htm

Mechanism: Low Power Distance Measuring Equipment (LPDME) [2225]

Low Power Distance Measuring Equipment (LPDME) is an Ultra High Frequency (UHF) ground-based radio-navigation aid. Distance Measuring Equipment (DME) ground stations reply to interrogations transmitted by aircraft avionics, and are capable of processing replies from more than 100 aircraft at a time. The DME avionics measure the time between an interrogation and a reply to determine the slant range to the ground station.

Acquisition projects have been established for two generic classes of DME ground stations: high power and low power. High power DMEs (HPDMEs) are rated at 1kw and are located to support enroute navigation. HPDMEs are typically co-located with Very High Frequency (VHF) OmniRange systems, forming what is termed a VOR/DME facility. Low power DMEs (LPDMEs) are rated at 100w and are located to support terminal area navigation such as Instrument Landing Systems (ILS) approaches.

LPDMEs are installed with many ILS facilities. When specified in the ILS approach procedure, DME may be used in lieu of the outer marker, as a back-course final approach fix, or to establish other fixes on the localizer course. LPDMEs are also installed with some localizer-only (LOC) facilities. Additional LPDMEs are being installed to support ILS approaches as recommended by the Commercial Aviation Safety Team (CAST).

Mechanism: Low Power Distance Measuring Equipment Service Life Extension Program (LPDME SLEP) [8097]

The Low Power Distance Measuring Equipment (LPDME) Service Life Extension Program (SLEP) will sustain LPDME operations capability in the National Airspace System (NAS) through 2025 while providing expansions at designated NAS Operational Evolution Partnership (OEP) airports. The LPDME SLEP would address system obsolescence, performance and maintenance issues as LPDME systems reach the end of their service life. The LPDME will be sustained through 2025 unless replaced by NextGen DME systems.

Background: LPDME is an Ultra High Frequency (UHF) ground-based radio-navigation aid. Distance Measuring Equipment (DME) ground stations reply to interrogations transmitted by aircraft avionics, and are capable of processing replies from more than 100 aircraft at a time. The DME avionics measure the time between an interrogation and a reply to determine the slant range to the ground station.

LPDME are rated at 100w and are located to support terminal area navigation such as Instrument Landing Systems (ILS) approaches.

LPDME are installed with many ILS facilities. When specified in the ILS approach procedure, DME may be used in lieu of the outer marker, as a back-course final approach fix, or to establish other fixes on the localizer course. LPDME are also installed with some localizer-only (LOC) facilities.

Mechanism: Microwave Landing System (MLS) [197]

Microwave Landing System (MLS) provides precision navigation guidance for exact alignment and descent of aircraft on approach to a runway. It provides azimuth, elevation, and distance.2. Both lateral and vertical guidance may be displayed on conventional course deviation indicators or incorporated into multipurpose cockpit displays. Range information can be displayed by conventional Distance Measuring Equipment (DME) indicators and also incorporated into multipurpose displays.3. The MLS supplements the Instrument Landing System (ILS) as the standard landing system in the United States for civil, military, and international civil aviation. At international airports, ILS service is protected to 2010. 4. The system may be divided into five functions: (a) Approach azimuth,   (b) Back azimuth,   (c) Approach elevation,   (d) Range, and   (e) Data communications. 5. The standard configuration of MLS ground equipment includes: (a) An azimuth station to perform functions (a) and (e) above. In addition to providing azimuth navigation guidance, the station transmits basic data, which consists of information associated directly with the operation of the landing system, as well as advisory data on the performance of the ground equipment.   (b) An elevation station to perform function (c).   (c) Distance Measuring Equipment (DME) to perform range guidance, both standard DME (DME/N) and precision DME (DME/P). 6. MLS Expansion Capabilities: The standard configuration can be expanded by adding one or more of the following functions or characteristics.   (a) Back azimuth: Provides lateral guidance for missed approach and departure navigation.   (b) Auxiliary data transmissions: Provides additional data, including refined airborne positioning, meteorological information, runway status, and other supplementary information.   (c) Expanded Service Volume (ESV) proportional guidance to 60 degrees. 7. MLS identification is a four-letter designation starting with the letter M. It is transmitted in International Morse Code at least six times per minute by the approach azimuth (and back azimuth) ground equipment. b. Approach Azimuth Guidance1. The azimuth station transmits MLS angle and data on one of 200 channels within the frequency range of 5031 to 5091 MHz. 2. The equipment is normally located about 1,000 feet beyond the stop end of the runway, but there is considerable flexibility in selecting sites. For example, for heliport operations the azimuth transmitter can be collocated with the elevation transmitter. 3. The azimuth coverage extends: (a) Laterally, at least 40 degrees on either side of the runway centerline in a standard configuration, (b) In elevation, up to an angle of 15 degrees and to at least 20,000 feet, and(c) In range, to at least 20 NM.

Mechanism: Mid-term Performance Based Navigation (PBN) [7970]

tbd

Mechanism: Non-Directional Beacon (NDB) [194]

Non-Directional Beacons (NDB) are low frequency (LF) or medium frequency (MF) ground-based radio navigation aids that broadcast a continuous wave (CW) signal with a Morse code identification on an assigned frequency signal. NDBs are used by pilots to determine the aircraft's bearing to the ground station. Some state-owned and locally owned NDBs are also used to provide weather information to pilots.

NDBs can be used for non-precision approaches at low traffic airports, as compass locators (locator outer markers (LOMs)) to aid a pilot in finding the initial approach point of an Instrument Landing System (ILS), and for en route operations in remote areas. NDBs are approved as a primary navigation system in the National Airspace System (NAS).

Mechanism: Non-Directional Beacon Replacement (NDB Rpl) [6349]

Non-Directional Beacon Replacement (NDB Rpl) provides for the sustainment of selected Non-Directional Beacons (NDB).

Mechanism: RNAV/RNP SIDS & STARS Phase 2 (RNAV) [8017]

tbd

Mechanism: RNAV/RNP SIDS & STARS Phase 3 (RNAV) [8020]

tbd

Mechanism: RNAV/RNP SIDs & STARs (RNAV/RNP) [8058]

tbd

Mechanism: RNAV/RNP SIDs & STARs Phase 1 (RNAV) [8014]

tbd

Mechanism: RNAV/RNP SIDs and STARs (RNAV) [8013]

tbd

Mechanism: Simplified Directional Facility (SDF) [2327]

Simplified Directional Facility (SDF) is a navigational aid (NAVAID) used for nonprecision instrument approaches. The final approach course is similar to that of an Instrument Landing System (ILS) localizer for lateral guidance to the approach procedure decision threshold. However, the SDF course may be offset from the runway, generally not more than 3 degrees, and the course may be wider than the localizer, resulting in a lower degree of accuracy. A glide slope path is not provided. The SDF signal is fixed at either 6 degrees or 12 degrees as necessary to provide maximum flyability and optimum course quality. Identification consists of a three-letter identifier transmitted in Morse code on the SDF frequency. The appropriate instrument approach chart will indicate the identifier used at a particular airport. The SDF transmits signals within the range of 108.10 to 111.95 MHz. The approach techniques and procedures used in an SDF instrument approach are essentially the same as those employed in executing a standard localizer approach except the SDF course may not be aligned with the runway and the course may be wider, resulting in less precision.

Mechanism: Tactical Air Navigation System (TACAN) [2182]

Tactical Air Navigation (TACAN) is a UHF (Ultra High Frequency) ground-based radio navigation aid that is the military counterpart of Very High Frequency (VHF) Omnidirectional Range co-located with Distance Measuring Equipment (VOR/DME). TACAN avionics provide both the bearing and slant range to the ground station. TACAN is often collocated with civil VOR systems to form a VORTAC to support both civil and military flight operations. TACAN is approved as a primary navigation system in the National Airspace System (NAS).

Mechanism: Tactical Air Navigation System Replacement (TACAN Rpl) [6345]

Tactical Air Navigation (TACAN) is a UHF (Ultra High Frequency) ground-based radio navigation aid that is the military counterpart of Very High Frequency (VHF) Omnidirectional Range/Distance Measuring Equipment (VOR/DME). It is the primary tactical air navigation system for the military services ashore and afloat. TACAN avionics provide both the bearing and slant range to the ground station - and hence a navigational position fix. Many avionics models include an air-to-air mode that enables aircraft to determine distance from each other, which can be particularly useful in rendezvous operations. TACAN is often collocated with civil VOR stations (Denoted as VORTAC facilities) to permit military aircraft to operate in civil airspace. TACAN is approved as a primary navigation system in the National Airspace System (NAS).

This mechanism replaces aging TACAN facilities through either a service life extension program (SLEP) or outright replacement.

Mechanism: Transponder Landing System (TLS) [1407]

Transponder Landing System (TLS) is intended only for private use; no public procedures will be published. The system is designed to provide approach guidance using existing avionics: Instrument Landing System (ILS) localizer/glideslope and Mode 3 transponders. TLS operates with special procedures that require pilot training. Operation is limited to one aircraft at a time. Ground equipment consists of a transponder interrogator, sensor arrays to detect transponder replies, and ILS-frequency transmitters. The TLS determines the aircraft''s vertical and azimuth position by processing the transponder replies. The aircraft''s position is computed relative to the desired approach path and translated into appropriate localizer and glide slope signals which are broadcast to and displayed on the aircraft''s Course Deviation Indicator. The TLS broadcast guides the aircraft on the proper course and glide path to the approach decision height.

The TLS''s at Pullman/Moscow (PUW) and Rhinelander-Oneida (RHI) are leased systems. PUW's TLS is expected to be removed from service in FY-05.

FY-05 Congressional funding was provided with direction that it be used to conduct site surveys at approximately 30 additional airports and, in consultation with the airports, to evaluate other landing system alternatives.

Mechanism: Very High Frequency Omnidirectional Range (VOR) [211]

The Very High Frequency Omnidirectional Range (VOR) is a ground-based radio navigation aid that broadcasts azimuth information to aircraft. VORs broadcast on assigned channels and include the facility identification in Morse code for pilot monitoring and verification. Some VORs are capable of broadcasting weather information and supporting pilot-controller communcations although these capabilities are typically provided by other systems. In addition to providing en route and terminal area azimuth guidance, VORs also support nonprecision instrument approach operations.

Currently, VORs are the primary radio navigation aid in the National Airspace System (NAS). They serve as the internationally designated standard short-distance radio navigation aid for air carrier and general aviation Instrument Flight Rules (IFR) operations.

VORs may be installed stand-alone or co-located with either a Distance Measuring Equipment (DME) or Tactical Air Navigation (TACAN) system. When co-located the facility is typically referred to as a VOR/DME or VORTAC (TACAN co-located with VOR) facility, respectively. This configuration allows pilots to determine their aircraft''s bearing and distance to a single location, i.e., a position fix.

With the advent of sattelite-based navigation capabilities, a planned reduction in operational VORs will begin in approximately 2010. The reduction will result in a minimum operational network (MON) of VORs that will support IFR operations at the busiest airports in the NAS while serving as a backup for satellite-based navigation.

There are approximately 1,000 VORs in the NAS which are not all shown below.

Mechanism: Very High Frequency Omnidirectional Range Replacement (VOR Rpl) [6346]

Very High Frequency Omnidirectional Range Replacement (VOR Rpl) system is a ground-based radio navigation aid that broadcasts navigation signals, 360 degrees in azimuth, oriented from magnetic north, plus a periodic Morse code identification signal. VOR avionics indicate the azimuth (bearing) to or from the VOR transmitter. Some VOR stations are used for the broadcast of weather information. Air Traffic Control (ATC) or Flight Service Station (FSS) specialists may use the voice features for transmitting instructions or information to pilots.

VOR is the primary radio navigation aid in the National Airspace System (NAS) and is the internationally designated standard short-distance radio navigation aid for air carrier and general aviation Instrument Flight Rules (IFR) operations. Because it forms the basis for defining the airways, its use is an integral part of the ATC procedures. In addition to providing en route and terminal area guidance, VORs also support nonprecision instrument approach operations.

VORs may be provided alone, but are more often collocated with either a Distance Measuring Equipment (DME) or Tactical Air Navigation System (TACAN) system to form a VOR/DME or VORTAC facility, allowing aircraft to determine both the bearing and distance to the ground station - and hence a navigational position fix.

The number of VOR systems shown herein includes all systems whether stand-alone or co-located with an Non-directional Beacon (NDB), DME or TACAN system.

A reduction in the VOR (only) population is expected to begin in 2010. The proposed reduction will transition from todays VOR services to a minimum operational network (MON) that will support IFR operations at the busiest airports and serve as an independent backup navigation source to Global Positioning Systems (GPS) and GPS/Wide Area Augmentation System (WAAS). Those VORs that remain in service will need to be replaced or Service Life Extension Program (SLEP), as portrayed in the quantities depicted in this mechanism.

Mechanism: Very High Frequency Omnidirectional Range Test (VOT) [198]

A ground facility, which emits a test signal to check Very High Frequency Omnidirectional Range (VOR) receiver accuracy. Some VOTs are available to the user while airborne, and others are limited to ground use only. The airborne use of VOT is strictly limited to those areas/altitudes specifically authorized in the Airport/Facilities Directory (A/FD) or appropriate supplement.

Mechanism: Wide Area Augmentation System (Satellite-Based Augmentation System) (WAAS (SBAS)) [561]

WAAS is the GPS (Global Positioning System) Satellite-Based Augmentation System (SBAS) operated by the FAA. The system consists of a distributed array of reference and master stations designed to provide range correction and integrity information messages that are used by WAAS-capable GPS avionics to accurately determine an aircraft's 3-dimensional position. Accurately surveyed WAAS Reference Stations (WRS) receive and process GPS satellite range data which is forwarded to redundant WAAS Master Stations (WMS) for additional processing before sending the resulting correction data to redundant WAAS Ground Uplink Stations (GUS). The GUS transmit the data to geostationary satellites (GEO), which retransmit them on a GPS civil-use frequency for reception by GPS/WAAS avionics. WAAS enables aircraft to determine their position with an accuracy that will support precision and non-precision approaches and reduced longitudinal separation throughout the NAS.

The WAAS service volume includes the conterminous United States, Hawaii, portions of Alaska and the Caribbean, and the U.S. border areas with Canada and Mexico. Using just the single civil frequency that is currently available from GPS, WAAS supports a near-precision instrument approach capability termed Localizer Performance with Vertical Guidance (LPV)

The initial WAAS coverage and availability were improved in 2007 with additional WRS and relocated GEO's. The additional WRS's expanded WAAS coverage to the north (Canada) and south (Mexico), and improved performance on the fringes of the WAAS service area (e.g., southern Texas, southern California, and the New England states). The new GEO's provide dual coverage throughout the U.S.

Further program improvements are described in MechID 6474 (WAAS LPV).

Mechanism: Wide Area Augmentation System (WAAS) / Localizer Performance with Vertical Guidance (LPV) (WAAS / LPV) [6474]

WAAS is the GPS (Global Positioning System) Satellite-Based Augmentation System (SBAS) operated by the FAA. WAAS operational capabilities will occur in four phases: Initial Operational Capability (IOC), Full LPV Performance (FLP), Full LPV-200 Performance, and Dual Frequency Operations. Each phase provides an additional level of operational capability that builds on the performance of the previous phase. These additional capabilities satisfy increasing user demand and the FAA's goal of increased safety, capacity and international leadership. The program is described in the WAAS Implementation Strategy and Planning document (ISP).

IOC, accomplished in FY 2003, provided high availability en route through non-precision approach (Lateral Navigation (LNAV)) service over the Conterminous United States (CONUS) as well as limited LPV approach service. At IOC, WAAS accuracy, integrity, availability and continuity improved compared to GPS alone, enabling the capability to execute an instrument approach procedure.

The FLP Phase will be completed in FY 2008 and will provide full LPV service with a limited LPV-200 approach service availability and coverage within CONUS. FLP extends LPV approach service to Alaska and parts of Canada and Mexico. Additionally, the WAAS architecture at FLP includes two new leased geostationary satellites (GEO) that provide the WAAS broadcast corrections to the WAAS service area, an additional master station, enhancements to the broadcast corrections, and additional wide area reference stations (WRS). The two new GEO's will replace the existing INMARSAT (geostationary satellites) leased satellites.

Phase III, Full LPV-200 Performance (FY 2009 – FY 2013), will provide for a robust, reliable, and sustainable LPV-200 capability. This phase will provide the technology evolution and sustainment activities necessary to maintain WAAS service including LPV-200 with high availability and coverage within CONUS. This phase will also support transition of WAAS maintenance and development capabilities to the FAA.

The Phase IV effort, Dual Frequency Operations (FY14 and beyond), uses the dual civil frequencies (L1 and L5) on GPS and WAAS satellites. In addition, WAAS will continue to support the single-frequency user through the program's life cycle.

Mechanism: Wide Area Augmentation System (WAAS) Corrections Broadcast Service (WAAS Corrections Broadcast Service) [631]

WAAS Ground Uplink Stations (GUS) transmit Navstar Global Positioning System (GPS) range correction information and data integrity messages to Geostationary Earth Orbit (GEO) satellites, which re-transmit the data for use by WAAS-equipped users. Airborne or terrestrial users use the correction information to accurately determine their 3-dimensional position for very accurate navigation or location purposes.

Since commissioning the FAA WAAS in 2003, WAAS has used two INMARSAT geostationary satellites (GEO) to broadcast the WAAS signal. The satellites are INMARSAT I-3 F3 and INMARSAT I-3 F4. The leases for these satellites are expiring and new satellites are coming on line as explained below.

Lockheed Martin is the contractor working FAA's WAAS Geostationary Communications and Control Segment (GCCS) initiative. A vital building block of WAAS-based broadcast services for aviation use, the GCCS creates additional user signals to improve system reliability. The Telesat Anik F1R satellite and the PanAmSat Galaxy 15 satellite both with GCCS payloads were launched in September and October 2005, respectively. Lockheed Martin and the FAA will perform 12 months of segment and system level integration and test prior to the WAAS GCCS service going operational in October 2006.

Also the INMARSAT I-3 F4 was moved west in the period February-April 2006.

When these satellite activities are complete - the INMARSAT I-3 F4 move and the debut of the PanAmSat WAAS broadcast - the net result will be better service availability for the users. In the past, both Alaska and the eastern two-thirds of the U.S. have only been within the broadcast footprint of one WAAS GEO. As a result, both of these expansive areas were vulnerable to a loss of WAAS service if one of the two WAAS GEOs failed for any period of time. In its new location, the INMARSAT I-3 F4 satellite footprint will now cover all of Alaska. Additionally, the new PanAmSat broadcast will also cover all of Alaska. Alaska will gain double redundant coverage. The benefit is similar in the eastern two-thirds of the U.S. where the new PanAmSat broadcast will add a second layer of WAAS coverage. By the end of 2006, the majority of all WAAS users within the United

States will now be in view of at least two WAAS GEOs, and in some cases in view of three WAAS GEOs.

At a Service Level Review held on 18 April 2007 it was reported that integration of one new geostationary satellite signal into the WAAS was
completed.

Additional information at http://gps.faa.gov

Mechanism: Wide Area Augmentation System Technology Refresh (WAAS Tech Refresh) [1660]

Elements of Wide Area Augmentation System Technical Refresh (WAAS Tech Refresh) consist of two paths. One is improvement to operational capability that enhances performance of WAAS. The other is the known replacement of equipment, including hardware, software, and telecommunications links and networks within the WAAS, Wide-area Master Station (WMS) and Ground Uplink Station (GUS).

The May 2004 re-baselining projects Tech Refresh to begin in FY-2014 & to continue through the WAAS life-cycle, which ends in 2028.

Domain: Air Traffic Control Surveillance

Mechanism: CSPO (PRM) (PRM) [7886]

TBD

Cooperative Surveillance

Mechanism: ASDE-X Technology Refresh and Disposition (ASDE-X TR & Disposition) [7344]

The Airport Surface Detection Equipment - Model X (ASDE-X) is a modular surface surveillance system capable of processing radar, multilateration, and Automatic Dependent Surveillance-Broadcast (ADS-B) sensor data which provides airport surface surveillance to air traffic controllers. The ASDE-X Technology Refresh and Disposition provides funding for the technology refresh, obsolete and diminishing source part replacement and/or eventual disposition of the 35 operational and three support systems.

The technology refresh will be implemented between 2012 and 2016. A decision is planned for 2014 as to removal of surface primary radars. Evolving air traffic security requirements will impact this decision.

Refer to Mechanism Identification (MID) Number 820 for an ASDE-X site list.

Mechanism: Air Traffic Control Beacon Interrogator Model 6 (ATCBI-6) [301]

The Air Traffic Control Beacon Interrogator Model 6 (ATCBI-6) is a ground-based system that interrogates transponders, receives, and processes replies from transponders, determines the range and azimuth to the aircraft, and forwards the information to appropriate air traffic control (ATC) automation systems. Replies provide identification and altitude data of the transponder. The ATCBI-6 Replacement Program will procure about 140 Monopulse Secondary Surveillance Radar (MSSR) with Selective Interrogation (SI) to replace existing operational beacons, which includes four support systems (not shown in the quantities below) for training, testing, logistics, and operational support.

As of December 2008, 137 ATCBI-6 systems had been delivered, 137 delivered to sites and 111 commissioned. Ninety-six (96) legacy ATCBI systems have been removed.

The ATCBI-6 will replace all ATCBI-4 and ATCBI-5 systems at NAS en route facilities. All ATCBI-4 systems will be out of the NAS by the end of 2007. ATCBI-5 systems will be moved to terminal or beacon only site (BOS) facilities.

Mechanism: Air Traffic Control Beacon Interrogator Models 4/5 (ATCBI-4/5) [238]

The Air Traffic Control Beacon Interrogator Model 5 (ATCBI-5) and ATCBI-4 are air traffic control (ATC) beacon systems that interrogate transponder-equipped aircraft. These are secondary radar systems that interrogate aircraft transponders to acquire Mode 3A aircraft identification codes and Mode C altitude information codes. The ATCBI-4/5 output this data in shaped-pulse video form to a collocated primary radar or separate digitizer processor for digital target correlation processing. This collocated processor determines the aircraft Mode 3/A idenitification and position data in terms of radial range, azimuth and altimeter altitude data reported in Mode C.

After deployment of the ATCBI-6 systems in 2011, all ATCBI-4 and ATCBI-5 systems will be removed from the en route sites. ATCBI-5 systems will be relocated to terminal radar sites to replace ATCBI-4 beacon systems. A small number of ATCBI-4 and ATCBI-5 systems remain in the NAS. These systems will eventually be replaced by an ATCBI-6 or a new beacon.

There will be a limited decommissioning of remaining ATCBI-5 systems after ADS-B Rule Compliance in mandated.

Mechanism: Airport Surface Detection Equipment-Model X (ASDE-X) [820]

The Airport Surface Detection Equipment - Model X (ASDE-X) is a modular surface surveillance system capable of processing radar, multilateration, and Automatic Dependent Surveillance-Broadcast (ADS-B) sensor data which provides airport surface surveillance to air traffic controllers. ASDE-X provides low cost surface surveillance for airport areas. Plans are to implement ASDE-X technology at 35 ASDE-3 sites. Three non-operation systems will be installed to support logistics and training.

ASDE-X Technology Refresh and Disposition provides funding for the technology refresh, replacement of obsolete and diminishing source parts and eventual disposition of the 35 operational and three support systems. The technology refresh will be implemented between 2012 and 2016.

Eleven ASDE-X systems are operational as of November 2007. Current plans are for ASDE-X to be operational until 2025. A decision is planned for 2014 as to removal of surface primary radars. This decision will be impacted by evolving air traffic security requirements.

Mechanism: Beacon Interrogator, Military OX-60 (OX-60) [2447]

The OX-60 is a secondary (beacon) system collocated with the 12 joint-use FPS-117 long-range primary radars in Alaska and 1 joint-use FPS-117 in Hawaii. It is used to interrogate transponder-equipped aircraft, receive aircraft identification, determine aircraft position, and forward the information to appropriate U.S. Department of Defense (DoD) and FAA air traffic control (ATC) automation systems.

The OX-60 is a secondary (beacon) and collocated primary radar systems provide a correlated radar/beacon target output.

Mechanism: Beacon Interrogator, Military TPX-42 (TPX-42) [6457]

The TPX-42 beacon interrogator is a military analog interrogator (Identify Friend or Foe (IFF)) system used to detect and report the identity and location of aircraft in a specific volume of airspace. The designation TPX-42 may also refer to a complete beacon and display system. The TPX-42 beacon interrogator subsystem It is used in conjunction with the DOD GPN-20 military airport surveillance radar (ASR) and FAA ASR-9. The TPX-42 is similar to the FAA's Air Traffic Control Radar Beacon Interrogator Models 4 and 5 (ATCBI-4/5). TPX-42 systems provide service to the NAS.

Plans are to replace the TPX-42 beacon systems as the DASR or ASR-11 systems are implemented. Three DOD systems, collocated with ASR-9 primary systems at Hill AFB, may remain operational for the near term. Replacement systems have not been designated.

Mechanism: Beacon Interrogator, Military UPX-39 (UPX-39) [2446]

The UPX-39 is a new secondary surveillance radar (SSR) beacon system that will replace the 12 OX-60 secondary (beacon) radars in Alaska (12) and Hawaii (1) at the 13 joint-use (FPS-117 primary radar) facilities to improve the quality, reliability, and availability of radar data used for air traffic control (ATC) and to reduce FAA and United States Air Force (USAF) maintenance costs. The FAA will use existing interfaces to provide the radar data to the Air Route Traffic Control Center (ARTCC) facilities. The FAA provides technical support and funds its share of the cost associated with the fabrication, installation, and acceptance of 13 systems at the joint-use radar facilities.

The UPX-39 and collocated primary radar systems provide a correlated digital output to NAS and non-NAS users.

Mechanism: Mode S Service Life Extension Program (SLEP) Phase 2 (Mode S SLEP Phase 2) [7610]

The Mode Select (Mode S) Service Life Extension Program (SLEP) Phase 2 program is required to maintain current maintenance supportability and performance requirements for secondary radar services. The SLEP program will provide service life extension upgrades to address issues with parts obsolescence, diminishing supply sources and high failure rate parts. The Mode S SLEP Phase 2 is a separate SLEP program, from the previously referenced ASR-9/Mode S SLEP Phase 2 mechanism, with CIP number, CIP# Z0T.05-00.

The Mode S SLEP Phase 2 will be implemented on up to 151 systems including 141 FAA operational, FAA nine support systems and one Bermuda Government-owned system that provides data to the New York ARTCC. The number of systems upgraded is dependent of the results of the ADS-B Backup Strategy, New beacon implementation decisions, ASR-11 and Mode S relocation activities. A decision will be made in 2011 to sustain or replace terminal and en route Mode S systems with the New Beacon system. Refer to Mechanism Identification (MID) Number 239 for a Mode S site list.

There will be a limited decommissioning of selected Mode S systems after ADS-B Rule Compliance in mandated.

Mechanism: Mode Select (Mode S) [239]

The Mode Select (Mode S) is a ground-based system capable of selective interrogation of Mode S transponders and general interrogation of Air Traffic Control Radar Beacon System (ATCRBS) transponders within range. The system also receives, processes, and forwards the transponder replies to appropriate air traffic control (ATC) automation systems. Data formats for both interrogation and reply include data exchange capability.

The Mode S system provides a limited implemention of Traffic Information Service (TIS) that makes local traffic data available to the flight deck via the Mode S data link. TIS, a Mode S data link service, provides automatic traffic advisories to properly equipped aircraft. Pilots are able to request and receive a display of nearby traffic. The relative range, bearing, and altitude (if known) and a "proximate" or "threat" classification of nearby aircraft will be displayed in the cockpit.

The total Mode S procurement included 148 systems. One Hundred thirty-nine (139) Mode S systems are operational. One hundred sixteen are installed at short range radar (terminal) facilities and twenty three at installed at long range radar (LRR) facilities. Near term plans are to commission two systems at Chicago Ohare (ORD). Remaining systems, which are displaced by the ASR-11 deployment, will be stored at the FAA Logistics Center.

Ninety-six (96) operational sites provide Traffic Information Service (TIS) service. Mode S systems will continue providing TIS-B services until TIS-B service is provided by the Surveillance and Broadcast Services (SBS) system.

The Mode S systems will be sustained through Service Life Extension Programs (SLEP) and Operations & Maintenance (O&M) funding until a decision is made on sustaining or replacing the Mode S Systems. A Mode S SLEP Phase 2 is being evaluated. This SLEP is discussed in MID 7610. A decision for limited en route and terminal replacement of legacy beacons (Mode S), and removal of remaining systems (Mode S) in planned for 2014.

Mechanism: New Beacon (New Beacon) [7518]

The New Beacon system will provide backup cooperative surveillance to Automatic Dependent Surveillance - Broadcast in en route and terminal environments. A decision for implementatino of the new Beacon system is planned for 2011 at NASEA Decision Point (DP) #78. A separate decision at DP #105 is planned for 2014 for limited implementation of a "New Beacon" system to replace Mode S systems in the en route and terminal environments. The New Beacon system may replace some ATCBI-5 systems that remain in the NAS.

The initial estimate for the number of "New Beacon" systems is 190. This count will change as requirements are defined.

Mechanism: New En Route Surveillance System (New En Route Surveillance System) [640]

The New En Route Surveillance System is a future generation surveillance system capable of providing cooperative surveillance capabilities in the terminal and en route environments based on the technology at that time. A decision will be made in the 2014 timeframe on whether this system will replace the Air Traffic Control Radar Beacon Interrogator Model 6 (ATCBI-6) and Mode Select (Mode S) systems for terminal and en route environments. The New En Route Surveillance System would be a future replacement that would be interfaced to DOD owned en route primary radars.

Mechanism: Precision Runway Monitor (PRM) [244]

The Precision Runway Monitor (PRM) system is a highly accurate electronic scan (e-scan) radar that tracks and processes aircraft targets at a 1-second update rate (as opposed to 4.8 seconds with conventional radars). The system is sometimes referred to as PRM-E. The PRM system provides controllers with automatic alerts and high-resolution displays that, in conjunction with specific procedures, enable pilots to fly simultaneous independent approaches to parallel runways spaced less than 4,300 feet apart. Without PRM parallel runways can be used for simultaneous independent approaches only during Visual Meteorological Conditions. With PRM, simultaneous independent approaches can be made to closely spaced parallel runways under Instrument Meteorological Conditions (IMC). The inability of pilots to conduct such approaches during adverse weather reduces throughput and increases delays.

PRM systems were commissioned at the Minneapolis-St. Paul International Airport (KMSP) in Oct. 1997, Lambert-Saint Louis International Airport (KSTL) in Oct. 1998, and Philadelphia International Airport (KPHL) in Sep. 2001. A PRM system was installed at New York's John F. Kennedy International Airport (KJFK) but was subsequently dismantled and removed. A PRM was commissioned at San Francisco International Airport (KSFO) in Oct. 2004. A PRM system was commissioned at Cleveland Hopkins International Airport (KCLE) in May 2005. A PRM was commissioned at the Atlanta Hartsfield-Jackson International Airport (KATL) in Apr. 2007.

Note that the PRM at Minneapolis-St. Paul (KMSP) was recently removed and sent to the FAA William J. Hughes Technical in Atlantic City, NJ.

PRM systems may be sustained until 2016 with service life improvements. However, a decision will be made in 2011 as to migration of PRM to PRM-A, based on multilateration technology.

Mechanism: Precision Runway Monitor Alternate - Multilateration Technology (PRMA - MLAT Technology) [7343]

The Precision Runway Monitor Alternate (PRM-A) system is a low cost cooperative surveillance system that uses Multi-lateration Technology (M/LAT) technology derived from ASDE-X to provide aircraft position and identification for parallel approach airspace volumes. The PRM-A system correlates surveillance data from terminal and surface radars, multi-lateration receivers, and Automatic Dependent Surveillance-Broadcast (ADS-B) systems.

PRM-A supports tracking and maintaining separation standards for aircraft on simultaneous independent approaches on parallel runways spaced less than 4,300 feet apart. Parallel approaches can be performed during poor visibility and adverse weather conditions without reduced delays and lost capacity. The target position update rate is one second as compared to 4.8 seconds with traditional terminal beacon systems. .

PRM-A data is displayed on high resolution displays and automation systems such as Standard Terminal Automation Replacement System (STARS). Automatic conflict alerting is also provided

PRM-A performancewill be evaluated at the Detroit's Metropolitan Wayne County Airport (DTW) airport, as a first article test site, with plans for certification in 2008. A decision will be made in 2011 as to whether to expand PRM-A implementation in the NAS and whether it will replace PRM E-Scan systems.

Mechanism: Precision Runway Monitor Service Life Extension Program (PRM SLEP) [6409]

The Precision Runway Monitor Service Life Extension Program (PRM SLEP) extends the service life of the PRM sensor (secondary radar system) through at least 2025. The PRM is similar to the Mode Select (Mode S), which operates and updates targets at a faster rate than that of the normal Air Traffic Control Radar Beacon System (ATCRBS) or Mode S system. This faster update rate provides improved precision in predicting target positions. The PRM system is utilized to increase efficiency of operations during instrument meteorological conditions (IMC) by allowing independent simultaneous approaches to parallel runways spaced less than 4,300-feet apart. The Standard Terminal Automation Replacement System (STARS) provides the display function for the air traffic controllers.

A decision for the continuation or removal from service the of Electronic Scan (E-SCAN) PRM will be based on required navigation performance (RNP) and the decision on implementing multilateration that is scheduled for 2009.

Mechanism: Surveillance Data ASTERIX and IP Upgrade (Surveillance Data ASTERIX and IP Upgrade) [6449]

The ASR-9/Mode S All-purpose Structured EUROCONTROL Radar Information Exchange (ASTERIX) Upgrade provides improved surveillance data interface capabilities to National Airspace System (NAS) automation systems. This upgrade would include implementing IP addressing to support data networking. This will allow surveillance data to be sent to automation systems for improved tracking and data networking. ASTERIX formatting and IP addressing would be implemented for surveillance surface, terminal, and en route systems and ADS-B data.

Roadmap Decision Point 102 will address the requirement for ASTERIX and IP Addressing in 2009. All surveillance systems will be impacted including terminal and en route surveillance and ADS-B. Quantities will be derived based requirements for each surveillance systems and which systems will manege NAS interfaces.

Dependent Surveillance

Mechanism: ADS-B (Segment 1) (ADS-B) [8052]

tbd

Mechanism: ADS-B in Delegated Separation Alerting (ADS-B) [7842]

TBD

Mechanism: Automatic Dependent Surveillance (Capstone) Ground Station (ADS (Cap) Ground Station) [1408]

The Automatic Dependent Surveillance (Capstone) Ground Station (ADS (Cap) Ground Station) is a demonstration system used by the Capstone project under Safe Flight 21. It receives Global Positioning System (GPS)-derived aircraft four (4)-dimensional position data, aircraft identification, aircraft velocity, and other selected aircraft data for processing at air traffic control (ATC) facilities, and transmits Traffic Information System-Broadcast (TIS-B) information on aircraft in areas of radar coverage (and other airspace status information when available) to properly to equipped aircraft, to support operational trials. These ground stations are located in remote locations in Alaska, and feed the automation system at the Anchorage (KZAN) Air Route Traffic Control Center (ARTCC).

The Surveillance and Broadcast Services implementation will extend ADS-B service throughout the NAS. Limited application will be used for Wide Area Multi-Lateration (WM/LAT) operations in the CONUS.

Mechanism 1408 is succeeded by MID 7614, which address the SBS Program and ADS-B implementation. the SBS Program will conduct testing, validation and implementation activities in Alaska.

Mechanism: Automatic Dependent Surveillance Broadcast (ADS-B) [7614]

ADS-B will be implemented by the Surveillance and Broadcast Services (SBS) Program to provide two services: (1) SBS including ADS-B and ADS-Rebroadcast and (2) Traffic Information Service Broadcast (TIS-B) and Flight Information Service Broadcast (FIS-B) and support five ADS-B enabled applications: (1) Enhanced Visual Acquisition, (2) Enhanced Visual Approach, (3) Final Approach and Runway Occupancy Awareness, (4) Airport Surface Situational Awareness and (5) Conflict Detection for flight and Air Traffic Management (ATM) operations. SBS will provide data to FAA defined Service Delivery Points (SDP) as the demarcation points between SBS and the ground-based user systems.

Implementation:
The SBS applications span all national airspace domains (Oceanic, En Route, Terminal and Surface) and require tightly coupled coordination with the Terminal and En Route Service Units. Interfaces will be integrated to all automation platforms that serve the NAS. This provides an opportunity to develop a single computer human interface (CHI) for seven automation platforms – En Route Automation Modernization (ERAM), HOST Computer System (HCS), Microprocessor En Route Automated Radar Tracking System (MEARTS), Standard Terminal Automation Replacement System (STARS), Common Automated Radar Terminal System (CARTS), Advanced Technologies and Oceanic Procedures (ATOP) and Airport Surface Detection Equipment Model X (ASDE-X).

SBS will be implemented in two segments. The SBS Program will develop connectivity and validate ADS-B suitability for ATC services through integration to the five primary automation platforms and establish an In-Service Decision (ISD) on ADS-B, ADS-R,TIS-B and FIS-B in Segment 1 by 2010. The remaining automation platforms will be addressed as system enhancements in Segment 2 by 2013.

The SBS vendor will install and own about 340 SBS ground stations in four regions of the U.S. by 2010 with an option to install over 400 more by 2013. The SBS vendor will provide SBS capability to the FAA under a fee-for-services arrangement.

SBS - Segment 1:
The SBS Program has achieved Segment 1 milestones up to contract award and subsumed the Alaska Capstone and other ADS-B related programs activities. Key remaining Segment 1 implementation milestones are:
1. Deploy and certify equipment to support service delivery in selected locations
2. Certify ADS-B based separation standards for 3 and 5 nautical miles on five FAA automation platforms - ERAM, HOST, MEARTS, STARS, CARTS
3. Publish ADS-B "Out" Notice of Proposed Rulemaking (NPRM)
4. ADS-B "Out" Final Rule
5. Confirm minimum avionics performance to ensure future utility.
6. Define additional aircraft to aircraft requirements
7. Achieve early benefits in non-radar airspace
8. Support application development with industry partner United Parcel
Service (UPS) at their Louisville Global Operations Center (GOC)

ADS-B downlink will be implemented at four key sites, the Gulf of Mexico; Louisville, KY - Terminal Radar Approach Control (TRACON) and UPS GOC; Philadelphia, PA – TRACON; and Alaska Anchorage Center and Juneau Air Traffic Control Tower.

SBS - Segment 2:
SBS capabilities will be activated in the remaining NAS service volumes with plans to complete NAS-wide deployment of ADS-B by 2013. The ADS-B "Out" Final Rule for broadcast will be published during the end of Segment 1 and beginning of Segment 2, providing an equipment baseline to continue user equipage and application development and deployment.

Milestones beyond 2013 are:
1. Continue aircraft to aircraft application requirements definition and deployment with a goal of achieving avionics equipage of 26% by 2014 and 100% FY 2020.
2. Complete removal of targeted legacy surveillance systems, per the ADS-B Backup Strategy, between FY 2016 and 2023.
3. Complete removal of targeted TIS-B services by 2025 and decommission TIS-B service after all aircraft are ADS-B equipped.

Mechanism: Automatic Dependent Surveillance Broadcast – Future Segments (ADS-B - Future Segments) [7613]

Automatic Dependent Surveillance Broadcast – Future Segments will continue implementation started in Surveillance and Broadcast Services (SBS) Program Segment 2 with milestones as listed below.

In the timeframe 2013-2020:
Continue Aircraft to Aircraft Application Deployment - FY 2010–2014; Additional Aircraft to Aircraft Requirements Definition - FY 2010–2014;
Complete 26% Avionics - FY 2014;
Targeted Removal of Legacy Surveillance - FY 2016–2020 (see note 1).

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In the timeframe 2021-2025:
Complete 100% Avionics - FY 2020;
Complete Removal of Targeted Legacy Surveillance - FY 2023(see note 1);
Complete Targeted Removal of Traffic Information Services-Broadcast (TIS-B)- FY 2025(see note 2).

Notes:
1. The ADS-B Backup Strategy requires retaining primary and secondary radars at selected locations.

2. TIS-B service will be decommissioned after all aircraft are ADS-B equipped.

Mechanism: CSPO (RPATS/ADS-B In) (CSPO RPATS ADS-B) [7891]

TBD

Mechanism: CTA (CTA) [7897]

TBD

Mechanism: D-TAXI/D/OTIS (D-TAXI/D/OTIS) [7901]

TBD

Mechanism: Future CAS Strategy (CAS) [7865]

TBD

Mechanism: NextGen Far-Term Work Package (TBD) [7972]

The NextGen Far-Term Work Package will combine capabilities of the NextGen Mid-Term Work Package into a common platform, along with the capabilities of En Route Automation NextGen Mid-Term WP. Required functionality will be "terminal-derived." All automation will be included in a Common Automation Platform.

Mechanism: Requested Trajectory (RTA) [7923]

TBD

Mechanism: Trajectory Optimization (Trajectory) [7930]

TBD

Mechanism: Wide Area Multi-Lateration (WM/LAT) [7615]

Wide Area Multi-Lateration (WM/LAT) is a limited implementation of the multi-lateration technology, derived from the Airport Surface Detection Equipment Model X (ASDE-X), to support air traffic control operations a few airports in Colorado with data feeds to the Denver ARTCC. WM/LAT operation provides air traffic surveillance coverage in areas with restricted low altitude radar coverage due to mountainous terrain or no radar coverage. The FAA is evaluating WM/LAT operations between 2007 and 2010.

WM/LAT operations will be extended to Juneau, Alaska. WM/LAT services Juneau, Alaska will be implemented as part of the ADS-B implementation under the SBS Program. WM/LAT services may be extended to other areas in the Western Continental United States (CONUS) with restricted radar coverage. An FAA decision is pending in 2010 on NAS-Wide deployment of ADS-B which would extend ADS-B service throughout the NAS. SBS implementation of ADS-B related services may subsume WM/LAT operations.

Decommission and End of Service dates are based on the assumption that NAS-Wide Deployment of ADS-B services would likely replace WM/LAT. The ADS-B Backup Strategy projects complete removal of targeted legacy surveillance systems, per between FY 2016 and 2023. WM/LAT operations are partially or fully funded by local airport transportation authorities that would participate in decisions to end the service.

Independent Surveillance

Mechanism: ARSR-4 Automated Technical Documentation (ARSR-4 Automated Tech Docs) [7332]

The Air Route Surveillance Radar Model 4 (ARSR-4) Automated Technical Documentation (ARSR-4 Automated Tech Docs) program provides funding for automated technical documentation for the ARSR-4 system.

This mechanism is completed.

Mechanism: ASR-9/Mode S SLEP Phase 2 (ASR-9/Mode S SLEP P2) [7581]

The Airport Surveillance Radar Model 9 (ASR-9) Mode Select (Mode S) Service Life Extension Program (SLEP) Phase 2 program is required to maintain current maintenance supportability and performance requirements for primary radar services. The SLEP programs provide service life extension upgrades to address issues with parts obsolescence, diminishing supply sources and high failure rate parts. The ASR-9/Mode S SLEP Phase 2 will become separate SLEP programs, referenced as ASR-9 SLEP Phase 2 (CIP# S03.01-06) and Mode S SLEP Phase 2 (CIP# Z0T.05-00).

The ASR-9 SLEP Phase 2 will be implemented at 119 terminal sites and six support systems. Ten DOD ASR-9 systems will also be impacted. A decision will be made on sustaining or replacing the terminal primary radar systems in 2011. Refer to Mechanism Identification (MID) Number 236 for an ASR-9 site list.

The Mode S SLEP Phase 2 will be implemented on 148 systems. The number of systems upgraded is dependent of the results of ASR-11 and Mode S relocation activities. A decision will be made in 2011 on sustaining or replacing terminal and en route Mode S systems with the New Beacon system. Refer to Mechanism Identification (MID) Number 239 for a Mode S site list.

Mechanism: Air Route Surveillance Radar Model 1E (ARSR-1E) [240]

The Air Route Surveillance Radar Model 1E (ARSR-1E) is based on a 1970s vintage radar that has been updated through Service Life Extension Program (SLEP). It is a long-range radar system with a maximum detection range of 200 nautical miles (nmi). The ARSR-1E is a surveillance system used to detect azimuth and slant range of en route aircraft operating between terminal areas. It also provides weather intensity data. ARSR-1 and ARSR-1D are similar configurations to the ARSR-1E. The ARSR-1E is interface to a collocated Common Digitizer Model 1/2 (CD-1/CD-2) or other digital processor which provides digitized output.

The ARSR-1E is integrated with a collocated ATCBI-6 or Mode S beacon to provide correlated target output data. Twenty-two ARSR-1E systems are collocated with ATCBI-6 and three are collocated with Mode S systems.

These are legacy FAA and DOD systems that are now owned by DOD. The FAA will participate in maintenance and staffing. These systems are likely to be replaced by DOD if decommissioned.

Mechanism: Air Route Surveillance Radar Model 2 (ARSR-2) [241]

The Air Route Surveillance Radar Model 2 (ARSR-2) is based on a 1970s vintage radar that has been updated through Service Life Extension Program (SLEP). It is a long-range radar system with a maximum detection range of 200 nautical miles (nmi). The ARSR-1E is a surveillance system used to detect azimuth and slant range of en route aircraft operating between terminal areas. It also provides weather intensity data. The ARSR-1E is interface to a collocated Common Digitizer Model 1/2 (CD-1/2) or other digital processor which provides digitized output.

The ARSR-2 is integrated with a collocated ATCBI-6 and Mode S beacon to provide correlated target output data. Eighteen ARSR-2 radars provide service to the NAS. These systems are owned by DOD with maintenance support from the FAA. The ARSR-2 service will be sustained until 2025.

Mechanism: Air Route Surveillance Radar Model 3 (ARSR-3) [229]

The Air Route Surveillance Radar Model 3 (ARSR-3) is a 1980s radar that provides primary long-range surveillance data, including slant range and azimuth data. It processes the returns which includes demodulation, analog-to-digital conversion, moving target indicator (MTI) function processing, sensitivity time control (STC), range and azimuth gating (RAG), and digital target extraction - all of which are performed digitally (with the exception of the front-end RF demodulation and analog-to-digital conversion). In addition, the ARSR-3 has a weather channel with associated processing to provide three-level weather intensity contour information in digital format.

Twelve ARSR-3 systems are integrated with a collocated ATCBI-6 or ATCBI-5 beacon system to provide correlated target output data. Primary radar service in the affected coverage areas will be sustained until 2027 by DOD unless a decision is made to replace them with new surveillance systems. The FAA will provide maintenance support.

Mechanism: Air Route Surveillance Radar Model 4 (ARSR-4) (ARSR-4) [230]

The Air Route Surveillance Radar Model 4 (ARSR-4) is a three-dimensional, long-range, rotating phased array, primary surveillance radar with integrated height finder capability. It is part of the Joint Surveillance System (JSS) that is used in conjunction with ARSR-1, ARSR-2 and ARSR-3, to provide coverage as part of the National Airspace System (NAS) and nationwide air defense surveillance network. The ARSR-4 performs the functions as other ARSR radars for the FAA. ARSR-4 also satisfies DOD specific requirements for providing height data on surveillance targets. The ARSR-4 outputs weather intensity contour data formatted in up to six levels of intensity.

The ARSR-4 is integrated with a collocated Air Traffic Control Beacon Interrogator Model 5 (ATCBI-5) or ATCBI-6 beacon systems to provide correlated target output data. ARSR-4 is not currently collocated with Mode Select (Mode S) systems.

Forty-one (41) ARSR-4 systems provide service to the NAS. Two additional systems are owned by DOD and do not interface to the NAS. One support system is installed at the FAA Logictics Center. ARSR-4 systems are funded by DOD and FAA with providing FAA maintenance support. Plans are to sustain the ARSR-4 up to 2025 unless a decision is made to procure replacement systems through DOD earlier.

Mechanism: Airport Surface Detection Equipment Model 3/Airport Movement Area Safety System Upgrade (ASDE-3/AMASS Upgrade) [6368]

The Airport Surface Detection Equipment Model 3/Airport Movement Area Safety System (ASDE-3/AMASS) Upgrade provides for the technical refresh of the ASDE-3 and AMASS. Selected system components will be replaced or upgraded to extend the service life of these systems through 2023 (ASDE-X End of Service Life (EOSL)), at which point all ASDE systems (ASDE-3/AMASS, ASDE-3X, ASDE-X) may be replaced with a common system.

SLEP implementations will be affected by a decision to be made on removal of surface primary radar systems.

Mechanism: Airport Surface Detection Equipment-Model 3 (ASDE-3) (ASDE-3) [232]

Airport Surface Detection Equipment - Model 3 (ASDE-3) provides primary radar surveillance of aircraft and airport service vehicles on the surface movement area. ASDE-3 is installed at the busiest U.S. airports. Radar monitoring of airport surface operations (ground movements of aircraft and other supporting vehicles) provides 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.

ASDE-3 systems provide airport surface coverage thirty-four (34) airports. The ASDE-3 will undergo a Service Life Extension Program (SLEP) to extend its service life through 2015 (see ASDE-3 SLEP), which will enable it to more effectively support the Airport Movement Area Safety System (AMASS) through this same time period.

ASDE-3 will be maintained with O&M funding until 2022. A decision will be made on removal of surface primary radars in 2014. This will be impacted by security requirements. If a decision is made to remove ASDE-3, the decommissioning will start about 2018 with End of Service planned for 2022.

Mechanism: Airport Surface Detection Equipment-Model 3 Service Life Extension Program (ASDE-3 SLEP) [1684]

The Airport Surface Detection Equipment-Model 3 Service Life Extension Program (ASDE-3 SLEP) provides for the technical refresh of the ASDE-3 system. The following components will be replaced or upgraded: antenna azimuth encoders, transmitter power supply modulators, digital processing circuit cards, display units, and other obsolete parts. The SLEP will extend the life of the ASDE-3 through 2015, which will allow it to support the Airport Movement Area Safety System (AMASS) more effectively.

Future technology refreshes of the ASDE-3 will be included as part of the ASDE-3/AMASS Upgrade activity. The ASDE-3 SLEP will affect 40 systems including 37 fielded and 3 support systems. Many systems likely to be replaced by implementing ASDE-X technology at the ASDE-3 sites.

Mechanism: Airport Surveillance Radar Model 11 (ASR-11) [233]

The Airport Surveillance Radar Model 11 (ASR-11) is a short-range digital, integrated primary and secondary surveillance radar (SSR) radar system with a 60 nautical mile (nmi) detection range. It is being installed at low to medium activity airport terminal areas. The ASR-11 provides surveillance coverage in terminal areas and as en route coverage gap filler.

The ASR-11 provides Moving Target Detection (MTD) processing for primary radar targets, monopulse SSR processing for beacon targets and weather intensity mapping. The system outputs correlated radar/beacon target reports and weather maps, in two or six intensity levels, to support air traffic control operations.

Seventy-two (72) ASR-11 systems are being procured including 65 FAA operational systems, five DOD operational systems and two support systems. The ASR-11 systems will replace all legacy ASR-7 systems and 28 ASR-8 systems. Effective October 2007, 34 sites are commissioned and operational in the National Airspace System (NAS). All 66 FAA systems have been procured and the remaining 32 systems are scheduled to be commissioned by September 2009.

Mechanism: Airport Surveillance Radar Model 11 Technology Refresh (ASR-11 TR) [7390]

The Airport Surveillance Radar Model 11 Technology Refresh (ASR-11 TR) segment funds ASR-11 digital radar systems technology refresh activities that will ensure the system continues to meet surveillance performance and maintenance requirements until 2025 or when a replacement radar is acquired.

The ASR-11 Technical Refresh Program will implement an Advanced Signal Data Process (ASDP) to address life cycle obsolescence risk as well as the known performance limitations associated with the existing Signal Data Process (SDP) portion of the ASR-11 system. ASDP also upgrades the existing ASR-11 SDP with newer technically advanced processor cards with more memory and faster processing speeds. The ASDP will perform the signal processing for primary radar target and weatherdata.

The ASR-11 Technical Refresh is scheduled to complete integration and testing at the FAA William J Hughes Technical Center (FAATC) and SPAWAR in Charleston, SC in 2008. Deployment is scheduled to start in 2009.

The ASR-11 Technical Refresh will be installed by FAA retrofit teams in a manner that minimizes operational impacts. Site sparing and updates to technical documentation will be included. Components replaced by the retrofit will be returned to the FAA Logistics Center (FAALC) for potential reuse as deployable spares.

The technology refresh will be implemented on 67 FAA and 5 DOD ASR-11 systems. Refer to Mechanism Identification (MID) Number 233 for an ASR-11 site list.

The ASR-11 Technology Refresh will impact the DOD Digital Airport Surveillance Radar (DASR) which shares configuration and maintenance with the FAA ASR-11. Therefore, the ASR-11 Technology Refresh would be implemented on the DOD DASR systems also. The DASR site listing is not provided.

Mechanism: Airport Surveillance Radar Model 7 (ASR-7) [234]

The Airport Surveillance Radar Model 7 (ASR-7) is a short-range (60 nautical miles (nmi)) analog radar system used to detect and report the presence and location of aircraft in a specific volume of airspace. It is used in conjunction with the Air Traffic Control Beacon Interrogator-Model 4 or Model 5 (ATCBI-4 or ATCBI-5) or Mode Select (Mode S).

All ASR-7 and co-located beacon systems will be replaced by the ASR-11 system by 2011. The ASR-7 will be decommissioned.

Mechanism: Airport Surveillance Radar Model 8 (ASR-8) [235]

The Airport Surveillance Radar Model 8 (ASR-8) is a short-range (60 nautical mile (nmi)), analog radar system used to detect and report the presence and location of aircraft in terminal and en route airspace. The ASR-8 uses a moving target indicator (MTI) processing and output target data in analog form. A few ASR-8 systems are integrated with a collocated digitizing processor to provide a digital output.

The ASR-8 is used in conjunction with the Air Traffic Control Beacon Interrogator Models 5 (ATCBI-5) or Mode Select (Mode S). Only sites with the collocated digitizer provide correlated radar/beacon data in a digital output.

There are thirty-eight operational and two support ASR-8 radar systems in the NAS. These ASR-8 systems have exceeded their planned service life. Efforts are on-going to manage obsolete and aging parts to sustain the ASR-8. A Service Life Extension Program (SLEP) is being considered to sustain service at the ASR-8 facilities.

Mechanism: Airport Surveillance Radar Model 8 Service Life Extension Program (ASR-8 SLEP) [7582]

The Airport Surveillance Radar Model 8 (ASR-8) Service Life Extension Program (SLEP) project is required to extend the service life of the ASR-8 systems which are exceeding their service life. The SLEP will ensure that the ASR-8 systems maintain current supportability and performance requirements for primary radar services, at thirty-eight sites, through 2025 in support of the NAS Architecture Roadmap. The SLEP will also upgrade two support systems. Alternative approaches for the SLEP will address Diminishing Manufacturing Source (DMS), and maintenance and performance including high failure rate components; replacement of major processor and transceiver component; and system replacement.

ASR-8 is a short-range (60 nautical mile (nmi)), analog radar system used to detect and report the presence and location of aircraft in terminal and en route (gap filler) airspace. The ASR-8 uses a moving target indicator (MTI) processing and output target data in analog form. A few ASR-8 systems are integrated with a collocated digitizing processor to provide a digital output.

ASR-8 systems collocated with the Air Traffic Control Beacon Interrogator Models 5 (ATCBI-5) or Mode Select (Mode S) beacon systems. Sites with the collocated digitizer currently provide correlated radar/beacon data in a digital output. After the SLEP is impplemented, all ASR-8 systems will have the capability to output data in the ASR-9 Common Digitizer (ASR-9/CD). ASTERIX formatted data will be available if requirements are defined in Decision Point #102.

There are thirty-eight operational and two support ASR-8 radar systems in the NAS. A site listing is provided in Mechanism number 235, which shows the ASR-8 location baseline.

The JRC 2A (IID) and 2b (FID)will be delayed. Revised dates will be provided later.

Mechanism: Airport Surveillance Radar Model 9 (ASR-9) [236]

The Airport Surveillance Radar Model 9 (ASR-9) is a short-range (60 nmi) radar system used for terminal area and en route gap filler surveillance. The ASR-9 processes the radio frequency (RF) returns using a moving target detection (MTD) function to extract surveillance target and weather contour data. The MTD offers improved detection over multiple Doppler frequencies over traditional moving target indicator (MTI) processing.

The ASR-9 weather channel is capable of producing two or six level weather contour mapping. This data is provided to Air Traffic Control display systems. A separate Weather System Processor (WSP) is interfaced to the ASR-9 to extract surveillance data. ASR-9 weather channel and WSP data is input to the Integrated Terminal Weather System (ITWS). The ASR weather channel data may be used to supplement Next Generation Weather Radar (NEXRAD) coverage.

The ASR-9 is collocated and interfaces to Mode Select (Mode S) or Air Traffic Control Beacon Interrogator Model 5 (ATCBI-5) systems to produce correlated radar/beacon surveillance data.

There are 125 FAA and 10 Department of Defense systems. Many DOD systems are integrated into the NAS to supplement coverage requirements. The ASR-9 will be upgraded using Service Life Extension Programs (SLEP) to ensure that it continues to meet maintenance and performance requirements. A decision is planned 2007 for a SLEP to address high failure parts, receiver modifications and parts for which there are diminishing source or suppliers.

Mechanism: Airport Surveillance Radar Model 9 (ASR-9) Service Life Extension Program (SLEP) Phase 2 (ASR-9 SLEP Phase 2) [7611]

The Airport Surveillance Radar Model 9 (ASR-9) Service Life Extension Program (SLEP) Phase 2 program is required to maintain current maintenance supportability and performance requirements for primary radar services. The SLEP will provide service life extension upgrades to address issues with parts obsolescence, diminishing supply sources and high failure rate parts. The ASR-9 SLEP Phase 2 will be funded as CIP# S03.01-06.

The ASR-9 SLEP Phase 2 will be implemented at up to 119 terminal sites and six support systems. Ten DOD ASR-9 systems will also be impacted. A decision will be made on sustaining or replacing the terminal primary radar systems in 2011. Refer to Mechanism Identification (MID) Number 236 for an ASR-9 site list.

Mechanism: Airport Surveillance Radar Model 9 and Mode Select SLEP (ASR-9/Mode S SLEP) [1683]

ASR-9 and Mode S Service Life Extension Programs (ASR-9/Mode S SLEP) are intended to extend their effective service life and address maintenance support issues.

ASR-9/Mode S SLEP Phase 1A was approved by the JRC in September 2004. This SLEP includes modifications to the antenna on the primary surveillance radar and control and monitoring subsystems on the secondary radar, Mode-S, and the primary radar. Additionally, we are replacing the waveguide and install oil splash shields and leveling bolt kits at all 135 sites. The antenna modifications, waveguide, and oil splash kits have been fielded at 80 sites and are currently being implemented at the rate of eight (8) per month. Installations will be completed in early FY2008.

ASR-9/Mode S SLEP Phase 1B was approved by the JRC in June 2005. This SLEP addresses high failure components within the ASR-9 transmitter. Currently, six first article systems have been built and key site installation was completed in May 2007. Full production installation will begin in December 2007 and will complete in FY2009.

The Remote Maintenance Systems (RMS) implementation, started in 2005, will be completed in FY2007. The ASR-9/Mode S SLEP Phase 1 is scheduled to be completed in 2009.

The ASR-9 and Mode S systems will have separate SLEP for phase 2. Current plans are to implement SLEP improvements to sustain the ASR-9 until 2027 and the Mode S until 2025. A decision will be made in 2011 as to replacement of these systems with new primary and beacon radar systems.

Mechanism: Airport Surveillance Radar, Military (GPN-20) [2028]

The GPN-20 radar is a military short-range (60 nautical miles (nmi)) analog radar system used to detect and report the presence and location of aircraft in a specific volume of airspace. The GPN-20 is the military version of the FAA's Airport Surveillance Radar Model 8 (ASR-8). It is used in conjunction with the TPX-42 military beacon (identify friend or foe (IFF)) or Air Traffic Control Beacon Interrogator model 5 (ATCBI-5) or ATCBI-4. The GPN-20 and collocated beacon may output surveillance data on separate analog outputs. A Common Digitizer Model 2 (CD-2) digitizing processor is integrated at some sites to provide a correlated primary/secondary target report.

DOD is currently deploying the Digital Airport Surveillance Radar (DASR) to replace the aging GPN-20 radars. The DOD replacement schedule may be is not available. DASR systems are addressed in MID 2004.

Mechanism: Digital Airport Surveillance Radar (DASR) [2004]

The Digital Airport Surveillance Radar (DASR) provides advanced digital primary radar including weather intensity surveillance with an integrated monopulse Secondary Surveillance Radar (SSR) system for use in the airport terminal area. DASR is a military version of the Airport Surveillance Radar Model 11 (ASR-11). Some DASR systems will provide surveillance data to support FAA Air Traffic Control operations.

DOD has procured approximately one hundred and five (105) DASR systems. DASR deployments are managed by DOD. Five DOD DASR systems have a duplicate listing on the FAA ASR-11 site list. Deployment for these five DASR systems, including Pensecola- Whiting Field, Willow Grove NAS, Edwards AFB - High Desert, Velvet Peak and Panamint Valley, are tracked by the FAA.

DASR systems at NAS Oceana, Dobbins AFB and McGuire AFB DASR interface to the NAS.

A common configuration will be maintained for ASR-11 and selected DASR systems. The ASR-11 Technology Refresh modifications will be implemented in these DASR systems.

Mechanism: Fixed Position Surveillance Model 117 (FPS-117) [557]

The Fixed Position Surveillance Model 117 (FPS-117) radar is a joint-use military surveillance system used by the FAA to detect slant range and azimuth of en route aircraft. These radars are located in Alaska (12) and Hawaii (1), and are expected to be sustained until at least 2020.

Twelve FPS-117 radar and collocated beacon system provide a correlated radar/beacon target output in digital format to the NAS. Another system at Mt Kokee, HI is capable of providing data to the NAS.

THE FPS-117 systems will be sustained by DOD until a decision is made on a new surveillance system replacement.

Mechanism: Fixed Position Surveillance Model 20 Series (FPS-20 Series) [242]

The Fixed Position Surveillance Model 20 Series (FPS-20 Series) is a military primary radar of various models (FPS-20A, FPS-64, FPS-66A, FPS-67/A/B, and ARSR-60M) used by the FAA to detect slant range and azimuth of en route aircraft operating between terminals in the continental United States. Each of the different radar models is a similar variation of the original FPS-20 military radar. These performanance and maintainability for systems have been sustained through service life extension programs (SLEP).

FPS-20 radars are integrated with digitizer processors and collocated ATCBI-6 amd Mode S beacon systems to provide a correlated search/beacon digital ouptut. Twenty-one FPS systems are interfaced to the NAS. An additional DOD system at Tinker AFB may interface to the NAS.

Mechanism: Long Range Radar Infrastructure Upgrades (LRR Infrastructure Upgrades) [6825]

The Long Range Radar (LRR) Infrastructure upgrades or replaces critical infrastructure systems at all LRR facilities. LRR facilities have co-located primary and secondary (beacon) systems. Long-range radar assets include the Air Route Surveillance Radar Models 1E, 2, 3, and 4 (ARSR-1E, ARSR-2, ARSR-3, ARSR-4), and Fixed Position Surveillance (FPS) radars provide en route primary radar surveillance. LRR systems are colocated and integrated with either Air Traffic Control Beacon Interrogator (ATCBI-6) UPX-39 and OX-60 beacon systems to provide a correlated search/beacon data output.

Maintenance funding is provided through a cost sharing arrangement with Department of Defense (DoD) and Department of Homeland Security(DHS). The FAA will continue to provide operations and maintenance staffing for LRR systems.

There are 267 LRR systems including integrated primary/secondary and beacon only facilities. These facilities are at CONUS and non-CONUS locations. Flat F&E funding levels are estimated at five million ($5M) per year for facility maintenance only through 2011 and beyond. Equipment funding is addressed by the ATCBI-6, New Beacon and DOD primary surveillance system procurement programs.

Decisions are planned for 2014 for limited en route and terminal replacement of legacy beacons (Mode S), and removal of remaining systems (Mode S) and 2024 for replacement of ATCBI-6 systems. These decision will impact funding needs for LRR facilities.

Mechanism: Low Cost Ground Surveillance (LCGS) (Low Cost Ground Surveillance (LCGS)) [7609]

The Low Cost Surface Surveillance (LCGS) system, managed under the Runway Incursion Reduction Program (RIRP), will evaluate alternatives low cost airport surface surveillance systems for operations at small to medium-sized airports. LCGS is to provide scalable and adaptable coverage of airport areas. Coverage may be extended to include user-specified regions, such as runways, taxiways, and ramp areas, or an entire airport movement area.

Benefits provided by LCGS include detection of aircraft and surface vehicles on the airport area during periods of low visibility due to environmental conditions such as heavy precipitation, snow, fog and icing.

Currently, the LCGS program plans to conduct a pilot program to evaluate candidate technologies. LCGS alternatives will be evaluated against criteria for performance, safety, maintainability and cost effectiveness.

Cost/benefit analysis will be performed to identify airport that will benefit from LCGS service. A site listing will be provided when the cost/benefit analysis is mature.

Mechanism: New Primary Radar (New Primary Radar) [7519]

The ADS-B Backup Strategy, completed January 2007, recommends retaining terminal primary radar service at sites that currently have ASR systems.

A decision will be made on implementation of next generation primary radar system in 2011. The next generation primary radar would be implemented at selected terminal sites based on the ADS-B backup strategy, air traffic safety, security and weather data requirements. Current plans are that the New Primary Radar would replace approximately 39 ASR-8 and 121 ASR-9 radar systems.

A decision on replacing the ASR-8 and ASR-9 is planned for 2014. A separate decision is planned for replacement of the ASR-11 in 2024.

Approximately 246 ASR sites would be evaluated for possible ASR replacement. Replacement requirements will be evaluated based on service life of existing systems, supportability, performance and new requirements.

The New Primary Radar may implement weather requirements depending on an Investment Decision in 2018 as to whether to SLEP 1) Wind Shear systems, 2) ASR-9/11 Wx Channel and 3) NEXRAD or replace them with a NextGen Wx Surveillance Capability.

Mechanism: New Primary Surveillance System (New Primary Surveillance System) [245]

The New Primary Surveillance System is a conceptual system that would be implemented in 2018. It would provide the capability to replace terminal radar systems with Next Generation (NEXTGEN) radars that incorporates primary and secondary surveillance functions and enhanced Doppler weather surveillance capabilities.

Requirements for new systems will be evaluated based on service life of existing primary and secondary radar systems, evaluation of new radar technologies and aviation security requirements.

Mechanism: Runway Status Lights (RWSL) [6853]

Runway Status Light (RWSL) system uses surveillance data from airport surveillance sensors Airport Surface Detection Equipment Model X (ASDE-X), ASDE-3, and Airport Surveillance Radar Model (ASR) as input to runway lighting safety logic to improve pilot situational awareness in the airport operating areas. The RWSL program accepts fused surface radar and multi-lateration surveillance inputs to activate lights at runway/taxiway intersection points and runway take-off hold areas to help prevent collisions or reduce the severity of runway incursions.

The system includes two types of in-pavement lighting indicators to improve situational awareness. The first type of lighting indicators are Runway Entrance Lights (REL) which advise pilots when the runway is unsafe for entry or crossing at that location. The second type of lighting indicators are Take-off Hold Lights (THL) which provide a indication to pilots whether a runway is safe to enter or traverse due to traffic on the runway or about to enter the runway.

The RWSL system will be installed at 19 ASDE-X airports. Support systems will be installed at the Program Support Facility (PSF) and the Training Academy. The system will incorporate airport-adaptable safety software and commercial off-the-shelf (COTS) airfield lighting equipment at selected airport locations. The safety logic and COTS lighting systems configured as required by the runway configuration at each airport.

ATO-P will evaluate applications using Final Approach Runway Occupancy Signal (FAROS) and Runway Intersection Lighting (RIL) as potential configurations.