ORDER

6000.37

PROJECT IMPLEMENTATION PLAN FOR THE MAINTENANCE MANAGEMENT SYSTEM (MMS)

MAY 23, 1991

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

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FOREWORD

This order directs affected Federal Aviation Administration (FAA) organizations to take the action necessary to implement the Maintenance Management System (MMS). It identifies all activities, schedules, and funding sources required/available to accomplish this implementation. Implementation of MMS is part of Capital Investment Plan (CIP) Project 26-01, Remote Maintenance Monitoring System. Management responsibility for this project has been assigned to Automation Engineering Division, ANA-100; support and coordination by other identified organizations is essential to successful implementation of this system.

Rondel Lipps
Program Manager for Maintenance Automation

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CHAPTER 1. GENERAL

1. PURPOSE. This order presents overall guidance and direction for the orderly development and implementation of the Maintenance Management System (MMS) at Air Route Traffic Control Center (ARTCC) and General National Airspace System (GNAS) sectors of the Federal Aviation Administration (FAA). This order establishes program management requirements, project implementation, and defines the responsibilities governing the activities of involved organizations. The order also identifies and describes specific events and activities to be accomplished in order to implement MMS.

2. DISTRIBUTION. This order is distributed at director level to the office of the Program Directors for Automation, Surveillance, Navigation and Landing, and Communications and Aircraft Acquisition; Systems Maintenance, NAS Transition and Implementation, NAS Program Management, and the NAS System Engineering Services; offices of System Capacity and Requirements, and Training and Higher Education; director level at the FAA Technical Center (ACT); branch level to the Airway Facilities (AF) divisions, and limited distribution to the AF field offices.

3. DEFINITIONS. The acronyms used in this order are identified in appendix 1.

4. AUTHORITY TO CHANGE THIS ORDER.

a. Authority. The Program Manager for Maintenance Automation, ANA-200, has the authority to change this order.

b. Applicability. The information contained in this order shall be used by FAA offices, services, regions, Mike Monroney Aeronautical Center (AAC), ACT, National Field Support Sectors, and contractor personnel for accomplishing their support of the MMS software implementation activities. The guidance and schedule information contained herein shall form the framework for these organizations in the more detailed planning activities required at the regional and field levels. Deviations from this order must be approved by the Program Manager for Maintenance Automation, ANA-200.

c. Duration. The duration of the program shall continue through the last MMS software component's Operational Readiness Demonstration (ORD).

5.-19. RESERVED.

CHAPTER 2. PROJECT OVERVIEW

20. SYNOPSIS. The MMS is a software component of the Remote Maintenance Monitoring System (RMMS) and is central to the agency's plans for modernizing maintenance operations. MMS is hosted on the maintenance processor subsystem (MPS), which is currently deployed at all ARTCC's, FAA headquarters (ASM-270), FAA Academy (AAC-940), ACT (ASM-450, ACN-250, ACD-350), Mike Monroney Aeronautical Center (ASM-600), and nine GNAS sectors (Norfolk, Memphis, Dallas/Ft. Worth, Houston, Windsor-Locks, Detroit, Denver, Wichita, and Fairbanks). MMS will provide automated information support functions to AF specialists and managers in the performance of their duties. This support will be provided at facilities where specialists are stationed, as well as at remote, normally unattended facilities where specialists visit to perform maintenance tasks. The functions will provide for the collection, storage, and access to facility and maintenance data at maintenance sectors, work centers, maintenance control centers (MCC), regional offices, and select FAA support and headquarters organizations by authorized personnel. MMS compliments the other major component of RMMS, the Interim Monitor and Control Software (IMCS), which allows authorized personnel to perform real-time monitoring, control and certification of both local and remote facilities. A full description of the RMMS is contained in FAA-E-2782, RMMS Core System/Segment Specification.

a. MMS Scope. The MMS is oriented towards providing automated support for facility maintenance logging requirements; replacing all or parts of several national systems (e.g., National Airspace Performance Reporting System (NAPRS)); providing automated recordkeeping capabilities for additional functions such as technical inspections, test equipment tracking and field stock control; providing data selection, reporting, and downloading capabilities in support of performance reporting and trend analysis; and supporting data exchange between MMS and other related FAA management information systems (MIS) either in existence or planned. MMS will satisfy the FAA maintenance support requirements specified in FAA-E-2734, MMS (A-Level) System Specification (Requirements), and will be developed using a phased approach.

b. MMS Phases. The FAA will develop MMS in an evolutionary manner consisting of three distinct phases. Phase 1 is oriented towards supporting the logging requirements associated with Order 6000.15B, General Maintenance Handbook for Airway Facilities; and initiating the transition process from existing

national systems. Phase 2 is oriented towards automation of additional recordkeeping functions and the development of automated interfaces between MMS and other FAA MIS's. Phase 3 provides for enhancements to the capabilities developed during the initial phases, as well as for the development of additional capabilities approved through the FAA configuration management process as outlined in Order 1800.8E, National Airspace System (NAS) Configuration Management.

c. MMS National Releases. The FAA will deploy MMS through a series of national releases. Deployment will proceed in accordance with existing guidelines as outlined in governing FAA orders. Six national releases of MMS are envisioned. Releases 01 and 02 will address MMS Phase 1 capabilities. Releases 03, 04, 05, and 06 will address Phase 2 capabilities. Each release, after 01, will also provide corrections and enhancements to the previous release.

d. Software Development Methodology. MMS software development will proceed in accordance with the FAA's adaptation of DOD-STD-2167A, DOD Software Development Standards. The development process will utilize evolutionary prototyping and development techniques to minimize risk and achieve the intended project objectives in a manner acceptable to the end user. Field involvement in all aspects of this project is an essential element in the MMS software development methodology.

21. PURPOSE. The FAA's modern maintenance concept for the NAS specifies improved work force utilization, productivity, and quality of worklife as fundamental objectives. In support of these objectives, the MMS project seeks to reduce the costs and improve the effectiveness of maintaining NAS services, facilities and equipment. These objectives will be accomplished in MMS' three developmental phases, as follows:

a. Phase 1 includes provisions for:

(1) Timely and accurate facility maintenance logging of data and information in order to facilitate decisionmaking by management.

(2) Uniform reporting of service and facility interruptions and equipment failures; and initial data downloading capabilities.

(3) Timely maintenance by field specialists of the facility, service, equipment, and power systems data bases.

(4) Timely maintenance by regional office personnel of the precommissioned facility file data.

(5) A baseline for follow-on MMS enhancements.

b. Phase 2 includes provisions for:

(1) Consolidation and automation of numerous manual and semi-automated sector/regional maintenance operations systems into a single environment.

(2) Electronic interchange of NAS configuration and status information between MMS and other FAA related systems (e.g., Program Management System (PMS)).

(3) Enhanced data downloading capabilities in support of performance and trend analysis as well as local reporting.

c. Phase 3 includes provisions for:

(1) An official vehicle for incorporating new capabilities into the MMS software in accordance with field feedback.

(2) Improvement of existing capabilities in accordance with field feedback.

(3) Changes to the MMS software to accommodate changes in operating systems, hardware revision levels, and other systems with which MMS interfaces.

22. HISTORY. The origins of MMS go back to the mid-70's when the AF was assessing future changes in the NAS and reassessing its maintenance philosophy and concept in order to successfully respond to those changes.

a. Preparations for a New Maintenance Approach. In 1976, the AF commissioned a Maintenance Philosophy Steering Group (MPSG) made up of regional and headquarters division managers and assistant division managers. This group was to assess the changes that could be expected in the NAS from 1980 to 1990; assess the applicability of the current NAS maintenance philosophy to that system; and develop a maintenance concept suitable for the system expected in operation during this period. The results of this effort are documented in Order 6000.27A, Transmittal of the Maintenance Philosophy Steering Group (MPSG) Report. This order describes the 80's Maintenance Concept and

set the FAA on a course of modernizing the maintenance operations associated with NAS facilities. Updates to the MPSG report have provided further definition of this effort, and it became known as the 80's Maintenance Program.

(1) NAS Maintenance Program Concept. In 1980, after a review of the NAS, FAA chartered the comprehensive NAS Plan for modernizing and improving air traffic control and airway services from 1981 to the year 2000. A later revision to this plan addressed improvements in the areas of safety, capacity, productivity, and economy through higher levels of automation, consolidating maintenance operations, and applying state-of-the-art technology in telecommunications. This was followed by the issuance of Order 6000.27A, which established the basic concept for implementing the 80's Maintenance Program.

(2) Requirements and Prototype Development. During the early 1980's various contractors worked with the FAA to develop the operational requirements and functional specifications for various RMMS components. Several software prototype efforts were also carried out in advance of full scale system development and deployment.

(3) Program Concept Updated. In 1988, a second Maintenance Philosophy Steering Group (MPSG II) prepared an update to the original Order 6000.27A. This revision, Order 6000.27B, reflects an update of the original effort based upon the results of a continuing review of expected NAS changes.

b. The Maintenance Management System evolved from the Airway Facilities Service's recognition that the new maintenance concept necessitated by a more modernized NAS would require a new MMS to properly support that concept.

(1) Requirements Document. In February 1984, the FAA released FAA-E-2734. This document defined the operational, performance, and application requirements for the MMS components of the RMMS.

(2) Development Agreement. In April 1984, the FAA entered into an agreement with the John A. Volpe National Transportation Systems Center (VNTSC), Department of Transportation (DOT), Cambridge, MA, to develop the MMS capabilities of the RMMS.

(3) Initial Prototype. In January 1985, the FAA released the initial MMS testbed prototype to selected key sites for evaluation purposes.

(4) Testbed Release. In December 1985, the FAA released MMS testbed version 3.3 to selected key sites for a full scale operational evaluation and to all MPS sites for use in building locally constructed data bases. A description of MMS Phase 1 testbed activities, including the testbed evaluation process and field evaluation results, can be found in appendix 3.

(5) Release 01 to All Sites. In October 1987, ASM-450 released the MMS version 01 for use at MPS sites for interruption reporting/logging, corrective maintenance logging, and preventative maintenance scheduling and logging. Full operational use was tied to hardware and communication line availability.

23.-29. RESERVED.

CHAPTER 3. PROJECT DESCRIPTION

30. FUNCTIONAL DESCRIPTION. The functional requirements associated with MMS are described in FAA-E-2734. This provides the next level of detail for requirements allocated to MMS as described in NAS-SS-1000, NAS System Specification, Volume 5, dated December 1986. Further detail will be provided in the MMS Software Requirements Specification (SRS), currently being developed. The following paragraphs provide a brief functional description of the MMS.

a. MMS Overview. MMS will provide automated services aimed at improving the effectiveness and efficiency with which AF maintenance specialists and management officials perform their work. These automated services will be provided to FAA personnel via terminals at:

(1) Maintenance work centers, ARTCC's, MCC's, and sector, regional and national field support offices where specialists and supervisory personnel normally are stationed.

(2) Remote or normally unmanned facility sites, equipped with communication lines, that must be visited by specialists to perform scheduled and unscheduled maintenance duties.

(3) FAA headquarters primarily in support of national data file queries, analytical studies, and recurring reports to management.

Access to MMS shall be restricted to authorized personnel through the use of appropriate security techniques and procedures, as documented in appropriate RMMS and MMS security orders currently being developed.

b. MMS Functional Requirements. The maintenance functions to be supported by MMS automated services fall into three application areas: maintenance operations, performance monitoring and reporting, and configuration and status.

(1) Maintenance Operations capabilities shall provide the user with an automated log for recording scheduled and unscheduled facility maintenance activities, a means for scheduling and tracking periodic maintenance (PM) activities, and a means for scheduling, tracking, and recording facility and equipment certification activities.

Other applications to be supported in this area include modification tracking, field stock control, test equipment inventory, hardware discrepancy reports (HDR), program technical reports (PTR), inspection records and personnel training and certification.

(2) Performance monitoring and reporting capabilities shall provide the user with support for collecting, recording, and disseminating information on interruptions and outages that need to be reported outside of MMS for upward reporting required by the FAA, and for performance analysis.

(3) Configuration and status capabilities shall provide automated support for the creation and maintenance of the facility, service and equipment profile (FSEP) required to support local maintenance activities, national analysis efforts, and the national staffing standards process. A more detailed list of the functions associated with each area appears in figure 3-1.

c. Replacement of Existing National Systems/Files. The automated capabilities to be provided by MMS software will incorporate, enhance and replace the services performed by, or associated with, three existing AF national systems and two files. The NAPRS replacement will not include the data collection analysis and reporting of Air Traffic counts and delays. These systems and files are:

(1) Maintenance Automation Reporting System (MARS).

(2) National Airspace Performance Reporting System (NAPRS).

(3) Power Distribution System (PDS).

(4) Facilities Master File (FMF).

(5) Precommissioned Facilities File (PFF).

d. The MMS Operating Environment is composed of processors, terminals, a communications network and data bases:

(1) Maintenance Processors. MMS applications software will execute on MPS hardware procured as part of the RMMS program and deployed at ARTCC's, AF headquarters, and national field support offices in accordance with Order 6140.15, Project Implementation Plan for the Maintenance Processor Subsystem (MPS) Enhancements.

Access to MMS capabilities will be via maintenance data terminals connected to each MPS either directly or over communications lines. The MPS is described in detail in FAA-E-2782.

(2) Maintenance Data Terminals (MDT). MDT's will be located at national, regional and sector offices, sector work centers, and manned facility sites. Each MDT will be equipped with the necessary hardware, software, and printer functionality necessary to support MMS usage. Portable MDT's (PMDT) will be carried by specialists to remote facilities in order to provide MMS services onsite in support of maintenance activities. Initially, communication services will be required at any MDT location remote from an MPS in order to access the MMS. Technical guidance and direction for implementing MDT's in the RMMS are described in Order 6000.34A, Project Implementation Plan for the Remote Maintenance Monitoring System Maintenance Data Terminals (MDT).

FIGURE 3-1. MAINTENANCE FUNCTIONS SUPPORTED BY MMS (by Application Area)

Maintenance Operations
- Facility Maintenance Log
- Periodic Maintenance
- Facility, Equipment and Service Certification
- Miscellaneous Activity Scheduling
- Field Stock Control
- Test Equipment Tracking and Calibration
- Hardware Discrepancy and Program Technical Reports
- Maintenance Projects
- Inspection Records
- Personnel Training and Certification

Performance Monitoring
- Performance Reporting
- Performance Monitoring Data Downloading

Configuration and Status
- Facility, Service, and Equipment Profile (including engine generator)
- Site Description and Site Peculiar Information
- Modifications
- Configuration Control Decisions
- Problem Resolution

(3) The communication network utilized by MMS consists of the interconnected MPS's and the MDT's connected to their assigned MPS's either directly or over communication lines:

(a) MPS to MPS Communication Functions.

1. Initial support of MMS users will be provided by the existing MPS communications network. This network joins the MPS's together in a ring-like structure with 2400 bps circuits. This structure is supplemented with 9600 bps leased point-to-point circuits between the network's executive node at AF headquarters and four other nodes. Figure 3-2, Existing MPS to MPS Communications Architecture, illustrates this network.

2. Future support of MMS users will be provided by a new MPS to MPS communication network that is planned for implementation. The new network will upgrade the present MPS to MPS circuits from 2400 to 9600 bps. Five MPS to headquarters circuits will provide 19.6 kbps service. Any MPS not directly on a 19.6 kbps circuit may gain access to it by one 9600 bps hop. Figure 3-3 illustrates the new network. Implementation of this network will coincide with the national data multiplexing network (DMN) project implementation schedule. This schedule will be published in the DMN Project Implementation Plan being developed by the Office of the Associate Program Manager for Engineering, Interfacility Communications Program, ANC-140.

(b) MDT to MPS communication functions in support of MMS users will be provided through the use of dial-up lines and existing or planned FAA projects providing equipment and lines for communication services at the national, regional, and sector level. Each sector office will be provided access to its assigned MPS using DMN equipment. This equipment has been installed as part of Phase II of the DMN project. MPS access for other sector locations (e.g., sector field offices, work centers) will be provided through equipment installed during 1990 as part of Phase III of the DMN project.

(4) MMS Data Base Distribution. Each sector MPS will maintain the data base (e.g., facility maintenance logs, line frequency tables) for the area of its jurisdiction (i.e., an ARTCC and its supported GNAS sectors). National MMS data bases will be maintained on the executive node MPS at FAA headquarters. The executive node will also provide national level MMS processing functions. Figure 3-4 identifies the regional MPS sites. Each AXX-400 is responsible for assigning non-MPS sectors in the region to an MPS site for access to MMS.

FIGURE 3-2. EXISTING MPS to MPS COMMUNICATIONS ARCHITECTURE

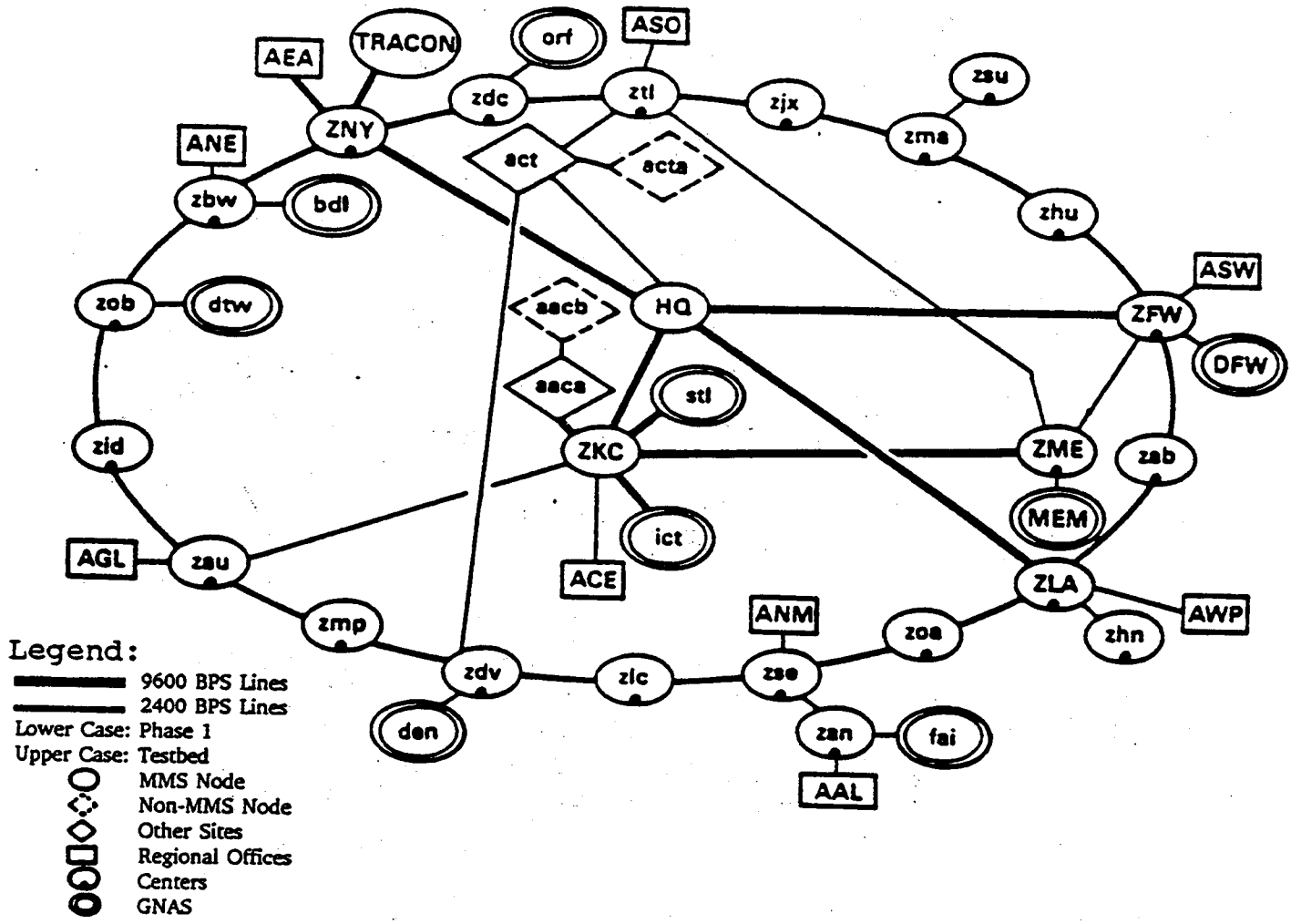

FIGURE 3-3. FUTURE MPS TO MPS COMMUNICATIONS ARCHITECTURE

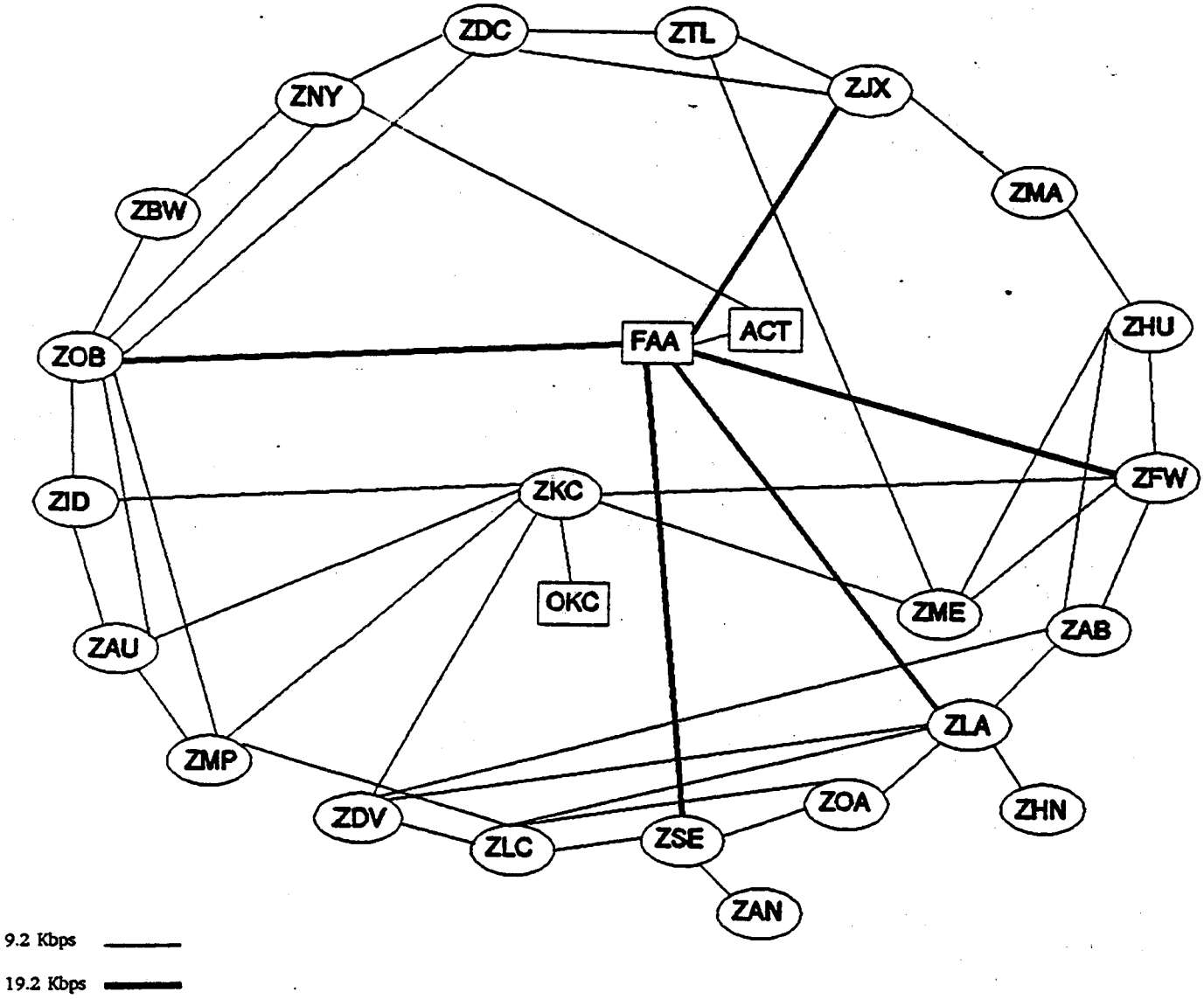

FIGURE 3-4. REGIONAL MPS SUPPORT SITES

Alaskan Region	Anchorage ARTCC
Central Region	Kansas City ARTCC
Eastern Region	New York ARTCC
Great Lakes Region	Chicago ARTCC
New England Region	Boston ARTCC
Northwest Mountain Region	Seattle ARTCC
Southern Region	Atlanta ARTCC
Southwest Region	Ft. Worth ARTCC
Western Pacific Region	Los Angeles ARTCC

31. PHYSICAL DESCRIPTION. Implementation of MMS software will have no impact on the physical environment at a regional office, ARTCC, GNAS sector office, facility, or work center. Therefore, this paragraph is limited to information pertaining to the physical characteristics of the equipment associated with the hardware, terminal, and communications functions provided by other projects, but utilized in support of the MMS. The following paragraphs delineate the sources for this information.

a. MPS Hardware Configurations. The MPS hardware platform, on which MMS will reside, consists of Tandem Corporation NonStop Model TXP and NSII computers. These computers are designed to support continuous on-line transaction processing applications in a fault tolerant environment. Further information including the physical characteristics of each MPS hardware component and the physical layout at each site is contained in Order 6140.15, chapter 3 and appendixes 3, 4, and 5.

b. MDT Hardware Configuration. The MDT physical characteristics will be defined in electronic equipment modifications (EEM) provided to field sites prior to MDT distribution. Typical configurations are provided in Order 6000.34A.

c. Communication Configurations.

(1) Communication support for MDT's will be based on the evolving DMN. As such, MMS will share communications being provided for support of computer based instruction (CBI) and the Traffic Management System (TMS). Dial-ups will be available where service is not provided by this net. Phase II of the DMN placed statistical time division multiplexing (STDM) equipment in the field sufficient to support initial connectivity requirements of regional and sector office.

configurations. Phase III of the DMN, scheduled for contract award in the second quarter of FY90, will provide the remainder of the equipment required to extend terminal support to sector work center locations.

(2) Delivery of the Phase II DMN STDM equipment was made to the ARTCC designated as support for each GNAS sector or regional office. Follow on activities required to complete network installation have been identified and will be the subject of the MMS Terminal Communications Project Implementation Plan, currently being developed.

32. SYSTEM REQUIREMENTS. This paragraph is not applicable to the implementation of MMS software. MMS implementation does not place any additional system requirements on NAS facilities.

33. INTERFACES. This paragraph delineates the major software system interfaces affecting MMS implementation. Figure 3-5 identifies the software systems with which MMS is to share data, and the organizations responsible for each system. The IMCS interface is an internal MPS interface while the others involve non-MPS hardware platforms. The following paragraphs provide brief descriptions of each system to which MMS will interface. Complete functional and physical interface definitions will be provided in an MMS interface design document to be developed for each of the systems listed in figure 3-5.

FIGURE 3-5. MMS SYSTEM INTERFACES

System	Responsible Organization
Interim Monitor and Control Software	ANA-100
Logistics and Inventory System	AAC-400
Consolidated Personnel Management Information System	APN-100
Program Management System	ASM-200/SEI
Personal Property In-Use Management System	ALG-220
National Airspace Performance Analysis System	ASM-110
National Flight Data Center	ATM-600
Aircraft Management Information System/ Automatic Flight Inspection System	AVN/AAC

a. Interim Monitor and Control Software (IMCS) performs status and alarm collection and reporting, remote control, initiation of diagnostics, and on-line data recording. When requested by a user, MMS extracts data resident in IMCS data files to create facility maintenance log entries. This includes data pertaining to alarm conditions, to facility or equipment configuration or status changes accomplished via remote command, and to remotely-performed diagnostics.

b. Logistics and Inventory System (LIS). The MMS interface to the FAA Logistics Center in Oklahoma City, Oklahoma, will be through LIS. The specific capabilities of this interface are yet to be determined.

c. Consolidated Personnel Management Information System (CPMIS). MMS will receive from CPMIS training history data pertaining to personnel who are responsible for the maintenance of NAS facilities and equipment. This data will be used to determine the availability of specialists in a specific region or sector who are trained to perform maintenance on a particular type of equipment. It will also be used to automate the sector level specialist certification program. This will support identification of inadequacies for potential resolution by region and sector management.

d. Program Management System (PMS). The PMS integrates a majority of FAA headquarters NAS projects into a single data base source system located at the System Engineering and Integration (SEI) contractor facility in Washington, D.C. PMS is accessible by all headquarters offices via dedicated terminals, and by regions and centers via microcomputers. Personnel having the necessary equipment and authority to access PMS can review summary level PMS data related to the status and milestones of NAS projects. The PMS will receive from MMS FSEP extracts, which it requires to maintain the currency of its data base, and data pertaining to EEM's and serial number changes. The PMS will provide MMS with data necessary to support selected MMS Phase 2 functional capabilities.

e. Personal Property In-Use Management System (PPIMS). PPIMS will transmit data to MMS in order to identify test equipment that is added to or deleted from NAS.

f. National Airspace Performance Analysis System (NASPAS). MMS will provide performance analysis data extracts to NASPAS. This data downloading capability will support the facility performance and trend analysis capabilities within NASPAS.

g. National Flight Data Center (NFDC). The NFDC will receive notification of service and facility status changes (e.g., commissionings, decommissionings) from MMS. The NFDC requires this information so that it may generate new, modify existing, or eliminate obsolete Flight Information Publications (e.g., approach plates, en route and terminal area charts).

h. Aircraft Management Information System (AMIS)/Automatic Flight Inspection System (AFIS). MMS will receive flight inspection schedules from AMIS/AFIS. The results of flight inspections will be entered into MMS via the facility maintenance log and/or capabilities provided in support of MMS Phase 2 inspection requirements. AMIS/AFIS users will be able to query MMS in order to generate reports regarding the performance and outcome of both scheduled and unscheduled flight inspections.

34. AF USERS OF MMS. The functional capabilities of MMS will be used by FAA personnel at all levels within the AF organization. The following subparagraphs provide brief descriptions of MMS usage for each AF MMS user organization.

a. Associate Administrator for Airway Facilities (AAF). AAF users include Systems Maintenance Service (ASM) and NAS Transition and Implementation Service (ANS). AAF users query MMS for standard and ad hoc reports as required. Their primary requirements from MMS are for facility and service interruption reports, equipment failure reports, and FSEP data.

b. MMS National Data Base Administrator (DBA) and Support Staff. The MMS National DBA is responsible for the configuration control of the MMS data base. Authorized sector personnel perform the actual ongoing maintenance of their respective data bases, but only the National DBA is authorized to modify the logical or physical configuration of the MMS data base. The National DBA and support staff will establish policy governing the assignment of user authorization codes. The National DBA will query MMS for standard and ad hoc reports as required. MMS DBA support staff will consist of Data Management Program (ASM-200) analysts with a detailed knowledge of the MMS data base and a thorough understanding of MMS applications. Support staff will respond to special requests by MMS national users who require new or special reports, or who have questions regarding the use of MMS.

c. Regional Offices. Regional office users will query regional MPS's for standard and ad hoc reports as required. They also will use MMS to review FSEP changes, interruptions/outages,

and other items entered into the MMS data base, that require regional office review and/or evaluation. Users may update any appropriate status fields for these items in the MMS data base to indicate their disposition. Regional office users will also be the primary users for a number of Phase 2 capabilities. MMS, for example, may receive technical evaluation schedules and the results of technical evaluations from regional office personnel.

d. Center Sectors, GNAS Sectors, and Field Sites. Center sector, GNAS sector, and field site AF employees will utilize many MMS capabilities on a daily basis. Field personnel will, as outlined in governing orders (e.g., Order 6000.15B) and policy directives, enter data into MMS. Examples of such data include facility maintenance log entries, PTR's, HDR's, schedule updates, FSEP updates, and other maintenance-related information. Users will query MMS for standard and ad hoc reports as required. Users will receive configuration management reports, maintenance alerts, modification specifications and other problem-related documentation.

e. Engineering Field Support Sector (EFSS). The EFSS is composed of the National Automation EFSS (ASM-450) and the National Airway EFSS (ASM-600). ASM-450 is responsible for automated facility and equipment modifications, and receives PTR's and HDR's pertaining to automated facilities and equipment from MMS. ASM-600 is responsible for non-automated facility and equipment modifications, and will receive hardware discrepancies for non-automated facilities and equipment from MMS. The EFSS is responsible for the determination of solutions to problems affecting NAS services, facilities, and equipment. When a particular problem is resolved, the resolution is documented. This documentation will be provided to the MMS for subsequent dissemination to regional offices and the affected center sectors, GNAS sectors, and field sites. EFSS documentation presently includes plant equipment modifications (PEM), configuration control decisions (CCD), site technical bulletins (STB), and site program bulletins (SPB). Ultimately, this documentation may be accompanied by software patches and listings, handbook changes, new handbooks, FAA directives, and EEM's. EFSS personnel will query MMS for standard and ad hoc reports that enable them to determine the disposition of specific modifications, thereby providing the capability to track modifications through the various stages of implementation. Subsequent to evaluation, EFSS personnel will update the status of each submission in the MMS data base to indicate its disposition. Users will query MMS to review the status of their submissions and obtain EFSS feedback as to duplicates or known

solutions. EFSS personnel will also query MMS for data to download in support of trend analysis and interruption reports. These capabilities will be used to evaluate the performance of NAS services, facilities, and equipment.

f. FSEP Data Set Recipients. The national functionality of the systems that support the FMF, PDS, and PFF, and the data comprising these files, will be incorporated into MMS. The PDS was previously referred to as the engine generator profile (EGP). All recipients of national data sets and reports currently derived from these files will receive them from MMS.

35.-39. RESERVED.

CHAPTER 4. SCHEDULE

40. PROJECT SCHEDULES AND GENERAL STATUS. Summary milestone schedules encompassing program and project milestone activities are developed by the MMS Project Manager, ANA-120, maintained by the SEI, and controlled by the Program Manager for Maintenance Automation, ANA-200. Project milestones are reflected in terms of scheduled completion dates, current status date, and actual completion date. Project summary milestone schedules are reviewed bimonthly by the NAS Program Status Review Board (PSRB). The summary schedule associated with the MMS project forms the basis for deriving the schedules reflected in this order. If necessary, the schedule summarizing MMS implementation milestones will be updated periodically to reflect the latest MMS implementation milestones based on actual deployment of prior releases, national reprioritization decisions, and actual availability of requisite capabilities from other projects. Schedule changes will be implemented through the formal change process prescribed by the NAS Project Statusing and Baseline Schedule Change Control Procedures.

41. MILESTONE SCHEDULE SUMMARY. Figures 4-1 through 4-4 present an overview of the MMS schedule from several perspectives. Figure 4-1 presents overall project development steps tied to each major MMS national release. Figure 4-2 presents current MMS capabilities. Figure 4-3 presents the schedule for Phase 2 capabilities. Figure 4-4 presents the schedule for MMS interfaces to other systems. The Systems Maintenance Service (ASM) will provide, under separate cover, a transition schedule for existing national systems.

a. Evolutionary Implementation. The summary schedules reflect an evolutionary implementation of capabilities within a particular application area; this reflects the software development philosophy arising from the MMS testbed effort and heeds, rather than ignores, the realities of procuring hardware, software, communications lines, and training support in the Federal marketplace. The initial operating capabilities (IOC) for Phase 1 are based upon field feedback from the MMS testbed effort. The evolutionary development process outlined in the MMS Software Development Plan (SDP) will govern the Phase 2 IOC. The full operating capabilities (FOC) are intended to satisfy all functional requirements as outlined in document FAA-E-2734. Enhanced operating capabilities for Phase 1 will commence with MMS Release 03; Order 1800.8E will govern this process.

FIGURE 4-1. OVERALL PROJECT DEVELOPMENT STEPS

1. Packaging Decision
2. Preliminary Design Review
3. Critical Design Review
4. Operational Test & Evaluation/Integration Testing
5. Shakedown Testing
6. Baseline Testing
7. Quality Assurance Testing
8. National Deployment

FIGURE 4-2. CURRENT MMS CAPABILITIES

Facility Maintenance Log

Periodic Maintenance

Facility and Equipment Certification

Performance Reporting

Facility, Service, & Equipment Profile

FIGURE 4-3. PHASE 2 PROJECT SCHEDULE

Application Area	IOC	FOC
Test Equipment Tracking & Calibration	1992	1993
Field Stock Control	TBD	TBD
NAS Problem Reporting	1992	1993
Personnel Training & Certification	1992	1993
Modifications	1993	1994
Maintenance Projects	1993	1994
Inspection Records	1993	1994
Configuration Control Decisions	1993	1993
Problem Resolution	TBD	TBD

FIGURE 4-4. SYSTEM INTERFACE SCHEDULE

Interim Monitor and Control Software	1990
Consolidated Personnel Management Information System	1992
Personal Property In-Use Management Information System	1992
Program Management System	1993
Logistics and Inventory System	1993
National Airspace Performance Analysis System	TBD
National Flight Data Center	TBD
Aircraft Management Information System/ Automatic Flight Inspection System	TBD

b. Schedule Exclusions. Schedules associated with MPS enhancement, MDT availability, and installation of communications lines are outside the scope of this project implementation plan (PIP). Interdependencies and sequence relationships between MMS and the programs providing these capabilities are outlined in paragraph 42 and in the MMS Terminal Communications Project Implementation Plan currently being developed.

42. INTERDEPENDENCIES AND SEQUENCE. Implementation of MMS is critically dependent on the implementation of other projects. Some of these projects are the responsibility of organizations other than ANA-120. The MMS transition team has responsibility for coordinating successful completion of these projects.

a. MPS Communication Project. National implementation of MMS capabilities relating to FMF, PFF, PDS, and interruption reporting requires enhanced MPS to MPS communication capabilities. ASM-300 is in the process of engineering and implementing the required communications capabilities. These capabilities are intended to provide the capacity, reliability, and throughput necessary to support MMS national and regional data distribution requirements. The schedules within this order reflect availability of the enhanced MPS communications network by the end of 1993.

b. GNAS Sector Communication Projects. Utilization of MMS within the AF GNAS sectors is tied to several ASM-300 initiatives aimed at improving MPS access from sector offices, sector field offices/sector field units (SFO/SFU), work centers, and remote facilities. Specifically, these include:

(1) Sector Offices. Use of MMS for interruption reporting and data maintenance (e.g., FMF) from the sector office requires the availability of improved communications services between the sector office and its assigned MPS. The improved services shall provide ready access to the assigned MPS, acceptable response times, and reliable transmission. The MMS schedule reflects a completion date in 1992 for the actions necessary to implement the required services at all sector offices; some are already using MMS in support of these functions. Mandatory use of MMS for general logging is based upon additional sector office communication services (i.e., capacity) and a standard logging capability for the MDT becoming available during the third quarter of 1992. Some GNAS sector offices are currently active users of MMS within the existing communications infrastructure.

(2) SFO, SFU and Work Centers. Use of MMS from SFO's, SFU's, and work centers requires the establishment of adequate communication services between the user organization and its assigned MPS. Some sites are currently using MMS Release 03 in support of interruption reporting, periodic maintenance scheduling, and facility maintenance logging for selective facilities. However, broad operational use of MMS at these organizational elements is based upon communication services availability during the third quarter of 1992.

(3) Remote Facilities. Use of MMS from unmanned remote facilities is tied to availability of communication services from the facility to the MPS associated with the facility, and to the availability of portable MDT's (see paragraph 42c). Current implementation plans assume a phased availability of the communication services beginning in fiscal year 1991; the RMMS program recognizes that not all remote facilities will support MPS access. The MDT software project and implementation plan will address this issue.

c. Maintenance Data Terminals (MDT). Use of MMS at any location other than at the ARTCC's is tied to MDT availability. The FAA is procuring sufficient fixed and portable MDT's to permit MMS use throughout the AF organization. A complete list of the planned MDT allotments and delivery times are contained in Order 6000.34A, appendix 4.

d. MMS Phase 2 System Interfaces. Successful completion of the interface capabilities, as reflected in figure 4-4, requires that a preliminary interface requirements specification exist 45 days prior to the packaging decision (see figure 4-1) for the MMS release containing the interface.

43.-49. RESERVED.

CHAPTER 5. PROJECT MANAGEMENT

50. PROJECT MANAGEMENT, GENERAL. The MMS project is part of the RMMS project (CIP Project 26-01). Overall project management responsibility for RMMS implementation rests with the Program Manager for Maintenance Automation, ANA-200. RMMS management functions relative to MMS implementation encompass technical, financial, program office and schedule management planning responsibilities. Responsibilities for MMS are as follows.

a. Automation Engineering Division, ANA-100. Maintenance Automation Program management and funding.

b. Maintenance Automation Program, ANA-200. MMS project management encompassing MMS development and implementation; scheduling; budget/finance; MDT procurement and installation.

c. Associate Program Manager for Engineering (APME), Maintenance Automation, ANA-120. Project management and implementation.

d. Performance Analysis Branch, ASM-110. MMS requirements, conflict resolution and user guidance in support of NAPRS and NASPAS.

e. Technical Standards Branch, ASM-120. Requirements, conflict resolution, and user guidance in support of automated facility maintenance logs (FML); preparation of an MMS order; and rewrite of existing orders.

f. Data Systems Communications Engineering Branch, ASM-450. Modification engineering; development of site EEM's describing site installation and user requirements; development of SPB's; software maintenance; documentation; baseline configuration management; operational test and evaluation (OT&E) planning and conduct; keysite test planning and conduct; field support for installation activities.

g. Maintenance Automation Branch, ASM-270. MPS executive node operations; national files data base administration; MMS validation tables and historical data bases; user support; network monitoring of the national lines terminating at the executive node MPS; MMS requirements, conflict resolution, and user guidance in support of the FMF and PFF; programming operations funds.

h. Future Programs Branch, ASM-240. Maintenance automation operational concepts and requirements development.

i. Telecommunications Operations and Administration Branch, ASM-310. Network management for the DMN and other national networks.

j. Telecommunications Network Planning and Engineering Branch, ASM-320. Network engineering and leased line acquisition.

k. Interfacility Communications Program Branch, ANC-140. Acquisition and deployment of communications equipment.

l. Weather Systems and Remote Maintenance Monitoring Branch, ACN-250. Associate Program Manager for Testing and Test Director responsibilities as specified in Order 1810.4A, FAA NAS Test and Evaluation Program, and main focal point for all RMMS testing. MMS software evaluation and OT&E/integration test planning and conduct; operation of the ANA-120 development node at ACT; and FAA conducted MPS capacity analysis and performance testing.

m. Operations Program Branch, ASM-260. Personnel and training management including project staffing requirements, funding estimation, allocation, and administration (in conjunction with AHR-10, Executive Staff).

n. FAA Academy, Mike Monroney Aeronautical Center, AAC-900. The FAA Academy has responsibility for establishing the resident training environment and providing recurring MMS resident training. The FAA Academy (AAC-942C) is required to bring up the MMS system and the training data base on the FAA Academy MPS. The FAA Academy is also responsible for the distribution and control of MMS on-the-job training (OJT) course materials.

o. FAA Regional AF Divisions, AXX-400. Each FAA region is responsible for regional implementation of MMS in accordance with national policies and guidelines. MMS regional coordinators and contacts have been identified for each region (appendix 4). Specific responsibilities include:

(1) Coordinating overall MMS implementation within the region, and verifying sector site preparations and equipment installation efforts.

(2) Serving as the primary contact within the region for all MMS matters including data base loading, policy issues, and hardware/terminal placement.

(3) Installing and verifying the performance of all MPS related hardware, firmware, system software, and MMS software.

(4) Reviewing and evaluating the MMS functional capabilities which are required by the regional office to be incorporated into future MMS releases.

(5) Assuring that the regional communications requirements for MMS deployment are satisfied.

(6) Coordinating the transition from existing national systems to MMS.

(7) Assigning all non-MPS sectors to an MPS site for access to MMS.

(8) Coordinating MMS installation and operational shakedown.

p. AF Sectors with MPS. Each MPS sector is responsible for managing the sector MMS implementation processes in accordance with national and regional guidelines. The sector manager's designated MMS site coordinator is responsible for overseeing day-to-day implementation activities. Specific areas of responsibility include:

(1) Coordinating all site engineering activities.

(2) Coordinating the creation of all local data bases required to support all MMS capabilities.

(3) Coordinating and confirming the completion of all site preparations.

(4) Coordinating the installation and operational shakedown of MMS within the sector.

(5) Planning and documenting specific actions taken in the sector to implement MMS.

(6) Assuring that security requirements are met.

(7) Providing access to terminals and space for user orientation.

(8) Maintaining local MMS software and documentation based on national updates.

(9) Formalizing and presenting to the regional office the overall sector feedback based upon user experience during the operational shakedown period.

(10) Assuring that MPS system operations and maintenance do not adversely affect MMS and IMCS operations.

q. Non-MPS AF Sectors. Supervisors and administrators at the non-lead GNAS sectors and unit supervisors at the remaining sector field office/units have access to all MMS functions; however, hardware limitations may restrict the use of the automated logging and PM scheduler functions. The sector manager, through the designated MMS site coordinator, is responsible for:

(1) Coordinating site access to a designated MPS site in accordance with regional office guidance.

(2) Coordinating the placement, installation, and testout of microcomputers, printers, and telecommunications equipment.

(3) Coordinating the creation of local data files required to support MMS functions.

(4) Coordinating site participation in the operational shakedown of MMS in accordance with regional guidelines.

(5) Formalizing and presenting to the regional office overall sector feedback, based upon user experience during the operational shakedown.

r. SEI. Development and maintenance of program milestone and project summary schedules.

s. VNTSC, DTS-65, Information Systems Division. MMS software development and testing prior to delivery to the FAA for verification and deployment; implementation support; document preparation; and backup support to ASM-450 for software maintenance and the MMS national hotline.

t. MMS Transition Team. Assist the RMMS program manager in the identification and resolution of issues having the potential to impede successful implementation of MMS or a smooth transition from existing systems.

u. MMS/IMCS Working Group. Assist the MMS technical officer (TO) in the identification and resolution of technical,

procedural, and policy issues requiring resolution as part of the MMS and IMCS implementation processes; advise the MMS transition team of issues not resolvable by the MMS/IMCS working group.

51. PROJECT CONTACTS. ANA-120 maintains a series of program information distribution lists which identify the key contacts in each responsible organization by name, organization code, and phone number, together with an alternate contact when appropriate. The personnel listed in figure 5-1 are the organizational contacts for MMS implementation. Region, ARTCC, and GNAS sector personnel directly involved with, and responsible for, the successful completion of the MMS project are listed in appendix 4. A complete list of VNTSC project contacts is maintained in the MMS SDP.

FIGURE 5-1. CONTACTS FOR MMS IMPLEMENTATION

Position	Name	Organization	Telephone Comm./FTS
Program Manager	Ron Lipps	ANA-200	(202)646-/967-2021
Associate Program Manager for Engineering	Al Beard	ANA-120	(202)646-/967-2093
MMS Project Manager	Susan Knapton	ANA-120	(202)646-/967-5586
MDT Project Manager	Susan Knapton	ANA-120	(202)646-/967-5586
MMS Training Technical Officer	Susan Knapton	ANA-120	(202)646-/967-5586
MPS Technical Officer	Gary Dickinson	ANA-120	(202)646-/967-5438
Communications Technical Officer	Gary Dickinson	ANA-120	(202)646-/967-5438
NAPRS Lead	Frank DeMarco	ASM-110	(202)267-/267-8581
FML Lead	Will Cadwell	ASM-120	(202)267-/267-8298

(continued on next page)

FIGURE 5-1. (CONT)

Position	Name	Organization	Telephone Comm./FTS
OT&E Integration Testing	Dan Penrith	ACN-250	(609)484-/482-4337
OT&E Shakedown Testing	Lou Hodac	ASM-450	(609)484-/482-6252
Configuration Management	Lou Hodac	ASM-450	(609)484-/482-6252
Information Management	Cindy Allen	ASM-270	(202)267-/267-8970
Planning and Budgeting	Cogan Marshall	ASM-240	(202)267-/267-8285
Telecommunications Network Planning and Engineering	Dan Chess	ASM-320	(202)267-/267-8800
Communications Equipment	Paul A. Sass	ANC-140	(202)646-/967-4960
Test Director	Dan Penrith	ACN-250	(609)484-/482-4337
Training Requirements	Bob Whitfield	ASM-260	(202)724-/724-0378
Academy Training	Ben McWatters	AAC-942C	(405)686-/749-2710
Scheduling Support	Bill Burgner	SEI	(202)646-/967-5707
VNTSC Program Manager	Joe McGann	VNTSC/DTS-65	(617)494-/837-2031
Transition Team Lead	Susan Knapton	ANA-120	(202)646-/967-5586
MMS/IMCS Working Group Lead	Susan Knapton	ANA-120	(202)646-/967-5586

52. PROJECT COORDINATION.

a. Overall Project Coordination. The project management office (ANA-120) coordinates overall MMS implementation. This includes, but is not limited to, coordinating:

(1) Availability of the MMS PIP, and subsequent updates.

(2) Regional involvement in the MMS implementation process including availability of field personnel in support of MMS development and testing.

(3) Input into order rewrites, revisions, and creation.

(4) National training needs and material.

(5) Communication requirements for MPS to MPS connectivity; national telecommunication line and modem requirements for region and sector office MPS connectivity; establishment of the requisite communication capabilities to support national deployment of MMS.

b. Contributing Organizations Requiring Coordination. ANA-120 is responsible for coordinating MMS development, implementation, and support activities of the following contributing organizations:

(1) ASM-100. Maintenance Engineering Division.

(2) ASM-200. Maintenance Operations Division.

(3) ASM-300. Telecommunications Management and Operations Division.

(4) ASM-400. National Automation Engineering Field Support Division.

(5) ANC-100. Communications Engineering Division.

(6) ACN-200. Communications/Navigation/Surveillance Division.

(7) AHT-400. Airway Facilities Training Program Division.

(8) AAC-900. FAA Academy, Mike Monroney Aeronautical Center.

(9) AXX-400. FAA Regional Airway Facilities Divisions.

(10) Keysites. MPS sites designated by ASM-450, as described in paragraph 87.

c. Contributing Organization Activities Requiring Coordination. ANA-120's coordination responsibilities associated with contributing organizations are briefly outlined by organization in the following paragraphs.

d. Systems Maintenance Service, Maintenance Engineering Division. ANA-120 shall coordinate and work with ASM-100 to effect MMS national implementation and the overall transition from existing paper and/or semi-automated systems to the MMS. This includes, but is not limited to coordinating:

(1) Rewrite of existing orders and procedures governing maintenance operation activities to incorporate MMS.

(2) Development of approaches and schedules for effecting the transition from existing national systems to MMS; ASM-200 is also involved in this process.

(3) Incorporation within MMS of software changes reflecting modifications which affect the deployed version of MMS, to existing orders, procedures, and operational guidelines; this includes feedback in the form of PTRs and HDRs.

(4) Resolution of issues raised by the development team for clarification or direction by the MMS transition team or the MMS/IMCS working group.

e. Systems Maintenance Service, Maintenance Operations Division. ANA-120 shall coordinate with ASM-200 to effect:

(1) Availability of MMS on the executive node MPS; the creation and use of national data files in support of MMS; and, national transition cutover for FMF, NAPRS, PFF, and PDS. ASM-100 is also involved in this transition process.

(2) Availability of updates to national data files (e.g., short names) and validation tables.

(3) Access to MMS specialists to support ASM-200 personnel in resolving field queries pertaining to MMS data and/or usage.

(4) All training requirements. ASM-260 will coordinate these requirements with AHT-400 and the FAA Academy.

f. Systems Maintenance Service, Telecommunications Management and Operations Division. ANA-120 shall coordinate and work with ASM-300 to:

(1) Provide enhanced telecommunications services for the national MPS network.

(2) Determine and coordinate MMS-related communication line and equipment requirements for regional office to MPS connectivity, sector office to MPS connectivity, and field site connectivity.

(3) Provide telecommunications lines and equipment to effect national implementation of MMS.

g. Systems Maintenance Service, National Automation Engineering Field Support Division. ANA-120 shall coordinate and work with ASM-400 to test, evaluate, deploy, and maintain MMS software and documents. This includes but is not limited to coordinating:

(1) Participation of the EFSS's (ASM-600 and ASM-450) and availability of the ASM-600 and ASM-450 MPS's in support of MMS implementation.

(2) Availability of resources in support of software distributions, hardware/software problem resolution, and MMS baseline system maintenance.

(3) Development of approaches and schedules for effecting the transition from existing national systems to MMS; ASM-100 is also involved in this process.

h. Communications Engineering Division. ANA-120 shall coordinate and work with ANC-100 to effect the availability of communications equipment in support of national implementation of MMS.

i. Communications/Navigation/Surveillance Division. ANA-120 shall coordinate and work with ACN-200 as it is involved in MMS implementation to:

(1) Fulfill APMT/Test Director responsibilities as specified in Order 1810.4A, and act as main focal point for planning and conducting all testing.

(2) Plan system administration and operations procedures and support to the VNTSC for the ANA-1 development node at the ACT.

(3) Develop tools and procedures for, and conduct MPS capacity analysis and performance measurement tests.

(4) Provide adequate MPS resources for the MMS development and test efforts.

j. FAA Regional Office AF Divisions. ANA-120 shall coordinate and work with AXX-400 in each FAA regional office to effect overall MMS implementation within the region. Each AXX-400 is responsible for assigning all non-MPS sectors in the region to an MPS site for access to MMS.

k. Keysites. The concept of keysites is critical to the successful development and deployment of MMS. As MMS moves forward, the concept of keysites will remain a cornerstone for developing and implementing software which satisfies field requirements in an efficient and effective manner. ASM-450 and ANA-120 will establish keysites as required.

(1) Keysite group responsibilities include:

(a) Providing guidance during the initial prototyping stage for new software development efforts.

(b) Participating in design reviews.

(c) Participating in preview testing of new capabilities, as well as formal beta testing.

(d) Reviewing draft documents prior to national release.

(e) Providing assistance in testing maintenance fixes requiring access to MPS sites other than the development node; an example of this is testing of the network distribution capabilities built into the logging subsystem.

(f) Serving as a test site for the planned implementation process for new MMS software releases and capabilities.

(2) The MMS project manager will coordinate this involvement through the appropriate administrative channels.

53. PROJECT RESPONSIBILITY MATRICES. The MMS project manager has the overall responsibility for the MMS project. Appendix 2 presents the external and internal organizational elements responsible for major project functions within the areas of software, training, communications, and national implementation.

54. PROJECT MANAGERIAL COMMUNICATIONS.

a. Project Status Reviews. MMS project status is reviewed on a bimonthly basis by the NAS PSRB, and by ANA-1 at FAA headquarters. These reviews assess the technical, schedule and cost status of the program; they are summarized in PSRB reports. Figure 5-2 outlines the existing meetings and forums used within MMS to promote project managerial communications.

FIGURE 5-2. MEETINGS AND FORUMS FOR PROJECT COMMUNICATIONS

Mechanism	Frequency	Location
Program Status Review Board	Bimonthly	D.C.
MMS Transition Team Meeting	As required	D.C.
MMS/IMCS Working Group	Bimonthly	Varies
Technical Interchange Meetings	As required	Varies
VNTSC Sponsor Program Reviews	Semiannual	Varies
AAF VNTSC Program Reviews	Annual	VNTSC
MMS Regional Coordinators Conference	Annual	Varies
MMS National Release Meetings	Annual	D.C.
Packaging		
Preliminary Design Review		
Critical Design Review		
Test Readiness Review		

b. Other Devices. The FAA, in addition to the formal review and technical interchange meetings, promotes project managerial communications through various written/oral reports and other communication devices. These include briefings, the Flight Standards Service (AFS) "Tieline", letters of agreement, bimonthly RMMS telcons; quarterly written status reports from VNTSC; an MMS SDP; dissemination of pertinent meeting minutes to concerned organizations; and periodic written status reports to the field. ANA-1 will establish additional devices as warranted. A brief description of meetings, forums, reports, and other communication devices deemed of interest to the general MMS community is provided in subparagraph b(1) - b(6).

(1) MMS Transition Team. This team is composed of representatives from headquarters and field organizations having the most direct stake in the national implementation and transition process, and two regional representatives. At these meetings the team reviews the status of existing action items; accepts and records new issues; and develops action plans for action items not yet assigned to a designated actionee. New or revised action plans are presented to the appropriate service director for approval and tasking to the actionee. The team also uses the meeting to update information in the action item status system prior to reporting progress to the appropriate service directors.

(2) MMS/IMCS Working Group. This group will meet bimonthly and serve as a central coordination medium by which the development, deployment, maintenance, and support of the MMS and IMCS is accomplished. The meeting provides a forum for all major program participants to surface, discuss, and resolve critical issues affecting development, pose questions, make non-policy decisions and assign action items to participants for resolution. The meeting also serves as a forum for generating issues for consideration by the MMS transition team.

(3) Technical Interchange Group. As required, ANA-120 will convene a meeting to provide a forum for the exchange of technical information pertaining to the MMS as a system or a particular functional capability within the MMS. These meetings will provide feedback on existing or planned capabilities and assist in identifying technical concerns with the deployed or proposed product. These meetings typically involve the program office TO; personnel involved in system development; and headquarters, regional, and sector representatives with responsibility for or technical information about the specific area of interest.

(4) MMS Regional Coordinators Conference. ANA-200 will conduct, on an annual basis, a national MMS Regional Coordinators Conference. The conference objective is to facilitate dialogue among headquarters organizations and the regions on the current and future status of MMS implementation. These meetings typically involve MMS regional coordinators and key project contacts as identified in paragraph 51; some sector representation is also present.

(5) MMS National Release Meetings. The MMS SDP outlines the attendees, occurrence within the development cycle, and purpose of these meetings for national releases as well as

Phase 2 prototype development activities. The primary meeting objective is to involve field, region, and headquarters personnel in the MMS development process. This approach reduces the inherent risk of implementing a capability that satisfies an order or a technical specification but is deemed unacceptable by the end-user either from an operational or human factors perspective.

(6) RMMS National Telcons. ANA-120 will conduct telcons on the first Wednesday of every other month at 3:00 PM Eastern Standard Time (EST). These telcons will be used to provide a two-way flow of information relative to RMMS implementation status. To participate, individuals must call their regional duty officer prior to 3:00 PM EST and request connection to the RMMS National Telcon.

(7) VNTSC Quarterly Status Report. The VNTSC will submit a quarterly status report which outlines the activities, and major deliverables; highlights projected activities and work areas for the next quarter; and describes any potential or actual problem areas affecting MMS implementation.

(8) Briefings. Bargaining unit representatives will be briefed as appropriate on the MMS project and its effect on the maintenance specialist workforce at the national, regional, and local levels. Other briefings will occur as required.

55. IMPLEMENTATION STAFFING. There are no unique or peculiar staffing requirements associated with implementation of this project. Offices with assigned responsibilities are expected to accomplish their tasks with existing resources. ANA-120 will work with ASM-100 to identify and resolve staffing issues arising from the implementation effort. Any resolution will be reflected in future staffing allocations. Post-commissioning operational and maintenance personnel are not to be considered a part of this requirement.

56. PLANNING AND REPORTS. The documentation (plans, reports) referenced in this PIP in relation to MMS implementation is listed in subparagraphs a - e:

a. VNTSC Quarterly Status Reports.

b. Monthly PSRB Reports.

c. SDP.

d. Project Master Test Plan.

e. Training Plan.

57. APPLICABLE DOCUMENTS. The following documents are referred to in this PIP and provide technical specifications, information, policy, and directives applicable to this implementation effort. Conflicts between these and other documents should be referred to the MMS Project Manager for resolution.

a. DOD-STD-2167A, DOD Software Development Standards.

b. FAA-E-2734, Maintenance Management System (A-Level) System Specification (Requirements), Computer Technology Assoc. Inc., 10/83.

c. FAA-E-2782, RMMS Core System/Segment Specification.

d. Order 1100.134A, Maintenance of National Airspace System Automation Subsystems.

e. Order 1800.8E, National Airspace System Configuration Management.

f. Order 1810.4A, FAA NAS Test and Evaluation Program.

g. Order 6000.15B, General Maintenance Handbook for Airway Facilities.

h. Order 6000.27B, Transmittal of the Maintenance Philosophy Steering Group (MPSG) Report.

i. Order 6000.34, Project Implementation Plan for the Remote Maintenance Monitoring System (RMMS) Maintenance Data Terminals (MDT).

j. Order 6140.4, Electronic Equipment Modification Handbook - Maintenance Processor Subsystem.

k. Order 6140.15, Project Implementation Plan for the Maintenance Processor Subsystem (MPS) Enhancements.

l. FAA-STD-028, Contract Training Programs.

m. MMS Software Development Plan, Draft, 3/89.

n. NAS-SS-1000, NAS System Specification, Vol. 5, 12/86.

o. TI 6030.1, Maintenance Management System (MMS) User's Manual, 9/88.

p. TI 6030.2, Maintenance Management System (MMS) System Administrator's Guide, 1/89.

q. TI 6030.3, Maintenance Management System (MMS) System Design Document, 12/88.

r. TRANSFER/Mail User's Guide, Tandem Computer Corp.

s. PS-Mail Users's Guide, Tandem Computer Corp.

58.-59. RESERVED.

CHAPTER 6. PROJECT FUNDING

60. PROJECT FUNDING STATUS, GENERAL. Funding for this project has been approved through fiscal year 1991 (see Congressional budget appropriation for CIP Plan 26-01).

61. REGIONAL REQUIREMENTS. Limited funding for regional activities associated with field participation in MMS development is being budgeted by ANA-1. Funding will be authorized for travel and per diem expenses incurred in support of various reviews, national coordination meetings, and technical interchange meetings. Funding will be provided on a case-by-case basis.

62.-69. RESERVED.

CHAPTER 7. DEPLOYMENT

70. GENERAL DEPLOYMENT ASPECTS.

a. Deployment Instructions. All MMS deployment activities will be coordinated and managed by ANA-120. Deployment of the MMS software will occur in accordance with chapter 4, figure 4-3. ASM-450 will provide, for each MMS release, a site-readiness checklist which itemizes all required system hardware, software, and data bases necessary to proceed with MMS installation at a site.

b. Access to the existing MPS-based MMS software requires no specific actions other than the data base build activity, communication line installation, MPS enhancement installation, and MMS sector training program being carried out in accordance with prior ANA-120 directions, and Orders 6000.34 and 6140.15.

c. Deployment of the enhanced MMS capabilities contained in MMS Release 03 calls for no specific deployment actions other than those which ASM-450 will outline in an SPB. Access to and deployment of the enhancements to support future Phase 2 capabilities may require some additional deployment activities. If required, these will be defined in future revisions to this order.

d. Deployment Readiness Review (DRR). As required by AAF policy issued in a June 29, 1987, memorandum, a DRR was conducted by the Navigation/Landing and Facilities Monitoring Division prior to software delivery of MMS release 03 to the first operational site. The preliminary results were briefed to Deputy Associate Administrator, AAF-2 in 1990. The final results will be briefed in a DRR report to AAF-2 after integration and shakedown testing is conducted at the ACT.

e. Deployment Decision. The purpose of the DRR is to determine the readiness of site personnel and procedures to deploy (i.e., install, integrate, operate, support and use) the MMS in an operational setting. The outcome will be a deployment decision, and may involve resolution of action items identified during the DRR process.

71. SITE PREPARATION. No site preparation is necessary under this order since MMS is being deployed using hardware and communications capabilities deployed under other PIP's.

72. DELIVERY. ANA-120 will arrange for delivery of the master software tape and documents for the MMS to ASM-450; all documentation will be provided in hard copy form as well as on floppy disks. Responsibility for reproducing and distributing the software and documentation is an ASM-450 function. All materials will be delivered to the region/site MMS coordinator as identified in appendix 4. Site delivery will commence within 10 working days of completion of quality assurance testing for the release (see chapter 4, figure 4-1).

a. MPS Site. These sites will receive a complete release package containing a magnetic tape with the latest version of the MMS software; user, system administration and system documentation; and an SPB with instructions for loading the new software, testing the system to assure proper installation and demonstrating the operational status of the system. Site installation and ORD at all ARTCC and GNAS MPS sites will be completed within 60 days of receipt of the MMS software release.

b. Non-MPS Sectors. These sectors will receive a release package consisting of MMS documentation and the SPB. Non-MPS sectors will coordinate their transition to the new software with the MMS regional coordinator and MMS system administrator at the MPS site supporting the GNAS. This transition will coincide with the 60-day window for ORD at the MPS site.

73. INSTALLATION PLANNING. The activities and responsibilities associated with the implementation of the MMS are defined in terms of the data base preparation, training, onsite installation, installation procedures and system startup sequence that will be followed at MPS, non-MPS and field support sites. Instructions for loading the MMS application software, converting data files, testing the success of the load process and cutting over for operational use will be issued to the regions in a SPB. Each MPS site is required to notify ANA-120, through the MMS regional coordinator, of any conditions which preclude operational cutover during the scheduled transition period. The sequence of activities required for MMS implementation at the various sites has been divided into three phases and is described in figure 7-1 for each type of site.

a. Installation sequence, activities and responsibilities at ARTCC and GNAS MPS sites. The installation sequence, activities and responsibilities are expressed in terms of pre-installation, installation and post-implementation phases. The MMS software installation activities will be limited to 10 consecutive calendar days, broken out as described in

subparagraphs a(1) - a(3), below, and as presented in figure 7-1. Total system operational unavailability for MMS use is limited to a maximum of 48 consecutive hours, as shown in figure 7-2.

All MMS user sites will, prior to availability of a new MMS release, continue to use the current version of MMS to support data base loading activities, pending successful installation and site acceptance of the new software.

(1) Pre-Installation Phase. This phase includes all site AF personnel activities required to prepare for shutdown of the existing MMS Pathway, back up and conversion of data files and installation of the new MMS configuration. The MMS SPB will provide direction for pre-installation and installation support activities required to enable installation by the local system administration staff. Upon MMS software shutdown, and until the enhanced software is accepted by the site, each site will be required to maintain paper logs of alarms, alerts and other MMS-maintained information, and to capture NAPRS data on personal computers using either the existing Compustar-based software or the rehosted NAPRS/MDT software.

FIGURE 7-1. TIMEFRAMES FOR INSTALLATION ACTIVITIES

MMS SYSTEM ADMINISTRATION ACTIVITY	MAXIMUM DURATION
Pre-installation	5 Days
Installation	2 Days
Post-installation	3 Days

FIGURE 7-2. TOTAL SYSTEM OPERATIONAL UNAVAILABILITY

IMPLEMENTATION PHASE	DURATION
Pre-installation	12 hours
Installation	
Software Installation and Reconfiguration	16 hours
Checkout	8 hours
Post-implementation	12 hours
Total System Operational Unavailability	48 hours

Pre-installation activities encompass, at a minimum, the following, which will be described in detail in an SPB.

(a) Review the SPB and become familiar with the overall installation process including procedures for editing the configuration file, shutting down the existing MMS Pathway, backing up system and MMS subvolumes, and performing any other prescribed steps or tests prior to the installation process.

(b) Verify that the required hardware, software, and telecommunications equipment and system configuration necessary to install the MMS software is in place.

(c) Verify the contents of the release package according to the instructions accompanying the package.

(d) Edit MMS configuration load files (as required) provided with the SPB on magnetic tape to reflect the site-specific configuration; efforts will be made to minimize the need for this step.

(e) Shut down the MMS Pathway after proper notification to all users.

(f) Back up all MMS subvolumes and data base files to tape.

(g) Run any test prescribed in the SPB or desired by the local system administrator.

(2) Installation Phase. The installation phase encompasses all activities performed by the local MMS system administration staff to execute utilities for converting selective MMS site data base files to new formats compatible with the new MMS software release; installing and testing the MMS software release within its own Pathway; and integrating the MMS application with the IMCS software within a single Pathway environment. The MMS system administrator's installation process will include, at a minimum, the following activities.

(a) Removal of the existing MMS application from the system.

(b) Conversion of selected MMS data files to new formats compatible with the new release.

(c) Installation of the MMS software configuration files for operational environment.

(d) Performance of installation checkout and acceptance tests to validate that the process was successful; a subset of the test scripts from the OT&E and shakedown tests will be provided with the SPB for this purpose. This process verifies that the MMS Pathway is operating error free; tests to confirm that major software components are loaded correctly; and, after all local configuration and start-up procedures are completed and the system is operating in a stable mode, the MMS site coordinator is responsible for conducting an operational shakedown of MMS.

(e) Installation of MMS software configuration files for the training environment.

(f) Performance of installation checkout and acceptance tests to validate that the process was successful.

(3) Post-Installation Activities. Post-installation activities will be performed by site and regional personnel as described in the SPB. Post-installation activities are divided into three sub-phases, as described in subparagraphs (3)(a) - (3)(c).

(a) A site acceptance inspection will be conducted onsite by the MMS site coordinator, or designated representative, for each MPS site. The results of the installation process will be reviewed. Successful conclusion of this inspection, and of local testing and checkout, will signify that local sector management has approved and accepted the enhanced software and the installation.

(b) Assigned AF personnel will verify the accuracy of MMS user documentation, and will conduct checkout tests on the new software using test scripts contained in the SPB to verify MMS operations and validate that MMS functions correctly. A site-specific subset of the shakedown tests conducted at the ACT will be developed and performed by designated site personnel to assess the readiness of the enhanced software, local procedures, and personnel to assume site-specific operational status. Site shakedown testing will be conducted within the post-installation timeframes in figure 7-2, prior to the milestone dates presented in paragraph 41, for national deployment of each major release.

(c) Site personnel will update MMS data to include the paper logs maintained during system unavailability. This will consist of performing keyboard entry of the MMS data (corrective and preventative maintenance and certification

actions) recorded manually on paper logs. Log entries created automatically by MMS after installation may have to be closed.

b. Installation Sequence, Activities, and Responsibilities at GNAS Non-MPS Sites. Non-MPS sector sites are not directly involved in the installation process; however, MMS regional coordinators may request participation in the post-installation checkout process. Non-MPS sites need to be aware of the schedule for transition at their assigned MPS site. MMS coordinators within non-MPS sectors need to coordinate, with their sector personnel, the distribution and availability of revised documentation (e.g., MMS User's Manual) and material outlining new features and changes within the latest version.

c. Installation Sequence, Activities, and Responsibilities at FAA Field Support Sites. The installation sequence, requirements, activities, and responsibilities associated with implementation of enhanced MMS software at FAA support sites are the same as for ARTCC and GNAS MPS sites. Support sites that do not maintain MMS log information as part of their duties will not be required to maintain paper logs of MMS data, nor perform keyboard entry of data recorded on paper logs into MMS.

74. DATA BASE PREPARATIONS. In order to make full use of MMS capabilities, the equipment level and periodic maintenance and certification data bases need to be populated. The MMS testbed effort indicated that the GNAS equipment and PM data base collection and creation process was labor intensive.

a. Headquarters Support. ANA-120 intends to provide a system that automates the process of entering the equipment level information and periodic maintenance and certification information. ANA-120 will stage the release of these capabilities over two versions of the data base load software.

b. Approach Overview. The basic process for populating a sector's MPS data files does not require continuous access to the MPS. ANA-120 will provide a software tool and sector specific data files for use on the MDT's.

(1) The software will support all aspects of the local collection and review process and permit uploading of the data to the MPS for inclusion in the MMS data base. The MDT-based software will perform selected data edits and validation checks, while the MPS will perform other edits and checks requiring access to the MPS resident data. An automated feedback loop will exist so that sectors can determine which records have been

accepted or rejected by the MMS. This tool and its associated data files provide an aid to the implementation process and do not represent a set of duplicate files requiring continuous maintenance.

(2) The process for constructing a GNAS sector's local skeleton data files uses the FMF to identify sector facilities. ANA-120 will provide generic data files containing equipment, periodic maintenance, and certification data for the applicable sector facilities; these are created from data obtained from keysite GNAS sites that have already populated their MMS data files. The sector must add sector/facility-specific data collected by the technicians to the appropriate records within the MDT-resident data files.

(3) The local data base will produce forms. These forms will assist personnel to enter the site specific information for each facility located at that site. Each GNAS will have the responsibility to gather the specific equipment information, enter it on these forms and then into the local data base.

(4) After the information is entered into the local data base, a user, designated by local management or having primary responsibility for this effort, will invoke a routine that will transfer the information into the GNAS data files; these data files will be in the same format as the MMS data files. A user-invoked procedure will then transfer these files to the assigned MPS.

(5) The GNAS data files on the Tandem will reside external to the MMS operational environment. A program will perform validity checks on the data. The program will write all records that do not pass the validity checks to a logfile. The user will correct records in the logfile and resubmit them to the validation program.

(6) After validation, the information will be loaded into the MMS data base along with records for other AF sectors supported by this MPS. More specific information on the function, implementation, and use of this software tool will be documented in the MDT Software Project Implementation Plan, planned for development in early 1992.

75.-79. RESERVED.

CHAPTER 8. VERIFICATION

80. FACTORY VERIFICATION. All MMS software releases subject to implementation under this PIP will be developed through an agreement with VNTSC. VNTSC software verification shall adhere to the process and guidelines established in the MMS SDP prepared in accordance with DOD-STD-2167A. The MMS SDP emphasizes verification throughout the system development process; formal validation, through testing, occurs at several key points in the process. Verification and validation apply to all aspects of the system including software, documentation, and installation instructions. VNTSC will perform these product testing activities prior to delivery to ANA-120.

a. VNTSC Verification Process. VNTSC shall conduct a series of reviews and tests. Prior to delivery of each MMS release, VNTSC shall conduct unit, integration, and internal qualification tests. VNTSC shall conduct reviews for each major MMS release; these include a software requirements review, preliminary design review, critical design review (CDR), and internal test readiness review. Prior to the CDR, VNTSC shall deploy preliminary versions of MMS software at several field sites for the purpose of previewing new capabilities and verifying the intended user interface. Subsequent to the CDR, VNTSC shall deploy the intended MMS software release at several FAA sites for beta testing. This process is intended to verify that all intended functions are implemented in the manner agreed to during the CDR and perform as outlined in the specifications. Subsequent to beta testing, VNTSC shall conduct an internal functional qualification test, and shall document the results in a software test report.

b. Verification Requirements. Overall factory verification shall:

(1) Demonstrate that the software performs to specifications.

(2) Verify fulfillment of requirements agreed to through the release process outlined in the MMS SDP.

(3) Verify the acceptability of associated deliverable documentation including user, training, and system administration documents.

(4) Identify deficiencies in the functional specifications.

(5) Verify loading instructions and procedures.

(6) Assess interface compatibility with other systems.

c. FAA Verification Testing. The FAA, subsequent to field beta testing of the intended release, shall conduct a Test Readiness Review in preparation for a decision to proceed with formal FAA testing. Sites shall verify installation and operation in accordance with instructions provided as part of the SPB.

81. CHECKOUT. MMS release checkout activities comprise VNTSC checkout testing and FAA testing as described in subparagraphs a and b.

a. VNTSC Checkout Testing. VNTSC will provide MMS software configurations for operations in both a GNAS and ARTCC MPS hardware environment. VNTSC shall use the MPS hardware at the ACT to verify proper software operations after installation. This will encompass performance of tests to verify that the load processes were successful and to verify preliminary performance.

b. FAA Checkout Testing. ASM-450, assisted by site personnel, will perform quality assurance testing of the software at two keysites. Checkout shall:

(1) Demonstrate that installation is successful and complies with specified requirements.

(2) Verify the performance of integrated hardware and software.

(3) Verify that required support items (e.g., manuals) are available, technically compatible, and in compliance with specifications.

82. CONTRACTOR INTEGRATION TESTING. VNTSC will test each system interface as part of the field beta test process outlined in the MMS SDP. The extent of this testing will vary depending on availability of the requisite test environments. These tests will include verification of the interfaces defined in the applicable interface control document. Full integration testing is an FAA responsibility.

83. CONTRACTOR ACCEPTANCE INSPECTION (CAI). A CAI is not required as part of this order.

84. FAA OT&E INTEGRATION TESTING. ACN-200 is responsible for the overall conduct of integration testing. ACN-200 will be responsible for preparing the test plan and procedures for these tests. FAA integration testing will be performed in accordance with the integration test plan and procedures developed by ACN-200. Integration test results will be compiled by ACN-200 in an integration test report. The objectives of the integration tests are as follows:

a. Verify functional performance of the integrated computer software configuration items (CSCI) and hardware configuration items (HWCI).

b. Test the integration of the contractor software product with other system software/hardware components.

c. Support performance measurement and capacity analysis of the integrated system; compare expected with actual/observed performance, identify deficiencies, and recommend approaches for resolving bottlenecks.

85. SHAKEDOWN AND CHANGEOVER. OT&E shakedown test activities will be performed at both the ACT and MPS sites.

a. Testing at the FAA Technical Center will be performed by ASM-450 to determine the degree to which the MMS release is ready to assume operational status. This will encompass development and conduct of tests by ASM-450 to assess the suitability of MMS performance in an operational setting, the adequacy of associated operating procedures, and the viability of trained personnel to operate and maintain the system at MPS sites. These tests include:

(1) Verification of the functional and operational performance of contractor developed software.

(2) Verification that all requirements specified in the appropriate documents (e.g., FAA-E-2734), and scheduled for deployment, have been met.

(3) Verification that all functions specified in the SRS for a particular CSCI are accomplished by the contractor's software product.

b. Testing at MPS Sites. A site-specific subset of the shakedown tests will be developed and performed by designated site personnel to assess the readiness of the enhanced system, including procedures and personnel, to assume site-specific operational status. This may encompass some of the same shakedown tests performed at the ACT, or a modification of those tests by the site for site-specific applications. The SPB will provide additional details on other tests to be conducted at each MPS site.

86. JOINT ACCEPTANCE INSPECTION (JAI). A JAI is not required as part of this order.

87. KEYSITE TESTING. Other Government test activities include keysite testing of MMS enhancements conducted at the first operational ARTCC and the first operational GNAS by ASM-450. The primary purpose of keysite testing is to validate SPB pre-installation procedures for MMS cutover to the new release, the installation/cutover process, and post-installation procedures for software checkout, data base consistency checks, and running test scripts. Validation of the SPB will occur at an ARTCC and a GNAS. The SPB will be finalized for national distribution, and issued to regions at the conclusion of keysite testing.

88.-89. RESERVED.

CHAPTER 9. INTEGRATED LOGISTICS SUPPORT

90. MAINTENANCE CONCEPT. ASM-450 shall have overall maintenance responsibility for the MMS CSCI. VNTSC, in accordance with a Letter of Agreement (LOA) between ANA-1 and ASM-100, shall provide assistance until such time as ASM-450 assumes full maintenance responsibility for the mature MMS product. ASM-450 shall perform maintenance through the existing configuration management (CM) process described in Order 1800.8E. Critical problems that preclude MMS utilization in support of the maintenance function will be addressed immediately. Noncritical problems, as determined by ASM-450, will be reviewed and scheduled for inclusion in future releases of MMS.

a. Responsibilities. Specific maintenance responsibilities for the participating organizations include:

(1) Site Responsibility. Field-site personnel are responsible for handling problems caused by hardware, software, and telecommunications equipment failures. Problems with the MMS application software are reported through the local MMS coordinator/system administrator to ASM-450, using the media described in subparagraph 90b. The local MMS coordinator shall report major problems to the regional MMS coordinator.

(2) ASM-450 Responsibility. ASM-450 is responsible for addressing problems reported by the field-site personnel. This includes an immediate verbal response via the hotline and written responses using the Electronic Message System. ASM-450 documents and monitors problems. ANA-120 personnel participate with ASM-450 in assigning priorities to individual software problems and scheduling software modifications for release. ASM-450 is also responsible for implementing approved maintenance changes.

(3) VNTSC Responsibility. VNTSC will provide back-up support to the ASM-450 hotline. VNTSC, once contacted by ASM-450, may work directly with the site to investigate and resolve the problem. VNTSC will provide feedback to ASM-450 on the resolution and/or need for additional action. In accordance with the ANA-1/ASM-100 LOA, VNTSC will incorporate approved maintenance changes into MMS until such time as ASM-450 fully assumes maintenance responsibilities.

b. Problem Reporting Mechanisms. MMS is under CM. Field and headquarters personnel shall report all problems and requirements for change through the existing CM mechanisms

(e.g.,HDR's, PTR's, NAS Change Proposals), in accordance with Orders 1800.8E and 1100.134A, Maintenance of NAS Automation Subsystems.

c. Support Mechanisms. MMS users within an ARTCC or GNAS sector will contact the sector MMS coordinator/system administration personnel to resolve problems. MMS coordinators and/or MPS system administration personnel will have access to two primary support mechanisms for use in communicating problems to and obtaining support from ASM-450. The mechanisms and intended usages are:

(1) Hotline. A telephone number will be designated at ASM-450 as the field support hotline. Personnel will be available at that number for immediate assistance with critical software problems. A critical problem is defined as one which precludes use of MMS functions and thus impedes work flow at the site. The hotline may also be used at sites where Tandem's TRANSFER/Mail is not available. The hotline is to be used by personnel involved with the MMS administration function. Other MMS users should contact the onsite MMS administration personnel to resolve problems. To use the hotline, the following information should be provided when available:

(a) Description of the problem, including the activities being performed, the subsystem and function in use at the time when the problem occurred, and the values of pertinent variables.

(b) Description of the screen, including the exact error messages and codes displayed on the screen. The MMS modules are coded to display the termination status numbers in the upper lefthand corner of the screen; these numbers should be reported.

(c) Site information, including its telephone number if an immediate solution to the problem cannot be given.

(2) Electronic Message System. Tandem's TRANSFER/Mail and PS-Mail applications will support communication via electronic messaging with ASM-450. Instructions for using these applications are provided in Tandem's TRANSFER/Mail and PS-Mail user's guides. The MMS coordinator will follow instructions in the MMS System Administrator's Guide for selecting the destination(s) for information transmitted via the electronic message system. This information, which attempts to supplement PTR's submitted via normal channels, should include similar details to these noted in subparagraph 90c(1).

Information for configuring Tandem's TRANSFER/Mail function into the MMS Pathway is detailed in TI 6030.2, MMS System Administrator's Guide.

91. TRAINING. AF site, regional office, and headquarters personnel will be trained in the use of the MMS software through either FAA Academy training or an OJT course, as specified in the MMS Training Plan. FAA Academy training classes will be scheduled by AAC-900 and made available through the FAA training request process. Personnel requiring training will be identified by the appropriate supervisory/management level personnel. A performance examination will be administered upon completion of the OJT course. Enrollment in the OJT course is not mandatory for previously trained personnel.

a. Personnel Identification.

(1) PASS Training Requirements. A nationally negotiated agreement with the Professional Airways Systems Specialists (PASS) Union, documented in a memorandum entitled Impact and Implementation Procedures: MMS, outlines various requirements associated with MMS implementation. A key section of this document states:

> The employer shall ensure that employees who are required to use MMS are provided adequate training on the system prior to being required to use the MMS at its facilities during the test phase and full implementation phase.

(2) RMMS Training Requirements. The RMMS Program, in keeping with this agreement, requires training for all FAA personnel needing access to MMS capabilities. Training is divided into MMS user training and system administrator training.

(a) User Training. The major user group for the MMS Phase 1 software releases consists of maintenance specialists, supervisors, technicians in-depth (TID), and system engineers. This target group will integrate MMS into virtually every aspect of their daily work. Most other users, including regional office and headquarters personnel, will use MMS either to produce standard reports or review the data base contents. Phase 2 capabilities will result in a broadening of the user base to sector, regional, and headquarters personnel. For example, deployment of the field stock control capabilities and LIS interface may result in MMS utilization by field logisticians and regional office logistics personnel.

(b) System Administrator Training. FAA personnel responsible for the maintenance and management of MMS at MPS sites will require training specific to those functions. Personnel at non-MPS sites may require some training on selective subsystem capabilities, depending on their specific responsibilities. Chapter 7 provides some insight into the various support methods.

b. Methodology.

(1) User Training.

(a) Training Prior To Release 03. Training for MMS users, prior to MMS release 03, consisted of FAA Academy courses and field-conducted training. The field-conducted training placed a significant workload on some field personnel and generally provided too narrow a view of MMS capabilities.

(b) New Training. The FAA, coincident with MMS release 03, deployed an OJT course for both MMS and IMCS. This course supplements training slots available through the normal FAA Academy allocation process. ANA-120 also developed an OJT course for regional office/AFS MMS users. Personnel attending resident course training at the FAA Academy may serve as local training resources for individuals enrolled in the OJT courses. The new courses depart from the previous narrow focus and cover the entire spectrum of MMS, as well as provide training on specific user capabilities (e.g., logging). Users will gain a perspective of their role as a user and how this role fits with the roles of others involved in day-to-day maintenance operations.

(2) MMS System Administration Training.

(a) An FAA Academy-resident course is recommended for all AF personnel responsible for managing MMS at each MPS site. This course would provide comprehensive, specific training on the design, capabilities, security, and management of the MMS. This includes coverage of MMS data base files and the associated FAA software systems that will interface with MMS. At this time, such training is not available. ANA-120 has developed and submitted a training proposal to ASM-260 for such a course to be developed and provided by the FAA Academy.

(b) FAA Academy training is available for Tandem system management. Comments from the field, however, overwhelmingly state that, although this training is excellent,

it is too generic and does not go far enough to meet the specific job tasks and requirements of managing MMS and IMCS online. ANA-120 has developed and submitted training proposals to ASM-260 for FAA Academy courses to be developed which will provide training in the following areas:

1. Maintaining the integrity of the MMS data base.

2. Maintaining and controlling local and remote access into MMS.

3. MPS network architecture and management.

4. Technical and administrative functions such as filing HDR's and PTR's, preview testing, and maintaining a tape library.

5. Assisting users at remote sites, regional offices, and headquarters to troubleshoot access problems.

6. Data archival and retrieval.

7. MPS disaster recovery and security procedures.

(c) Interface Training. In addition, training will soon be required in the management of those FAA applications, and associated data base files, that will interface with MMS.

c. Equipment. MDT equipment is required to support MMS field training through the OJT course approach. Field, regional office, and headquarters personnel will use terminals and printers acquired through various procurement actions (see paragraph 42c.).

d. Prerequisites. There are no prerequisites for receiving MMS user training. A working knowledge of automation and familiarity with a computer keyboard is recommended, but not required.

e. Non-MMS. The training covered by this order is oriented toward the MMS user community. No training is provided outside of this context (e.g., Tandem specific training).

92. SUPPORT TOOLS AND TEST EQUIPMENT. No support tools or test equipment are required for MMS implementation.

93. SUPPLY SUPPORT. Supply support of MMS related hardware is covered by the existing MPS and MDT program arrangements with the hardware vendors and the FAA Logistics Center. Supply support actions are described in full in Order 6140.4, EEM Handbook for the MPS, and Order 6140.15, chapter 9.

94. VENDOR DATA AND TECHNICAL MANUALS. ASM-450, based upon the existing distribution process, shall provide the following technical manuals:

a. MMS User's Manual. The purpose of TI 6030.1, MMS User's Manual, is to sufficiently describe the functions performed by the system in non-automated data processing terminology, such that the user organization can determine its applicability and when and how to use it. It serves as a reference document for preparation of input data and parameters and for interpretation of results. This document is not meant to serve as a training tool.

b. MMS System Administrator's Guide. The purpose of TI 6030.2 is to provide individuals responsible for managing the MMS system and associated data files with information and detailed procedures for carrying out administrative responsibilities. Information within this document is restricted to individuals responsible for managing the MMS system, or to their delegates. This document will:

(1) Provide a brief overview of the MMS purpose and design.

(2) Describe the MPS hardware and software environments that support MMS.

(3) Detail the configuration and use of Tandem software to support and monitor MMS transactions and to maintain data base integrity.

(4) Discuss the procedures for establishing and maintaining system security.

(5) Explain the basic functions of the MMS administration subsystem.

(6) Introduce the basic concepts and procedures necessary to use Tandem's TRANSFER/Mail or PS-Mail capability available through an MMS interface.

(7) Describe the MMS interface to the Tandem Transfer Delivery System for network updates associated with various MMS capabilities (e.g., FSEP, logging).

(8) Outline MMS data base files and personnel responsibilities for loading the files prior to system installation.

(9) Detail procedures for operating the MMS PM scheduler.

(10) Highlight basic procedures for generating ad hoc reports using Tandem's ENFORM.

c. MMS SRS. The MMS SRS is a DOD-STD-2167A oriented document which specifies the engineering and qualification requirements for the subset of the RMMS identified as the MMS. This document ties back to document FAA-E-2734. ANA-1 will, as revisions are made to FAA-E-2734, make the necessary changes to the MMS SRS. The MMS SRS will:

(1) Provide an overview of MMS and the SRS.

(2) Identify documents applicable to the requirements of MMS.

(3) Define the general engineering requirements of MMS, including external interfaces, general MMS capabilities, internal interfaces, data elements, adaptation parameters, sizing and timing, safety, security, human performance/human engineering, quality, design constraints, and traceability.

(4) Contain MMS qualification methods and applicable requirements necessary to establish that the delivered software satisfies the requirements intended for a specific release.

(5) Contain detailed capabilities for each general engineering requirement.

(6) Serve as the basis for the design and formal testing of each MMS component, and facilitate the FAA's assessment of the quality and completeness of each delivered software release.

d. MMS Software Design Document (SDD). The MMS SDD will describe the complete design of a fielded version of MMS. The document will present the design in technical terms meaningful to MMS software engineers, maintenance personnel, and system administration personnel. Over time the format and content of this document will transition to the DOD-STD-2167A format for a SDD. The MMS SDD will include:

(1) A functional overview of the MMS and its intended operational environment.

(2) A summary of MMS system, user, performance, and quality assurance requirements.

(3) A functional decomposition and top-level design.

(4) An overview of MMS design considerations and constraints, intended operational environment, and interface characteristics.

(5) A summary description of each MMS software function within a specific subsystem, as well as associated file input/output module descriptions and design considerations.

(6) For the overall MMS configuration item, detail descriptions of the file and record descriptions, screen layouts, help screen contents, standard report descriptions, validation table contents, message contents, and intermodule linkages.

(7) For each module, detail design information relating to processing logic, screen input fields, protected screen input fields, data validation tables, interfaces, program linkages, associated help screens, and messages generated by one module for transmission to others.

e. MMS Training Manuals. The purpose of MMS training manuals is to provide the necessary documentation and training materials required to train MMS users and administrators in effective application of MMS to the performance of their duties. The determination of the specific manuals to be provided will evolve from the contractor development and the FAA's acceptance of the MMS training plan.

95. EQUIPMENT REMOVAL. Equipment removal is not applicable to this PIP.

96. FACILITIES. MMS as a software product has no direct impact on facilities. However, the hardware (e.g., MDT's, MPS's) and communications equipment (e.g., modems, multiplexors, administrative data transmission network (ADTN) pads) used by MMS do have an impact. The specific facility impacts and considerations of implementation are covered in the appropriate program plans and EEM's.

97.-99. RESERVED.

CHAPTER 10. ADDITIONAL PROJECT IMPLEMENTATION ASPECTS

100.-109. RESERVED.

APPENDIX 1. ACRONYMS USED IN THIS ORDER

1. PURPOSE. This appendix contains a listing of the acronyms used in this order along with their definitions.

2. LISTING OF ACRONYMS.

AAC	Mike Monroney Aeronautical Center, Oklahoma City, OK
AAF	Associate Administrator for Airway Facilities
AAL	Alaskan Region headquarters
AAP	Program Manager for Advanced Automation
AAT	Associate Administrator for Air Traffic
ABC	GNAS sector, Anchorage, Alaska
ABQ	GNAS sector, Albuquerque, New Mexico
ACE	Central Region headquarters
ACN	Engineering, Test and Evaluation Service
ACT	FAA Technical Center, Atlantic City, New Jersey
ADTN	Administrative Data Transmission Network
AEA	Eastern Region headquarters
AES	Systems Engineering Service (part of ADL - pre 1988)
AF	Airway Facilities
AFIS	Automatic Flight Inspection System
AFS	Flight Standards Service
AGL	Great Lakes Region headquarters
AHR	Associate Administrator for Human Resource Management
AHT	Office of Training and Higher Education
ALG	Logistics Service
ALR	Office of Labor and Employee Relations
AMIS	Aircraft Management Information System
AND	Associate Administrator for NAS Development
ANE	New England Region headquarters
ANM	Northwest Mountain Region headquarters
ANS	NAS Transition and Implementation Service
APM	Program Engineering and Maintenance Service (part of ADL, 1987-88)
APME	Associate Program Manager for Engineering
APMT	Associate Program Manager for Testing
APN	Office of Personnel
ARTCC	Air Route Traffic Control Center
ASM	Systems Maintenance Service
ASO	Southern Region headquarters
ASW	Southwest Region headquarters
ATM	Office of Air Traffic System Management
AUS	GNAS sector, Austin, Texas
AVN	Aviation Standards National Field Office
AVR	Associate Administrator for Regulation and Certification

AVS	Associate Administrator for Aviation Standards
AWP	Western Pacific Region headquarters
AXX-400	Regional AF divisions
BDL	GNAS sector, Windsor Locks, Connecticut
BGR	GNAS sector, Bangor, Maine
BIL	GNAS sector, Billings, Montana
BOS	GNAS sector, Boston, Massachusetts
bps	bits per second
CAE	GNAS sector, Columbia, South Carolina
CAI	Contractor Acceptance Inspection
CAP	GNAS sector, Suitland, Maryland
CBI	Computer based instruction
CCD	Configuration Control Decision
CDR	Critical Design Review
CHI	GNAS sector, Chicago, Illinois
CIP	Capital Investment Plan
CLT	GNAS sector, Charlotte, North Carolina
CM	Configuration management
COTR	Contracting Officer's Technical Representative
CPMIS	Consolidated Personnel MIS
CRW	GNAS sector, Charlestown, West Virginia
CSCI	Computer Software Configuration Item
CVG	GNAS sector, Covington, Kentucky
DAK	GNAS sector, Bismarck, North Dakota
DBA	Data Base Administrator
DEN	GNAS sector, Denver, Colorado
DFW	GNAS sector, Dallas/Ft. Worth, Texas
DMN	Data Multiplexing Network
DMUX	Data multiplexor
DOD	U.S. Department of Defense
DOT	Department of Transportation
DRR	Deployment Readiness Review
DSM	GNAS sector, Des Moines, Iowa
DTS-65	Information System Division (at VNTSC)
EEM	Electronic Equipment Modification
EFSS	Engineering Field Support Sector
EGP	Engine generator profile
ELP	GNAS sector, El Paso, Texas
EMP	GNAS sector, Syracuse, New York
EST	Eastern Standard Time
FAA	Federal Aviation Administration
FAI	GNAS sector, Fairbanks, Alaska
FLIPS	Flight Information Publications
FMDT	Fixed Maintenance Data Terminal
FMF	Facility Master File
FML	Facility maintenance log
FMP	Field Maintenance Project
FOC	Full operating capabilities

FSEP	Facility, Service and Equipment Profile
GGA	GNAS sector, Oakland, California
GNAS	General National Airspace System
GRI	GNAS sector, Grand Island, Nebraska
HAR	GNAS sector, Harrisburg, Pennsylvania
HDR	Hardware Discrepancy Report
HNL	GNAS sector, Honolulu, Hawaii
HWCI	Hardware Configuration Item
IAH	GNAS sector, Houston, Texas
ICT	GNAS sector, Wichita, Kansas
ILL	GNAS sector, Springfield, Illinois
IMCS	Interim Monitor and Control Software
IND	GNAS sector, Indianapolis, Indiana
IOC	Initial operating capabilities
JAI	Joint Acceptance Inspection
JAN	GNAS sector, Jackson, Mississippi
JAX	GNAS sector, Jacksonville, Florida
LAS	GNAS sector, Las Vegas, Nevada
LAX	GNAS sector, Los Angeles, California
LIS	Logistics and Inventory System
LIT	GNAS sector, Little Rock, Arkansas
LOA	Letter of Agreement
LSSG	Lead sector support group
MARS	Maintenance Automation Reporting System
MCC	Maintenance Control Center
MCH	GNAS sector, Detroit, Michigan
MCS	Monitor and Control Software
MCWG	Maintenance Concept Working Group
MDT	Maintenance Data Terminal
MEM	GNAS sector, Memphis, Tennessee
MGM	GNAS sector, Montgomery, Alabama
MIA	GNAS sector, Miami, Florida
MIN	GNAS sector, Minneapolis, Minnesota
MIS	Management Information System
MMS	Maintenance Management System
MPS	Maintenance Processor Subsystem
MPSG	Maintenance Philosophy Steering Group (1976)
MPSG II	The second MPSG (1988)
NAPRS	National Airspace Performance Reporting System
NAS	National Airspace System
NASPAS	National Airspace Performance Analysis System
NCP	NAS Change Proposal
NEW	GNAS sector, New Orleans, Louisiana
NFDC	National Flight Data Center
NODB	National Outage Data Base
NYT	GNAS sector, Garden City, New York
OATS	Office Automation Technology and Service

OHI	GNAS sector, Cleveland, Ohio
OJT	On-the-job training
OKC	GNAS sector, Oklahoma City, Oklahoma
ORD	Operational Readiness Demonstration
ORF	GNAS sector, Norfolk, Virginia
OT&E	Operational Test and Evaluation
PASS	Professional Airways Systems Specialist
PDS	Power Distribution System
PDX	GNAS sector, Portland, Oregon
PEM	Plant Equipment Modification
PFF	Pre-commissioned Facility File
PHX	GNAS sector, Phoenix, Arizona
PIP	Project Implementation Plan
PIT	GNAS sector, Pittsburgh, Pennsylvania
PM	Periodic maintenance
PMDT	Portable Maintenance Data Terminal
PMS	Program Management System
PPIMS	Personal Property In-Use Management System
PSRB	Program Status Review Board
PTR	Program Technical Report
R&R	Repair and return (item)
RCL	Radio communications link
RDU	GNAS sector, Raleigh, North Carolina
RMMS	Remote Maintenance Monitoring System
RMS	Remote Monitoring Subsystem
RMSC	Remote Monitoring Subsystem Concentrator
SAC	GNAS sector, Sacramento, California
SAN	GNAS sector, San Diego, California
SDD	Software Design Document
SDP	Software Development Plan
SE	Systems engineer
SEA	GNAS sector, Seattle, Washington
SEI	Systems Engineering and Integration Contractor
SFO	Sector Field Office
SFU	Sector Field Unit
SJU	GNAS sector, San Juan, Puerto Rico
SLC	GNAS sector, Salt Lake City, Utah
SMP	Sector Maintenance Project
SPB	Site Program Bulletin
SRS	Software Requirements Specification
STB	Site Technical Bulletin
STDM	Statistical time division multiplexing
STL	GNAS sector, St. Louis, Missouri
TELCO	Telephone company
TID	Technician-in-depth
TMDT	Transportable Maintenance Data Terminal
TMS	Traffic Management System
TO	Technical officer

TPA	GNAS sector, Tampa, Florida
TRI	GNAS sector, Trenton, New Jersey
VNTSC	John A. Volpe National Transportation Systems Center
WIS	GNAS sector, Greenbay, Wisconsin
ZAB	Albuquerque, New Mexico ARTCC
ZAN	Anchorage, Alaska ARTCC
ZAU	Chicago, Illinois ARTCC
ZBW	Nashua, New Hampshire (Boston) ARTCC
ZDC	Washington, D.C. ARTCC
ZDV	Denver, Colorado ARTCC
ZFW	Fort Worth, Texas ARTCC
ZHN	Honolulu, Hawaii ARTCC
ZHU	Houston, Texas ARTCC
ZID	Indianapolis, Indiana ARTCC
ZJX	Jacksonville, Florida ARTCC
ZKC	Kansas City, Missouri ARTCC
ZLA	Los Angeles, California ARTCC
ZLC	Salt Lake City, Utah ARTCC
ZMA	Miami, Florida ARTCC
ZME	Memphis, Tennessee ARTCC
ZMP	Minneapolis, Minnesota ARTCC
ZNY	New York, New York ARTCC
ZOA	Oakland, California ARTCC
ZOB	Cleveland, Ohio ARTCC
ZSE	Seattle, Washington ARTCC
ZTL	Atlanta, Georgia ARTCC

APPENDIX 2. PROJECT RESPONSIBILITY MATRICES

1. PURPOSE. This appendix presents the external and internal organizational elements responsible for major project functions within the areas of software, training, communications, and national implementation.

2. GENERAL.

a. Development Process. Within figure 1, region, GNAS and ARTCC participation in the provisioning of software refers to involvement in the packaging meeting which determines new capabilities or modified capabilities to be included in a scheduled release of MMS; participation in the prototype process to define the man-machine interface; and field pre-review of the capabilities targeted for inclusion in the next MMS release. In general, representatives from two regional offices, ARTCC's and GNAS's will participate in this process.

b. Communication Responsibilities. Figure 3 identifies communication responsibilities as applicable to the MMS project. The RMMS item/activity refers specifically to the responsibilities for the requirements of this project while the other items/activities refer to the responsibilities for specific telecommunication resources/assets targeted for use on this project.

FIGURE 1. MAJOR PROJECT RESPONSIBILITY MATRIX: SOFTWARE

ITEM/ ACTIVITY	ACTION	ANA 120	ASM 450	ACN 250	VN-TSC	AXX 400	GNAS	ARTCC
Provisioning Software	Plan	●	●		●			
	Provide				●			
	Participate					●	●	●
	Review	●	●					
	Receive	●	●					
	Distribute		●					
Provisioning Technical Documentation	Provide				●			
	Review	●	●					
	Receive	●	●					
	Distribute		●					
OT&E Integration Testing	Plan			●				
	Conduct			●				
OT&E Shake-down Testing	Plan		●					
	Conduct		●					
Keysite Testing	Plan	●	●					
	Conduct		●					
	Participate						●	●
Maintenance	Plan	●	●					
	Conduct		●		●			
Configuration Management	Plan	●	●					
	Conduct		●					
Site Prep./ MMS Install.	Plan	●	●	●		●	●	●
	Conduct					●	●	●
	Participate		●					

FIGURE 2. MAJOR PROJECT RESPONSIBILITY MATRIX: TRAINING

ITEM/ ACTIVITY	ACTION	ANA 120	ASM 450	AAC 900	VN-TSC	AXX 400	TRNG. CONT.	MPS Sector
Field Training	Plan	●		●		●	●	
	Develop	●					●	
	Review	●	●	●	●	●	●	
	Conduct			●			●	●
Tandem Training Data base	Plan	●	●		●		●	
	Develop	●			●			
	Test		●				●	
	Deploy		●					
	Install							●
	Support							●
Regional Office Training	Plan	●		●		●	●	
	Develop	●					●	
	Review	●		●	●	●		
	Conduct						●	
FAA Academy Training	Plan	●		●			●	
	Develop						●	
	Conduct			●			●	

FIGURE 3. MAJOR PROJECT RESPONSIBILITY MATRIX: COMMUNICATIONS

ITEM/ ACTIVITY	ACTION	ANA 120	ASM 300	ANC 140	AXX 400	GNAS	CONT.	ARTCC
RMMS (MMS project specific)	Plan	●	●		●			
	Review	●		●	●	●		●
	Acquire		●	●	●			
	Implement	●	●	●	●			
	Manage		●		●			
ADTN	Control		●					
	Plan	●	●					
	Request				●	●		●
	Review	●						
	Install						●	
	Implement	●			●	●		●
DMN	Control		●	●				
	Plan	●	●	●	●			
	Procure			●				
	Implement			●				
	Review	●	●		●			
	Install				●	●		●
MPS Communications Network	Control			●				
	Plan	●	●		●			
	Review	●			●	●		●
	Implement	●			●	●		●
RCL (Radio Communications Link) Network	Control		●					
	Plan		●					
	Request				●			
	Coordinate		●		●			
	Implement				●			

FIGURE 4. MAJOR PROJECT RESPONSIBILITY MATRIX: IMPLEMENTATION AND TRANSITION

ITEM/ ACTIVITY	ACTION	ANA 120	ASM 100	ASM 200	ACN 250	AXX 400	GNAS	ARTCC
Rewrite Orders	Plan	●	●					
	Develop		●					
	Review (see note)	●						
Field Implement-ation	Plan	●	●	●		●		
	Review					●	●	●
	Conduct		●			●	●	●
	Coordinate	●				●		
	Participate		●	●				
MDT	Plan	●				●		
	Acquire	●						
	Test		●		●			
	Deploy	●	●					
	Install					●	●	●
Transition	Plan	●	●	●		●		
	Review	●				●	●	●
	Conduct		●	●		●	●	●
Site Preparation	Plan						●	●
	Review					●		
	Conduct						●	●

Note: Review of revised order and a new MMS order will be carried out in accordance with existing FAA orders and procedures.

APPENDIX 3. MMS PHASE 1 TESTBED

1. PURPOSE. This appendix contains a description of MMS Phase 1 testbed activities.

2. BACKGROUND. During 1985, Configuration Management Division, AES-400, through VNTSC, designed, developed and deployed an MMS Phase 1 testbed system at the following eight keysites:

New York ARTCC (ZNY)
Fort Worth ARTCC (ZFW)
Memphis ARTCC (ZME)
Kansas City ARTCC (ZKC)
Los Angeles ARTCC (ZLA)
Dallas/Ft. Worth GNAS (DFW)
Memphis GNAS (MEM)
New York TRACON (NYT)

The primary objective of this effort was to obtain feedback from these keysites for use in shaping the content and implementation approach for the MMS Phase 1 system to be deployed at all MPS sites.

a. The testbed evaluation process consisted of three distinct software releases and one release modification over a 9-month period. Not every keysite was involved in all aspects of the evaluation; Ft. Worth ARTCC, Memphis ARTCC, and Dallas/Ft. Worth GNAS were involved in all aspects of the evaluation process. The other keysites were involved in the majority of the activities. Whenever possible, site feedback was incorporated into the subsequent release or prioritized and scheduled for inclusion in a future release.

(1) Testbed release 1.0 was primarily used to test the proposed MMS/IMCS linkage. In addition, selected keysite representatives received an opportunity to review the initial system screens and capabilities in order that the testbed development team could incorporate requested modifications prior to the full keysite evaluation period. Major changes were made to the logging subsystem as a result of this feedback.

(2) Testbed release 2.0 was released for full keysite evaluation. Based upon initial keysite feedback, some inherent design limitations and software problems were identified.

(3) Testbed release 3.0 was provided to all keysites in July 1985. This release incorporated further enhancements and modifications requested by lead sector support group (LSSG) keysite representatives. The initial evaluation period concluded with a September meeting. The Data Management Branch, AES-420, LSSG, and VNTSC representatives analyzed the results, itemized requests for changes in order of their priority, and reached agreement on a future course of action. AES-400 approved the plan.

(4) During the fourth quarter of 1985, VNTSC made the necessary MMS maintenance corrections identified by the LSSG. In December testbed release 3.3 was provided to all keysites. This release served as the baseline for developing MMS Phase 1, release A01. During the first quarter of 1986, all non-keysite MPS sites received testbed release 3.3 for use in the creation of local files (e.g., equipment) required for MMS use.

b. Field Evaluation Results. AES-420 and VNTSC obtained feedback from keysites during the MMS testbed effort in several ways:

(1) Use of a hotline and an automated problem reporting mechanism.

(2) Biweekly telcons involving keysites, regional offices, headquarters, and development team representatives.

(3) Formal LSSG review meetings.

(4) Written memorandums from keysites in response to specific AES-400 requests for testbed information.

(5) Site visits by VNTSC and AES-400 personnel during the testbed effort.

c. Keysite feedback indicated that the MMS concept was workable within both the GNAS and ARTCC environments. The testbed process identified numerous software, hardware, telecommunications and implementation concerns. These included:

(1) Insufficient mainframe hardware at each MPS site.

(2) Insufficient terminals to adequately address logging within the GNAS environment.

(3) Inadequate telecommunications networks within the lead GNAS sectors to permit remote logging directly into MMS.

(4) Outmoded existing orders (e.g., Order 6000.15), based largely upon a paper-oriented system.

(5) Testbed release 3.3 response problems and required enhancements necessary to adequately address user needs.

(6) Limited manpower to establish and maintain MMS within both the ARTCC and GNAS sector environments.

AES-400 and other responsible organizations agreed to address these concerns as part of the MMS Phase 1 national deployment process.

d. Follow-up Actions. Specific actions, initiated as a result of the MMS testbed evaluation from the keysites, included the following:

(1) AES-400 and VNTSC incorporated the necessary engineering modifications to MMS requested by the keysites; significant response time improvements and enhanced user functionality were anticipated.

(2) The Flight Information Division, APM-600, and AES-400 developed a plan to procure additional CPUs, memory, disk drives, terminals, and microcomputers.

(3) AES-400 and the Maintenance Engineering Division, APM-100, established a working group to address common concerns, including interfacing MMS/IMCS and rewriting existing logging orders.

(4) AES-400 and the Communications and Facilities Division, APM-500, agreed to collaborate on development of a course of action to establish viable communications within each GNAS sector and between each regional office and its designated MPS site.

(5) AES-400 and concerned FAA organizational elements began to address the mechanisms by which the field provides day-to-day support of MMS installation and operation.

(6) The FAA proceeded with plans to utilize local support specialists, such as the technical support specialist, to train personnel within their specific sector.

APPENDIX 4. REGION, ARTCC AND GNAS SECTOR CONTACTS

1. PURPOSE. This appendix contains a listing of regional, ARTCC and GNAS sector personnel directly involved with, and responsible for, the successful completion of the MMS project.

2. LISTING OF CONTACTS.

NAME	SITE	PHONE
Regional Offices		
x George Foster	AAL	FTS-868-5300
Howard Cleveland	AAL	FTS-868-5676
x Tom Mardis	ACE	FTS-867-5679
x Selim Haber	AEA	FTS-667-1375
Martin Happes	AEA	FTS-667-1375
x Jody Oles	AGL	FTS-384-7449
Vinn Beigh	AGL	FTS-384-7605
x Walter Macomber	ANE	FTS-836-7214
William McMakin	ANE	FTS-836-7154
x Mike Evenson	ANM	FTS-392-2329
Hiro Oishi	ANM	FTS-392-2867
x Tom Stanley	ASO	FTS-246-7266
x Larry Young	ASW	FTS-734-5359
x Abe Jung	AWP	FTS-984-1607
Norm Butner	AWP	FTS-984-1429

x MMS Regional Coordinator

NAME	SITE	PHONE
ARTCC's		
Alaskan Region		
Phil Frietag	ZAN	907-269-1154
Joe Boswell	ZAN	907-269-1157
Central Region		
Wayne Coffman	ZKC	FTS-753-1665
Eastern Region		
Tony Hussey	ZNY	FTS-663-3500
Jim Alexander	ZDC	FTS-925-4600
Great Lakes Region		
Norm Hosse	ZAU	FTS-388-9308
Hanz Knitter	ZAU	FTS-388-9308
Manuel Dejesus	ZOB	FTS-292-8175
Dale Lewis	ZOB	FTS-292-8175
Jerry Crosby	ZID	FTS-332-0344
Dick Miller	ZID	FTS-332-0344
Mike Breunig	ZMP	FTS-784-3260
Jerry Russel	ZMP	FTS-784-3260
New England Region		
Marden Marshall	ZBW	FTS-834-6773
Northwest Mountain Region		
Phil Nickell	ZDV	FTS-323-4406
Mike Jankovich	ZLC	FTS-586-3287
Jose Fabela	ZSE	FTS-390-5368
Southern Region		
Carl Steedman	ZTL	FTS-249-7868
Charles Blackwell	ZTL	FTS-249-7868
Robert Fishback	ZJX	FTS-965-1610
Mel Eady	ZME	FTS-222-3181
Ivan Correa	ZMA	FTS-820-1361

NAME	SITE	PHONE
ARTCC's (cont)		
Southern Region (cont)		
Debbie Johnson	ZMA	FTS-820-1361
Southwest Region		
Josie Sandoval	ZAB	FTS-476-0421
Wayne Bacon	ZFW	FTS-334-1418
Bill Lagaly	ZHU	FTS-572-5482
Western-Pacific Region		
Jeannie Harrington	ZLA	FTS-968-8420
Donna Lyseng	ZOA	FTS-449-6375
Jason Lai Hipp	ZHN	808-734-6617
GNAS Sectors		
Alaskan Region		
Larry Fields	FAI NA-AFS	907-456-4600
Steve Ruks	ANC SA-AFS	907-266-8517
Central Region		
Robert (Bob) Buss	STL	314-425-7129
Charles (Charlie) Blue	ICT	316-946-4480
Ronald (Ron) VanPelt	DSM	515-285-0822
William (Bill) Sorensen	GRI	308-381-5560
Eastern Region		
Lacy Baldwin	CRW	FTS-930-5195
Russell Swinski	PIT	FTS-722-2684
Charlie Egan	ORF	FTS-827-6733
Wayne McCaulley	HAR	FTS-590-4900
David Specher	CAP	FTS-763-8450
Mike Kolysko	EMP	FTS-950-5648
Ernest Vargas	MET	FTS-664-2834
Paul Alexander	TRI (Trenton)	FTS-483-2024

NAME	SITE	PHONE
GNAS Sectors (cont)		
Great Lakes Region		
Vincent Bridgeforth	CHI	FTS-886-6262
Pat McCormacken	CHI	FTS-866-6262
Jim Knight	DAK	FTS-783-4208
Tom Schauer	DAK	FTS-783-4208
Maureen Beharelle	ILL	FTS-955-4966
Raymond Eckard	ILL	FTS-955-4966
Steve Lawrence	IND	FTS-332-0467
Gorden Musser	IND	FTS-332-0325
Daniel Chambers	MCH	FTS-372-3290
Beverly Mansfield	MCH	FTS-372-3290
Roger Johnson	MIN	FTS-725-4241
Wayne Meyer	MIN	FTS-725-4241
Dung Chu	OHI	FTS-942-2350
Michael Dejesus	OHI	FTS-942-2350
Kim Beauparalant	WIS	FTS-360-3820
Tom Johnson	WIS	FTS-360-3820
New England Region		
Margaret Lutz	BDL	FTS-643-2832
Chuck Thompson	BGR	FTS-833-7346
Chris Toll	BOS	FTS-835-4629
Northwest Mountain Region		
Chuck Bishop	BIL	FTS-585-6610
Danny Lovato	DEN	FTS-326-5519
Scott Pottoroff	DEN	FTS-326-5505
Richard Wilkens	PDX	FTS-423-2240
Al Groo	SLC	FTS-588-5180
Wayne Martin	SEA	FTS-764-6616

NAME	SITE	PHONE
GNAS Sectors (cont)		
Southern Region		
Gene Dodge	CLT	FTS-672-6440
Fred Thorpe	CLT	FTS-672-6440
Ron Tokar	CAE	FTS-677-5945
Charles Young	CAE	FTS-677-5945
Merle Olmsted	CVG	FTS-778-3104
John B. Doolittle	JAN	FTS-490-4622
David D. Lucas	JAN	FTS-490-4622
James D. Wright	JAX	FTS-946-3540
David Smith	JAX	FTS-946-3540
Gerald Vowell	MEM	FTS-222-3435
Jay Jones	MEM	FTS-222-3435
Forest Tipton	MIA	FTS-350-2510
Andy Meding	MIA	FTS-350-2510
Robert E. Scheffler	MGM	FTS-534-7461
Wyman McCall	MGM	FTS-534-7461
Mike Moore	RDU	FTS-672-4106
Charles Kincaid	RDU	FTS-672-4106
David Harrell	SJU	809-791-0243
Frank Laras	SJU	809-791-0243
R. A. Shelton	TPA	FTS-826-2571
Randy Mayfield	TPA	FTS-826-2571
Southwest Region		
John Selby	OKC	FTS-736-4527
Terry Cooksey	LIT	FTS-740-5507
Lou Goble	ABQ	FTS-479-6770
Louis Dewenter	NEW	FTS-682-6703
James Coursey	HOU	FTS-521-3028

NAME	SITE	PHONE
GNAS Sectors (cont)		
Southwest Region (cont)		
Steve Mayo	ELP	FTS-476-9275
Cruz Sanchez	SAT	FTS-730-5116
Jimmy Wilson	DFW	FTS-731-5607
Arden Huffstutler	AUS	FTS-770-5653
Western-Pacific Region		
Paul Milani	GGA	415-568-0674
Geneson Coloma	HNL	808-839-2550
Bob Warnke	LAX	213-215-2223
Dan Newberry	PHX	FTS-261-4215
Darwin Aldous	SAC	FTS-460-4030
Doug Northington	SAN	FTS-895-5905