P7950.01B

FEDERAL AVIATION ADMINISTRATION
AUG 26 1997
TECHNICAL CENTER LIBRARY
ATLANTIC CITY INTL AIRPORT, NJ 08405

Program Implementation Plan
for the
Weather and Radar Processors (WARP) Program
CIP # W-04
Solution Implementation Phase

FEDERAL AVIATION ADMINISTRATION
AUG 26 1997
TECHNICAL CENTER LIBRARY
ATLANTIC CITY INTL AIRPORT, NJ 08405

April 2, 1997

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Distribution: A-W(SU/CT/UA/ND/SD/TR/TP/TZ/LM/OP/FZ/NS/OS/ML/TQ/HR/LR)-2; A-X(AF/AT/LG)-3; A-FAF-0 (LTD); A-FAT-0 (LTD)

Initiated By: AUA-460

DOCUMENT CHANGE NOTICE (DCN)

1. Originator Name and Address AUA-460	2. [ ] Proposed [X] Approved	3. Code Identification N/A	4. Standard No. FAA-STD-036
		5. Code Identification N/A	6. DCN No.
7. System Designation NAS	8. Related ECR/NCP No. See #14	9. Contract No. N/A	10. Contractual Activity N/A
11. Program Implementation Plan for the Weather and Radar Processor (WARP)		12. Effectively	

This notice informs recipients that the document identified by the number (and revision letter) shown in block 4 has been changed. The pages changed by this DCN (being those furnished herewith) carry the same date as the DCN. The page numbers and dates listed below in the summary of changed pages, combined with non-listed pages of the original issue of the revision shown in block 4, constitute the current version of this document.

13. DCN No.	14. Pages changed	S*	A/D*	15. Date
*	This is an initial issue.			4/7/95
A	This represents a complete revision.	S*		11/27/95
B	This represents a complete revision.	S		4/2/97

S* = Indicates Supersedes Earlier Page *A = Indicates Added Page *D = Indicates Deleted Page

FOREWORD

A Program Implementation Plan (PIP) provides management direction and technical guidance in the implementation of a program to all levels of the FAA from program inception through commissioning. It is a living document that derives its value through the coordination, analysis, and modification of the information contained within.

The purpose of the review by the Regional Associate Program Managers (RAPMs) and their designated regional and site personnel is both to provide information about the program's plans and implementation strategies and to provide an opportunity to assess the viability of proposed strategies in relation to regional and facility constraints and capabilities. The PIP is **NOT** an order and does not require concur/non-concur sign-off by regional management. If the information provided in the PIP is fully acceptable and consistent with regional and/or site capabilities, then notification that the review has been completed and that no deficiencies or concerns were noted will be appreciated. If, however, there is additional information required, or if reviewers identify technical, logistical, or tactical inconsistencies or concerns which are outside local (i.e., site or regional office) capability to resolve, please bring the nature of the concern to the attention of ANS-700.

Kevin R. Young 4/2/97
Kevin Young, AUA-460
Product Lead for
Weather Processors

Jerry Champion, ANS-700
Division Manager,
NAS Transition Integration Division

TABLE OF CONTENTS

1.0 GENERAL 1

1.1 Purpose of Document 1
1.2 Scope of Document 1
1.3 Distribution 1
1.4 Definition of Terms 1
1.5 Cancellation 2
1.6 Authority to Change 2
1.7-1.19 (Reserved) 2
1.20 Risk Assessment Overview 2

2.0 PROGRAM OVERVIEW 3

2.1 Synopsis of Mission Need 3
2.1.1 Operational Needs 4
2.1.2 Strategic Goals 4
2.2 Functional Description 4
2.3 Program History & Status 6
2.4 Program Milestones 7
2.5 Inter-Agency Involvement 8
2.5.1 Department of Defense (DOD) 8
2.5.2 National Weather Service (NWS) 8
2.5.3 U.S. Customs Service 8
2.5.4 Drug Enforcement Agency (DEA) 8
2.6-2.19 (Reserved) 8
2.20 Risk Assessment 8

3.0 AF OPERATIONS 9

3.1 Summary of Maintenance Operations Impacts 9
3.1.1 Transitory State 9
3.1.2 Operational State 10
3.2 AF Procedural Changes 10
3.2.1 Preventive Maintenance 10
3.2.2 Corrective Maintenance 11
3.2.3 Software Maintenance 12
3.2.4 System Operations/Monitoring 12
3.2.5 System Certification 13
3.2.6 Personnel Certification 13
3.3 Facilities and Equipment 13
3.4 Systems Maintenance 14
3.5-3.19 (Reserved) 14
3.20 Status Assessment 14

4.0 AT OPERATIONS 15

4.1 Summary of AT Operational Impacts 15
4.1.1 Transitory State 16
4.1.2 Operational State 16
4.2. AT Procedural Changes 16
4.2.1 ATC Operational and Management Procedures 17
4.2.2 Flight Procedures/Standards 17

4.2.3 Administrative and Management Procedures 17
4.2.4 Software Verification Procedures 17
4.2.5 Inter-facility Procedures 17
4.2.6 Personnel Certification Procedures 17
4.2.7 System Back-up/Cutover Procedures 17
4.3 AT Implementation Responsibilities 17
4.4-4.19 (Reserved) 18
4.20 Status Assessment 18

5.0 SYSTEM CONFIGURATION AND ENGINEERING 19

5.1 NAS Level Architecture 19
5.1.1 NAS Target State 19
5.1.2 Inter-program interfaces 19
5.2 Platform Architecture 21
5.2.1 Interim Platform Configuration 21
5.2.2 Target State Configuration 21
5.3 Subsystem Level Architecture 21
5.3.1 Hardware 21
5.3.2 Software 23
5.3.3 Physical Specification 24
5.4-5.19 (Reserved) 28
5.20 Risk Assessment 28

6.0 PHYSICAL FACILITIES 29

6.1 Real Estate 29
6.1.1 Real Estate Requirements 29
6.1.2 Real Estate Plans 29
6.2 Heating, Ventilation & Air Conditioning (HVAC) 29
6.2.1 HVAC Requirements 29
6.2.2 HVAC Plans 30
6.3 Cables 30
6.3.1 Cable Routing/Raised Floor Requirements 30
6.3.2 Cable Plans 31
6.4 Power 31
6.4.1 Power Requirements 31
6.4.2 Power Plans 33
6.5 Physical Safety & Security 33
6.5.1 Security and Safety Requirements 33
6.5.2 Security and Safety Plans and Procedures 33
6.6 Environmental / HAZMAT 34
6.6.1 Environmental Requirements 34
6.6.2 Environmental Plans and Procedures 34
6.7 Grounding, Bonding, Shielding & Lightning Protection 34
6.7.1 Grounding, Bonding, Shielding & Lightning Protection Requirements 34
6.7.2 Grounding, Bonding, Shielding & Lightning Protection Plans 34
6.8 Space 34
6.8.1 Space Requirements 34
6.8.2 Space Allocation Plans 34
6.9 Construction & Modification 34
6.9.1 Construction and Modification Requirements 34
6.9.2 Construction and Modification Plans 35
6.10 Telecommunications 35
6.10.1 Telecommunications Requirements 35

6.10.2 Telecommunications Plans and Procedures 35
6.11-6.19 (Reserved) 35
6.20 Risk Assessment 35

7.0 FINANCIAL RESOURCES 37

7.1 Summary of Funding Plan 37
7.2 Facilities and Equipment (F&E) Budget 38
7.2.1 F&E Budget Requirements 38
7.2.2 Summary of F&E Funding Status 38
7.3 Operations and Maintenance (O&M) Budget 39
7.3.1 O&M Budget Requirements 39
7.3.2 Summary of O&M Funding Status 39
7.4 Research, Engineering and Development (RE&D) Budget 39
7.5-7.19 (Reserved) 39
7.20 Risk Assessment 39

8.0 HUMAN RESOURCES 41

8.1 Human Source Management 41
8.1.1 Impacts of Acquisition on Human Resource Management 41
8.1.2 Human Resource Implementation Strategies 41
8.1.3 Security Clearances 42
8.2 Staffing 42
8.2.1 Impacts of Acquisition on Staffing 42
8.2.2 Staffing Plans 42
8.2.3 Staffing Schedule 43
8.3 Training 43
8.3.1 Training program 43
8.3.2 Training Quotas 43
8.3.3 Personnel Skills 43
8.4-8.19 (Reserved) 43
8.20 Risk Assessment 43

9.0 TEST AND EVALUATION 45

9.1 Overview of Test Program 45
9.1.1 Government Test Program 45
9.1.2 Contractor Test Program 45
9.2 T&E Schedule 48
9.3 T&E Responsibility Matrix 50
9.3.1 Government Test Organization 50
9.3.2 Contractor Test Organization 53
9.4 T&E Field Support Requirements 54
9.4.1 Personnel Requirements. 54
9.4.2 Test Equipment Requirements 54
9.4.3 System Access 54
9.4.4 Space Requirements 54
9.5 T&E Program Status 54
9.5.1 Test Results Summary 54
9.5.2 Outstanding Program Trouble Reports (PTR) 55
9.5.3 Discrepancy Correction Process 55
9.6-9.19 (Reserved) 55
9.20 Risk Assessment 55

10.0 SYSTEM SUPPORT 57

10.1 System Support Concept 57
10.1.1 Hardware 57
10.1.2 Software 57
10.2 Special Support Facilities 57
10.2.1 Mike Monroney Aeronautical Center 57
10.2.2 FAA Technical Center 57
10.2.3 Other Special Support Facilities 58
10.3 Materiel Support 58
10.3.1 Project Materiel 58
10.3.2 Provisions and Supply Support 59
10.3.3 Packaging Transportation and Storage 59
10.4 Technical Documentation 59
10.4.1 Hardware Documentation 59
10.4.2 Software Documentation 60
10.4.3 Procedural Documentation 60
10.5-10.19 (Reserved) 60
10.20 Status Assessment 60

11.0 PROGRAM SCHEDULE INFORMATION 61

11.1 NAS Implementation Schedule 61
11.2 Deployment Schedule 62
11.3 Site Implementation Schedule 62
11.4 Schedule Dependencies 63
11.5-11.19 (Reserved) 63
11.20 Risk Assessment 63

12.0 ADMINISTRATION 65

12.1 Acquisition Program Summary 65
12.1.1 Market Survey 65
12.1.2 Acquisition Strategy 65
12.2 Contracting Information 66
12.2.1 Prime Contract 66
12.2.2 Service Contracts 67
12.2.3 Program Support Contracts 67
12.2.4 Regional Contracting 67
12.2.5 GFP/GFI/GFE Obligations 67
12.3 Product Management 67
12.3.1 Product Lead Charter 67
12.3.2 Product Team (PT) 67
12.3.3 Program Status Reporting 69
12.3.4 Exception Management 69
12.4 Quality Assurance 69
12.4.1 Program Acceptance Criteria 69
12.4.2 Risk Management 69
12.5 Configuration Management (CM) 69
12.5.1 CM Responsibilities 70
12.5.2 Configuration Control Board (CCB) 70
12.5.3 CM Milestones 70
12.5.4 Configuration Items 70
12.6-12.19 (Reserved) 71
12.20 Status Assessment 71

13.0 IMPLEMENTATION (REQUIREMENTS) 73

13.1 Implementation Support Organization 73
13.1.1 Associate Product Lead for NAS Implementation (APLNI)/Implementation Support Specialist (ISS) 73
13.1.2 Field Level Involvement 73
13.1.3 Regional Associate Program Manager (RAPM) 73
13.1.4 Technical On-site Representatives (TOR) 74
13.1.5 Contract Support 75
13.2 Site Implementation Process 75
13.2.1 Implementation Planning Phase 76
13.2.2 Pre-Installation and Checkout (Pre-INCO) Phase 77
13.2.3 Installation and Checkout (INCO) Phase 77
13.2.4 System Integration Phase 78
13.2.5 Field Familiarization Phase 78
13.2.6 Dual Operations Phase 78
13.2.7 Equipment Removal Phase 79
13.3-13.19 (Reserved) 80
13.20 Status Assessment 80

APPENDICES

APPENDIX A - GENERIC SITE IMPLEMENTATION PLAN (GSIP) A-1

APPENDIX B - ACRONYMS B-1

APPENDIX C - SOURCES C-1

FIGURES

FIGURE 5.1-1 STAGE 0 WARP SYSTEM EXTERNAL INTERFACES (PLEASE OMITT ACF)..... 20
FIGURE 5.3-1 TYPICAL ARTCC WARP SYSTEM HARDWARE ARCHITECTURE BLOCK DIAGRAM 22
FIGURE 5.3-2 ALASKA ARTCC WARP SYSTEM HARDWARE ARCHITECTURE BLOCK DIAGRAM 23
FIGURE 5.3-3-2 LOCATION/ORIENTATION/WARP PROCESSOR (AWB) 25
FIGURE 5.3-3-3 WARP PROCESSOR EQUIPMENT RACKS SPACE REQUIREMENTS 26
FIGURE 5.3-3-4 STAGE 0 TYPICAL WARP ARTCC SYSTEM EQUIPMENT RACK ELEVATIONS 27
FIGURE 5.3-3-5 LOCATION/ORIENTATION/WARP WORKSTATION (CW1) 28
FIGURE 5.3-3-6 WARP METEOROLOGIST WORKSTATION SPACE REQUIREMENTS 28
FIGURE 6.4-1 INTERFACE DIAGRAM/WARP(AWB) 32
FIGURE 6.4-2 INTERFACE DIAGRAM/ WARP WORKSTATION (CW1) 32
FIGURE 6.4-3 INTERFACE DIAGRAM/ WARP BRIEFING TERMINAL (CW1) 33
FIGURE 9.2-1 WARP WORKING SCHEDULE 40
FIGURE 11.1-1 NAS IMPLEMENTATION SCHEDULE 62
FIGURE 11.3-1 WARP SITE IMPLEMENTATION SCHEDULE 62

TABLES

TABLE 3.1 PERFORMANCE AND AVAILABILITY OBJECTIVES FOR WARP SYSTEM 9
TABLE 3.2.1. WARP PREVENTATIVE MAINTENANCE TASKS 11
TABLE 5.3-3-1. WARP ENVELOPE REQUIREMENTS 24
TABLE 6.2-1 WARP ENVIRONMENTAL REQUIREMENTS 29
TABLE 6.2-2 WARP STAGE 1 OPERATIONAL ENVIRONMENTAL CHARACTERISTICS 30
TABLE 6.4-1 WARP ELECTRICAL REQUIREMENTS 33
TABLE 12.3-1 WEATHER PROCESSOR PRODUCT TEAM 68
TABLE 13.1-1 WARP AIR WAY FACILITY REGIONAL ASSOCIATE PROGRAM MANAGERS... 73
TABLE 13.1-2 WARP AIR TRAFFIC REGIONAL ASSOCIATE PROGRAM MANAGERS 74
TABLE 13.1-3 AF REGIONAL TECHNICAL ON SITE REPRESENTATIVES (TOR'S) 75

1.0 GENERAL

1.1 Purpose of Document

This Program Implementation Plan (PIP) identifies the activities, schedules, technical direction, and funding required/ available to implement the Weather and Radar Processor (WARP) Program.

1.2 Scope of Document

This document is applicable to all FAA offices with responsibility to implement the WARP Program.

1.3 Distribution

This document is distributed to the Program Management level in the office of the Product Lead for Weather Processors, Systems Maintenance, National Airspace System (NAS) Systems Engineering, and Acquisition Support; director level in the Air Traffic Plans and Requirements, NAS Transition and Implementation, Flight Standards Services and the Offices of Budget, Training and Higher Education, and Air Traffic System Management; and branch level in the regional Airway Facilities and Air Traffic divisions. (Re: FAA Standard 036B dtd 5/10/94, p. 2)

1.4 Definition of Terms

The following terms (Re: IPG dtd 6/94, p. 17-18) are defined to clarify their specific usage in this document:

Implementation. Those activities necessary to deploy and support the products of a single program into a facility or field environment. Implementation activities include site and facility preparation for new or relocated systems and equipment, equipment installation and test, and completion of all steps leading to full operational capability, including Initial Operational Capability (IOC), Operational Readiness Demonstration (ORD), and final acceptance and certification by Air Traffic and System Operations personnel. The following seven time phases comprise the implementation process:

Planning. Implementation planning begins during the Concept Exploration Phase of the acquisition process. The planning phase ensures that adequate resources will be available and that appropriate preparation has been completed prior to conducting site implementation activities.

Pre-Installation and Checkout (Pre-INCO). This phase begins with the program site survey and concludes with delivery of program equipment at the site. Pre-INCO activities include power installation, signal cable location, and overall site preparation, and culminate with the delivery of program equipment and successful completion of site preparation.

Installation and Checkout (INCO). INCO activities address the installation and completion of stand-alone testing of delivered equipment. Successful completion of Contractor Acceptance Inspection(CAI) denotes the end of INCO.

Integration. Integration begins upon successful completion of INCO. The program equipment is integrated with the existing NAS system/subsystems, including FAA internal and external interfaces. Interface testing is conducted, and Initial Operational Capability (IOC) may be declared.

System Familiarization. Once IOC is declared, controllers, meteorologists, maintenance staff, system engineers, and managers take steps to increase the number of staff at full proficiency on the system during System Familiarization. The contractor provides support, including On-the-Job Training (OJT) and briefings to all personnel involved in the program. System use begins in a carefully controlled operational environment during limited low traffic periods and increases incrementally to verify that the integrated system is fully functional. The end of System Familiarization is marked by the final Joint Acceptance Inspection (JAI) and an Operational Readiness Demonstration (ORD).

Dual Operations. Dual Operations at replacement sites follows ORD and commissioning of the new system through decommissioning of the old system. This time is used to develop increased confidence in system operations and supportability under live traffic conditions.

Equipment Removal. Equipment Removal occurs after the facility managers decommission the old system, which at this point is no longer required for operational backup. During Equipment Removal, old equipment is removed and disposed of, the facility is restored, and FAA facility and equipment databases are updated to reflect the new configuration.

Operations & Maintenance. The Operations & Maintenance phase of the acquisition process begins upon completion of Equipment Removal of old system and continues beyond implementation for the remainder of the system life cycle. The Operations & Maintenance phase marks the achievement of full operational capability.

Personnel Certification. Personnel certification is a two-phase process consisting of a certification authority phase and a responsibility assignment phase. Certification authority requires FAA technical personnel to demonstrate knowledge of the theory of operations and the ability to practically demonstrate this knowledge. Certification responsibility is the official assignment to FAA technical personnel to use their authority to certify a specific service/system/subsystem/equipment in the NAS.

System Certification. Periodic verification and validation that the advertised quality and scope of services, and the capability of providing those services, are being provided to the users.

Transition. The aggregate of implementation activities for multiple programs, destined for deployment to a specific facility or field environment.

Transitory State. The period of time at a site from Pre-INCO through Equipment Removal.

1.5 Cancellation

N/A

1.6 Authority to Change

The Product Lead for Weather Processors, AUA-460 and ANS-700 are the approval authorities for all changes to this document.
(Re: FAA Order 1810.1F dtd 3/19/93, p. 2-28)

1.7-1.19 (Reserved)

1.20 Risk Assessment Overview

Risk assessment is addressed at the end of each section of this implementation plan. This assessment will document potential risk areas, assess possible negative impacts, and specify management strategies to mitigate these risks.

2.0 PROGRAM OVERVIEW

2.1 Synopsis of Mission Need

The Weather and Radar Processor(WARP) mission is to provide the Air Traffic Control Specialists (ATCS) with accurate, reliable, timely weather information in clear and precise manner. The WARP will also provide the meteorologist and weather personnel with the tools to analyze rapidly changing, potentially hazardous weather conditions to support the air traffic control specialist in their primary mission of safely sequencing and separating aircraft. The WARP Mission Needs Statement (MNS) reaffirms the need for aviation weather products tailored for use by the controllers to assist them in the tactical and strategic decision-making process.

The Air Traffic Weather Requirements Team (ATWRT) report, dated February 11, 1993 validates the need for aviation weather products tailored for use by the controllers to assist them in the tactical and strategic decision-making process. Traffic management unit specialists and supervisors require accurate, reliable information on current and forecast weather conditions to safely and efficiently regulate the flow of aircraft within the national airspace system (NAS). Pilots also require the same information viewed by controllers in order to safely navigate routes through controlled airspace.

There is a need for a system to provide common, accurate, real-time data to all users. Today, the air traffic control specialists and meteorologists receive different data over different communications media at different accuracy's, resolutions, and update rates. Air traffic control specialists receive weather radar information from surveillance radar which are designed for the detection of aircraft. The central flow weather service unit (CFWSU), center weather service unit (CWSU) and traffic management units (TMU) receive the bulk of their weather information from the Meteorologist's weather processor (MWP)system.

The ATWRT report grouped their aviation weather needs into three categories: information collection, information dissemination, and information display. Information collection needs involve the tailoring of data to ensure the accuracy/quality of the product to meet specific operational requirements, while making the product readily available. Information dissemination includes the requirement for timely and consistent data distribution. Information display covers the need for three level graphic representations of "operationally significant" weather changes and integrated/merged products. It also covers other needed computer-human interfaces to support the air traffic specialist's decision-making process for tactical operations and strategic planning. (Re: AP dtd 3/95 p.2)

The WARP detailed functional description is contained in the WARP System Specification, FAA-E-2898. The Air Route Traffic Control Center (ARTCC) WARP system is comprised of all the hardware and software required to acquire, process, display, and disseminate weather data and products for an individual ARTCC site. The ARTCC WARP system includes the following hardware and software components.

a. All hardware and required software from the demarcation point from the Harris satellite communications network to the individual ARTCC WARP site for receipt of Harris Weather Data Service (HWDS) weather data and Unisys NEXRAD Information Dissemination Service (NIDS) radar data.

b. All hardware and required software for support of the Meteorologist and weather personnel workstation and briefing terminal operations.

The Air Traffic Command Systems Control Center (ATCSCC) WARP system is comprised of all the hardware and software required to acquire, process, display, and disseminate weather data and products for the ATCSCC site. The ATCSCC WARP system includes the following hardware and software components:

a. All hardware and required software from the demarcation point from the Harris satellite communications network to the ATCSCC WARP site for receipt of Harris Weather Data Service (HWDS) weather data and Unisys (NIDS) radar data.

b. All hardware and required software for support of Meteorologist and weather personnel workstation and briefing terminal operations.

The WARP system is capable of:

a. Simultaneous and continuous receipt, processing and storage of a specified set of weather products through designated communications media;

b. Displaying and annotating a radar, satellite, or graphical product for the meteorologist's and weather personnel use with selected graphic display capabilities;

c. Producing, displaying and disseminating selected meteorological analyses (graphic format);

d. Displaying, composing, manipulating, and disseminating alphanumeric weather products for display at remote terminals located in the TMU in the ARTCC, and ATCSCC

e. Creating and modifying graphics and/or annotations to existing graphics for display at remote monitors located in the TMU and/or other locations within the ARTCC;

f. Meeting the inherent availability of (A_I) requirement 0.99917873 for the ARTCC configuration and for the Air Traffic Control Systems Command Center (ATCSCC).

2.1.1 Operational Needs

The operational needs to be addressed by WARP are:

a. Continuous acquisition of all available real-time weather measurements pertaining to the area of interest;

b. Acquisition of official weather observations, reports and forecasts as available;

c. Detection of potential weather hazards with prompt notification to the Meteorologist and weather personnel;

d. Graphic workstation display manipulation functions for rapid presentation and analysis of weather conditions;

e. Graphic and textual product generation and dissemination capabilities for communicating hazards: to ATC users, including providing radar weather information for display on controller surveillance displays. (Re: MNS dtd 3/95 p. 2-3)

2.1.2 Strategic Goals

The WARP will provide ATCSs with accurate, reliable and timely weather information to assist them in tactical and strategic decision-making, relevant to safe and efficient regulation and management of the flow of aircraft within the NAS. WARP will also provide meteorologists with the tools to analyze rapidly changing, potentially hazardous weather conditions. A total of 26 systems, including briefing terminals, will be installed. WARP has the following goals (Re: AP dtd 3/95 p. 3-7):

a. to provide Next Generation Weather Radar (NEXRAD), Weather Service Radar (WSR-88D) to Display System Replacement (DSR) for use by en route controllers.

b. To replace Air Route Surveillance Radar (ARSR) weather reflective data with the highly accurate WSR-88D reflectivity data; thereby allowing for the intercontinental ARSR equipment to be decommissioned.

c. To integrate aviation weather information into a single system for use by supervisors, Traffic Management Unit (TMU) specialists, and meteorologists.

d. To provide aviation weather to supervisors and TMU personnel to aid in strategic planning.

2.2 Functional Description

The detailed functional description of the WARP is contained in the WARP System Specification, FAA-E-2898.

The Air Route Traffic Control Center (ARTCC) WARP system is comprised of all the hardware and software required to acquire, process, display, and disseminate weather data and products for an individual ARTCC site. The ARTCC WARP system includes the following hardware and software components:

a. All hardware and required software from the demarcation point(s) of the FAA-supplied communications media (FAATSAT, NADIN II) to the individual ARTCC/Air Traffic Systems Control Center (ATCSCC) WARP site for receipt of vendor Source(s) data and weather data from other ARTCC/ATCSCC WARP(s) and for transmission of WSR-88D weather data to neighboring ARTCC WARP site(s)and ARTCC WSR-88D mosaics to the ATCSCC WARP

b. All hardware and required software from the demarcation points of the NAS interfaces to the individual ARTCC/ATCSCC WARP sites (22) for receipt of weather data (WSR-88D, WMSCR, ADAS), receipt of time synchronization and status requests (CTS, MPS), and transmission of weather data (WMSCR, DSR)

c. All hardware and required software for support of the meteorologist workstation and briefing terminal operations.

The ATCSCC WARP system is comprised of all the hardware and software required to acquire, process, display, and disseminate weather data and products for the ATCSCC site. The ATCSCC WARP system includes the following hardware and software components:

a. All hardware and required software from the demarcation point(s) of the FAA-supplied communications media (FAATSAT, NADIN II) to the ATCSCC WARP site for receipt of vendor Source(s) data and weather data from other ARTCC WARP site(s)

b. All hardware and required software from the demarcation points of the NAS interfaces to the individual ARTCC/ATCSCC WARP sites (22) for receipt of weather data (WMSCR), receipt of time synchronization and status requests (CTS, MPS) and transmission of weather data (WMSCR)

c. All hardware and required software for support of meteorologist workstation and briefing terminal operations.

The procured system will be capable of:

a. Simultaneous and continuous receipt, processing and storage of a specified set of weather products through designated communications media;

b. Displaying and annotating a radar, satellite, or graphical product for the meteorologist's and weather personnel's use with selected graphic display capabilities;

c. Producing, displaying and disseminating selected meteorological analyses (graphic format);

d. Displaying, composing, manipulating, and disseminating alphanumeric weather products for display at remote terminals located in the TMU located with the ARTCC, ATCSCC;

e. Creating and modifying graphics and/or annotations to existing graphics for display at remote monitors located in the TMU and/or other locations within the ARTCC;

f. Interfacing with, obtaining and mosaicking data from up to 27 Service Weather Radars (WSR-88Ds);

g. Providing WSR-88D products to air traffic controllers, TMU personnel, and CWSU meteorologists and, as an enhancement, to the data link processor for transmission to aircraft in flight.

h. Accepting other weather products/data (pilot weather reports and meteorologist-generated products) from WMSCR for forwarding to air traffic systems.

i. Meeting the inherent availability requirement of 0.99963 for the ARTCC configuration. (Re: AP dtd 3/95 p. 9)

2.3 Program History & Status

WARP incorporates current Real-Time Weather Processor (RWP), Meteorologist Weather Processor II (MWP Extension) requirements, and new National Weather Service (NWS) requirements to create a single, integrated system. The acquisition strategy incorporates a phased implementation schedule which addresses specific functional requirements in four distinct stages. Stage 0 COTS/NDI portions of WARP is to competitively replace the MWP. During Stage 0, the FAA will lease the COTS and NDI portions of the WARP hardware and software as a turn-key service from the WARP contractor to competitively replace the MWP at the earliest possible date. The WARP contractor will test and install the Stage 0 system, and provide data, hardware, software, communication, and maintenance on a leased service until Stage 1/2 is deployed. Stage 1 and 2 is combined and will be initiated under the basic contract to develop the NAS interfaces necessary to provide NEXRAD data to ATCS' consoles via the DSR and other required NAS interfaces, and integrate these capabilities with the WARP COTS/NDI hardware and software. This stage will meet the most urgent AT requirements: to acquire, process, and disseminate WSR-88D NEXRAD reflectivity data for display on the surveillance displays; and to provide the Meteorologist and weather personnel with a workstation for monitoring and alerting the ATCSs of potentially hazardous weather conditions. The Stage 1/2 development program will be conducted in parallel with Stage 0. Stage 1/2 production, installation, training, data services and maintenance are included as options. The contractor will be responsible for defining the most operationally and cost effective transition from Stage 0 to Stage 1/2. Stage 1/2 will provide additional interface capabilities and meteorological analysis tools. Stage 3 provides pre-planned product improvements (P3I) to permit technology transfer initiatives, such as incorporation of products from advanced weather research programs and development of interfaces to future weather related NAS systems.

The WARP program is being implemented under Capital Investment Plan (CIP) project number W-04. The WARP program evolved from the CIP 23-02 Central Weather Processor (CWP) project which was initially defined in the NAS Plan, dated December 1981. Approval for CWP full-scale development was given by the Deputy Secretary in a Key Decision Memorandum 3 (KDM 3) in August 1984. In 1988, an updated KDM 3 was sent to the Office of the Secretary of Transportation (OST) requesting authorization to separate the CWP project into two elements: the meteorologist weather processor (MWP) and the real-time weather processor (RWP). The Deputy Secretary authorized the FAA to proceed with a 5 year leased MWP system and to proceed with the full-scale development of the RWP.

MWP provided an interim, near-term, NDI solution to automate some of the CWSU/CFWSU meteorologist's operational support activities. Twenty-three MWP systems were deployed during 1990 and early 1991. Subsequently, the MWP replacement system, received KDP 4 approval for production and deployment on December 28, 1992, but the program was superseded by WARP before a request for proposal (RFP) was issued.

MWP was viewed as a near-term, interim capability to automate some of the meteorologist's operational support activities. Subsequent to the OST decision, Jet Propulsion Laboratory (JPL) was contracted to develop RWP prototype software which was completed in 1991. After an RWP Major System Acquisition Review, in March 1991, the RWP program was put on hold pending Air Traffic's revalidation of operational aviation weather requirements.

Subsequently, the MWP replacement system, received approval for Phase 4, production and deployment, on December 28, 1992. In addition, the ATWRT report was released in February 1993. In May 1993, Systems Engineering and Air Traffic Plans and Requirements directorates proposed that the MWP Extension and RWP programs be merged into a single acquisition; WARP fulfills that position advocated by AT. This acquisition will permit the MWP-leased system to be phased out in concert with the installation and commissioning of WARP at each location.

Due to the foregoing activities and accomplishments of the MWP and RWP programs, the WARP program, as a consolidation of RWP and MWP functional requirements, is picking up at KDP 3 requesting full-scale development/limited production phase. A mission need statement (MNS) was approved by Air Traffic and a acquisition plan (AP) has been approved. The MNS revalidates the mission need and cites the WARP as the alternative which is favored by Air Traffic as the preferred solution to the need. The MNS will be processed through the FAA Acquisition Review Committee (ARC) and the Department of Transportation (DOT) Transportation Systems Acquisition Review Committee (TSARC).
(Re: AP dtd 3/95 p. 1-3)

2.4 Program Milestones

WARP milestones are shown below (Re: WARP working schedule dtd 6/28/96). A more detailed implementation schedule is included in Section 11.

Acquisition Step	Duration	Start	Finish
ARC/TSARC KDP-3	1d	Thu 3/30/95	Thu 3/30/95
ADM, MNS, AP & APB approved	29d	Fri 3/31/95	Wed 5/10/95
WARP/DSR MOU Signed	1d	Fri 6/23/95	Fri 6/23/95
Specification Baselined	1d	Thu 7/13/95	Thu 7/13/95
DPA Approved	1d	Fri 7/5/95	Fri 7/5/95
TEMP Approved	1d	Fri 7/21/95	Fri 7/21/95
Issue Solicitation/Final RFP	1d	Mon 7/31/95	Mon 7/31/95
Contract Award	1d	Fri 6/28/96	Fri 6/28/96
Stage 0	1094d	Tue 10/1/96	Thu 9/30/99
Start Work	1d	Tue 10/1/96	Tue 10/1/96
TIM/PMR	1d	Mon 12/16/96	Mon 12/16/96
TRR	1d	Tue 1/28/97	Tue 1/28/97
DT&E FAT	1d	Tue 2/11/97	Tue 2/11/97
PAT&E SAT	1d	Tue 3/4/97	Tue 3/4/97
TIM/PMR	1d	Mon 3/31/97	Mon 3/31/97
ISR Decision	1d	Mon 4/28/97	Mon 4/28/97
TIM/PMR	1d	Mon 6/2/97	Mon 6/2/97
Stage 0 Deployment	84d	Sat 7/5/97	Fri 9/26/97
End Stage 0	1d	Thu 9/30/99	Thu 9/30/99
Stage 1	3016d	Fri 6/28/96	Thu 9/30/04
Start Work	1d	Fri 6/28/96	Fri 6/28/96
PAC	1d	Fri 8/2/96	Fri 8/2/96
SRR	1d	Fri 8/30/96	Fri 8/30/96
SDR/SSR	1d	Fri 11/22/96	Fri 11/22/96
PDR	1d	Fri 3/7/97	Fri 3/7/97
TIM/PMR	1d	Thu 5/1/97	Thu 5/1/97
CDR	1d	Fri 7/18/97	Fri 7/18/97
TIM/PMR	1d	Thu 10/30/97	Thu 10/30/97
TIM/PMR	1d	Fri 1/30/98	Fri 1/30/98
TRR	1d	Fri 6/12/98	Fri 6/12/98
DT&E FAT (Contractor's Facility)	1d	Fri 6/26/98	Fri 6/26/98
DT&E SAT (FAATC)	1d	Fri 8/7/98	Fri 8/7/98
DT&E SAT (ATCSCC at FAATC)	1d	Fri 8/21/98	Fri 8/21/98
Seattle DT&E SAT	1d	Fri 9/11/98	Fri 9/11/98
TIM/PMR	1d	Fri 10/30/98	Fri 10/30/98
Deinstall Seattle (Stage 0)	1d	Fri 1/29/99	Fri 1/29/99
TIM/PMR	1d	Fri 1/29/99	Fri 1/29/99
Install ATCSCC @ ATCSCC	1d	Fri 2/26/99	Fri 2/26/99

ISR Decision	1d	Mon 2/1/99	Mon 2/1/99
Stage 1 Deployment	141d	Fri 4/16/99	Fri 9/3/99
End Stage 1	1d	Thu 9/30/04	Thu 9/30/04

2.5 Inter-Agency Involvement

The following organizations are involved in the WARP program, as indicated.

2.5.1 Department of Defense (DOD)

Not applicable.

2.5.2 National Weather Service (NWS)

Aviation Services Branch, Office of Meteorology (W/OM13).

2.5.3 U.S. Customs Service

Not applicable.

2.5.4 Drug Enforcement Agency (DEA)

Not applicable.

2.5.5 Other Agencies

Not applicable

2.6-2.19 (Reserved)

2.20 Risk Assessment

The cost risk associated with the program exceeding the cost estimate is medium to low. Schedule risk is low. The acquisition strategy is structured to reduce schedule risk. The heavy reliance on commercial-off-the-shelf (COTS) and non development item (NDI) hardware and software, the phased acquisition approach that will implement technology as it is available, and the detailed schedule analysis and tracking combine to result in a low schedule risk and the ability to mitigate schedule delays as they arise. WARP has low technical risk overall due to the use of (COTS) items, NDI, phased development, and demonstrations of capabilities before purchase. Programmatic risks associated with other NAS subsystems to which WARP will interface are beyond the scope of this project, but will be closely monitored and coordinated with the respective Product Offices.

The E-Complex will be equipped with Critical power and building services power only. (Ref: ANS-300)

Programmatic risks have been minimized through an acquisition strategy that separates the capability to provide the WSR-88D (NEXRAD) data to the ATCS from that of replacing the MWP-like functionality. Additionally, design factors incorporated in the existing MWP system (e.g., more stringent specification of performance requirements like "concurrent processing") were taken into consideration in developing the WARP system specification. Evolving technology to receive, process, and display WSR-88D data is available in the commercial market and should further reduce programmatic risks. (Re: AP dtd 3/95 p. 10-11)

3.0 AF OPERATIONS

3.1 Summary of Maintenance Operations Impacts

No impacts to Airway Facility (AF) operations due to site implementation activities are envisioned except for a scheduled 4-hour outage to permit the Harris installation team to remove residual MWP equipment from the WARP processor racks and install the new equipment. The site will be prewired prior to the scheduled outage in order to minimize the outage time. The outage can be scheduled for the evening hours to minimize the impact to AF operations. The Alaska scheduled outage is anticipated to be 16 hours because the equipment racks must be relocated to another room in the ARTCC building.

No changes to AF operations are planned when the WARP system is in operational use. The hardware maintenance organization has been changed from Concurrent Engineering Services (formally Harris Computer Services Division) to Harris Technical Services Corporation (HTSC).
The WARP statement of work (SOW) requires Harris to plan and implement reliability and maintainability programs to meet the requirements of MIL-STD-785 and MIL-STD-470 respectively.

The WARP equipment is required to meet the following performance and availability objectives listed in Table 3.1.

Objective	ARTCC WARP	ATCSCC WARP
Inherent Availability	0.99963	0.99917873
Mean-Time-Between-Failure (MTBF)	no < 1354 hours	no < 608 hours
Mean-Time-To-Repair (MTTR)	no > 30 minutes	no > 30 minutes

Table 3.1 Performance and Availability Objectives for WARP System

FAA-E-2898 requires that equipment in the WARP allow restoration of a function interrupted by critical failure through replacement of the faulty Line Replaceable Unit (LRU) without special tools. Because of requirements for use of Non-Development Item (NDI) equipment, qualified parts lists, Reliability and Maintainability (R&M) design reviews, trade-off studies, and parts control lists are not imposed. (Re: Spec dtd 7/13/95 p.77-78)

During Stage 0, the WARP is leased Commercial-Off-The-Shelf (COTS) and NDI hardware and software as a turn key service from Harris who is currently providing a similar leased service on the MWP program. Harris is using a new maintenance organization for the WARP program who will be responsible for the on-site hardware maintenance and the repair depot. The Harris help desk and software maintenance will be a continuation of the MWP support. Similarly, **Harris Weather Data Service** (HWDS) hub will be maintained by Ascent Technical Services in Palm Bay, Florida as it was for the MWP leased service. The new hardware maintenance provider is HTSC.

3.1.1 Transitory State

The WARP implementation will be phased into four stages:

3.1.1.1 Stage 0

Leased COTS/NDI. During Stage 0, the WARP will be leased COTS and NDI hardware and software as a turn key service from the WARP contractor.

3.1.1.2 Stages 1-3

Full scale development._During the implementation of the WARP at a particular site, the following activities may affect AF System Management Office (SMO) operations (also see section 13.2 for further discussion of site implementation process):

a. Prior to system installation and checkout (Pre-INCO) some AF System Management Office (SMO) personnel may be asked to participate in site survey and site preparation activities.

b. During system installation and checkout (INCO) some shutdowns of operational facilities may be required to accommodate installation and test activities. AF System Management Office (SMO) personnel may also be required to be on-site during installation to monitor contractor installation activities. Operational facilities to be shut down are to be determined after deployment contract.

c. During system integration, AF System Management Office (SMO) personnel may be asked to support JAI, IOC, ORD, and commissioning activities.

d. AF System Management Office (SMO) personnel will be required to attend maintenance training.

e. Familiarization will be performed by AOS-500 and supported by the sector maintenance and operator personnel. Contractor support will be provided as required. (Re: Draft ILSP, dtd 3/95)

3.1.2 Operational State

Initial support, both on-site and depot level maintenance will be provided by the contractor for a period of one year after site acceptance. The FAA will have the option of extending this support. (Re: SOW 7/96)

3.2 AF Procedural Changes

The following information describes procedural changes to be introduced by implementation of WARP, to include frequency of performance and performance responsibilities:
Maintenance support for the WARP will be guided by FAA Order 6000.30B, Policy for Maintenance of the NAS Through the Year 2000. This order details a two-level maintenance philosophy, field and depot. The field and depot maintenance concept assumes the use of modular designed equipment, which enables field level personnel to correct equipment failures on-site by replacing the faulty Line Replaceable Unit (LRU). Field level maintenance consists of all maintenance activities performed on equipment installed in its operating environment and includes both preventive and corrective maintenance actions. Depot-level maintenance consists of reordering or repairing failed LRU's which are shipped from the site or work center. The WARP will utilize this maintenance concept throughout its operational life cycle. The predicted service life of the WARP is approximately five years, although technology insertions could increase this expected service if necessary. The maintenance and logistics support shall be consistent with this life cycle. A initial set of site and depot spares and any special test and support equipment required shall be provided by the Product Office using facilities and equipment (F&E) funds. (Re: MRD undated p. 2-3)

3.2.1 Preventive Maintenance

The total amount of time the WARP is unavailable due to preventive maintenance actions shall not exceed 3 hours during a 90 day period. (Re: Spec dtd 7/13/95 p. 78)

All preventive maintenance actions shall not exceed four actions per year or one per quarter. Actions will be coordinated with the user and scheduled for minimum interference with normal FAA facility operation. Periodic maintenance tasks and intervals between periodic maintenance shall be flexible enough to allow periodic maintenance to be accomplished in conjunction with corrective maintenance tasks. Upon completion of the corrective or periodic maintenance, the periodic maintenance clock is reset to provide the appropriate time interval to the next maintenance visit. The appropriate technical instruction manual shall contain details enumerating all maintenance activities that must be done on a recurring, periodic basis. (Re: MRD undated p. 4)

Harris is responsible for the WARP system maintenance. Preventative maintenance is performed quarterly or in conjunction with a site visit for corrective maintenance action or a system upgrade. The total amount of time the WARP is unavailable due to preventive maintenance actions must not exceed three (3) hours during a 90-day period.

Actions will be coordinated with the user and scheduled for minimum interference with normal FAA facility operation. Periodic maintenance tasks and intervals between periodic maintenance will be flexible enough to allow periodic maintenance to be accomplished in conjunction with corrective maintenance tasks. Upon completion of the corrective or periodic maintenance, the periodic maintenance clock will be reset to provide the appropriate time interval to the next maintenance visit. Preventative maintenance tasks are listed in Table 3.2.1.

Item to be Serviced	Preventive Maintenance Activity	Frequency
Satellite RX Terminal	Visual Inspection	Quarterly
Antenna and Structure	Check all Painted Surfaces for Chip & Corrosion	Quarterly
RF Electronics	Visual Inspection	Quarterly
Outdoor	Check Waterproof Connections; Check cables for Damage.	Quarterly
Indoor	Check all Cables for Damage	Quarterly
Electro Mechanical Drives	Check for Obstructions	Quarterly
Electronics	Visual Check of Cables and Connectors	Quarterly
Briefing Terminals	Visual Inspection of Cables and Connectors	Quarterly
Hardcopy Printers	Visual Inspection of Cables and Connectors	Quarterly
Hi-Rate Modem	Clean Filter Front Panel	Quarterly
Equipment Cabinets	Clean Filters	Quarterly
Antenna Deicing System	Check operational controls, inspect for birds nests, wasp nests etc.	Pre-Winter

Table 3.2.1. WARP Preventative Maintenance Tasks

Reports on preventive maintenance tasks will list each task performed by:

- Site Identifier
- Description of task
- Date and time-of-day task was performed
- Length of time to complete
- Who performed the task

3.2.2 Corrective Maintenance

Stage O. WARP hardware will be maintained by the WARP contractor.
Maintenance support is available 24-hours a day, 7-days a week. The maintenance requirements for the WARP service is to restore the WARP system within four (4) hours (maximum) after government notification or as mutually agreed with the designated FAA site representative. The 4-hour MAX system restore time does not apply to Non-critical equipment. Non-critical equipment includes the following:

- Single Briefing Terminal failure
- Single Workstation Monitor failure
- Printers, Tape Drives

Non-Critical failures are restored within five (5) days or as coordinated with the site. Corrective maintenance is limited to the removal and replacement of the LRU to restore service. The total time to restore the service after the help desk is notified is recorded on the trouble ticket before it is closed.

Reports on corrective maintenance tasks includes:

- Reported failure date and time
- Failure symptom(s)
- Time required to isolate the failure
- Time required to restore the WARP system
- Time required to repair or replace the failed unit
- Part number and quantity of spares used.

As calls requesting maintenance assistance are received, a work order is opened documenting the caller's name, site, problem description, time of call, etc. If the site has experienced a Critical Failure, the maintenance help desk will immediately dispatch the Field Engineer assigned to the site. The maintenance help desk will continue to work with the caller to obtain additional information and correct the problem if possible. If the failure is not critical, the maintenance help desk will work with the caller to solve the problem and dispatch the field engineer, if necessary. After the system is restored, the field engineer/maintenance help desk adds more information to the work order, i.e., time the system was restored, spares used, corrective action taken, etc., to close the work order. A summary of this information will be provided monthly in Contract Data Requirements List (CDRL) M002, Monthly Service Report.
Stages 1-3: Corrective maintenance service will commence promptly after notification that equipment is inoperative, or that degradation of functions has occurred, or when, through the process of performing periodic maintenance services, it is determined that failure is imminent. When the faulty LRU is located, it is removed from the equipment/subsystem and replaced with a serviceable spare.

After replacement, maintenance personnel shall perform the system alignment procedures as detailed in the technical instruction book. When LRUs are replaced, they will be forwarded to a contractor on an exchange and repair (E&R) basis as directed by the FAALC. Sites may order expendable items from the contractor . The mean-time-to-repair (MTTR) for WARP shall be less than 30 minutes when the failure is in an LRU and a spare LRU is available on site. This repair time will include diagnostic time, removal of the failed LRU, replacement and installation of the new LRU including any adjustments or data loading necessary to initialize the LRU, and all adjustments required to return the subsystem to normal operation. (Re: MRD undated p.4)

3.2.3 Software Maintenance

Stage 0: WARP software will be maintained by the Harris Corp.
Harris is responsible for the software maintenance of the WARP Stage 0 system. A User Help Line is manned during normal business hours, 5-days/week, except for holidays. This support begins during the first site installation and continues until 90 days after the last site installation. After the 90 day period following the last site installation, the User Help Line will not be manned 100% of the time during Harris work hours. Harris voice mail will be utilized to collect user questions and will be checked for messages throughout each Harris work day.

A toll free number 1-800-984-5594 is available to reach the Harris User Help Line. Users may also communicate with the User Help Line via E-Mail at **wx_help@harris.com**. Calls are logged into a data base as they are received at the User Help Line and are closed as quickly as possible. If the site/user has experienced a system failure, the 24/7 maintenance help desk should be called immediately and not the User Help Line.

Stages 1-3: Maintenance of the WARP software will be performed by the WARP contractor under direction of AOS at FAATC. A WARP system will be provided to FAATC for software maintenance support. (Re: Draft ILSP, dtd 3/95 undated)

3.2.4 System Operations/Monitoring

A remote maintenance monitoring system (RMMS) is being implemented for the purpose of enhancing the integrity of the NAS, reducing maintenance and support costs, and minimizing the impact of equipment failures. Therefore, the WARP shall have interface capability with the RMMS sufficient to allow remote on-line performance monitoring and off-line fault isolation. (Re: updated MRD p. 3)

This functionality is currently being replaced by NAS Infrastructure Management System (NIMS). Harris is currently designing to the NIMS interface. MPS will eventually change to NIMS. The WARP RMMS function shall perform collection, processing, storage and transfer of data. WARP RMMS functions shall not interfere with other functions of the WARP. The WARP RMMS shall contain the hardware and software necessary to perform data collection functions associated with monitoring WARP performance, maintaining security, and executing control. The type of data the WARP RMMS shall collect includes performance values from the WARP, threshold values from an MPS, control messages from an MPS terminal message, and diagnostic test data from the WARP. (Re: Draft ILSP, dtd 7/95, p 10).

The WARP RMS function shall perform collection, processing, storage and transfer of data. WARP RMS functions shall not interfere with other functions of the WARP. The WARP RMS shall contain the hardware and software necessary to perform data collection functions associated with monitoring WARP performance, maintaining security, and executing control. The type of data the WARP RMS shall collect includes performance values from the WARP, threshold values from an MPS, control messages from an MPS terminal message, and diagnostic test data from the WARP. (Re: Draft ILSP, dtd 7/95, p 10)

The Maintenance Processor Subsystem (MPS) shall monitor the performance of the WARP system both hardware and software, report system failures/status to the WARP user and MPS and provide system level control of the operation of the WARP system. (Re: Spec dtd 7/13/95 p 58/59)

3.2.5 System Certification

Since the WARP will be used to provide an advisory service, system certification will not be required. This is based on requirements listed in FAA Order 6000.15B, General Maintenance Handbook for Airways Facilities. (Re: MRD undated p. 5)

3.2.6 Personnel Certification

Since the WARP will be used to provide an advisory service, personnel certification will not be required. This is based on requirements listed in FAA Order 6000.15B, General Maintenance Handbook for Airways Facilities. (Re: MRD undated p. 5)

3.3 Facilities and Equipment

The Facilities and Equipment (F&E) personnel will participate, monitor, and assist in site surveys conducted by Harris. For the WARP Stage 0 implementation, site surveys are scheduled for the Anchorage ARTCCs and the ATCSCC. The purpose of the ATCSCC site surveys is to determine the requirements and signal routing for the fiber optic cable installations. The Anchorage ARTCC site survey is to support the connection to the unique interfaces. The unique Alaska Stage 0 WARP interfaces includes HRPT Image Processing Subsystem (HIPS), Bureau of Land Management (BLM) lightning data, and direction connection to seven Weather Service Radar-88D (WSR-88D) radars. During installation, F&E personnel will provide access to required power and signal buses.
No site surveys are required for the remaining sites because the new cabling will be routed following the same routing as for the MWP cables. The 10B-T cable used to connect the printers and new briefing terminals will be shipped in bulk to the site. These cables will be cut to the correct length and terminated in RJ45 connectors on-site. This procedure will allow the installation team to accommodate minor moves for these devices.

Stage 1-3 the F&E personnel will participate in site surveys after contract award, monitor and assist those site surveys conducted by the contractor. During installation, F&E personnel will cross-connect the interfacing equipment and provide access to required power and signal buses. In addition, the F&E personnel will participate in WARP orientation provided by the contractor at Government-owned facilities.
(Re: 6030.45A, p 25)

3.4 Systems Maintenance

During system implementation for stage 1-3, both preventive and corrective maintenance actions will be performed by Harris personnel. Sector personnel are to insure that all maintenance actions are performed in accordance with approved documentation. (Re: SOW 7/96 5/95)

The WARP Stage 0 system is a leased system that is maintained by Harris. Harris maintenance personnel are included on the WARP installation teams to receive OJT for the new equipment and software. The Harris maintenance personnel will have previously received formal classroom training in Melbourne, Florida prior to the installations.

3.5-3.19 (Reserved)

3.20 Status Assessment

Currently, there are no AF operations issues associated with fielding the WARP that would impact implementation.

4.0 AT OPERATIONS

4.1 Summary of AT Operational Impacts

During the implementation of the WARP at a particular site, the following activities may affect AT operations (also see section 2.2 for further discussion of site implementation process):

During system installation and checkout (INCO) system shutdown or interruption of the MWP system may be required for each site. Such activities will be coordinated with Air Traffic management by the Technical On-Site Representative (TOR)). Any required shutdowns of operational facilities will be coordinated with Air Traffic management by the Technical On-Site Representative (TOR) and will normally be permitted only between the hours of 10:00 p.m. and 6:00 a.m. local time. Scheduled outage will be limited to four hours.

During the System Integration phase of implementation, existing Letters Of Agreement (LOA) and Notices to Airmen (NOTAMs) should be examined to determine need for changes when the WARP is in operational use. If applicable, NOTAMs and revisions to LOAs should be executed.

During the familiarization testing phase, ATC personnel who will use the output of the WARP will participate in shakedown testing per defined test procedures.

During the dual operations phase for Stage 0 will be approximately 3 weeks at the Dallas/FW ARTCC, both the WARP and the MWP will be available for operational use.

Once the WARP Stage 0 system is in operational usage, changes to AT operations are minimal. In summary, the changes are as follows:

a. **Harris Weather Data Service (HWDS)** - Lightning products from Global Atmospherics Inc. (GAI). GAI products have been added to the service. ATC will now be able to display lightning strikes on their displays to show the front of a thunderstorm. The display will show the location, time, and polarity of each strike.

b. **NEXRAD Information Dissemination Service (NIDS)** - The NIDS vendor has been changed from WSI to Unisys. There is no change to AF operations because the Harris WARP applications software processes the NIDS radar data similar to the previous MWP system. The only apparent change to the operator is the color of the map backgrounds.

c. **Feature Changes** - Changes to AT operations as a result of the systems enhancements when the site is upgraded from MWP to WARP include:

   1. A third 20" monitor added to the meteorologist's workstation. The third monitor permits the Meteorologist and weather personnel to open and keep open more windows. Any display can be shown on any one of the three monitors. The only restriction is only one animation loop can be run on each monitor at the same time. The mouse can be dragged across all three monitors.
   2. The operator only has to log on once.
   3. The Graphical User Interface (GUI) retains the last user settings.
   4. The Meteorologist and weather personnel can overlay radar and satellite imagery products on the same display.
   5. Auto update of all products
   6. The new briefing terminals have many new features including:
      - Windows 95 environment
      - GUI interface - mouse controls
      - Animation loops can be run
      - Computer Based Training (CBT)

- On-line pull down help menu
- View multiple products
- Addition of lightning data products to the HWDS

4.1.1 Transitory State

During the implementation of the WARP at a particular site, the following activities (Re: info from ATR-130, dated 3/94) may affect AT operations (also see section 2.2 for further discussion of site implementation process):

a. During system installation and checkout (INCO), some system shutdown or interruption may be required. Such activities will be coordinated with Air Traffic management by the Technical on Site Representative (TOR). Any required shutdowns of operational facilities will normally be permitted only between the hours of 10:00 p.m. and 6:00 a.m. local time.

b. During the System Integration phase of implementation, existing letters of agreement (LOA) and Notices to Airmen (NOTAMs) should be examined to determine need for changes when the WARP is in operational use. If applicable, NOTAMs and revisions to LOAs should be executed.

c. During the Familiarization testing phase, ATC personnel who will use the output of the WARP will participate in Familiarization testing per defined test procedures.

d. During the dual operations phase, both the WARP and the MWP will be available for operational use.

4.1.2 Operational State

The WARP Mission Needs analysis identified program objectives designed to positively impact AT operations, as summarized below:

a. Comprehensive weather data acquisition - The WARP will acquire Doppler weather data from the WSR-88D including high resolution precipitation, upper air wind field measurements, severe storm identifications and tracking data. The WSR-88D will identify individual storm cells and storm height and will detect extreme phenomena such as hail or organized cyclone winds. The WARP will also receive automated surface observations, identical to those broadcast continuously to pilots, National Weather Service (NWS) upper air gridded model data, pilot reports, and other NWS data.

b. Enhanced meteorological processing - Product data from all WSR-88Ds within the ARTCC airspace coverage will be processed by the WARP to form mosaics of interpretation in three bands to coincide with air traffic altitude sectorization. The WARP will process pilot reports and other alphanumeric products to improve their value as quick source aids to controllers. The WARP will also transform upper air wind and temperature forecast data to provide hourly projections of expected conditions to selected flight levels and grid positions.

c. Weather data dissemination - The WARP will disseminate mosaicked WSR-88D reflectivity data to controllers for depiction on their displays. Reformatted alphanumeric weather products needed by controllers to provide weather support services to pilots will also be disseminated. Textual and graphic weather hazard warnings and advisories created by the Meteorologist and weather personnel will be disseminated to controllers, pilots and other ATC users for overlay and correlation with targets. See section 5.3 for additional information on capabilities.

(Re: MNS dtd 3/95 p. 8-9)

4.2. AT Procedural Changes

Organizational changes are already in place. No procedural changes should take place. (Re: ATP-100 dtd 9/13/94)

4.2.1 ATC Operational and Management Procedures

No changes will be made to the present procedures.
(Re: ATP-100 dtd 9/13/94)

4.2.2 Flight Procedures/Standards

Organizational changes are already in place. No procedural changes should take place.
(Re: ATP-100 dtd 9/13/94)

4.2.3 Administrative and Management Procedures

No changes will be made to the present procedures.
(Re: ATP-100 dtd 9/13/94)

4.2.4 Software Verification Procedures

No changes will be made to the present procedures.
(Re: ATP-100 dtd 9/13/94)

4.2.5 Inter-facility Procedures

No changes will be made to the present procedures.
(Re: ATP-100 dtd 9/13/94)

4.2.6 Personnel Certification Procedures

No changes will be made to the present procedures.
(Re: ATP-100 dtd 9/13/94)

Harris provides training for the new briefing terminals. A Certificate of Training is presented to each briefing terminal course graduate and not later than 10 calendar days after the end of the class. The Certificate of Training will contain:

- Course Title
- Hours of training completed
- Location of training
- Class start and end dates
- Student name and social security number
- Course grade (Pass/Fail)

4.2.7 System Back-up/Cutover Procedures

No changes will be made to the present procedures.
(Re: ATP-100 dtd 9/13/94)

4.3 AT Implementation Responsibilities

Air traffic personnel will support the implementation process by monitoring and participating in the resolution of WARP AT related issues. They will also review and verify new/revised policy and procedures attendant to the WARP program. AT personnel will identify the skill categories required for WARP operational tasks and activities, and provide estimates of the level of effort needed to perform such tasks and activities. (Re: ATP-100 dtd 9/13/94)

4.4-4.19 (Reserved)

4.20 Status Assessment

The risk assessment associated with Air Traffic operations is low. This risk assessment is considered low because of program schedule and limited training required.

5.0 SYSTEM CONFIGURATION AND ENGINEERING

5.1 NAS Level Architecture

5.1.1 NAS Target State

The NAS Architecture is defined as an inter-functioning aggregate of facility sets. The following is a list of the identified NAS facility sets: ARTCC, AFSS, Landing, ATCCC, ATCT/TRACON, RCF, Navigation, NAWP, Surveillance, Weather, Support, RMMS, TMCC, and DUAT Service. The WARP program is a subsystem of the ARTCC set. The NAS is controlled by 23 Centers (21 in CONUS and one each for Alaska and Hawaii). Every ARTCC is responsible for approach, departure, and enroute control. The Air Route Traffic Control Centers lateral boundaries are updated periodically as dictated by operational needs. The ARTCC facility set consists of the following subsystems (Re: NAS-SS-1000 Vol. I dtd 2/93 p. II-2, II-8):

1. Display System Replacement (DSR);
2. AWOS data acquisition system (ADAS);
3. Flight service data processing system (FSDPS), except NY TRACON and Honolulu;
4. Local communication network (LCN);
5. National airspace data interchange network IA (NADIN IA), except NY TRACON;
6. National airspace data interchange network IIA (NADIN II);
7. Radio control equipment (RCE), Type II;
8. Voice switching and control system (VSCS);
9. Data link processor (DLP), TBD for NY TRACON;
10. Maintenance data terminal (MDT);
11. National radio communications system (NARACS);
12. National radio communications systems (NARACS), emergency operating facility (EOF), Denver and Atlanta only;
13. Network monitor and control equipment (NMCE);

5.1.2 Inter-program interfaces

Stage 0 has few interfaces to other NAS programs and its purpose is primarily a bridge from the existing MWP system until the development of the WARP Stage 1 system is completed and ready for deployment. Figure 5.1-1 illustrates the external interfaces to the WARP Stage 0 system.

The WARP is compatible with the existing NAS systems as detailed below:

5.1.2.1 WSR-88D (NEXRAD)

The Alaska WARP system will receive Doppler weather radar products from the WSR-88D (NEXRAD) Class IV ports as a direct connection to the WARP system over the Alaska NAS Interfacility Communications System (ANICS) satellite system. The WARP will interface with WSR-88D in accordance with UNISYS 12083041.

5.1.2.2 ANICS

The WARP system will utilize the ANICS for any communications with the Alaskan WSR-88D radars required to support the WARP as specified in the ANICS specification.

The WARP will be compatible with a number of existing or future systems for Stages 1-3 as detailed below:

5.1.2.3 National Airspace Data Interchange Network (NADIN) Packet Switch Network (PSN)

The WARP will exchange information with the WMSCR and other WARP systems through the NADIN PSN. The WARP shall interface with NADIN Packet Switching Network (PSN) in accordance with NAS-IR-43020001.

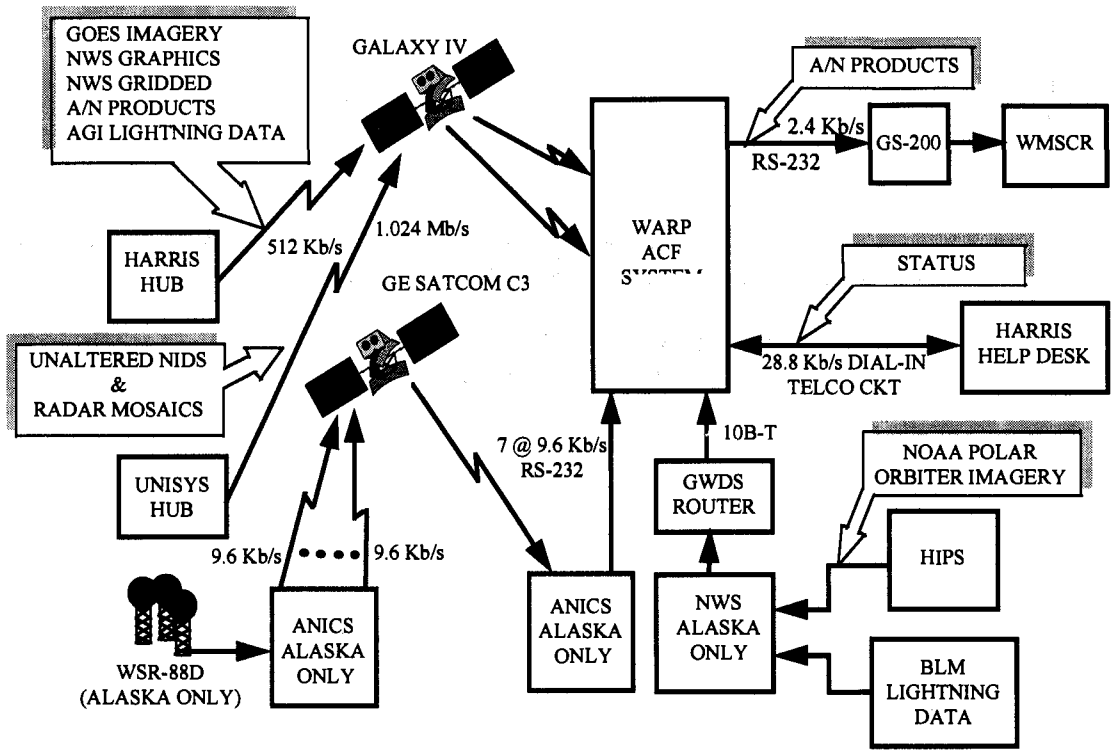

Figure 5.1-1 Stage 0 WARP System External Interfaces

5.1.2.4 Weather Message Switching Center Replacement (WMSCR)
The WARP will exchange alphanumeric, binary, and graphic weather products with the WMSCR. The WARP shall interface with WMSCR in accordance with NAS-IR-949022507 to transmit and receive weather message data to/from external NAS

5.1.2.5 Maintenance Processor Subsystem (MPS)
The WARP shall interface with MPS in accordance with NAS-IR-51030002, to transmit failure/status data to the MPS and receive WARP status requests from the MPS. This will be replaced by NIMS in the near future.

5.1.2.6 Coded Time Source (CTS)
The WARP shall interface with CTS in accordance with NAS-IR-92020000, to receive time synchronization data.

5.1.2.7 Local Communications Network (LCN)
The WARP shall interface with LCN in accordance with NAS-IR-21020000.

5.1.2.8 AWOS/ASOS Data Acquisition System (ADAS)
The WARP will acquire local real-time weather observations from ADAS. The WARP shall interface with ADAS in accordance with NAS-IR-25112508.

5.1.2.9 Automated Enroute Air Traffic Control (AERA)
The WARP will supply weather information, especially WSR-88D mosaic products, to the AERA for display to controllers.

5.1.2.10 WSR-88D (NEXRAD)
The WARP will receive Doppler weather radar products from the WSR-88D (NEXRAD). The WARP shall interface with WSR-88D in accordance with UNISYS 12083041.

5.1.2.11 Other WARPs
The WARP shall interface with other WARPs in neighboring ARTCCs, via NADIN PSN, for the purpose of exchanging radar data.

5.1.2.12 FAA Telecommunications Satellite (FAATSAT)
The WARP system shall utilize the FAATSAT for any communications with the ARTCCs/ATCSCC facilities required to support the WARP as specified in the FAATSAT specification.

5.1.2.13 Integrated Terminal Weather System (ITWS)
The WARP interface with ITWS will be developed during the contract.

5.1.2.14 Display System Replacement (DSR)
The DSR provides an interface to the WARP, via the WARP Gateway, as specified in NAS-IC-25152104. The DSR/WARP interface provides R-controllers a capability to receive and display weather map products obtained from WARP, via the LCN.

5.2 Platform Architecture
The NAS is broken down into three physical platforms: ARTCC, ATCT/TRACON, and Airway Support Facilities (ASF). The WARP is an element of the ARTCC platform. (Re: NAS-SS-1000 Vol.I p. II-2)

5.2.1 Interim Platform Configuration
The WARP is within the ARTCC Platform.

5.2.2 Target State Configuration
Standard ARTCC with WARP fully integrated.

5.3 Subsystem Level Architecture
The WARP Stage 0 hardware architecture for a typical WARP ARTCC site is illustrated in Figure 5.3-1. The four WARP subsystems are the Server Subsystem which is located downstairs in the Automation Wing of the ARTCC building; the Workstation Subsystem which is located upstairs in Control Wing of the ARTCC building; the Briefing Terminal Subsystem also located in the Control Wing; and the Communications Subsystem which is distributed in the Automation and Control Wings of the building.

The Alaska ARTCC WARP system has several unique interfaces that are implemented during Stage 0. These include the HIPS polar orbiting satellite imagery data, Bureau of Land Management lightning data, and the direct connection to seven WSR-88D radars. Figure 5.3-2 illustrates the hardware architecture diagram for the Alaskan ARTCC WARP system.
Stage 1-3 Architecture will be added at the Stage 1-3 update

5.3.1 Hardware
The Workstation and Briefing Terminal Subsystems provide the user interface between the WARP system and the FAA personnel. The Workstation includes a color printer and a laser printer. The Briefing Terminal includes one color printer to serve all of the briefing terminals. A list of the hardware is listed in Table 5.3.

5.3.1.1 Workstation display console
The WARP workstation console shall provide weather information to the Meteorologist and weather personnel. The WARP workstation console shall consist of one full IBM Standard (QWERTY) keyboard, one mouse or trackball and three color graphics monitors with a diagonal screen of 19 inches, measured on the

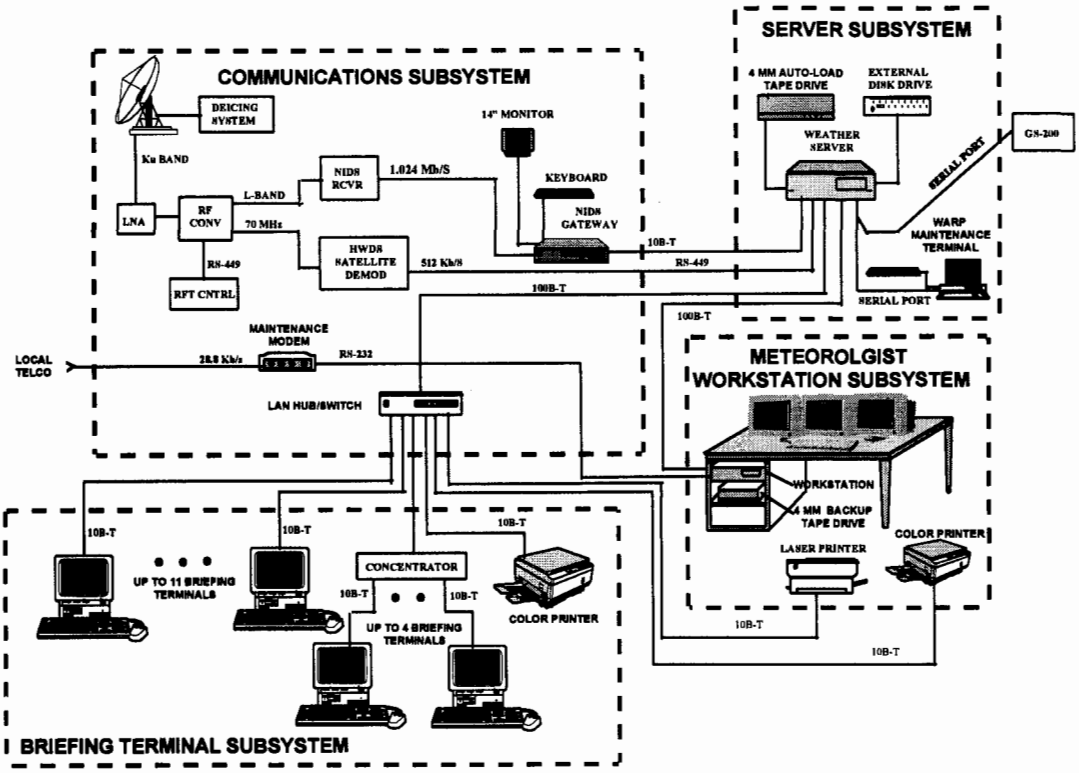

Figure 5.3-1 Typical ARTCC WARP System Hardware Architecture Block Diagram

visible portion of the screen between the inner edges of the picture tube housing, ninety (90) percent of the visible portion of the screen area displayable, a pixel resolution of 1280 by 1024, non-interlaced 70 Hz, and Dot pitch of .28 mm. (Re: Spec dtd 7/13/95 para. 3.2.4.2.1)

5.3.1.2 Briefing terminals

The WARP briefing terminal shall provide weather information to AT users. The WARP briefing terminal shall consist of one full QWERTY keyboard and one color graphics monitor as described in 5.3.1.1. (Re: Spec dtd 7/13/95 para. 3.2.4.2.2)

5.3.1.3 Color hardcopy device

The ARTCC WARPs shall include one hardcopy color device for the workstation and one for the briefing terminals. The ATCSCC WARP shall include one hardcopy color device for each workstation and two hardcopy color devices for the briefing terminals. The hardcopy color devices shall contain the following commercially available characteristics:

a. Uses non-smearing, non-banding laser or thermal process

b. Produces 4096 colors/256 gray shades without dithering and utilizing black as a primary color

c. Produces 300 dots per inch resolution

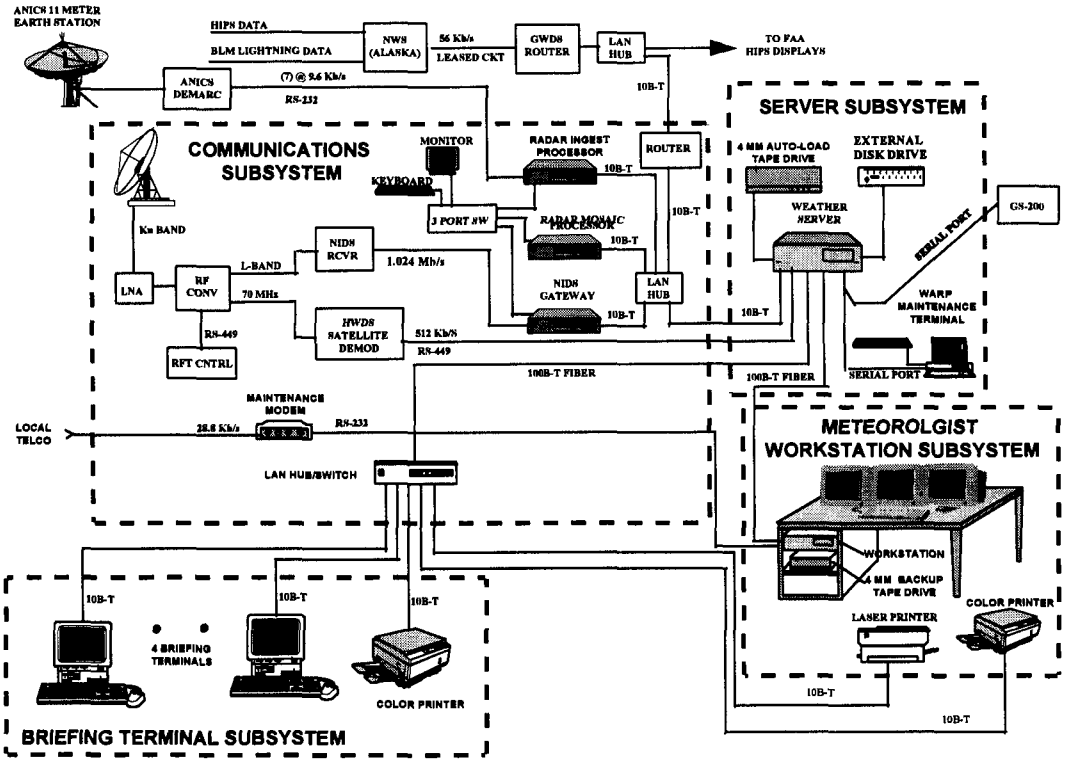

Figure 5.3-2 Alaska ARTCC WARP System Hardware Architecture Block Diagram

d. Produces a hardcopy output of an image product with no larger than 1 inch margins on 8-1/2 by 11 inch and 11 by 17 inch paper that can be written on with pencil and either permanent marker or transparency marker

e. Meets the Occupational Safety and Health Administration (OSHA) standard OSHA-29 with respect to acceptable noise levels. (Re: Spec dtd 7/13/95 para. 3.2.4.2.3).

5.3.1.4 Alphanumeric printer

A commercially available laser printer with the following characteristics shall be provided at each ARTCC and ATCSCC WARP workstation:

a. Produces 300 dots per inch resolution

b. Produces output of at least 10 pages per minute

c. Uses 8-1/2 by 11 inch paper that can be written on with standard ink pen, felt tip, and pencil.

A commercially available laser printer shall be provided at each meteorologist workstation. (Re: Spec dtd 7/13/95 para. 3.2.4.2.4).

5.3.2 Software

Existing proven designs from commercially available Sources shall be used for the software components of the WARP to the extent possible. (Re: Spec dtd 7/13/95) Functional elements are described in subparagraphs below.

5.3.2.1 Data Acquisition
The WARP acquires radar, satellite, lightning, alphanumeric, gridded, and graphic products from outside Sources. Radar data is obtained from a NIDS vendor (Unisys). Satellite, lightning, alphanumeric, gridded, and graphic products are obtained from the HWDS.

5.3.2.2 Product generation/display
The WARP processes, generates, and displays radar, satellite, lightning, alphanumeric, gridded, and graphic products. The WARP also allows the user to create, modify, store, delete, and display his/her own alphanumeric, graphic, and annotated graphic products.

5.3.2.3 Alarm/alert processing
The WARP is capable of generating Product Alarms/Alerts, Weather Alarms/Alerts, System Alarms/Alerts, and Processing Error Alarms/Alerts. The WARP provides the capability for the Meteorologist and weather personnel to specify the duration and volume of the alarms.

5.3.2.4 Data management
The WARP manages the weather data base. The major topics are system logging, retention, archiving, and data base refresh requirements.

5.3.2.5 System monitoring and control
The WARP Stage 0 system monitors itself for problems, and it provides the user with authorized access to the WARP. The WARP Stage 1 system will be monitored and controlled by NIMS.

5.3.2.6 Dissemination
The WARP disseminates acquired products and generated products.

5.3.3 Physical Specification
The WARP equipment width, and depth shall not exceed the dimensions as referenced in Table 5.3-3-1. (Re: NAS-IR-61002415 dtd 6/23/94 p. 3)

Existing proven designs from commercially available Sources shall be used for all hardware components of the WARP. (Re: Spec dtd 7/13/95 p. 75)

COMPONENT NAME	QTY	WIDTH (IN)	DEPTH (IN)	HEIGHT (IN)	FRONT CLEAR (IN)	REAR CLEAR (IN)	UNIT SPACE (SF)	TOTAL SPACE (SF)
WARP Processor	1	212.4	36	76	36	36	160	160
Workstation	1						75[1]	75[1]
Briefing Terminal	15						6[2]	90[2]
							Total Square Feet	325

Table 5.3-3-1. WARP Envelope Requirements

Notes:
1. Access space is included.
2. Access space is not included.

The physical dimensions and characteristics of the WARP equipment such as size and weight will be determined by the vendor and will be consistent with the requirements of NAS-IR-61002415, ARTCC/WARP IRD.
(Re: Spec dtd 7/13/95 para. 3.2.4.6 and 3.2.4.7)

The WARP equipment supplied shall be mounted in the first floor control room and the Automation Wing Basement (AWB) as shown in Figure 5.3-3-2 and shall be mounted to withstand local seismic conditions.

Cabinets and frames shall be designed for an average weight distribution of floor loading not to exceed 125 lb/sq. feet. The WARP shall have no point load that exceeds 1000 lbs/sq. inch over a 4 square foot area for each single cabinet and rack. (NAS-IR-61002515 dtd 6/23/94 p.3).

Cabinets and frames are designed for an average weight distribution of floor loading not to exceed 125 lb/sq. feet. The WARP will not have point loads that exceeds 1000 lbs/sq. inch over a 4 square foot area for each single cabinet and rack.

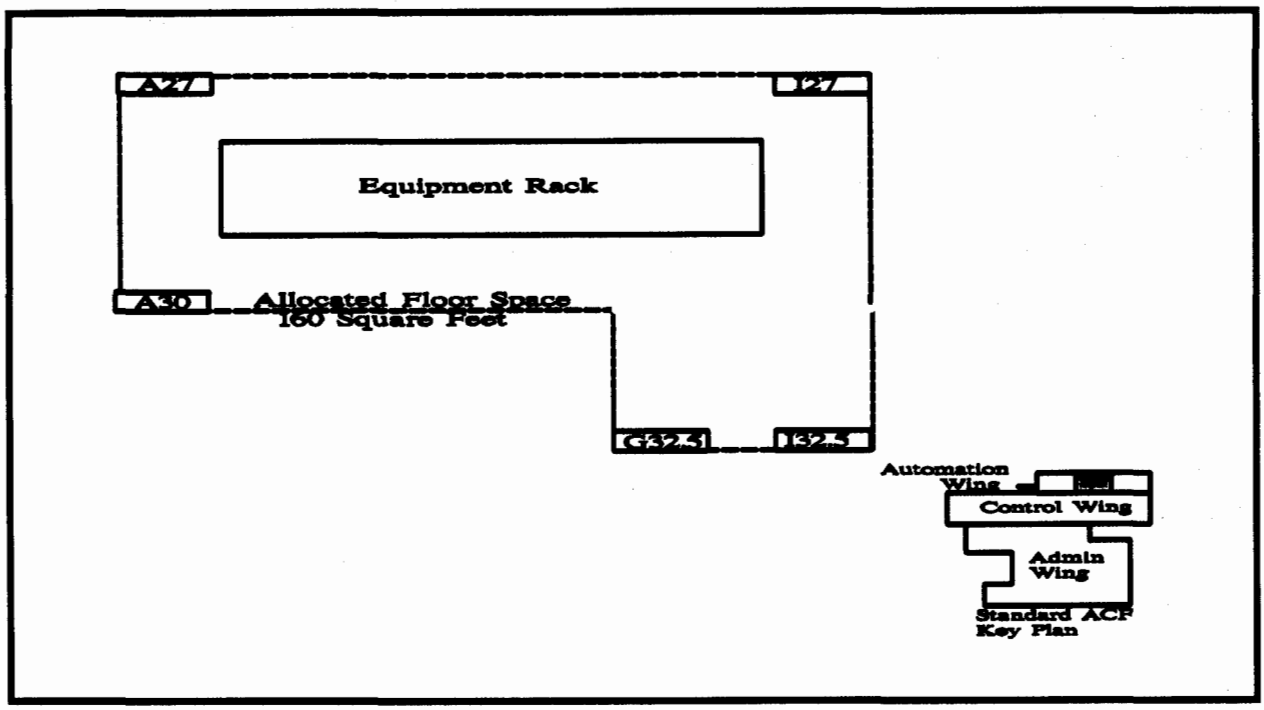

Figure 5.3-3-2 Location/Orientation/WARP Processor (AWB)

Notes:
a. Location, space, and orientation may vary based on ARTCC effectively.
b. Corner alphanumeric are wing-floor location coordinates.
c. All cables are routed under the raised floor.

The space requirement for the WARP processor racks is illustrated in Figure 5.3-3-3. The expansion space needed for the new Stage 1 server is also shown on the drawing to provide the facilities engineers advance notice of the Stage 1 facility requirements. As shown, the WARP processor racks do not require as much space as was allocated for the equipment in NAS-IR-61002515. The new Sun Model 5000 server that will be installed in not a standard rack. Its dimensions are 30"W x 39"D x 56"H. Therefore, this rack is larger than the MWP rack that was deinstalled from this same location during the MWP extension contract. Also, the extra depth of the server rack only permits 33 inch rear access.

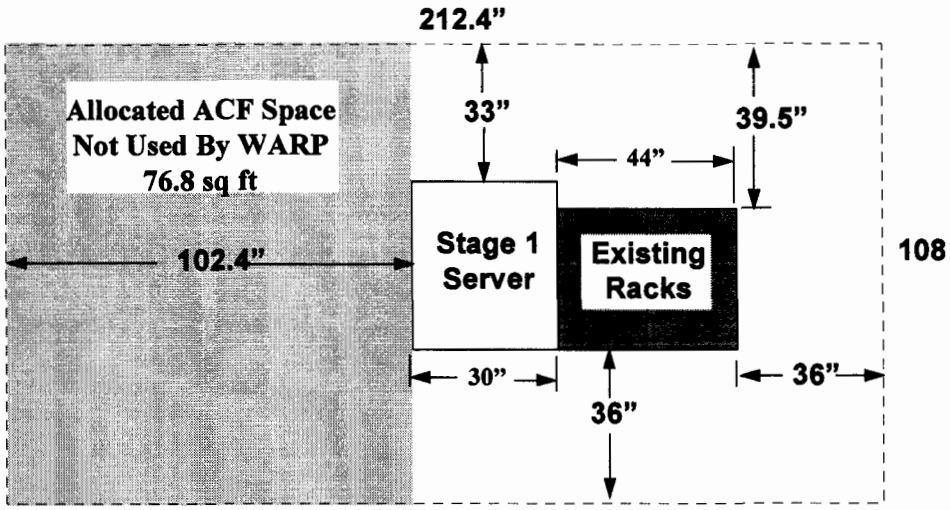

Figure 5.3-3-3 WARP Processor Equipment Racks Space Requirements

The rack elevations for the Stage 0 racks are shown in Figure 5.3-3-4. These racks are the existing MWP equipment cabinets which will be upgraded to reflect the modifications shown in Figure 5.3-3-4.

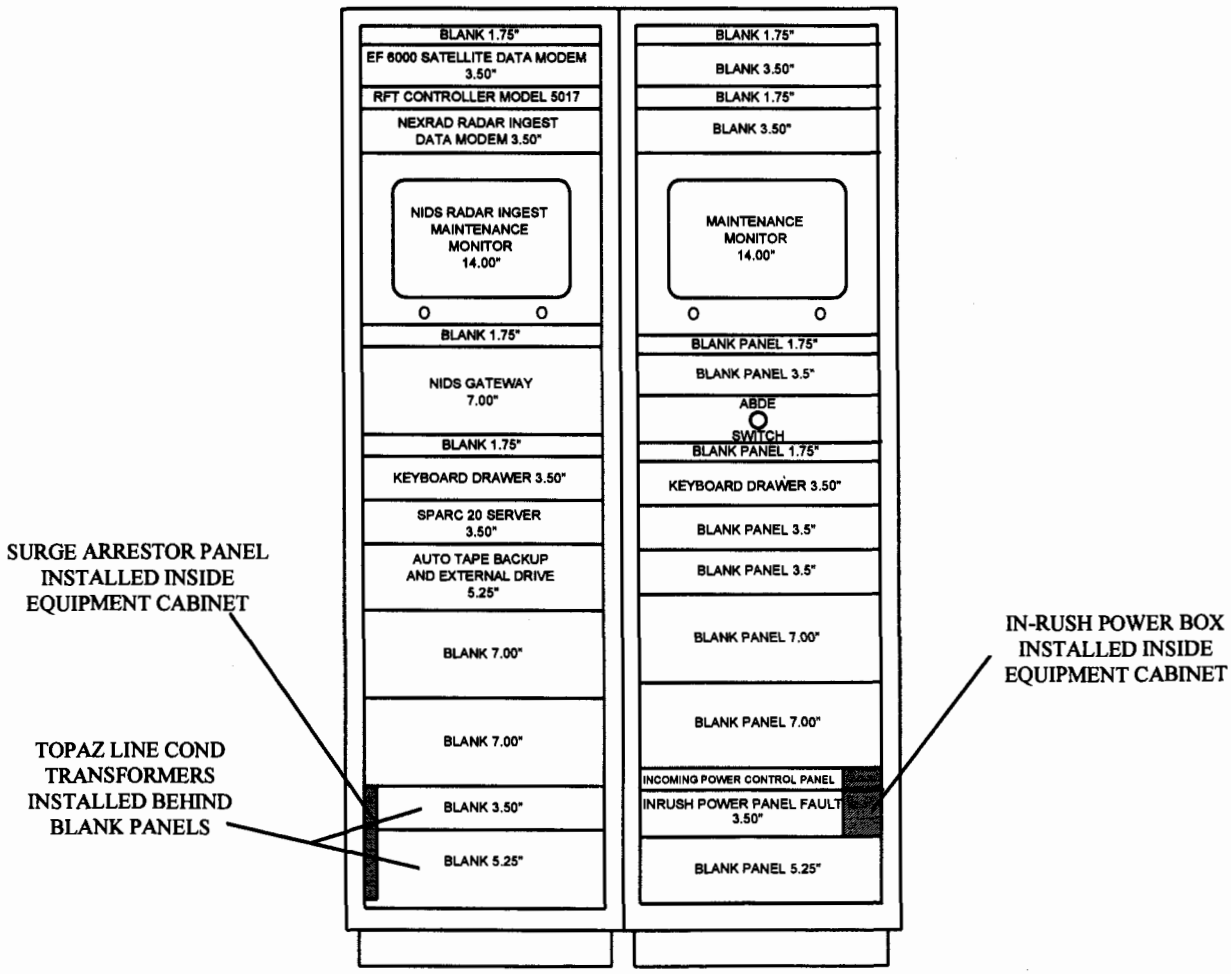

Figure 5.3-3-4 Stage 0 Typical WARP ARTCC System Equipment Rack Elevations

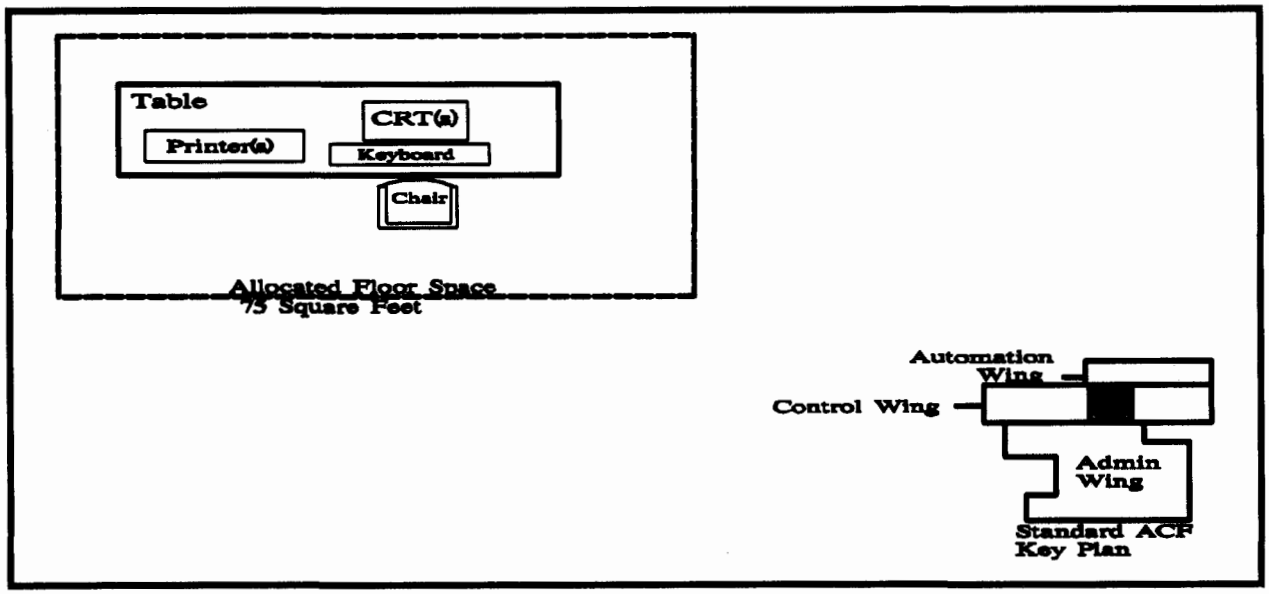

Figure 5.3-3-5 Location/Orientation/WARP Workstation (CW1)

Notes:

a. A maximum of fifteen briefing terminals require 6-square-foot cabinets may be located within the Control Wing first floor for a total of 90 square feet.

b. All cables are routed under the raised floor.

The WARP meteorologist's workstation space allocation specified in NAS-IR-61002515 is illustrated in Figure 5.3-3-5. This space includes room for one of the color printers and the laser printer. The allocation is for 75 square feet in the facility. The width and depth of the space allocation was not specified in NAS-IR-61002515. Figure 5.3-3-6 illustrates an optimum, but also a realistic usage of the 75 square feet. A 72"W x 32"D x 28"H table is shown for the workstation and its three 20" monitors. The existing MWP table is 60"W x 30"D x 28"H. Each of the new printer tables is 28'W x 32"D x 28"H.

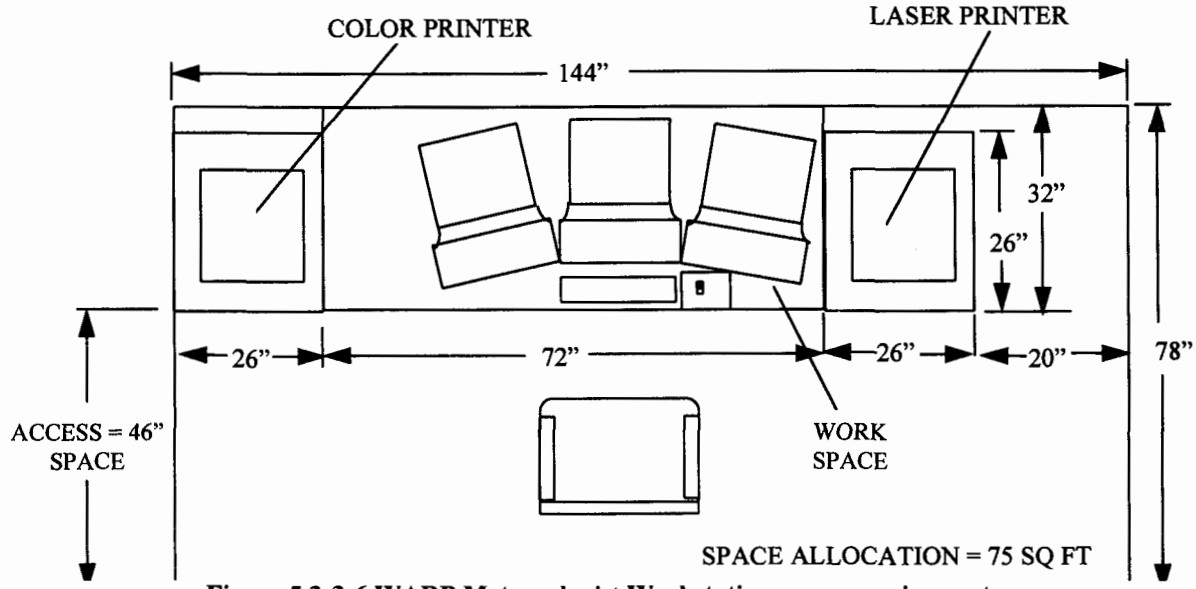

Figure 5.3-3-6 WARP Meteorologist Workstation space requirements

5.4-5.19 (Reserved)

5.20 Risk Assessment

The E-Complex Will be equipped with Critical power and building services power power only. (Ref: ANS-300)

The largest technical risk is in software, primarily in the variation of the non-developmental (NDI) software that will be proposed and used by various vendors. The government estimates of the lines of code to be either modified and/or developed were based upon RWP prototype software development additions for new MWP-like processing and display requirements. Because many vendors claim to have already developed the functionality needed, this estimate may be overstated. The software for the RWP was developed by the Jet Propulsion Laboratory (JPL) and consists of approximately 250K lines of Ada, C+, and commercial code.

Although WARP will utilize state-of-the-art computer systems, there is very little risk anticipated because all of the functions have been demonstrated in the existing MWP operations or RWP prototype systems.

Engineering risks are primarily in the software development and integration of NAS system interfaces. See section 2.20 Risk Assessment for further discussion of the risk.

6.0 PHYSICAL FACILITIES

6.1 Real Estate

6.1.1 Real Estate Requirements

The WARP will be installed in existing ARTCCs. There are no real estate acquisition requirements.

6.1.2 Real Estate Plans

Not applicable.

6.2 Heating, Ventilation & Air Conditioning (HVAC)

6.2.1 HVAC Requirements

The internal temperature of an operating WARP will stay within the operating limits, as specified by supplying vendors, of all WARP components, without requiring special cooling equipment (other than under floor forced-air cooling with WARP enclosures).The WARP system environmental requirements are listed in Table 6.2-1 in accordance with NAS-IR-61002515. The WARP heat generation shall not exceed the values shown in Table 6-III. (Re: NAS-IR-61002515 dtd 6/23/94 p. 12)

COMPONENT NAME	QTY	UNIT HEAT GEN BTU/HR	TOTAL HEAT GEN BTU/HR	AMBIENT CONDITIONS			
				ROOM TEMP		HUMID %	
				DEGF (L)	DEGF (H)	RH (L)	RH (H)
WARP Processor	1	50,900	50,900	60	90	10	80
Workstation	1	13,200	13,200	60	90	10	80
Briefing Terminals	15	433.3	6,500	60	90	10	80
Total BTU/HR			70,600				

Table 6.2-1 WARP Environmental Requirements

No additional HVAC requirements are identified for the WARP Stage 0 system. The result of the technology upgrade from the MWP equipment to the WARP equipment is no significant delta change in BTUs of heat generated by the new equipment.

The WARP system operational environments are tabulated in Table 6.2-2. The WARP Stage 1 heat load on the facility is included in the table because the Stage 1 Sun Model E-5000 server generates considerably more heat than the Stage 0 Sun SPARC 20 server. The entries in Table 6.2-1 represent the worst case operating environment of all the equipment that comprises that subsystem. The heat generated by the equipment is considerably less than the allowable load specified in NAS-IR-61002515 except for the Briefing Terminals. However, the heat generated by a briefing terminal in standby is less than 50% of the heat generated when the traffic manager is using the terminal. The monitor power saver feature is the reason for the lower standby power dissipation. Typically, all briefing terminals are not in use at the same time.

Component Name	Qty	Unit Heat Gen BTU/HR	Total Heat Gen BTU/HR	Ambient Conditions			
				Room Temp		Humid %	
				DEGF (L)	DEGF (H)	RH (L)	RH (H)
WARP Processor	1	21,360	21,360	55.4°F	95°	20	80
Workstation	1	3,412	3,412	50°F	95°	20	80
Briefing Terminals	15	620	3,720	41°F	95°	10	80
		Total BTU/HR	70,600				

Table 6.2-2 WARP Stage 1 Operational Environmental Characteristics

6.2.2 HVAC Plans

N/A.

6.3 Cables

6.3.1 Cable Routing/Raised Floor Requirements

The ARTCC and ATCSCC WARP shall be installed at each site as specified in NAS-IR-61002515, ARTCC/WARP IRD.(Spec dtd 7/13/95)

Equipment will be added to the existing MWP racks. Therefore, there is no new requirement for raised floors in the facilities. Existing cable trays will be utilized for the WARP installations. Cabling requirements can be summarized as follows:
100Base-T cables from the WARP processor equipment cabinets downstairs to the meteorologist's workstation upstairs will follow the existing cable routing in use today for the MWP program. The existing cable will be reused and a second 100Base-T cable added between the WARP processor server and the Local Area Network (LAN) hub/switch. Therefore, it is important that the CWSU not be moved to a new location when transitioned from MWP to WARP.

The cable limitation for 100Base-T copper cable is 100 meters. Facilities, such as Anchorage, will require a fiber optic cable between the WARP processor equipment cabinets and the workstation. Other facilities, including the ATCSCC, will be interconnected with fiber optic cable as required by the FAA Statement of Work.

The existing cabling is an ethernet LAN cable that is daisy chained from one briefing terminal to the next nearest briefing terminal until all briefing terminals (typically 9) are connected. If one unit fails, all briefing terminals downstream from the server are also unable to function. This cable will be replaced.
The new design utilizes a 10Base-T LAN for which each briefing terminal and printer is directly connected to a hub/LAN switch located at the meteorologist's workstation. Therefore, new briefing terminal and printer cabling is needed for the WARP installation.

Existing cable trays will be utilized for these cables.
Cabling will be plenum rated to be in compliance with fire codes.

6.3.2 Cable Plans

Cable routing plans will be included in each individual Site Implementation Plan. All cables are routed under the raised floor. Power and ground cable routing will not exceed 300 feet. (Re: NAS-IR-61002515 dtd 6/23/94 p. 6)

6.4 Power

6.4.1 Power Requirements

a. The WARP processing equipment and work station shall connect to the critical power system of the ARTCC as specified in Figure 6.4-1 and Figure 6.4-2.

b. The WARP Briefing Terminals shall connect to the essential power system of the ARTCC as specified in Figure 6.4-3.

c. If equipment is connected using each of three phases of the critical power system, then a balanced load shall be maintained on each of the three phases.

d. If an antenna is installed, the de-icer shall be connected to the essential power.

e. The interface power shall be provided by the facility consisting of a 3-phase power panel and circuit protection for 3 circuits of 30 amperes, 3 poles each.

f. The power consumption of the workstation equipment, located in the Control Wing First Floor, shall not exceed the values shown in Table 6.4-1.

g. The power consumption of the Briefing Terminal equipment, located in the E-Complex, shall not exceed the values shown in Table 6.4-1.

h. The power consumption of the processing equipment, located in the Automation Wing Basement, shall not exceed the values shown in Table 6.4-1.

i. The power consumption of all the WARP equipment together shall not exceed the values shown in Table 6.4-1.

j. Critical power requirements shall be in accordance with FAA Orders 6950.2c, and FAA-G-2100f, paragraph 3.3.2 and its subparagraphs.

k. (Re: NAS-IR-61002515 dtd 6/23/94 p. 3)

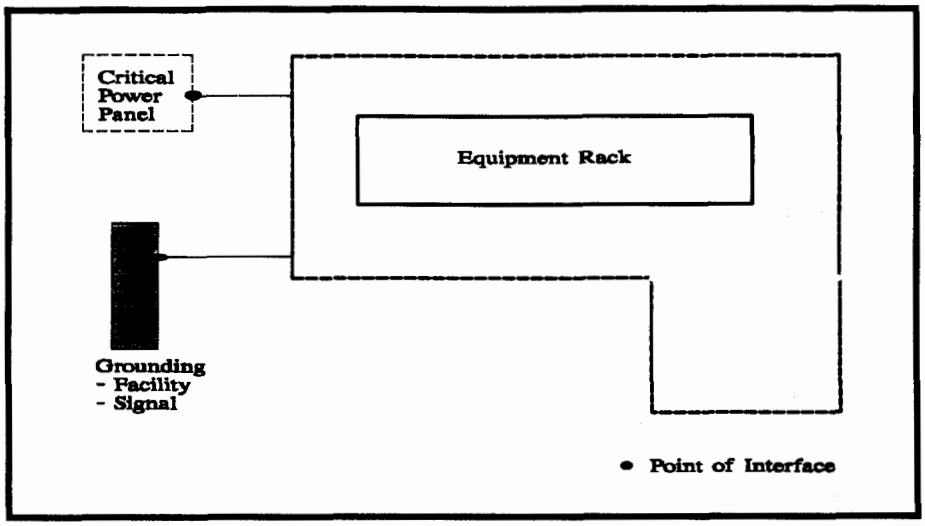

Figure 6.4-1 Interface Diagram/WARP(AWB)

Notes:
a. All cables are routed under the raised floor.
b. Power and ground cable routing will not exceed 300 feet.

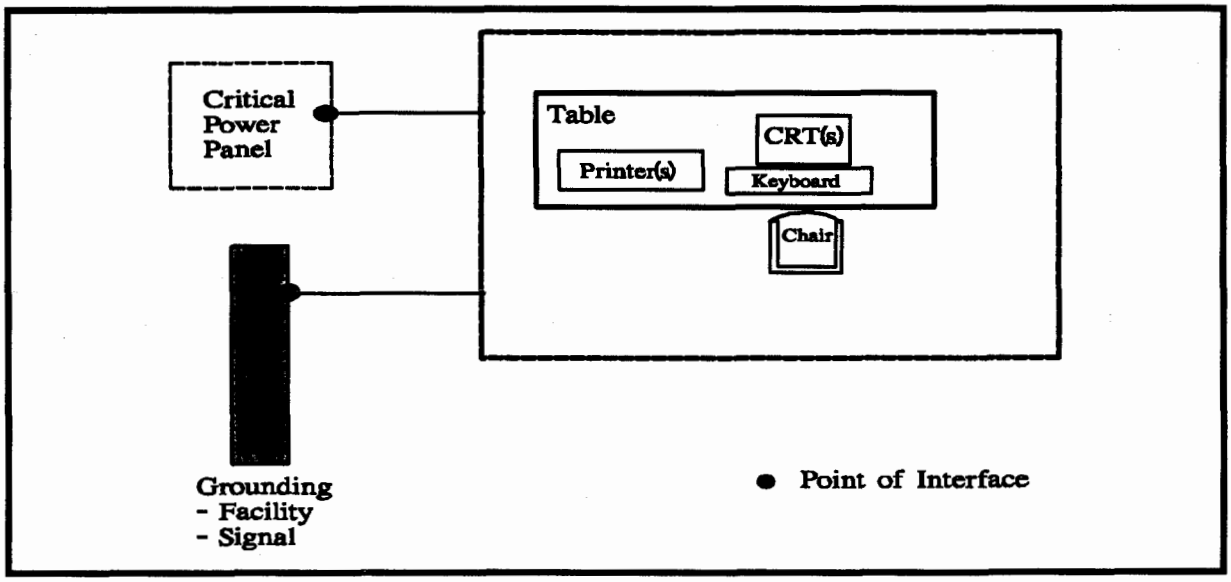

Figure 6.4-2 Interface Diagram/ WARP Workstation (CW1)

Notes:
a. All cables are routed under the raised floor.
b. Power and ground cable routing will not exceed 300 feet.

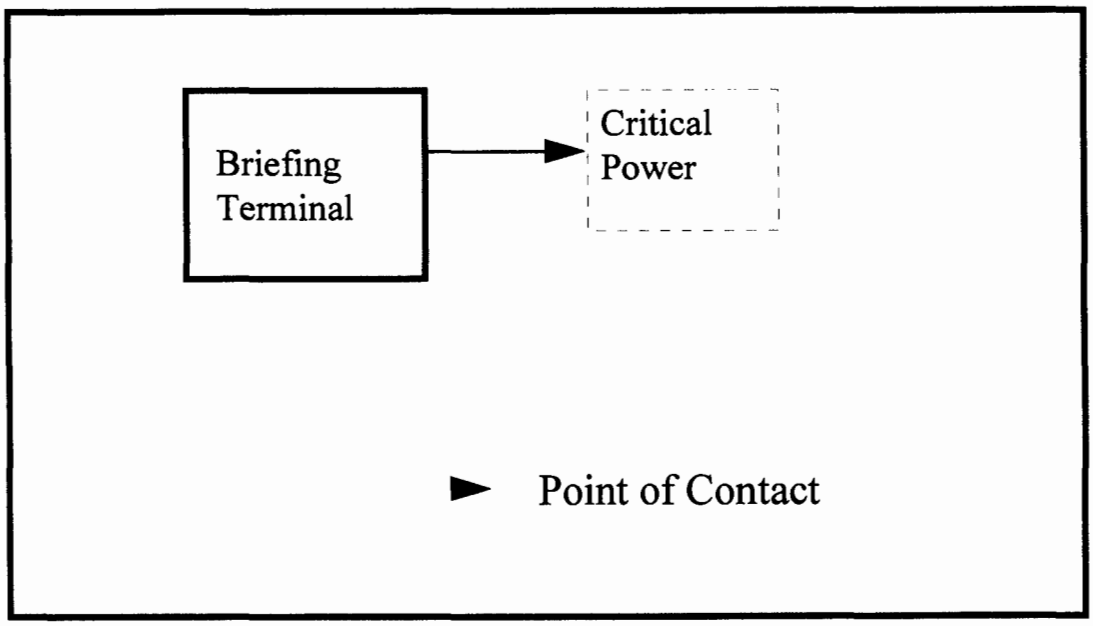

Figure 6.4-3 Interface Diagram/ WARP Briefing Terminal (CW1)

Notes: A maximum of fifteen briefing terminals may be located within the Control Wing first floor.

		CRITICAL POWER			ESSENTIAL POWER		
COMPONENT NAME	QTY	VOLTS 60 HZ	UNIT KVA	TOTAL KVA	VOLTS 60 HZ	UNIT KVA	TOTAL KVA
WARP Processor	1	120	17.8	17.8			
Workstation	1	120	4.8	4.8			
Briefing Terminals	15				120	0.156	2.34
			Total Critical KVA	22.6		Total Essential KVA	2.34

Table 6.4-1 WARP Electrical Requirements

6.4.2 Power Plans

The WARP will provide transient power protection, grounding, bonding and shielding in accordance with FAA-STD-020B. The ARTCC and ATCSCC WARP shall be installed at each site as specified in NAS-IR-61002515, ARTCC/WARP IRD.

6.5 Physical Safety & Security

6.5.1 Security and Safety Requirements

Not applicable.

6.5.2 Security and Safety Plans and Procedures

Not applicable.

6.6 Environmental / HAZMAT

Not applicable. There are no anticipated changes to the inside or outside building structure or environment. (Re: NAS-IR-61002515)

6.6.1 Environmental Requirements

Not applicable.

6.6.1.1 Monitoring

Not applicable.

6.6.1.2 Handling Hazardous Materials

Not applicable

6.6.2 Environmental Plans and Procedures

Not applicable

6.7 Grounding, Bonding, Shielding & Lightning Protection

6.7.1 Grounding, Bonding, Shielding & Lightning Protection Requirements

The contractor will be required to abide by FAA-Std-20B.

6.7.2 Grounding, Bonding, Shielding & Lightning Protection Plans

The installation of WARP equipment will be required to be shown in site preparation plans developed by the Harris, and meet all grounding, bonding, shielding, and lighting standards, in accordance with FAA-STD-020a paragraph 3.8.

6.8 Space

6.8.1 Space Requirements

Inside Storage space for approximately 5 to 6 pallets of equipment, furniture, and installation material will be required at each site. The Dallas/FW site will require storage space for one additional pallet that contains the dual operations equipment. The boxes that were used to deliver the new equipment will be reused to ship the residual MWP material back to Melbourne, Florida.

Temporary space will be needed near the WARP Processor racks in the basement for a workstation and some briefing terminals to support dual operations. Also, a classroom type environment would be convenient to temporarily place some briefing terminals for training. The terminals will be loaded with canned data for the training and will not require cabling to either the workstation or the WARP processor racks. As an alternative, the briefing terminals setup downstairs for the dual operations could be used for the training.

6.8.2 Space Allocation Plans

No additional space for WARP operations is needed for the Stage 0 equipment beyond the operational space already dedicated for the MWP equipment. However, additional space for a third rack which will house the Stage 1 WARP server should be considered while planning for this phase. The third rack should be located next to the existing two MWP racks to make up a 3-rack bay. The new rack's dimensions are 36"W x 39"D x 53"H.

6.9 Construction & Modification

6.9.1 Construction and Modification Requirements

Any building modifications that are necessary for WARP are already considered in FAA facilities plans. Therefore, there are no additional requirements for building construction or modification. (Re: AP dtd 5/95)

6.9.2 Construction and Modification Plans

Not applicable.

6.10 Telecommunications

6.10.1 Telecommunications Requirements

Telecommunications requirements for the Stage 0 WARP installations are as follows:
GFP Telco phone line for a 28.8 Kb/s dial-in modem. This line is currently in service at each site on the MWP program. For the Alaska ARTCC, this line needs to be transferred from Harris' name to the FAA.
Seven (7) 9.6 Kb/s circuits over the ANICS network to connect the WSR-88D radars to the WARP Radar Ingest Processor equipment.

The bandwidth of these circuits may increase to 14.4 Kb/s for Stage 1 as a result of changes anticipated in the WSR-88 Build 10 release scheduled for 1998.

6.10.2 Telecommunications Plans and Procedures

Will be addressed in Stage 1/2 by Harris.

6.11-6.19 (Reserved)

6.20 Risk Assessment

The E-Complex will be equipped with Critical power and building services power only. (Ref: ANS-300)

A great impact shall occur if the space is used by another program if the WARP schedule slips. This could also effect the communications that are already in place.

7.0 FINANCIAL RESOURCES

7.1 Summary of Funding Plan

The financial Life Cycle Cost (LCC) estimate for the WARP is based on a projected 10-year life cycle. The LCC estimates reflect the NAS interfaces development, system testing, system installation, and support costs for all 26 WARP systems (one to each of the 21 ARTCCs, one to the ATCSCC, one to the FAATC, the FAA Academy, one at the contractor's facility, and one optional system). A system is defined as all the meteorologist workstations, briefing terminals, and other peripherals necessary to fully support each individual site. The LCC estimates include projected cost for all stages. The costs associated with these major phases have been subdivided into primary cost drivers for each phase which are presented under appropriate budget categories (F&E, O&M, RE&D). Development and Production costs represent an estimated 65% of LCC. Operation and Support costs represent the remaining 35% of LCC.
(Re: CBA dtd 3/95)

The LCC estimates were determined using the following assumptions:

a. There will be 23 stage 0 systems.

b. There will be 26 WARP systems, one at each en route center, the ATCSCC, the FAA Technical Center, the FAA Academy, the Harris facility, and one optional system.

c. Stage 0 systems will be deployed in 1997. A limited production of up to 5 WARP stage 1/2 systems will be delivered in 1998; the stage 1/2 WARP will be installed nationwide in the 1999. Each system will have an operational life of 10 years, per Product Office, AUA-400, and ASD-100.

d. An "open system" hardware and software environment is required. Thus, a variety of hardware platforms would be capable of hosting the WARP. The software will operate under an 'open' operating system, such as X-Windows, Unix, or Windows-NT.

e. MWP functionality will be available COTS. Additionally, there will be vendors with software containing functionality similar to that required for RWP; however, this software will require modification to meet FAA requirements.

f. The software developed by JPL for the RWP will be provided to the production contractor as government-furnished information (GFI; i.e., the government does not claim liability for it, and the contractor is not required to use it).

g. The FAA will have the option of subscribing to the winning vendor's weather data service.

h. Contract award for WARP development will be in June 1996, based on a schedule analysis performed by system engineers.

i. Phases I and II of the, now canceled, Aviation Weather Products Generator (AWPG, CIP Project 63-22), previously scheduled to be implemented, respectively in the MWP and RWP, will both be hosted in the WARP. However, they will be developed under the aviation weather research programs and included as enhancements in stage 3, not as part of the initial operating capabilities. The specifications for these algorithms are as described in the "Cost-Benefit Analysis of the AWPG" (AC-92-1203, December 1992).

j. The system hardware will be maintained by the FAA. On-site maintenance staff will be able to cover the system.

k. This analysis does not include funds already expended on the transitional MWP, MWP Extension, or RWP projects.

l. Possible equipage of metroplex or local control facilities (MCF/LCFs) with WARP hardware was not considered in this analysis. If such equipage is determined to be required, a NAS Change Proposal will be issued.

m. The costs of continuing with two separate programs (RWP and MWP) was calculated by adding the costs from RWP and MWP Extension cost estimates (including AWPG Phases I and II development).

n. Benefits were calculated by updating the benefits estimate performed for the Cost-Benefit Analysis of the RWP (ATC-90-1064, September 1990).

7.2 Facilities and Equipment (F&E) Budget

The funding for the Development and Production phases of the WARP Program is managed through the F&E Budgeting Process.

7.2.1 F&E Budget Requirements

FAA budgeting requirements are submitted in accordance with FAA Order 2500.1M, Call for Estimates, General Information and Policies. The categories of FAA funding are presented below.

FAA Facilities and Equipment (F&E) appropriations:

a. F&E establishment funds, including initial logistics support capability.
b. Regional F&E funding, including costs associated with site preparation work, installations, and decommissioning, including engineering, relocation, and contract monitoring.
c. FAA in-house F&E costs for the WARP project.
d. Contractor support for the WARP project.
e. (Re: CBA dtd 3/95 p. 1-19)

The F&E costs are addressed below :

19% Systems Engineering
36% Software Development and Enhancements
8% Vendor Contract Management
18% Prime Mission Equipment (PME)
10% Hardware/Software Installation and Testing
3% Initial Spares
4% Initial Training
1% Data and Documentation Support
1% Other

The regional F&E budgets should be estimated based on the regional site survey reports and implementation plans called for in this PIP in accordance with FAA Order 2510.5, Fiscal Programming and Reporting Procedures for the F&E appropriations. Implementation funds will be dispersed to the regions through Project Authorizations (PA). (Re: CBA dtd 3/95 p. 1-19)

7.2.2 Summary of F&E Funding Status

The estimated facilities and equipment (F&E) procurement cost for the WARP is $126.4 million. This covers Stages 0, 1, 2 and 3 development, production, installation and initial operating costs during the proposed contract lifetime between FY 95 to FY 04.

The life cycle cost (LCC) estimate of the most likely WARP F&E procurement cost is $126 million.. The total LCC estimate for WARP including Operations and Maintenance is $227.8 million. This includes a hardware replacement in FY 04. (Hardware replacement ref. O&M).

The estimates for the costs were derived from a combination of comparisons with similar systems, known costs of existing commercial systems, estimates of adding FAA interfaces, and a parametric analysis of software development to support the FAA interfaces and the developmental items. The current budget includes sufficient funds to complete WARP Stages 0 and 1. FBCNs will be submitted to increase CIP funding and align funding to the WARP program requirements. (Re: AP dtd 3/95 p. 8)

7.3 Operations and Maintenance (O&M) Budget

The funding for the Operation and Maintenance phase of the WARP program is managed through the O&M Budgeting Process.

7.3.1 O&M Budget Requirements

The cost drivers for Operations and Support, based on a ten year life cycle, are addressed below.

3% Rent, Utility and Other
18% Data Service
6% Recurring Training
29% Communications
10% Hardware Maintenance
23% Software Maintenance
7% Replenishment Spares
3% Inventory Management
1% Recurring Travel

(Re: CBA dtd 3/95 p. 1-19)

7.3.2 Summary of O&M Funding Status

The FAA/DOT has been briefed regarding the WARP procurement and WARP DPA was approved on 9/8/94. Procurement authority was granted to MWP Extension, which WARP is replacing, under DPA KMA-93-0275. The MWP contract was awarded under DPA KMA-88-0331.
(Re: AP dtd 3/95 p. 8)

7.4 Research, Engineering and Development (RE&D) Budget

There are no RE&D budget requirements identified for the WARP program. (Re: CBA dtd 3/95 p. 1-19)

7.5-7.19 (Reserved)

7.20 Risk Assessment

The hardware cost estimates are based on current costs, however, they are expected to decrease as computer processor costs decrease. The main cost risk is in software development based on the approach taken by the winning bidder. The software is impacted by whether the contractor will use some or all of the GFI code, or whether the contractor chooses to develop all of it. The Product Office has assumed that some software development will be required. (Re: RMP dtd 11/12/93 p. 9-10)

8.0 HUMAN RESOURCES

8.1 Human Source Management

8.1.1 Impacts of Acquisition on Human Resource Management

This section addresses the potential impacts of the WARP program on human resource management elements. The assessment of impacts is based on current understanding of the WARP program technical and operational requirements which may introduce temporary or permanent adjustments to facility or sector operations or may require administrative action at the facility or sector level. Seven HRM elements are considered in this analysis: (1) personnel security; (2) relations with local communities; (3) relations with the aviation community; (4) employee work environment; (5) employee job satisfaction; (6) labor-management relations; and (7) organizational structure. (Re: FAA-STD-036B dtd 5/10/94 p. A-8)

8.1.1.1 Personnel Security

The WARP program does not require changes to personnel security clearances. Security processing may be required for site contractor personnel involved in site preparation, installation and test activities. Sector or security personnel may be required to perform escort responsibilities. (Re: AP dtd 3/95 p. 20)

8.1.1.2 Relations with Local Communities

Since the WARP will be installed in existing ARTCCs,ATCSCC there will be no impact to the residents in the vicinity of the WARP sites. (Re: AP dtd 3/95 p. 20)

8.1.1.3 Relations with Aviation Community

The WARP program will provide air traffic controllers with more accurate weather information to use when providing service to the aviation community. (Re: ATR-130 3/94)

8.1.1.4 Employee Work Environment

The WARP system specification includes human engineering requirements in areas such as user input format, feedback to users, and data entry and display equipment. The system specification and statement of work require conformance to certain sections of MIL-STD-1472D, Human Engineering Design Criteria for Military Systems, Equipment and Facilities. (Re: HFP dtd 10/94 p.8)

8.1.1.5 Employee Job Satisfaction

Air Traffic personnel can anticipate the availability of more accurate and a wider breadth of weather information, improved workstation and briefing terminal analysis support and display capability, and alarms and alerts of significant weather changes. For Airway Facilities personnel, the introduction of improved, state-of-the-art technology and attendant reduction in corrective maintenance can be expected to contribute to employee job satisfaction. (Re: ATR-130 3/94)

8.1.1.6 Labor-Management Relations

No issues unique to the WARP program are anticipated. (Re: ATR-130 3/94)

8.1.1.7 Organizational Structure(s)

No impacts to either Air Traffic or Airway Facilities organizations are anticipated. The WARP will have interface capability for remote maintenance monitoring. (Re: MRD undated p.3)

8.1.2 Human Resource Implementation Strategies

Regional and facility/sector managers are advised to consider the following strategies for addressing human resource management impacts identified in section 8.1.1:

a. identify facility/sector personnel for participation in WARP implementation planning activities, identification of facility/sector procedural impacts, and development/revision of facility/sector procedures.

b. provide timely and accurate information regarding WARP technical and operational features, site selection and installation activities and schedule.

c. coordinate conduct of WARP impact and implementation briefings with regional AXX-10 Office of Labor and Employee Relations. (Re: FAA-STD-036B dtd 5/10/94 p. A-8)

8.1.3 Security Clearances

No budget requirements for security clearances for the WARP program are indicated. Scheduling of contractor personnel who will be on-site for site survey, site preparation and equipment installation and testing should be coordinated with FAA security personnel. If FAA personnel will be required as escorts, coordination with the appropriate FAA offices should be considered.

The WARP does not handle classified material as defined in FAR Subpart 4.4; however, the WARP contractor will include requirements for the weather data not to be lost or unintentionally altered.

Furthermore, the contract will also require that any specially supplied data from the Government (e.g., WSR-88D Class I port data) may not be used by the vendor for any purposes other than the WARP. The contract will also require the contractor be responsible for the security of the communications network used by the WARP and the maintenance access to the WARP. (Re: AP dtd 3/95 p20)

8.2 Staffing

8.2.1 Impacts of Acquisition on Staffing

The acquisition of WARP will not have adverse affect on staffing. (Re: Draft ILSP, dtd 3/95)

The Divisions affected by the acquisition of WARP have sufficient staff and/or contractor support to accomplish the mission. (Re: Draft ILSP, dtd 3/95)

8.2.1.1 Operational Workload

Since WARP is replacing an existing system, there is no staffing impact to AT or CWSU meteorologists. The CWSU meteorologists, who are NWS employees, can expect a lessened workload but not enough to justify a reduction in staff. AF does not anticipate an increase in staff due to WARP maintenance needs.
(Re: ATR-130 3/94)

8.2.1.2 Implementation Workload

Site personnel will be required to coordinate all contractor activities before and during WARP implementation. (Re: SOW 7/96)

Site personnel will be required to coordinate all Harris activities before and during the WARP implementation. Regional and facility/sector managers are advised to consider the following strategies for addressing human resource management impacts identified in 6.1.

Identify facility/sector personnel for participation in WARP implementation planning activities, identification of facility/sector procedural impacts, and development/revision of facility/sector procedures.
Provide timely and accurate information regarding WARP technical and operational features, site selection and installation activities and schedule.

Coordinate conduct of WARP impact and implementation briefings with regional AXX-10 Office of Labor and Employee Relations.

8.2.2 Staffing Plans

There are no plans to change the staffing with the acquisition of WARP. (Re: Draft ILSP, dtd 3/95) .

8.2.3 Staffing Schedule

There are no plans to change the staffing with the acquisition of WARP. (Re: Draft ILSP, dtd 3/95) .

8.3 Training

Training courses and training material will be developed in accordance with FAA-STD-028B with the exception of AT training courses and training material, which will be developed in accordance with best commercial practices. (Re: SOW dtd 7/96)

Training courses and training is developed in accordance with best commercial practices. The Briefing Terminal training course will be provided concurrent with the Stage 0 installations.

8.3.1 Training program

The WARP contract will provide training for operators (ATC Specialists and Meteorologists) and maintenance personnel. Operator training will be presented at each site in conjunction with delivery of the equipment. A copy of all instructional materials used in operator training will be provided to each site for use in sustainment training. Maintenance training will enable technicians to troubleshoot any malfunction in the system using diagnostic aids and other standard troubleshooting methods. The contractor will perform maintenance training until the FAA Academy is prepared to provide training. In addition, the contractor will provide training for FAA personnel for Operational Test and Evaluation. (Re: AFR-300 3/94)

WARP is an extension of the MWP system. The training provided is a building block from the training already provided to the FAA personnel on the MWP program. The formal training focuses on the new briefing terminal's operation. This training is provided by a training instructor who is a member of the WARP installation team, a training video mailed in advance of the installation, and CBT incorporated in the briefing terminal as a file. Changes to the meteorologist's workstation are fewer. Training is provided as over-the-shoulder training to the meteorologist by the training instructor during the WARP installation.

8.3.2 Training Quotas

The number of classes and students per class are:

3 Classes

Students per class dependent on number the of briefing terminals available at each site.

8.3.3 Personnel Skills

The training program is based upon the premise that the FAA personnel who will receive the training are the meteorologists and traffic management personnel who currently operate the MWP system. Thus, the training is a "delta" to the training that these individuals have already received on the MWP system and covers just the new features for the WARP system. Student Prerequisites are:

Full Performance Level Air Traffic Management coordinator or supervisor/manager with previous MWP Training.

8.4-8.19 (Reserved)

8.20 Risk Assessment

The risk associated with Harris developed training courses is low.

9.0 TEST AND EVALUATION

9.1 Overview of Test Program

The Test and Evaluation Master Plan (TEMP) provides the overall test strategy for the WARP procurement. The TEMP is to define the overall Test and Evaluation strategy necessary to ensure the successful integration of the Weather and Radar Processor (WARP) into the NAS environment. The TEMP describes the Test and Evaluation (T&E) processes which will be used to ensure the system meets the requirements allocated to the project in the NAS-SS-1000 Volumes I, II and V, the NAS-SR-1000 and the WARP System Specification, FAA-E-TBD. The TEMP defines test strategy, test requirements, organizational roles and responsibilities and is developed in accordance with FAA Order 1810.4B and FAA-STD-024. A test Verification Requirements Traceability Matrix (VRTM) which presents high level functional and performance requirements to be tested during WARP Test and Evaluation is included in the TEMP. The VRTM requirements are derived from NAS-SS-1000, Volumes I, II and V that are allocated to the WARP program.

The TEMP current addresses the testing requirements for WARP stages 0, 1/2. In March 1995, the WARP program received conditional Key Decision Point 3 (KDP 3) approval. The TEMP will be updated prior to contract award and after the WARP NAS Change Proposal (NCP) is baselined. Although the WARP NCP addresses WARP Stage 0-3 requirements, no Stage 3 requirements are addressed in the WARP System Specification, FAA-E-TBD. Therefore, WARP Stage 3 requirements will need to be reflected in a future update of the TEMP. The WARP Stage 3 requirements identified in the NCP have been included in the Verification Requirements Traceability Matrix (VRTM) for information only.

The WARP Test and Evaluation Master Plan (TEMP), was approved by the Test Policy Rules Committee (TPRC) in July, 1995.(Re: TEMP, dtd 05/95, p -1)

9.1.1 Government Test Program

As part of the Test and Evaluation strategy, Operational Capability Tests (OCT) will be performed. The OCTs will be held at each offeror's facility as part of the technical evaluation of the proposal for contract award to assess the functional and performance capability of the proposed WARP stage 0 system.

Based on the WARP acquisition strategy, FAA T&E of the WARP system will require limited Development Test and Evaluation (DT&E) and limited Operational Test and Evaluation (OT&E) for stage 0. An In Service Review (ISR) will be required for Stage 0. The WARP stage 1/2 system will require full DT&E and full OT&E. A ISR decision will also be required for a Stage 1/2 deployment. WARP stage1/ 2 will be a new software release which will require a DT&E phase with a follow on OT&E phase prior to updating the deployed stage 1/2 WARP system(s). For each WARP Stage, a Production Acceptance Test and Evaluation (PAT&E) Site Acceptance Test (SAT) will be required for each full production WARP system deployed. (Re: TEMP dtd 5/95, p-12)

9.1.2 Contractor Test Program

Based on the WARP acquisition strategy, FAA Test and Evaluation (T&E) of the WARP system will require limited Development Test and Evaluation (DT&E) and limited Operational Test and Evaluation (OT&E) for Stage 0. A ISR will be required for Stage 0. The Contractor Master Test Plan (CMTP) was submitted 30 days after contract award on 30 July 1996. Comments were received from the FAA at the Software Requirements Review (SRR) meeting on 26 August 1996 and incorporated into the plan which was resubmitted as a final document. The components of the Harris conducted test program are identified in Table 9.1-1.

Test	Description	SOW Reference	Location
Software Integration Tests	Testing conducted after the OCT demonstration and before FAT to ensure the WARP Stage 0 software is mature.	N/A	Melbourne, FL
DT&E FAT Dry run	System level dry run test using the DT&E FAT test procedures.	3.2.2.3	Melbourne, FL
Test Readiness Review (TRR)	Meeting at which Harris will present test results of regression testing and FAT dry run tests. Approvals of system baseline and documentation required at this meeting prior to start of FAT.	3.2.2.3	Melbourne, FL
DT&E FAT Testing	System level test using approved FAT test procedure to verify the WARP System is capable of meeting the functional, interface and performance requirements of FAA-E-2898 with primarily live data and some simulated data. Test conducted on the Harris Site 0 system configured as the Dallas/FW system.	3.1.5.1	Melbourne, FL
DT&E FAT 48 Hour System Operability Test	Test conducted upon successful completion of DT&E FAT tests. Tests are non-scripted "free-play" test to demonstrate the WARP system can operate an extended period while performing routine functions in an ARTCC environment. Test conducted on the Harris Site 0 system configured as Dallas/FW.	3.1.5.1	Melbourne, FL
DT&E SAT Testing	System level test using approved SAT test procedure to verify the WARP Systems are capable of meeting the functional, interface and performance requirements of FAA-E-2898 with live data.	3.2.3.1	Dallas/FW ARTCC
DT&E SAT 48 Hour System Operability Test	Test conducted upon successful completion of DT&E FAT tests. Tests are non-scripted "free-play" test to demonstrate the WARP system can operate an extended period while performing routine functions in an ARTCC environment.	3.2.3.1	Dallas/FW ARTCC

Table 9.1-1 WARP Stage 0 Test Program

Test	Description	SOW Reference	Location
OT&E Support	Provide on-site support of one Software Engineer at the Dallas/FW ARTCC for a 3 week period. Provide on-call hardware maintenance support at the Dallas/FW site during OT&E. Provide factory support via help desk.	3.2.3.2	Dallas/FW ARTCC
Production Systems Factory Staging	Load software on new briefing terminals prior to shipment and run diagnostics to verify equipment is ready for shipment	None	Melbourne, FL
PAT&E SAT	Checkout to verify the equipment is installed properly and the site adaptation parameters were loaded correctly.	3.2.3.3	Each WARP ARTCC site.

Table 9.1-1 WARP Stage 0 Test Program (cont.)

9.1.2.1 Development Test and Evaluation (DT&E)

The WARP prime development contractor shall initially deploy its proposed COTS/NDI based system(WARP stage 0) to replace the MWP system. Concurrently, the WARP contractor shall begin implementation of the requirements for Stage 1/2. DT&E for the WARP stage 0 system is intended to verify the proposed COTS/NDI system tested at OCT meets the WARP stage 0 requirements. For the follow on WARP stages, DT&E is also intended to verify: (1) the WARP system meets all physical, functional, interface, and performance requirements of the WARP Specification; (2) that the developed/modified NAS interface software has been correctly integrated with the COTS/NDI capabilities of WARP stage 0, and; (3) the developed interfaces are correctly implemented according to applicable Interface Requirement Documents (IRDs), using simulated NAS interfaces where required.

As part of DT&E for Stages 1/2, the contractor shall conduct Developmental Qualification Testing (DQT) which may be witnessed informally by the government. DQT testing will consist of development and integration testing. DQT testing will verify that developed hardware and software meets the requirements of the WARP specification and that the WARP system is ready for formal acceptance testing.

For each stage of the WARP acquisition, the contractor shall plan and conduct a DT&E Factory Acceptance Test (FAT) of the WARP limited production systems. DT&E FAT will be formally witnessed by the FAA. The DT&E FAT will verify the capability of WARP to meet all physical, functional, interface, and performance requirements of FAA-E-TBD as delineated for each stage (0, 1/2) in the WARP RFP.

For WARP stage 0, the contractor shall plan and conduct a DT&E Site Acceptance Test (SAT) of the first site WARP system which will support OT&E. The DT&E SAT will occur at the first operational site and will be formally witnessed by the FAA. The DT&E SAT will verify the capability of WARP to meet the physical, functional, interface, and performance requirements of FAA-E-TBD as delineated for WARP stage 0 in the WARP RFP.

For WARP stage 1/2, the contractor shall plan and conduct a DT&E Site Acceptance Test (SAT) of the three WARP systems (two ARTCC, one ATCSCC) which will support OT&E. The DT&E SAT will occur at the FAA Technical Center and the first operational site and will be formally witnessed by the FAA. The DT&E SAT will verify the capability of WARP to meet physical, functional, interface, and performance requirements of FAA-E-TBD as delineated for WARP stages 1 and 2 in the WARP RFP. Delta DT&E will be performed as part of the DT&E SAT. Delta DT&E will test the interface requirements of the FAA-E-TBD and the NAS IRDs prior to Contractor Acceptance Inspection (CAI). (Re: TEMP dtd 5/95, p-12/13)

9.1.2.2 Operational Test and Evaluation (OT&E)

The FAA will conduct OT&E to evaluate WARP NAS operational effectiveness and suitability of the WARP system into the NAS. OT&E consists of three test phases - Integration, Operational, and Familiarization. The division of responsibilities for FAA OT&E (Integration, Operational, Familiarization) as per FAA Order 1810.4B WARP stage 0 OT&E testing will be performed at the first operational site and will be limited in scope since there are no NAS interfaces. WARP Stage 1/2 OT&E testing will be performed at the FAA Technical Center and at the first operational site. Successful completion of WARP OT&E for both stages 0 and 1/2 will support a ISR decision to deploy the contractor system for both stages of WARP. The contractor shall provide the WARP Stage 1/2 software to the FAA Technical Center after successful DT&E is completed. When a successful OT&E is completed on the Stage 1/2 software, a deployment recommendation will be made by ACT-320. Part of the OT&E testing will consist of key site testing. Key site testing will be a phased deployment approach. A few ARTCCs will be upgraded with the Stage1/2 software and allowed to run in an operational environment for a period of time to gain confidence in the system availability. Once completed, additional systems will be deployed.

All NAS subsystems planned for integration with WARP are scheduled to be available in time for WARP OT&E testing at the FAA Technical Center. Interfaces that are not available for OT&E at the FAA Technical Center will have to be tested using follow-on site testing at an operational site when the interfaces become available. Responsibility for testing of the WARP NAS interfaces, when they become available, will be discussed and agreed upon by the WARP program office and the respective WARP NAS interfacing subsystem program office.

During OT&E operational and Familiarization testing, personnel from air traffic, airways facilities (AF) and CWSU meteorological community will participate in assessing the operational effectiveness and suitability of the WARP system. (Re: TEMP dtd 5/95, p 13-15)

The contractor shall prepare and conduct a PAT&E SAT of the WARP system at each operational site after installation of WARP. The PAT&E SAT will verify the capability of the WARP System to meet the physical, functional, interface and performance requirements of FAA-E-TBD. During the SAT conduct, live NAS interfaces will be used, if available. (Re: TEMP dtd 5/95, p -15)

9.2 T&E Schedule

The WARP Acquisition Schedule is shown in Figure 9-2-1. The Acquisition Schedule integrates the testing schedule with program major milestones. (Re: WARP working schedule dtd 6/96)

WARP Working Schedule 12/11/96

Acquisition Step	Duration	Start	Finish
ARC/TSARC KDP-3	1d	Thu 3/30/95	Thu 3/30/95
ADM, MNS, AP & APB approved	29d	Fri 3/31/95	Wed 5/10/95
WARP/DSR MOU Signed	1d	Fri 6/23/95	Fri 6/23/95
DPA Approved	1d	Fri 7/5/95	Fri 7/5/95
Specification Baselined	1d	Thu 7/13/95	Thu 7/13/95
TEMP Approved	1d	Fri 7/21/95	Fri 7/21/95
Issue Solicitation/Final RFP	1d	Mon 7/31/95	Mon 7/31/95
Contract Award	1d	Fri 6/28/96	Fri 6/28/96
Stage 0	1094d	Tue 10/1/96	Thu 9/30/99
Start Work	1d	Tue 10/1/96	Tue 10/1/96
TIM/PMR	1d	Mon 12/16/96	Mon 12/16/96
TRR	1d	Tue 1/28/97	Tue 1/28/97

Figure 9.2-1 WARP Working Schedule

DT&E FAT	1d	Tue 2/11/97	Tue 2/11/97
PAT&E SAT	1d	Tue 3/4/97	Tue 3/4/97
TIM/PMR	1d	Mon 3/31/97	Mon 3/31/97
ISR	1d	Mon 4/28/97	Mon 4/28/97
Production Decision	1d	Mon 4/28/97	Mon 4/28/97
TIM/PMR	1d	Mon 6/2/97	Mon 6/2/97
Stage 0 Deployment	84d	Sat 7/5/97	Fri 9/26/97
End Stage 0	1d	Thu 9/30/99	Thu 9/30/99
Stage 0 Deployment	84d	Sat 7/5/97	Fri 9/26/97
Team A	84d	Sat 7/5/97	Fri 9/26/97
Leesburg	7d	Sat 7/5/97	Fri 7/11/97
ATCSCC 1	7d	Sat 7/12/97	Fri 7/18/97
ATCSCC 2	7d	Sat 7/19/97	Fri 7/25/97
Boston	7d	Sat 7/26/97	Fri 8/1/97
New York	7d	Sat 8/2/97	Fri 8/8/97
Cleveland	7d	Sat 8/9/97	Fri 8/15/97
Home Visit	7d	Sat 8/16/97	Fri 8/22/97
Indianapolis	7d	Sat 8/23/97	Fri 8/29/97
Kansas City	7d	Sat 8/30/97	Fri 9/5/97
Denver	7d	Sat 9/6/97	Fri 9/12/97
Salt Lake City	7d	Sat 9/13/97	Fri 9/19/97
Albuquerque	7d	Sat 9/20/97	Fri 9/26/97
Team B	84d	Sat 7/5/97	Fri 9/26/97
Miami	7d	Sat 7/5/97	Fri 7/11/97
Jacksonville	7d	Sat 7/12/97	Fri 7/18/97
Houston	7d	Sat 7/19/97	Fri 7/25/97
Atlanta	7d	Sat 7/26/97	Fri 8/1/97
Memphis	7d	Sat 8/2/97	Fri 8/8/97
Chicago	7d	Sat 8/9/97	Fri 8/15/97
Home Visit	7d	Sat 8/16/97	Fri 8/22/97
Minneapolis	7d	Sat 8/23/97	Fri 8/29/97
Anchorage	7d	Sat 8/30/97	Fri 9/5/97
Seattle	7d	Sat 9/6/97	Fri 9/12/97
Oakland	7d	Sat 9/13/97	Fri 9/19/97
Los Angeles	7d	Sat 9/20/97	Fri 9/26/97
Stage 1	3016d	Fri 6/28/96	Thu 9/30/04
Start Work	1d	Fri 6/28/96	Fri 6/28/96
PAC	1d	Fri 8/2/96	Fri 8/2/96
SRR	1d	Fri 8/30/96	Fri 8/30/96
SDR/SSR	1d	Fri 11/22/96	Fri 11/22/96
PDR	1d	Fri 3/7/97	Fri 3/7/97
TIM/PMR	1d	Thu 5/1/97	Thu 5/1/97
CDR	1d	Fri 7/18/97	Fri 7/18/97
TIM/PMR	1d	Thu 10/30/97	Thu 10/30/97
TIM/PMR	1d	Fri 1/30/98	Fri 1/30/98
TRR	1d	Fri 6/12/98	Fri 6/12/98
DT&E FAT (Contractor's Facility)	1d	Fri 6/26/98	Fri 6/26/98
DT&E SAT (FAATC)	1d	Fri 8/7/98	Fri 8/7/98
DT&E SAT (ATCSCC at FAATC)	1d	Fri 8/21/98	Fri 8/21/98

Figure 9.2-1 WARP Working Schedule (cont.)

Seattle DT&E SAT	1d	Fri 9/11/98	Fri 9/11/98
TIM/PMR	1d	Fri 10/30/98	Fri 10/30/98
Deinstall Seattle (Stage 0)	1d	Fri 1/29/99	Fri 1/29/99
TIM/PMR	1d	Fri 1/29/99	Fri 1/29/99
Install ATCSCC @ ATCSCC	1d	Fri 2/26/99	Fri 2/26/99
ISR Decision	1d	Mon 2/1/99	Mon 2/1/99
Stage 1 Deployment	141d	Fri 4/16/99	Fri 9/3/99
End Stage 1	1d	Thu 9/30/04	Thu 9/30/04
Stage 1 Deployment	141d	Fri 4/16/99	Fri 9/3/99
Atlanta	1d	Fri 4/16/99	Fri 4/16/99
Chicago	1d	Fri 4/23/99	Fri 4/23/99
Fort Worth	1d	Fri 4/30/99	Fri 4/30/99
Cleveland	1d	Fri 5/7/99	Fri 5/7/99
Houston	1d	Fri 5/14/99	Fri 5/14/99
Denver	1d	Fri 5/21/99	Fri 5/21/99
Washington	1d	Fri 5/28/99	Fri 5/28/99
Salt Lake City	1d	Fri 6/4/99	Fri 6/4/99
New York	1d	Fri 6/11/99	Fri 6/11/99
Kansas City	1d	Fri 6/18/99	Fri 6/18/99
Minneapolis	1d	Fri 6/25/99	Fri 6/25/99
Albuquerque	1d	Fri 7/2/99	Fri 7/2/99
Oakland	1d	Fri 7/16/99	Fri 7/16/99
Memphis	1d	Fri 7/23/99	Fri 7/23/99
Los Angeles	1d	Fri 7/30/99	Fri 7/30/99
Miami	1d	Fri 8/6/99	Fri 8/6/99
Indianapolis	1d	Fri 8/13/99	Fri 8/13/99
Jacksonville	1d	Fri 8/20/99	Fri 8/20/99
Boston	1d	Fri 8/27/99	Fri 8/27/99
Anchorage	1d	Fri 9/3/99	Fri 9/3/99

Figure 9.2-1 WARP Working Schedule (cont.)

9.3 T&E Responsibility Matrix

9.3.1 Government Test Organization

The following FAA organizations have WARP testing responsibilities.
(Re: TEMP dtd 5/95 p. 15-22)

AUA Provides overall team coordination for the successful acquisition, implementation, and service life extension of weather processor products through management and processes required. Has signature authority for PT decisions, procurement requests, and other related documentation required in the PT processes. Serves as IPT and FAA focal point for weather processor products inside and outside the FAA, including government, industry, the aviation community, and the media.

Product Lead Product Lead provides team leadership for the successful acquisition, implementation, and lifecycle of weather processor products through management and processes required within this plan. Represents the WPPT on Integrated Team (IT)/coaches team and is the team's focal point with the IT, IMT, and IPLT. Facilitates the team by nurturing, communicating, listening, coaching, mentoring, advising, and guiding the Product Team.

Project Lead The Project Lead provides overall team leadership for the WARP project for the successful acquisition, implementation, and lifecycle of the WARP project. Represents the WARP team and is the team's focal point for WARP. Facilitates the team by nurturing, communicating, listening, mentoring, advising and guiding them on day-to-day issues dealing with the WARP project.

AFR Provides team leadership for lifecycle management and ensures timely identification and delivery of support requirements for the weather processor products. Identifies all lifecycle support requirements in earliest phases of the acquisition and ensures support capability meets requirements before implementation. Leads team effort to prepare and recommend NAILS budget to achieve high system availability and low lifecycle cost.

AFZ Develops and recommends technical training programs to support WPPT products. Ensures sufficient classes are available for technical training for new equipment and for ongoing training. Conducts training needs assessments. Develops and evaluates technical training policies, programs, standards and procedures to meet FAA training requirements.

ACT Provides overall team guidance in establishing test schedules and the coordination of tests. Leads team effort to ensure that all test requirements are satisfied and that tests are performed in accordance with approved procedures. Prepares, in coordination with the PT, the Test and Evaluation Mater Plan (TEMP). Reviews contractor-prepared test plans, procedures and reports. Monitors Development Test and Evaluation (DT&E) testing. Plans, directs, conducts, and provides status/reports on government testing and is responsible for FAA Technical Center facility Test and Evaluation (T&E) readiness.

ANS Provides overall team guidance in the implementation of wind shear and weather products radar products into the NAS system. Serves as the WPPT focal point for the FAA regional members to ensure NAS integration and implementation requirement are met. Advises team on implementation issues for advance planning.

AOS Provides overall team coordination during the in service management phase. Has signature authority for specific sub product team decision, sub product team documentation and other related services required in the sub PT processes during this phase. Serves as the IPT and the FAA focal point for the sub product inside and outside of the agency, including government, industry, the aviation community and the media during this phase. Provides second and first level engineering support for the WPPT. Identifies all requirements associated with centralized supportabilty as well as development of systems enhancements. Leads team efforts to provide centralized engineering support of systems commissioned into the NAS environment. Identifies long-term system improvements and develops enhancements to meet these needs.

ASD Provides overall team guidance in the development of the NAS architecture and integrates technology to meet user needs. Analyzes requirements and alternative technologies, leads team effort to design and plan the development and integration of new systems, and develops configuration management policy. Provides overall team guidance with respect to formulation, administration, and evaluation of the financial plans for each wind shear and weather product line. Maintains and monitors the overall accounting program for all NAS acquisitions. Acts as a certifying agent for funding requests and provides a broad range of checks and balances within the FAA accounting structure

ASU Provides team leadership in the development and implementation of all procurement related processes outlined in the 4-1-96 FAA AMS. Exercises Contracting Officer authority for the entire procurement process within the WPPT. Assures contract awards and administration supporting the WPPT.

ATR Provides team leadership in the requirements process, operational requirements identification, development, and validation. Provides input and support to the WPPT products team acquisition process, development, test, evaluation, and implementation to assure products/systems meet air traffic operational requirements. Focal point with fields for requirements issues. Supports AT training and procedures development. Provides support to the PT in representation to international, IACO, and inter-service groups and committees for WPPT products.

AGC Provides team guidance to address and resolve legal concerns and provides advice matters of business judgment. Ensures conformance with all legal requirements of all applicable laws, rules, regulations, and orders. Reviews documentation to ensure compliance with requirements and other contractual issues.

AOP Provides overall team guidance on equipment and service certification. Develops and implements statistical data collection processes that allow system and service reliability and availability to be accurately assessed and analyzed. Provides overall team guidance in the development of new requirements and concepts of operation and maintenance which when implemented result in improved services, utilization of resources, and responsiveness to external customers of Airway Facilities. Responsible for providing network planning and engineering support; identifying specific telecommunications network user requirements and services/equipment needed to meet these requirements; developing cost and time-effective means of implementation, emphasizing efficient application of resources; and expanding and enhancing the agency's telecommunications network. Responsible for acquiring and implementing telecommunications systems, services, and equipment; translating validated requirements into acquisition programs; ensuring smooth transition from acquisition to implementation; and managing all leased telecommunications contracts.

ATQ Participates in the planning, management, and implements of the Independent Operational Test and Evaluation (IOT&E) program for those WPPT products designated for IOT&E. These efforts include development of the IOT&E plan, procedures, and schedule baseline of subsection 11 of the Integrated Program Plan. ATQ shall coordinate the IOT&E effort with the WPPT. Testing parameters shall address all critical operational issues and ensure independent assessment of operational effectiveness and operational suitability within the baseline IOT&E sub section of the Test and Evaluation section of the Integrated Program Plan.

AMA The FAA Academy in Oklahoma City, OK is the center for providing operational training in the agency's technical specialties. The technical training program is divided into many programs, such as the Air Traffic Control , Airway Facilities, Airports, Logistics, and Security programs. The FAA Academy also provides technical advice and assistance in the management and programming of agency training requirements. It also administers part of the out-of-agency training program.

ABA Provides team guidance in the development and recommendation of overall agency budgetary policies, standards, systems, and procedures pertaining to the agency's multi-year programming, budget estimates and justifications, allowances, allotments and apportionments, administration of these policies, standards, systems, and procedures when approved. Serves as the central point on all agency budgetary matters.

AML Ensures requirements for support equipment, supply support, technical data, packaging, handling storage, and transportation are identified and integrated into the acquisition of any product to facilitate total lifecycle support. AML-200 acts as the focal point for the above mentioned elements and coordinates interaction among product lines.

FAA SMO's are major organizational elements operating in the field environment.

SMO They handle system maintenance operations and provide engineering services on a day-to-day basis under the general direction of the regional AF division manager.

ASR This member provides spectrum engineering and frequency management and when appropriate, direction on all matters related to spectrum management. Among the task areas this office will support is the securing, implementation, and managing the aeronautical radio frequency spectrum in support of lifecycle management. This member's responsibility entails: 1) obtain and protect necessary frequencies for new, relocated, or replaced NAS facilities, 2) provide radio frequency interference (RFD) investigation and frequency management support including training, resources, and equipment, 3) development and execution of spectrum policy, 4) execution the AF portion of Obstruction and evaluation Program and, 5)execute Radiation Hazard Measurement Program.

Prime WARP Development Contractor Conducts development, factory, site acceptance, and production testing. Provides test support to FAA OT&E testing as requested. Works deficiencies related to testing.

FAA Regions Support activities described in the WARP Program Implementation Plan which lead to site acceptance and field Familiarization testing.

Test Plan Review Committee(TPRC) Responsible for approving TEMPs and their revisions, and resolving T&E issues that cannot be resolved at lower levels of management.

9.3.2 Contractor Test Organization

The Harris test organization individuals involved in the test program, their roles, and responsibilities are:

Harris Integration and Test Manager - Bob Morrissette was assigned as the Harris Integration and Test Manager for the WARP program. The Integration and Test Manager is responsible for the integration design, factory assembly, test documentation, shipping, installations, and acceptance tests for the WARP systems. Bob may be reached at (407) 984-6427.

Harris Stage 0 Test Director - Ted Schaufelberger was assigned as the Stage 0 Test Director. The Test Director is responsible for preparing the DT&E Factory Acceptance Testing (FAT) and DT&E Site Acceptance Test (SAT) test procedures and conducting DT&E FAT and DT&E SAT acceptance testing. Ted may be reached at (407) 984-5892.

Harris Chief Software Engineer - Bob Gillen was assigned as the Chief Software Engineer for the WARP program. The Chief Software Engineer is responsible for the software technical oversight and management of the software development effort. Bob will be on site at the Dallas/FW ARTCC during DT&E SAT. He may be reached at (407) 984-5700.

Harris OT&E Support - Luigi Labella was assigned as the Stage 0 OT&E Test software support at the Dallas/FW site. Luigi will also be assigned to one of the two Stage 0 installation teams for the production sites.

Harris Quality Assurance Engineer - Anne Humphreys was assigned as the Quality Assurance (QA) Engineer for the WARP program. The QA is responsible for ensuring the acceptance testing is conducted according to the approved test procedures, that the system under test is under Configuration Management (CM) control, and that all software Program Tracking Reports (PTRs) and hardware R-140 failure reports have been tracked and resolved. Anne will be at the Dallas/FW site during DT&E SAT to ensure the above processes are being followed by the test team. She may be reached at (407) 984-5589.

Harris Help Desk - Randy Sloan operates the Harris help desk. During the production site installations, Randy will be assigned to one of the installation teams. Randy has been a member of the MWP installation teams and has provided user training. Randy's duties at the help desk will temporarily be taken over by Kevin Seidler while Randy is assigned to the field. (System Implementation Requirements, dtd 12/2/96, Draft).

9.4 T&E Field Support Requirements

9.4.1 Personnel Requirements.

ACT-320 will provide 1.6 employee years (E.Y.) of internal FAA employees and 2.0 E.Y. of contractor support (1.0 E.Y. test engineers, 1.0 E.Y. meteorologist) to provide test and technical direction and support to AUA-460 in accordance with the WARP program directive in support of T&E of the WARP stage 0 and stage 1/2 systems.

During OT&E Operational and OT&E Familiarization testing, ACT-320 will require 3 FAA field personnel (meteorological and traffic management personnel) to provide technical and operational support during these test phases for WARP stage 0 and stage 1/2.
(Re: ACW-200B (ACT-300), TEMP dtd MAY, 1994)

9.4.2 Test Equipment Requirements

No test equipment is required for testing on-site for stage 0. All testing is either an inspection or a demonstration. (System Implementation Requirements, dtd 12/2/96, page 39).

Harris personnel shall identify and document all support and test equipment required for WARP 1/2 and 3. This includes common and special tools, test equipment, fixtures and material handling equipment. Requirements for special support and test equipment shall be justified in accordance with FAA Order 6200.4, Test Equipment Management Handbook. Whenever possible, support and test equipment requirements shall be satisfied by items currently in the Government inventory.
(Re: ACW-200B (ACT-300)

9.4.3 System Access

Harris will allow the government sufficient access to the WARP systems during DT&E FAT and DT&E SAT in order to verify all FAA-E-2898 physical, functional and performance requirements. Harris will be responsible for conducting the DT&E FAT, and DT&E SAT. Harris will allow hands-on access to the FAA for the WARP equipment during OT&E as required by the government. (System Implementation requirements, dte 12/2/96, page 39).

9.4.4 Space Requirements

The WARP space requirements for DT&E SAT and OT&E testing of the limited production WARP systems will be the maximum size/footprint requirements specified in the WARP facility IRDs. In the case of the ZFW stage 0 and ZSE stage 1/2 WARP system, the installed WARP system will have to share space occupied by the current MWP in the processor equipment area, in the CWSU and its briefing terminals on the floor. Minimal relocation of WARP equipment should be needed after transition from MWP and removal of the MWP equipment. The FAATC space requirements will support an ARTCC WARP and an ATCSCC WARP based on the facility IRD requirements. The ATCSCC WARP will be removed and installed in the ATCSCC after successful OT&E completion. (Re: NAS-IR-61002515, dtd June, 1994)

9.5 T&E Program Status

Harris satisfactorly conducted SAT and OT&E at ZFW first site.

9.5.1 Test Results Summary

Harris successfully completed the OCT demonstration prior to the WARP contract award. Test procedures are currently being dry run as they are written. Any PTRs identified as part of the test procedure preparation process are formally documented.

Harris shall provide test evaluation reports for all completed test phases. The test reports will describe evaluation criteria, results (pass/fail), and all relative supporting material. Each report prepared by the contractor shall be approved by the FAA before the next test phase begins. (TEMP dtd MAY, 1995)

9.5.2 Outstanding Program Trouble Reports (PTR)

It is too early in the program at the time of this CDRL preparation to list open critical PTRs and actions being taken to resolve them. To date, no critical PTRs have been identified and minor discrepancies are being corrected as they are identified. However, Outstanding PTRs will be reviewed at the Test Readiness Review (TRR) meeting with the FAA prior to the start of DT&E FAT testing. It is Harris' intention to have all outstanding PTRs closed by this time. Similarly, any outstanding PTRs remaining after completion of DT&E SAT are reviewed with the FAA prior to the start of OT&E. Agreement must be reached with the FAA before the next test phase can be initiated. (System Implementation Requirements, dtd 12/2/96, page 40)

9.5.3 Discrepancy Correction Process

The contractor shall be responsible for correcting all PTRs. All software updates from the contractor addressing PTR fixes will go through retesting which will be approved by the government. PTRs will be closed by the government after successful retesting proves the validity of the software update. Regression testing will also be performed to verify overall system functional requirements were not affected by the software modifications. The government will have approval authority over all retest and regression test plans and procedures. (Re: ACW-200B (ACT-300)

9.6-9.19 (Reserved)

9.20 Risk Assessment

Simulated NEXRAD data feeds may be utilized during OT&E when live feeds are not available. Likewise, full 58 Briefing Terminal (ATCSCC loading) will be simulated. Only 15 Briefing Terminals will be at the FAA Technical Center to support OT&E. This constitutes a full ARTCC Briefing Terminal load. The implementation of the ATCSCC WARP system by the contractor could have an impact on testing at the FAA Technical Center.(Re: ACW-200B (ACT-300)

10.0 SYSTEM SUPPORT

10.1 System Support Concept

a. Stage 0: WARP will be a leased , turn-key system to be supported by the WARP contractor.
b. Stages 1-3: The WARP contractor will provide hardware and maintenance support during the development of the WARP and for a period of one year after last site acceptance. This support will consist of preventive maintenance actions, performing modifications, fault isolation, replacement of line replaceable units (LRU), and other corrective maintenance actions required to ensure system availability. The contractor will also be responsible for depot level repair of failed LRUs. (Re: SOW 7/96).

10.1.1 Hardware

a. Stage 0: The WARP hardware will be maintained by the WARP contractor.

b. Stages 1-3: Under the anticipated maintenance concept, maintenance of the WARP hardware will be performed at two levels: site and depot. Site maintenance, which includes fault isolation and replacement of LRUs, will be performed by the contractor for a period of year following site acceptance, at which time FAA maintenance personnel will assume maintenance responsibility. Depot level maintenance, which includes the repair or replacement of LRUs, will be performed by a contractor. This contractor depot level support (CDLS) contract will be managed by the FAALC. (Re: SOW 7/96)

10.1.2 Software

a. Stage 0: The WARP software will be maintained by the WARP contractor.

b. Stages 1-3: Maintenance of the WARP software will be performed by the WARP contractor until the conclusion of stage 3 . A WARP system will be provided to FAATC for software maintenance support. (Re: Draft ILSP, dtd 3/95)

10.2 Special Support Facilities

10.2.1 Mike Monroney Aeronautical Center

Not applicable

10.2.1.1 Restoration Response Level

Not applicable

10.2.1.2 Field Level Maintenance

None required (Re: Draft ILSP, dtd 3/95)

10.2.1.3 Depot Level Maintenance

a. Stage 0: Not applicable

b. Stages 1-3: Upon completion of the one year interim contractor support period, depot level maintenance will be performed by the contractor and will be administered by FAALC under the Contractor Depot Level Support (CDLS) contract. (Re: SOW 7/96)

10.2.1.4 Engineering Support
None required (Re: Draft ILSP, dtd 3/95)

10.2.2 FAA Technical Center

Not Applicable

10.2.2.1 Restoration Response Level

Not applicable

10.2.2.2 Field Level Maintenance

Not applicable

10.2.2.3 Depot Level Maintenance

Not applicable

10.2.2.4 Engineering Support

Not applicable

10.2.3 Other Special Support Facilities

Not applicable

10.3 Materiel Support

10.3.1 Project Materiel

After the budget has been appropriated (for procurement of nationally-furnished equipment/systems), the Product Leads and Regional Associate Program Managers will receive Project Authorizations (PA's) from the Washington budget office. The Product Leads are responsible for ensuring data from the Project Materiel List (PML) are entered into the Logistics and Inventory System (LIS) Project Materiel Management System (PMMS) and that the LIS/PMMS contains all nationally furnished requirements necessary for the project. The F&E Project Engineers should review each budget submission to make sure their total requirements are identified and the project status report when received to ensure everything they require is on the report. The Regional Associate Program Managers are responsible for reviewing the LIS/PMMS to verify all required nationally furnished materiel has been included. (FAA Order 4650.7A, Management of NAS F&E Project Materiel, page 10)

The Product Lead shall:

a. ensure all approved national projects are established and maintained within the LIS/PMMS

b. ensure all NAILS requirements are identified for their projects; and

c. respond to (acknowledge, approve, or disapprove) regional project change requests; e.g., requests for project completion or cancellation, non-project requisitions, project change requests, etc.

The Product Leads are responsible for responding (in coordination with the applicable Washington Item Manager) to regional requests within 10 working days.
The Washington Item Managers shall:

a. provide item identification and control of project materiel, by requesting establishment or reactivation of a Master Inventory Record from the Logistics Center's Cataloging Branch, for project materiel not already identified;

b. enter and maintain their items within LIS/PMMS, which includes establishing and maintaining due-in (availability) dates in LIS/PMMS for equipment or materiel under contract; and

c. ensure the accuracy of major end item delivery data changes which have been provided for entry into the Material Delivery Forecast Module (MDFM).

At the headquarters level, the Washington Item Managers are responsible for preparing shipping and receiving instructions for vendor-shipped nationally procured NAS F&E project equipment and materiel. In addition, they are responsible for ensuring the regional Technical Officer's Representative (TOR) is aware of pending shipments. Washington Item Managers are responsible for prior coordination with the F&E Item Manager when program requirements or project scheduling changes require large or multiple shipments to be diverted from the installation site to the Logistics Center. (Re: FAA Order 4650.7A, pages 10-13)

10.3.2 Provisions and Supply Support

a. Stage 0 not applicable.

b. Stages 1-3 the FAA will establish supply support requirements for WARP. The FAALC will initially manage the CDLS contract. Follow on support will be provided by a CDLS contract or with FAALC in-house capabilities. The contractor will develop provisioning technical documentation (PTD) and provide LSAR data in accordance with the DD Forms 1949-3.

Provisioning technical documentation to be procured under the WARP contract includes:

Long lead times items list
Repairable items list
Tools and test equipment list
Short form provisioning parts list
Provisioning parts list
Design change notices
Common and bulk items list
Post conference list
(Re: Draft ILSP, dtd 7/95, p 12)

10.3.3 Packaging Transportation and Storage

a. Stage 0: Not applicable

b. Stages 1-3: The WARP contract will require spare parts to be preserved and packaged level A and packed level C in accordance with MIL-STD-2073-1, DOD Materiel Procedures for Development and Application of Packaging Requirements. Any other components or equipment to be shipped to the FAALC shall be individually preserved and packaged level A and packed level B. All shipments shall be made IAW FAA Order 4650.30. Components, equipment and spares shall be transported by the most economical means considering dependability, safety, urgency of need and the use of the least costly mode meeting these considerations. All materials must be shipped FOB destination. Components or equipment to be shipped to the sites will be preserved, packaged and packed in accordance with ASTM-D-3951, Standard Practice for Commercial Packaging. (Re: Draft ILSP, dtd 7/95 p 38)

10.4 Technical Documentation

10.4.1 Hardware Documentation

The WARP shall be provided with a complete set of installation, operation and maintenance technical manuals. The documentation shall be delivered for the entire system and for all equipment in the system, whether manufactured by the contractor or by another vendor. Installation, operation and maintenance manuals shall be delivered in final format to AOS-530 at the FAATC.

Technical manuals, including a User's Guide, shall be delivered in final format to AOS-530 at the FAATC and shall be provided for the operators and engineering support of the WARP system. Standard manufacturers installation, operation and maintenance manuals or instruction books, such as those provided with standard production equipment may be acceptable if judged to be sufficiently complete so as to meet the information content specified in FAA-D-2494b. Copies of all manuals and instruction books will be provided to the FAA Academy to support AF refresher training. Each site will receive manuals and instruction books to support AT cadre and NWS meteorologist training. All sites will received a complete set of manuals to support AF activities. Provisioning data, including technical drawings will be bought. (Re: Draft ILSP, dtd 7/95, p 18)

The contractor shall provide the following software documentation for all COTS equipment. All contractor developed software documentation required to support the operation and maintenance of the WARP will also be provided:

a. Software Detail Design Document (SDDD)
b. Software Programmer's Manual (SPM)

c. Computer System Operator's Manual (CSOM)
d. Software Design Document (SDD

a. Stage 0: The WARP will be provided a complete set of hardware instruction books/data related to the systems operation.

b. Stages 1-3: The WARP shall be provided with a complete set of instruction books/data related to the system design. The documentation shall be delivered for the entire system and for all the equipment in the system, manufactured by the contractor or by another vendor.

The Government will validate and verify each technical document book prior to Government approval. The contractor shall provide labor, tools, software, equipment, facilities, and any other engineering, technical, or administrative support necessary to the Government, as may be required, during the validation of the technical documentation. Draft submittals for Government review will be provided in hardcopy. Final submittals will be provided in camera reproducible copy and magnetic media as stated in the SOW. (Re: SOW 7/96)

10.4.2 Software Documentation

a. Stage 0: The WARP will be provided a complete set of software documentation relating to system operation.

b. Stages 1-3: The contractor will deliver to the government documentation relating to the design, test, quality assurance, delivery, installation, and operation of each computer resource CI and CSCI. Any table showing tractability between requirements, requirements to design, or requirements to test shall be developed using PC compatible data base utility. The data base files will be delivered to the Government.

For FAA-STD-026 categories of software (other than newly developed), the Government may approve existing documentation for CDRL deliveries. Approval of existing documentation will only be considered for software which has not been functionally changed and after the contractor has demonstrated that the software performs as documented. Once these two criteria have been satisfied, approval of existing documentation will be based on the guidelines provided in FAA-STD-026. (Re: SOW 7/96)

10.4.3 Procedural Documentation

a. Stages 0-3: Technical documentation will be provided for the operators, maintenance and engineering personnel. Standard manufacturers instruction books, such as those provided with standard production equipment may be acceptable if judged to be sufficiently complete so as to meet the information content specified in FAA-D-2494/1. Copies of all manuals will be provided to the Academy for development of initial and refresher training. (Re: SOW 7/96)

10.5-10.19 (Reserved)

10.20 Status Assessment

The support risks are undefined at this time because the final decision on contractor vs. government maintenance has not been made. The level of FAA maintenance could be an issue in the contract. A total support concept could be recommended by the bidders. (Re: RMP dtd 11/12/93 p.8)

11.0 PROGRAM SCHEDULE INFORMATION

11.1 NAS Implementation Schedule

Two installation crews will install the production sites at a rate of one site/crew/week figure 11.1-1. The crew will travel to the next site when the installation of the first site is completed in a round robin fashion to minimize travel time. It is Harris' plan to have the on site Harris maintenance technician confirm the shipment has arrived on site before the installation crew travels to the site.

The following dates are working dates provided only to indicate the relative completion dates (Re: WARP Working Schedule, dtd 6/28/96).

Location	Duration		Start	Finish
Stage 0	0ed	84d	Sat 7/5/97	Fri 9/26/97
Team A	0ed	84d	Sat 7/5/97	Fri 9/26/97
Leesburg	0ed	7d	Sat 7/5/97	Fri 7/11/97
ATCSCC 1	0ed	7d	Sat 7/12/97	Fri 7/18/97
ATCSCC 2	0ed	7d	Sat 7/19/97	Fri 7/25/97
Boston	0ed	7d	Sat 7/26/97	Fri 8/1/97
New York	0ed	7d	Sat 8/2/97	Fri 8/8/97
Cleveland	0ed	7d	Sat 8/9/97	Fri 8/15/97
Home Visit	0ed	7d	Sat 8/16/97	Fri 8/22/97
Indianapolis	0ed	7d	Sat 8/23/97	Fri 8/29/97
Kansas City	0ed	7d	Sat 8/30/97	Fri 9/5/97
Denver	0ed	7d	Sat 9/6/97	Fri 9/12/97
Salt Lake City	0ed	7d	Sat 9/13/97	Fri 9/19/97
Albuquerque	0ed	7d	Sat 9/20/97	Fri 9/26/97
Team B	0ed	84d	Sat 7/5/97	Fri 9/26/97
Miami	0ed	7d	Sat 7/5/97	Fri 7/11/97
Jacksonville	0ed	7d	Sat 7/12/97	Fri 7/18/97
Houston	0ed	7d	Sat 7/19/97	Fri 7/25/97
Atlanta	0ed	7d	Sat 7/26/97	Fri 8/1/97
Memphis	0ed	7d	Sat 8/2/97	Fri 8/8/97
Chicago	0ed	7d	Sat 8/9/97	Fri 8/15/97
Home Visit	0ed	7d	Sat 8/16/97	Fri 8/22/97
Minneapolis	0ed	7d	Sat 8/23/97	Fri 8/29/97
Anchorage	0ed	7d	Sat 8/30/97	Fri 9/5/97
Seattle	0ed	7d	Sat 9/6/97	Fri 9/12/97
Oakland	0ed	7d	Sat 9/13/97	Fri 9/19/97
Los Angeles	0ed	7d	Sat 9/20/97	Fri 9/26/97
Placeholder	0ed	1d	Thu 6/6/96	Thu 6/6/96

Location	Duration		Start	Finish
Stage 1/2	0ed	141d	Fri 4/16/99	Fri 9/3/99
Atlanta	0ed	1d	Fri 4/16/99	Fri 4/16/99
Chicago	0ed	1d	Fri 4/23/99	Fri 4/23/99
Fort Worth	0ed	1d	Fri 4/30/99	Fri 4/30/99
Cleveland	0ed	1d	Fri 5/7/99	Fri 5/7/99
Houston	0ed	1d	Fri 5/14/99	Fri 5/14/99
Denver	0ed	1d	Fri 5/21/99	Fri 5/21/99
Washington	0ed	1d	Fri 5/28/99	Fri 5/28/99
Salt Lake City	0ed	1d	Fri 6/4/99	Fri 6/4/99
New York	0ed	1d	Fri 6/11/99	Fri 6/11/99
Kansas City	0ed	1d	Fri 6/18/99	Fri 6/18/99
Minneapolis	0ed	1d	Fri 6/25/99	Fri 6/25/99
Albuquerque	0ed	1d	Fri 7/2/99	Fri 7/2/99
Oakland	0ed	1d	Fri 7/16/99	Fri 7/16/99
Memphis	0ed	1d	Fri 7/23/99	Fri 7/23/99
Los Angeles	0ed	1d	Fri 7/30/99	Fri 7/30/99
Miami	0ed	1d	Fri 8/6/99	Fri 8/6/99
Indianapolis	0ed	1d	Fri 8/13/99	Fri 8/13/99
Jacksonville	0ed	1d	Fri 8/20/99	Fri 8/20/99
Boston	0ed	1d	Fri 8/27/99	Fri 8/27/99
Anchorage	0ed	1d	Fri 9/3/99	Fri 9/3/99

Figure 11.1-1 NAS Implementation Schedule

11.2 Deployment Schedule

Typically, equipment will arrive on site a minimum of one week before the start of the equipment installation.

11.3 Site Implementation Schedule

The generic schedule for each site's major implementation milestones for the WARP program are included in Figure 11.3-1

Task Name	Duration
Pre-INCO Phase	6d
Conduct Site Survey	1d
Site Preparation	4d
Deliver Site Installation Plan	1d
INCO Phase	7d
Equipment Delivery	2d
System Installation	5d
System Integration Phase	2d
PAT&E	1d
Partial JAI	1d
Field Shakedown Phase	6d
On-Site Familiarization	5d
Final JAI	1d

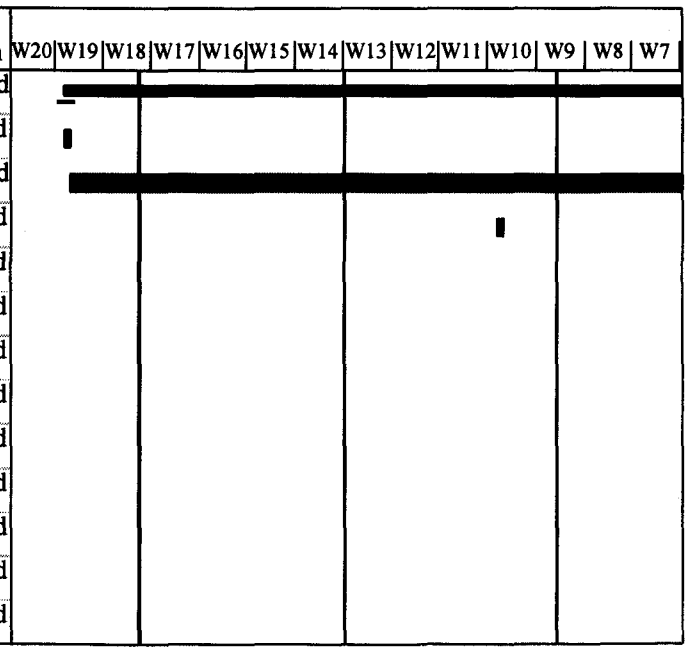

Figure 11.3-1 WARP Site Implementation Schedule

11.4 Schedule Dependencies

The WARP program schedule can be impacted by funding levels, technical difficulties experienced by the contractor, and system interfaces with the DSR. (Re: RMP dtd 11/12/93 p. 9)

11.5-11.19 (Reserved)

11.20 Risk Assessment

The E-Complex Will be equipped with Critical power and building services power only. (Ref: ANS-300)

12.0 ADMINISTRATION

12.1 Acquisition Program Summary

12.1.1 Market Survey

A market survey, initiated in early 1993 through a Commerce Business Daily (CBD) announcement, was conducted to assess the availability of the commercial market place to fulfill the WARP functional requirements for receiving, storing, processing, generating, and displaying weather radar, satellite, lightning, alphanumeric, graphic, and numerical data products.

In June 1993, FAA issued a memorandum (announced in the CBD) to interested firms to respond to questions about the feasibility of a weather processor workstation and to provide information on how their systems could satisfy the requirements summarized in the memo. A WARP feasibility study was published based upon vendor feedback that WARP functional requirements for the acquisition, processing, and display of aviation weather data are generally commercially available as an NDI. (Re: AP dtd 3/95 p. 12)

12.1.2 Acquisition Strategy

Based on the previous approvals, activities, and accomplishments of the MWP Extension and RWP programs, the WARP program was approved through KDP 3 to enter into full-scale development/limited production for Stages 0 through 3
A final approval for stage 0 will be requested prior to deployment. A final approval to deploy the full WARP capabilities will be requested after completion of the Stage 1/2 development phase. The MNS and operational requirements document (ORD) previously approved by Air Traffic have been updated. This acquisition plan and the acquisition program baseline (APB) have also been updated and approved by the ARC/TSARC concurrent with the MNS.

The WARP program will follow the guidelines of the FAA acquisition process identified in FAA Order 1810.1F, Acquisition Policy, and will employ full and open competition to select a contractor. In addition, a delegation of Source selection authority was requested and approved to appoint the Associate Administrator for Research and Acquisition, ARA-1, as the sources selection official for this procurement. To best accomplish the program's objectives and fulfill its requirements while minimizing risk, the WARP will be implemented using a phased acquisition approach with three stages.

The phased acquisition approach provides flexibility to develop capabilities based on priority and available funding, and mitigates risk. Reliance on COTS/NDI hardware and software also provides flexibility, mitigates risk, and enables the program to field up-to-date technology as it is available.

The acquisition approach includes an industry review of the WARP draft request for proposals (RFP) prior to issuing the solicitation. The specification completed industry review in February 1994, and industry and Government comments have been incorporated into the WARP specification.

Stage 0 WARP has been leased to Harris Corporation on a firm, fixed price basis. The lease included data, hardware, software, communications, and maintenance services. For Stages 1/ 2 and 3, a cost type full-scale development contract, with fixed price production options, has been awarded to Harris on the basis of the proposal being the most advantageous to the Government, price and other factors considered. As part of the source selection evaluation, an operational capability test (OCT) will be conducted at the Harris facilities.

Stage 1/2 full scale development will include procurement of four limited production systems: ARTCC WARP systems to be installed at the FAA Technical Center (FAATC), an operational site, and the Harris facility, and an ATCSCC system to be installed at the FAATC for testing prior to final installation at the ATCSCC. The full-scale development/limited production systems will be priced on a cost type basis. Options will include production systems, initial spares, training presentation, data, and logistics support services. A ceiling priced contract line item will be used to implement planned technical improvements. The options will be fixed price and cost type

respectively. Incentives for cost control and technical performance are under review and will be included in the contract.

Testing appropriate to each stage will be conducted at the Harris facility and at operational sites. Stage 0 testing will include factory acceptance testing (FAT) and site acceptance testing (SAT). The equipment acquired for the limited production for Stage 1/2 will be used for FAT, SAT and full operational test and evaluation (OT&E) activities. One system will be installed at the FAA Technical Center and another at an operational site (for live NEXRAD operations). The ATCSCC system will also be installed at the FAA Technical Center for initial testing prior to installation at the ATCSCC. A fourth system will be needed at the Harris facility to support continued software development activities of Stages 1/2, and 3. FAT, SAT, and OT&E will be conducted on Stage 1/ 2 and 3 software upgrades.

The Stage 0 system is completely COTS/NDI. The Stage 0 system will undergo an operational capabilities test as part of the technical evaluation, and complete acceptance testing and a In Service Review prior to its deployment.

Following successful Stage 1/2 OT&E and ISR (In Service Review), a final approval for Stages 0 full production and deployment will be requested. After approval, the remaining 22 WARP systems will be procured and installed. Once Stage 1/2 deployment has begun, the program will enter an operational and maintenance (O&M) phase, where the FAA will accept and use contract maintenance to maintain the deployed systems for the first 2 years. The contract will have a duration of 8 years. (Re: AP dtd 3/95 p. 2-4)

12.2 Contracting Information

The Product Lead for Weather Processors, AUA-460, has first line responsibility for WARP. (Re: PMP, dtd 8/94)

12.2.1 Prime Contract

Harris Information Systems Div.
Melbourne, FL

Harris Program Manager - Scott Stengel was assigned as the Harris Program Manager for the WARP Stage 0 program. He is responsible for maintaining control over costs and the implementation schedule. He may be reached at (407) 984-5945.

Harris Chief Systems Engineer - Russ Sinclair was assigned as the Chief Systems Engineer for the WARP program. He is responsible for the overall technical integrity of the program. He may be reached at (407) 984-5788.

Harris Integration and Test Manager - Bob Morrissette was assigned as the Harris Integration and Test Manager for the WARP program. He is responsible for the integration design, factory assembly, test documentation, shipping, installations, and acceptance tests for the WARP systems. He may be reached at (407) 984-6427.

Harris Stage 0 Test Director - Ted Schaufelberger was assigned as the Stage 0 Test Director. He is responsible for preparing the DT&E FAT and DT&E SAT test procedures and conducting FAT and SAT acceptance testing. He may be reached at (407) 984-5892.

Harris Quality Assurance Engineer - Anne Humphreys was assigned as the Quality Assurance Engineer for the WARP program. She is responsible for ensuring the acceptance testing is conducted according to the approved test procedures, that the system under test is under CM control, and that all software PTRs and hardware R-140 failure reports have been tracked and resolved. She may be reached at (407) 984-5589.

(Ref: Systems Implementation Requirements, dtd 12/96).

12.2.2 Service Contracts

The only contractor support organization that will be supporting the program and site implementation for Harris Information Systems Division (HISD) is the Harris Technical Services Corporation (HTSC). The role of HTSC includes: (Ref: Systems Implementation Requirements, dtd 12/96).

- Confirming that the shipment has arrived on site.
- Assist the Harris installation team to install and test the WARP system at each site. This assistance provides OJT for the maintenance technicians who will be maintaining the WARP equipment under the maintenance service contract with the FAA.
- Provide hardware maintenance support
- Operate the repair depot.
- Replenish consumable as the paper stocks, printer toner, etc. are depleted.

12.2.3 Program Support Contracts

The WARP Product Office is supported by the following contractor with a technical support contract:

TRW, Inc.
600 Maryland Ave, SW, Suite 750
Washington, DC 20024

12.2.4 Regional Contracting

FAA Regions are responsible for negotiating local contracts for WARP site preparation.

12.2.5 GFP/GFI/GFE Obligations

Equipment and plans procured under the development contract will be provided as GFP or GFI for the life-cycle WARP contract. AUA-460 is responsible for meeting this obligation.

12.3 Product Management

The Weathers Processors Product Lead , AUA-460, has first line responsibility for WARP. (Re: PMP, dtd 8/94)

12.3.1 Product Lead Charter

AUA-460 directs and manages all FAA activities for the acquisition and implementation of assigned weather programs, including WARP. The PL is responsible for the design, development, integrated logistics support, test and evaluation, full scale production, and installation of the WARP. The PL serves as the FAA spokesperson for all WARP activities within and external to FAA, including Congress, other Government agencies, contractors, the aviation community, and the media. (Re: PMP, dtd 8/94)

12.3.2 Product Team (PT)

The PT provides support to the PL and is responsible for planning and accomplishing the WARP program mission. The PT is comprised of the Product Office, a Project Lead and Leads from other organizations with a direct interest. Table 12.3-1 contains selected information regarding members of the PT dated 12/5/96.

Last Name	First Name		Routing Symbol	Function	Telephone	Facsimile	Location
Abernathy	Jack	L	AUA-460/TAC	Software Engineering	202-554-2536	202-554-0996	Capital Gallery
Alicea	Mariano		ACT-320/UAL	Test Engineering	609-641-2232	609-641-0654	Tech Center
Baltz	Barbara	L	AFR-304	Logistics	202-267--3707	202-267-5613	FOB 10A
Barker	Geoffrey		AFR-101/NISC	ISR (DRR)	202-646-5562	202-646-2300	100 VA. Ave.
Bee	Lisa		ATQ	OT&Oversight	202-267-8699		
Benner	Bill		ACT-320	APM for Test	609-485-4032	609-485-4035	Tech Center
Bigio	Carmen		AOS-500	Field Support	609-485-7945		Tech Center
Carpen	Thad	L	AUA-460/TAC	Systems Engineering	202-554-6422	202-554-0996	Capital Gallery
Cedro	Maureen		AUA-460/TAC		202-267-8102	202-554-0996	Capital Gallery
Chapman	Bob		AOS-530	Field Support.	609-485-7945		Tech Center
Coffelt	Michael		ATX-100	Training	202-493-5442		Tech Center
Conte	Joe		AUA-460/TAC	Meteorology	703-734-6752	703-734-6261	W1
Dadiani	John		AUA-460/TAC	Program Management	202-554-6427	202-554-0996	Capital Gallery
Davis	Richard		AFR/NISC	Logistics	202-646-5522	202-646-5500	FOB10A
Deans	Benn	L	AUA-460	Systems Engineering	202-267-8372	202-267-5624	FOB10A
Dewey	Al		AUA-460/TAC	Systems Engineering	202-554-6423		Capital Gallery
Dhaliwal	Avtar	L	AUA-460/TAC	IV&V	202-484-4617	202-554-0996	Capital Gallery
Diehm	Patrick W.		AML-463	FAA Logistics Center	404-954-3951		Oklahoma City
Durso	Anthony	L	AOS-530	Field Support	609-485-5615		Tech Center
Ellott	John		ATO-120.5	Air Traffic Operations	202-267-9348		
Fendall	Anita		AUA-460	Analyst	202-267-8662	202-267-5624	FOB 10A
Fretz	Dave		AUA-460	Systems Engineering	202-267-8664	202-267-5624	FOB 10A
Gates	Christopher		ATQ3/Technautics	OT&Oversight	609-671-5200		Tech Center
Goff	Craig	L	ASD-120	Systems Engineering	202-358-5332		Portals
Gordner	Nannette	L	ATR-230	AT Requirements	202-366-4608	202-366-5548	FOB10A
Hall	William		ACT 230/UAL	Test Engineering	609-641-2232	609-641-0654	Tech Center
Hammond	Lou		ASU-320	Contract Management	202-267-9464	202-267-5149	FOB10A
Hewitt	Glen		AAR-100	Human Factors	202-267-7163		FOB10A
Hill	Jacqueline	L	AUA-460	Product Leader	202-267-7515	202-267-5624	FOB10A
Hossaini	Wahed		ASD-140	Configuration Mgmt.	202-651-2395	202-484-1257	Portals,7th Fl.
Houston	Susan		AUA-460	Systems Engineering	202-488-3077		Portals
Johnson	Jay	L	AUA-460	Systems Engineering	202-267-8378	202-267-5624	FOB10A
Johnson	Lenka		ASD/SETA	Financial Analyst	202-651-2141	202-484-1255	Portals
Jordan	Christian	L	AGC-520	General Counsel	202-267-3138		FOB10A
Larkins	Olivia		AUA-460	Special Projects	202-267-7638		FOB10A
Lehane	Thomas	L	AUA-460/TAC	Systems Engineering	202-554-2545	202-554-0996	Capital Gallery
Long	Garry	L	AFZ-100	AF Training	202-493-4067		FOB10A
Marino	Joseph		ASD-140	Configuration	609-485-6250	609-485-4035	Tech Center
McClure	Susan		TRW-SETA	Planning, Scheduling	202-651-2438		Portals
Merchant	Rose		ATQ3/Technautics	OT & Oversite			Tech Center
Mittleman	Jeff		MITRE	Systems Engineering	703-883-7603	703-883-1330	MITRE/CAASD
Myers	Vanestra		ANS-700	Implementation	202-267-3898		400 VA. Ave.
Nguyen	Tri		Act-320	Test Engineering	609-485-7530	609-485-4035	Tech Center
Nyberg	Tom		AUA-460/TAC	Software Engineering	202-484-4614	202-554-0996	Capital Gallery
Patenaude	Gerald		ASU-410	FAA QRO	407-727-6796		Harris, ISD (FL)
Petty	Jeff		AUA-460/TAC	Program Mgmt. Analyst	202-554-2538	202-554-0996	Capital Gallery
Peyrebrune	John		AUA-460/TAC	Analyst	202-554--2531	202-554-0996	Capital Gallery
Piszczek	Dave		ASD-140	Configuration Mgmt.	202-358-5188		Portals
Platt	Jeanette		ASU-320	Contract Management	202-267-836	202-267-5149	FOB10A
Poston	Alan		AAR-100	Human Factors	202-267-7777		FOB10A
Printy	Matt		ACT-320/UAL	Test Engineering	609-641-2232	609-641-0654	Tech Center
Robinson	Lisa		AUA-460/TAC	Program Managment	202-484-4614	202-554-0996	Capital Gallery
Sayegh	Ed		AOS-530	Field Support	609-485-5255		Field Support
Shannon	Silas		AOP-400	Comm. Engineering	202-863-7300		Capital Gallery
Shepherd	Kimberly		AML-200	FAA Logistics Center	405-954-5309		Oklahoma City
Showalter	Bob		ASD-SETA	Systems Engineering	202-651-2256		Portals
Souders	Cheryl		ASD-120/SEDA	Systems Engineering	202-651-2278	202-484-1255	Portals
Spiegel	Gary	L	ASU-305	Contracts-Pricing	202-267-3614	202-2675814	FOB10A
Steadman	Vanessa		AUA-460/TAC	Software Engineering	202-554-2539	202-554-0996	Capital Gallery
Steinacker	Clayton		ATR-230	AT Requirements	202-366-6415	202-366-5548	Nassif PL 200
Street	Bill	L	ANS-700/NISC	Implementation	202-646-2113	202-646-5480	400 VA AVE
Last Name	First Name		Routing Symbol	Function	Telephone	Facsimile	Location
Townsend	Willie		AUA-460/TAC	Program Management	488-9740(116)	202-488-4729	Capital Galery
Trilling	Ron		AOP-400	Comm. Engineering	202-863-7317		Capital Gallery
Udell	Al		ASD/SETA	Cost & Schedule	202-651-2158	202-484-1255	
Vales	Roger		AUA-460/TAC	Systems Engineer	202-554-6426	202-554-0996	Capital Gallery
Weaver	Charles		ATQ-3/Technautics		703-671-5200		
White	Martha		AML-200	FAA Logistics Center	405-954 3482		Oklahoma City
Wilson	Margaret		AUIA-460	Business Mgmt	202-267-8254	202-267-5624	FOB10A
Wilson	Phil		AUA-460/TAC	Comm. Engineering	202-554-2542	202-554-0996	Capital Gallery
Woelfle	Frank		AOP-400	Comm. Engineering	202-314-7487		Capital Gallery
Young	Kevin		AUA-460	Product Team Leader	202-267-8547	202-267-5624	FOB10A
Zwicker	Greg		AUA-460/TAC		202-554-6436	202-554-0996	Capital Gallery

Table 12.3-1 Weather Processor Product Team

12.3.3 Program Status Reporting

To maintain effective and responsible control of overall progress, frequent reviews, conferences, and working sessions will be held between FAA management, the PL, and the PT, TORs, and the contractor. Participation in these conferences and working groups by contractor personnel and/or representatives of various other FAA offices is at the discretion of the PL. Routine status reporting will be required as indicated in the following subsections. (Re: FAA-STD-036B, dtd 5/94)

12.3.4 Exception Management

Management by exception involves identifying and resolving implementation and transition problems at as early as possible, at the lowest organizational level . Members of the WARP Team will identify implementation issues as early as possible, which then will be documented and tracked. Other implementation and transition issues will be identified by the field during PIP review.
A problem or concern becomes a national issue only upon submission by a division manager, after all avenues for resolution within the purview of that manager have been exhausted. The IPT is responsible for resolving issues referred to them by Product Lead. The APLNI/ISS is responsible for tracking national issues related to the WARP and periodically reports the status of issues to both the PL and the organization(s) which identified the problem.

The organization which resolves an issue completes an Implementation Issues Closure (IIC) form and transmits it through the same channels by which the issue was originated. The originating organization endorses the resolution and returns the IIC form to the APLNI/ISS formally stating their acceptance of the resolution. The APLNI/ISS ensures that the PIP is updated to reflect the results of issues which have been resolved. Facility managers, sector managers, and regional division managers share results of locally/regionally resolved problems among themselves.
(Re: Implementation Process Guidelines dated June, 1994, p. 25-31)

12.4 Quality Assurance

The contractor shall provide and maintain a quality control in compliance with FAA-STD-013, including a computer software quality program in compliance with FAA-STD-018. (Re: Spec dtd 7/13/95 p. 76)

The PL has put into place numerous checks for the program's quality through extensive testing activities and program reviews documented in the SOW. (Re: PMP, dtd 8/94)

12.4.1 Program Acceptance Criteria

The SOW has embraced all aspects of FAA 1810.4B, which describes test policy. The Contractor must pass extensive testing of the WARP at the FAA Technical Center and at the first site. (Re: TEMP dtd 5/94)

12.4.2 Risk Management

The PL has put into place numerous checks for the program's quality through extensive testing activities and program reviews documented. (Re: PMP, dtd 8/94)

12.5 Configuration Management (CM)

Configuration Management (CM) transfer of the system from the contractor to the FAA will be in accordance with the contract. Transfer of responsibilities between FAA offices during system implementation is directed by Order 1810.4A, which directs hand-off to test agencies at the FAA Technical Center. Order 1320.48B establishes responsibilities for system support and baseline configuration, and Order 6030.45 directs system transfer during site Familiarization and system commissioning. Prior to each hand-off, AUA-460 will notify the old and new office of primary interest (OPI) by letter, with copies to other offices whose activities are affected.

Formal hand-off will occur on three separate occasions; (1) the factory-from the contractor to AUA-460, using standard DD-250 procedures, (2) the factory-from the contractor to AUA-460 to the test organization, AUA-460, and (3) the FAATC from AUA-460 to AOS-530.

Transfer of custody of system equipment and system documentation from the project office to each facility will formally occur at the conclusion of the JAI in accordance with the procedures established by Order 6030.45, Chapter 4. (Re: SOW, dtd 5/95)

12.5.1 CM Responsibilities

The contractor will establish, implement, and maintain a configuration management program in accordance with FAA-STD-021A and MIL-STD-973 as tailored by the SOW for WARP hardware and software developed under the contract. The contractor will specify a single authority who will serve as a focal point for all communication of configuration management (CM) related issues. The contractor will document CM responsibilities and procedures in a single, integrated Configuration Management Plan (CMP), developed in accordance with MIL-STD-973, paragraph 5.2 and Appendix A.

The contractor will establish and maintain a baseline management process to freeze the configuration identification in conjunction with the project's reviews and audits and to control changes to those baselines. This control will include hardware, software, firmware, databases, and documentation.
(Re: Draft ILSP, dtd 8/94)

12.5.2 Configuration Control Board (CCB)

Harris establish their own Change Control Board (CCB) and develop CCB procedures to adequately establish baselines and support baseline management. Following government approval of their procedures, the contractor will maintain tractability and currency of the baselines and consistency between program documentation for hardware, software, firmware, databases, and their respective versions. The contractor will comply with the requirements of FAA-STD-021A and MIL-STD-973 in proposing and accomplishing changes to each approved specification/ baseline.

Changes to baselines shall be done in accordance with MIL-STD-973, paragraph 5.4.2.1 and Appendices C, D and F and FAA-STD-005D. National Airspace Change Proposals (NCPs) will be submitted when changes to baseline configuration identifications are proposed by the contractor/ government. Requests for Deviations/ Waivers (RDWs) will be submitted as necessary in accordance with MIL-STD-973.
(Re: Draft ILSP, dtd 3/95)

12.5.3 CM Milestones

CM milestones are established as the allocated, functional and product baselines.

The allocated baseline will be the initially approved documentation describing the functional, interpretability, and interface characteristics of WARP, at the CDR.

The functional baseline will be the initially approved document describing the functional interpretability and interface characteristics and the verification required to demonstrate specific characteristics. This verification will be accomplished upon satisfactory approval of the FCA/ PCA and OT&E.

The product baseline is the initially approved document describing all the necessary functional and physical characteristics of the Configuration Item (CI) and the selected functional and physical characteristics designated for production acceptance testing and tests necessary for support of the CI.
(Re: Draft ILSP, dtd 7/95)

12.5.4 Configuration Items

The contractor will select configuration items in accordance with MIL-STD-973, paragraph 5.3. The configuration identification will be documented in the allocated, functional and product baselines, developed and maintained IAW MIL-STD-973, paragraph 5.3.4. Further clarification of the CIs will be provided by the contractor at the PDR. (Re: Draft ILSP, dtd 7/95).

12.6-12.19 (Reserved)

12.20 Status Assessment

The WARP program administration has the necessary controls and milestones for normal program development. Risk is minimal.

13.0 IMPLEMENTATION (REQUIREMENTS)

13.1 Implementation Support Organization

Implementation of WARP will require assistance from numerous headquarters, regional and facility personnel. The organizations and their specific responsibilities known to date are contained in the following sub-sections. (Re: PMP, dtd 8/94)

13.1.1 Associate Product Lead for NAS Implementation (APLNI)/Implementation Support Specialist (ISS)

The APLNI/ISS has been assigned to the WARP program by ANS-700. They are the primary point of contact for all implementation related matters. They are responsible for reviewing contractor-developed implementation plans, procedures and reports. The APLNI/ISS are also responsible for coordinating and tracking the resolution of implementation and transition issues, coordinating information gathering for development of the PIP, assisting the Project Lead in compiling implementation information and data required to develop and refine implementation budget estimates, reviewing contractor-developed implementation plans, procedures, and reports; and assisting in the development major acquisition milestones relating to implementation and transition. The APLNI/ISS attends and participates in the Product Lead's weekly status meetings, weekly telecons, and bimonthly PT meetings.

13.1.2 Field Level Involvement

The Field Implementation Team (FIT) participates in PIP coordination and supports resolution of program implementation and transition issues. The FIT is chaired by ANS-700 and is comprised of headquarters elements such as AUA-460, ATR-230, AfZ-100, and AFR-304, ACT-320, AOS-500, AOP-400, ASD-120, and regional 400 and 500 representatives. Other participants from headquarters, Regions, and the field are routinely called upon to participate in FIT meetings depending on the phase of implementation and whether agenda items are of interest to them.

13.1.3 Regional Associate Program Manager (RAPM)

The Airway Facilities Regional Division Managers (AXX-400) are responsible for assuring that implementation sites review proposed implementation requirements, assess requirements against local constraints, and identify and seek resolutions to any issues associated with program requirements. Typically, the Regional Division Managers delegate coordination of these functions to the RAPMs to include serving as a member of the PT, responsibility for regional review of the PIP/GSIP, for programs to be implemented within the region, and development of Site Implementation Plans (SIPs). (Re: Implementation Process Guidelines dated June, 1994, p. 41)

The AF RAPM's, see Table 13.1-1, serve as focal points in their respective regions.
Updated 12/3/96 Regional RAPM input.

REGION	INDIVIDUAL	TELEPHONE
AAL-421I	Vared Lovett	(907) 271-6535
AEA-450	Jin McGovern	(718) 553-3467
ACE-420	Wayne Coffman	(816) 426-2242
AGL-459.2	Joe Szanati	(708) 294-7591
ANE-422	Ed Davis	(617) 238-7435
ANM-400	John R. Fredenberg	(206) 227-2414
ASO-420A.7	Rich Williams	(404) 305-6297
ASW-422	Chuck Morrow	(817) 222-4221
AWP-423	Ed Felipe	(310) 725-3498

TABLE 13.1-1 WARP Air Way Facility Regional Associate Program Managers

The AT RAPM provides field input and expertise to the Product Team(s) in the area of air traffic. ATC is a highly specialized operation that represents the concerns of the operators of the equipment, the Air Traffic Controllers.

They Function as the pipeline between field facilities and the Product Team(s) regarding operational functions and problems originating from the Air traffic field facilities. This may include human factors engineering concerns, future enhancements, or other factors. Air Traffic Representatives also act as coordinators and POC for technical problems, channeling problems and requests to the appropriate non-ATC functions for appropriate action.

AT RAPMs provide the Product Team(s) with air traffic education, and experience, to benefit the overall effectiveness of the team.

The AT RAPM's, see Table 13.1-2, serve as ATfocal points in their respective regions.
Updated 1/14/97 Regional RAPM input.

REGION	INDIVIDUAL	TELEPHONE
AAL-519	J.J. Hodges	907-271-2886
AEA-500	Ron Ferrara	718-553-4513
ATCSCC	Ralph Beard	703-904-4410
ACE-512C	Tom Klocek	816-426-3400
AGL-512	Craig Buma	708-294-7557
ANE-510.3	John O'Shea	617-238-7513
ANM-512	Dick Koch	206-227-2512
ASO-510	Vaughn Davis	404-305-5545
ASW-511	Mary Hokit	817-222-5519
AWP-510.4	John Maloney	310-725-6414

TABLE 13.1-2 WARP Air Traffic Regional Associate Program Managers

13.1.4 Technical On-site Representatives (TOR)

The TOR, is designated for each site by the appropriate AF division manager and is appointed by the Technical Officer. This position serves as the interface among the contractor, AF System Management Office (SMO) personnel, the RAPM and the TO/APME. The RAPM will request the TOR to be designated at the appropriate time within the planning phase.
A listing of the TOR will be furnished and contained in Table 13.1.4-1. The TOR's responsibilities include, but are not limited to, the following:

a. Coordinates site access for the contractor;
b. Provides input to logistics planning activities as they relate to site requirements;
c. Assists contractor during site surveys;
d. Provides assistance in the form of direction and guidance to the contractor to efficiently accomplish site preparation, installation, testing, and evaluation for the WARP;
e. Witnesses the site preparation, installation, and testing;
f. Participates in Familiarization testing and integration of the system;
g. Completes FAA Form 256, Inspection Report of Material or Services, for acceptance of WARP;
h. Assists in system field testing in accordance with the requirements of the test plans for WARP;
i. Participates in the JAI;
j. Maintains installation logs and submits installation status reports, based on log entries, to TO/APME.

(Re: PMP, dtd 8/94)

The TOR's, see Table 13.1-2, serve as focal points in their respective ARTCCs.
Updated 12/3/96 Regional RAPM input.

FACILITY	INDIVIDUAL	TELEPHONE
ZKC	Randy Crain	913-791-8652
ZDC	Rus Brewer	703-771-3681
ZDC	Joe Timko (alt)	703-771-3681
ZAU	Larry Cramer	847-608-5813
ZID	Bob Grissom	317-247-2289
ZMP	John Quamme	612-463-5648
ZNY	Sal Lomonaco	516-468-XXXX
ZNY	Joe Reilly (alt)	516-468-1178
ATCSCC	Chuck Nelms	703-904-4470
ZOB	Tom Davis	216-716-7179
ZBW	Ann Santos	603-886-7621
ZBW	Carmine Marinilli(alt)	603-886-7621
ZSE	Rick Knowles	206-351-3302
ZLC	Dominic Sisneros	801-524-5319
ZDV	Mark Stack	303-286-5510
ZFW	Yong Park	817-858-7497
ZAB	Joe Lozano	505-856-4339
ZHU	Dewitt Dansby	713-230-5363
ASO	David Lebby	404-305-6459
AWP	Scott Earl	310-297-1079
ZAN	Edward Vey	907-271-2889

TABLE 13.1-3 AF Regional Technical On Site Representatives (TOR's)

13.1.5 Contract Support

Contract support for the WARP program is contracted to:

The only contractor support organization that will be supporting the program and site implementation for Harris Information Systems Division (HISD) is the Harris Technical Services Corporation (HTSC). The role of HTSC includes:

- Confirming that the shipment has arrived on site.
- Assist the Harris installation team to install and test the WARP system at each site. This assistance provides OJT for the maintenance technicians who will be maintaining the WARP equipment under the maintenance service contract with the FAA.
- Provide hardware maintenance support
- Operate the repair depot.
- Replenish consummables as the paper stocks, printer toner, etc. are depleted.

13.2 Site Implementation Process

Site implementation includes activities performed primarily by regional and site personnel to implement a change in the functional or performance capability of a specific site. Whereas the program-level implementation activities are defined in relation to the five acquisition phases, site implementation activities are defined in relation to time intervals or phases which conform to the site implementation milestones. The planning for implementation at a specific site normally begins during the demonstration/validation phase of the

program acquisition cycle and continues into full scale development and production. Site implementation begins with the site survey which is normally conducted during the Full-scale development phase. The relationship of site implementation phases to program implementation phases may vary in order to mesh with a program's delivery schedule. Seven phases of site implementation are defined below. Site implementation plans identify tasks and resource requirements to be accomplished during each of these phases. (Re: Implementation Process Guidelines dated June, 1994, page 17)
These phases have been tailored for the WARP Stage 0 program implementation because it is a technology upgrade of the existing MWP system.

13.2.1 Implementation Planning Phase

Spanning the time prior to equipment installation and extending into the integration and testing of new systems, there are ongoing program implementation planning activities. These activities include, but are not limited to such activities as:

a. review and comment on the initial PIP and each of its updates

b. participation in resolutions for local and regional implementation discrepancies and issues

c. review and comment on program CDRLs

d. attendance/participation in program reviews, design reviews and other activities which may require the insight and experience of personnel from the field (Re: IPG, dtd 6/94, p.17)

e.

13.2.1.1 Implementation Activities

The implementation planning activities requiring field participation are:

a. Attending the PT meetings

b. Facilitating planning and information exchange

c. Serving on test teams

d. Reviewing and commenting on the initial Program Implementation Plan (PIP) prepared by the FAA and the System Implementation Requirements plan (CDRL A062) and Site Preparation, Installation, and Checkout plan (CDRL A063) prepared by Harris and each update.

e. Assuring the conduct of site implementation planning within the region

f. Developing the Site Implementation Plan

g. Participate in site surveys. For the WARP Stage 0 implementation, site surveys are planned only for the ATCSCC, and the Anchorage ARTCC. These site surveys are planned because:

   1. The ATCSCC MWP interface cabling is fiber optic owned by Electronic Data Systems (EDS). Harris is required to provide fiber optic cabling for WARP. The site survey will investigate whether new fiber optic cables are needed for technical reasons or whether the existing installed EDS house wiring is sufficient.

   2. The Anchorage ARTCC site survey will investigate the system cable requirements to connect to the HIPS interface for polar orbiting satellite imagery products and the Bureau of Land Management (BLM) lightning data sources.

The remaining sites do not require site surveys because the WARP processing equipment will be installed in the existing MWP racks downstairs and the briefing terminals replaced with new terminals in the same location. Bulk 10B-T cable will be brought to the sites to accommodate relocating the briefing terminals within a reasonable distance from their existing locations. The meteorologist workstation will be modified in place at its existing location. Therefore, site surveys are not needed because the new cables will follow the route of the MWP cabling.

13.2.1.2 Requirements

Harris and regional/site personnel will prepare system Implementation Requirements (SIR) and individual Site Implementation Plans (SIP) that cover those activities needed to implement WARP. The contractor will

prepare a SIP that addresses implementation considerations and activities beyond those normally covered in the SIP. This will include interfaces with other national FAA programs, FAA Headquarters requirements, site implementation sequencing, system management capability at contractor facilities, system-level quality assurance and cut over activities, and installation of system management equipment at designated sites.

13.2.2 Pre-Installation and Checkout (Pre-INCO) Phase

This phase begins with the conduct of the program site survey and concludes with delivery of program equipment at the site. During the interval between these two milestones, all site preparation tasks necessary for installation of equipment are performed.

13.2.2.1 Implementation Activities

Activities occurring within the Pre-INCO phase include site surveys, preparation, and equipment delivery. During this period, AUA-460 and Harris will perform site surveys as indicated on the Deployment / Site Installation Schedule. F&E activities during this period include, but are not limited to, building preparations, storage, providing facility power, space, air-conditioning, communications access, and Government support equipment preparations. For Stage 0, PRE-INCO are limited to equipment deliveries except for the three sites discussed above.

13.2.2.2 Requirements

During the Pre-INCO phase, AUA-460, Harris, and site personnel will perform site surveys as indicated on the Deployment / Site Installation Schedule in section 11.2. AUA-460 will contact regional and site representatives in advance of site surveys and equipment delivery to coordinate site support during these efforts. Harris personnel data will be provided to site representatives prior to commencement of installation activities. Harris will prepare and delivery a generic Site Preparation, Installation, and Checkout Plan (CDRL A063) for each required facility.

13.2.3 Installation and Checkout (INCO) Phase

The INCO phase begins with delivery of program equipment at the site and continues through successful completion of testing of the equipment in stand-alone mode. No FAA interfaces are integrated during this phase. The equipment contractor is normally responsible for installation activities and FAA personnel are in a monitor role. The INCO phase entails all the activities associated with receipt and positioning of program equipment, positioning and testing of stand-alone functionality. The milestone demarking the end of this phase is normally conclusion of the Contractor Acceptance Inspection (CAI). (Re: IPG dtd 6/94, p.19)

FAA personnel will install the WARP system cabling at the following sites:

Kansas ARTCC

ATCSCC

New York ARTCC

Washington ARTCC

13.2.3.1 Implementation Activities

The INCO phase begins at equipment delivery and continues until the start of PAT&E activities. Equipment and cabling will be installed as identified. INCO activities will be performed by Harris with support from Product Office personnel and site AF and AT personnel.

13.2.3.2 Requirements

At the beginning of the INCO phase, AUA-460 Shall conduct a pre-installation kickoff meeting. AUA-460 shall coordinate installation activities and effect problem resolution when necessary.

AF and AT personnel will be available during the Installation and Checkout phase in support of equipment installation

13.2.4 System Integration Phase

This phase begins when CAI is accomplished and concludes when the FAA declares Initial Operational Capability (IOC) for the system. During this phase, all FAA internal and external interfaces are established. The fully integrated functioning of program equipment and systems is verified and operational responsibility for the system is transferred from the Harris to the FAA.

13.2.4.1 Implementation Activities

The system integration phase includes PAT&E. PAT&E will be conducted on site by Harris to verify the equipment and software have been installed properly. The PAT&E is a checkout test verifying functionality/connectivity between the WARP server and the workstation and briefing terminals. The functionality checks include verifying the unique site adaptation parameters have been installed.

13.2.4.2 Requirements

During system integration, AUA-460 will coordinate facility activities required by Harris under the terms of the awarded contract. Harris will conduct the production site checkout testing and the FAA Product Office representative will participate. At the completion of testing, Harris will provide the site checkout results for each facility testing. Site personnel will coordinate the pre-installation activities and scheduling for Harris. AF and AT personnel will also participate in installation and testing activities. Designated AT TMS personnel will attend system familiarization training provided by Harris during the installation.

13.2.5 Field Familiarization Phase

This phase extends from the IOC milestone through completion of the Operational Readiness Demonstration (ORD). During this interval, the technical and operational work forces and management personnel employ the new equipment in a carefully controlled operational environment to verify that the fully integrated system is fully functional. Use of the new system capabilities typically begins with use for limited periods of time during low traffic time periods, gradually increasing usage for longer periods under full traffic load conditions. During this time, site personnel develop full proficiency in the maintenance and operation of the newly configured operational system. During this time, the contractor is in a support role. This phase does not apply to the WARP Stage 0 system implementation which is a leased service.

13.2.5.1 Implementation Activities

The Field Familiarization testing, will be conducted by the individual Site Coordinators and designated FAA facility personnel. Field Familiarization testing is separate and distinct from OT&E and occurs at each WARP installation. WARP orientation training for facility personnel will also be conducted during this phase (see section 8.3).. The Field Familiarization Phase will end upon successful completion of JAI.

13.2.5.2 Requirements

Not Applicable for Stage 0. Stage 1/2, and 3, Site AF and AT personnel shall support AOS-500 conduct of familiarization testing, and shall participate in familiarization training provided by the Harris. Site AT representative shall coordinate their operations with AF and contractor personnel to minimize disruption of controller operations during testing.

Site AF representative shall arrange for contractor access to the facilities and space necessary to complete system integration in accordance with the site installation plan.

13.2.6 Dual Operations Phase

This phase follows completion of the ORD milestone through commissioning of the system for on-going operations through completion of the Joint Acceptance Inspection (JAI). During this interval, the system is commissioned and pre-determined minimum number of personnel are certified on use of the system. The replaced system is available in back-up mode until removed. The Dual Operations phase will not be applicable to all acquisition programs.

(Re: Implementation Process Guidelines dated June, 1994, page 19)

The JAI is an activity to gain consensus of all involved that projects for facility establishment, improvement, or relocation are completed in accordance with national criteria, and that the facility is capable of performing its advertised functions.

Pre-JAI Activities: Once the specified construction and/or installation work has been completed, the on site engineer notifies the sector and the AF planning office by phone and/or memorandum. A JAI shall be performed before a new, improved, or relocated facility, system, or equipment is accepted for maintenance and/or operation on a commissioned basis in the NAS. The regional AF division is responsible for notifying the joint acceptance board chairperson when the facility will be ready for the JAI.
(Re: FAA Order 4650.30 dated 5/4/93, page 5-2 and Appendix 2, page 3)

13.2.6.1 Implementation Activities

A server and meteorologist workstation will be installed downstairs next to the WARP processor racks for parallel operations. Several of the briefing terminals will also be temporarily installed downstairs for the dual operations phase during SAT and OT&E. Space will be required to support the temporary installation of the new equipment downstairs adjacent to the WARP processor racks. After successful completion of OT&E, the workstation and briefing terminals will be moved upstairs to replace the MWP equipment. The site will have been prewired during the initial installation so that the deinstallation and relocation of the equipment can be accomplished within a scheduled downtime of 4 hours. No dual operations is planned for the production sites.

13.2.6.2 Requirements

This phase follows completion of the ORD milestone through commissioning of the system for on-going operations through completion of the JAI. During this interval, the system is commissioned and pre-determined minimum number of personnel are certified on use of the system. The replaced system is available in back-up mode until removed. The Dual Operations phase is applicable to the Dallas/FW site for a period of 3 weeks. (Re: Implementation Process Guidelines dated June, 1994, page 19)

The JAI is an activity to gain consensus of all involved that projects for facility establishment, improvement, or relocation are completed in accordance with national criteria, and that the facility is capable of performing its advertised functions.

Pre-JAI Activities: Once the specified installation work has been completed, the on-site engineer notifies the sector and the AF planning office by phone and/or memorandum. A JAI will be performed before a new, improved system, or equipment is accepted for operation on a commissioned basis in the NAS. The regional AF division is responsible for notifying the joint acceptance board chairperson when the facility will be ready for the JAI. (System Implementation Requirements, dtd 12/2/96, page 66)

13.2.7 Equipment Removal Phase

13.2.7.1 Implementation Activities

This phase follows completion of the JAI milestone and extends until all replaced equipment, implementation support and test equipment is removed and the facility is refurbished or restored. Included during this phase are all activities necessary to resolve outstanding program trouble reports (PTRs), outstanding ISR checklist items and JAI items. At the completion of this phase, implementation activities identified in the SIP requirements will be accomplished. (Re: Implementation Process Guidelines dated June, 1994, page 19)

Harris will remove the following residual MWP equipment from the site:

- WSI NIDS receiver
- VME Chassis
- Old 286 briefing terminals and monitors

The old furniture will be disposed of on-site. The FAA may keep the old furniture if desired. Unclaimed furniture will be disposed of by disassembling it and placing it in the trash container. MWP cables that are no longer needed will be tagged and abandoned in place.

13.2.7.2 Requirements

The Product Office shall provide contractual direction to the contractor concerning the disposition of the equipment being replaced at each site. Each site is required to provide the installation contractor, upon his arrival at the site, with completed 4650-12's for the equipment that is to be disposed.
Included during this phase are all activities necessary to resolve outstanding PTRs, outstanding ISR checklist items.

13.3-13.19 (Reserved)

13.20 Status Assessment

No implementation issues have been identified.

Appendix A

GENERIC SITE IMPLEMENTATION PLAN (GSIP)

Appendix A

GENERIC SITE IMPLEMENTATION PLAN (GSIP)

1. INTRODUCTION

1.1 Purpose

The WARP Transition GSIP has been developed as a tool to assist regional and site personnel with the development of the Site Implementation Plan (SIP). This plan is to be used as a starting point to identify those activities required to successfully complete implementation of the project at a specific location and identify the organization responsible for the various activities. Additionally, the activity list can be tailored to fit the specific needs of Regional and Site personnel and avoid developing each SIP from scratch.

1.2 Scope

The GSIP contains a Project Resource Table which covers the site implementation aspects of the project through the seven phases of implementation. The implementation phases covered in the WARP Transition GSIP include Planning, Pre-Installation and Check-Out (Pre-INCO), Installation and Check-Out (INCO), Integration, Familiarization, and Equipment Removal. The Dual Operations (DUAL-OPS) phase of implementation is not applicable to the WARP Transition project.

2. OVERVIEW

2.1 Responsibilities

The Program Management Team (PT) is responsible for development of the WARP GSIP. The Associate Product Lead for NAS Implementation (APLNI) and the Implementation Support Specialist (ISS) is responsible to coordinate the efforts of the PT.

2.2 Project Resource Table

The WARP Project Resource Table consists of a broad list of activities required to install a project at a facility. This list has been organized by the various phases of the implementation process. Facilities differ by platform and from facility to facility, therefore, certain activities may not apply and should be removed from the list. Other activities may be added to the list in order to complete the site plan. Once tailored for a particular site, the revised GSIP normally becomes the SIP for that site. When there is a contractor tasked to provide a SIP, the GSIP can be used to identify those FAA activities that need to be accomplished that may not be provided for in the contractor's SIP.

2.3 Soft Copy Support

An IBM PC compatible Microsoft Excel soft copy of the GSIP is available from the project APLNI/ISS. The soft copy may be run on a PC using either Microsoft Excel, Microsoft Word, or Microsoft Project. Using these tools, the project information can be easily updated and tasks and schedules can be generated by responsible individual, responsible organization, or by essential element.

2.4 Organization

The GSIP Project Resource Table divides the Essential Element Site Activities into categories by the implementation phases. The activities identified by the GSIP are then Sourced to the related paragraphs in the Program Implementation Plan (PIP). The space provided in the GSIP for Responsible Individual, Labor Category, Time to Complete, and comments are provided to Region and Site personnel for planning purposes in the
development of the SIP.

Number -	The item number of an activity for an implementation phase.
Description -	Description of activity.

PIP Paragraph Source -	Refers to the paragraph numbers of the Program Implementation Plan (PIP) where information related to the GSIP item is located.
Responsible Individual -	Refers to the organization identified as being responsible for the activity.
Additional Items -	The fields for Labor Category, Time to Complete and comments are provided for planning purposes in the development of the SIP.

Tasks within the GSIP identified as "N/A" indicate that there are no personnel requirements identified by the site as a result of this task.

WARP Generic Site Implementation Plan

Number	PLANNING Tasks	PIP Paragraph Source	Responsible Individual	Time To Complete	Due Date	Comments
1	Identify Site Prep Responsibilities	13.2.1	AUA-460	8 hours	60 days after Site Survey	
2	Coordinate funding PA for advanced project funding with Product Office as required	7.0	AUA-460 RAPM	4 hours	ongoing	
3	Identify the following: NAS CIP I.D. Project Start Date Installation site Site survey date and Checklist Equipment Installation date JON	11.0	AUA-460 RAPM Site POC	10 hours	90 days after contract award	
4	Identify AT/AF regional/site P.O.C. for WARP deployment support	13.1	RAPM	1 hour	By contract award	
5	Identify TOR	13.1.4	Site Manager	1 hour	Before Site Survey	
6	Identify additional AT and AF Personnel Requirements for Implementation and operations	3.0 4.0	Site POC	16 hours	90 days after contract award	
7	Identify the AT changes to: Admin and management procedures Software verification procedures Interfacility procedures System backup & cutover procedures	4.2	ATP ATR	8 hours	before Site Survey	

Number	PLANNING Tasks	PIP Paragraph Source	Responsible Individual	Time To Complete	Due Date	Comments
8	Identify AF changes to: Admin and management procedures software verification procedures Interfacility procedures System backup & cutover	3.2	ALM AOS	8 hours	before Site Survey	
9	Identify NWS changes to: Admin and management procedures S/W verification procedures Interfacility procedures System backup & cutover	4.3.1	NWS-MIC	8 hours	before Site Survey	
10	Identify NWS personnel for requirements and training	4.3.1	NWS-MIC	8 hours	before Site Survey	
11	Identify site personnel training requirements for AT/AF and NWS	8.3	Site POC	2 hours	before Site Survey	
12	Publish Site Survey checklist	6.0	Site POC	8 hours	before site survey	

Number	PRE-INCO Tasks	PIP Paragraph Source	Responsible Individual	Time To Complete	Due Date	Comments
1	Conduct Initial site survey: power: -critical -essential -grounding, bonding, & shielding space: -installation -office -storage -loading dock area hazmat: -dust -noise	6.0 6.8 6.6	AUA-460 Contractor AF POC AT POC NWS POC F&E Engineer Safety POC	16 hours	at site survey	
2	Identify Telecommunications requirements	6.10	AUA-460	1 hour	at site survey	
3	Finalize delivery schedule for project hardware	11.3	AUA-460 RAPM	TBD	30 days before ISR Decision	This task to be completed by the Product Office in coordination with the RAPM
4	Complete floor plan layout of control room: -Furniture requirements -functional arrangement of equipment -dimensional requirements -location and size of doors -clear space requirements -required locations of special electrical and mechanical provisions -height requirements	6.8.2	F &E Engineer	40 hours	90 days before equipment delivery	Site plans will be provided by the Product Office.

Number	PRE-INCO Tasks	PIP Paragraph Source	Responsible Individual	Time To Complete	Due Date	Comments
5	Complete equipment layout drawing package: -equipment name -units required (number) -dimensional requirements -raised floor requirements -impact of installation on operation of adjacent equipment -new furniture be required -floor drainage -minimum access requirements - front, back, sides, top	6.8	AUA-460 AXX-4XX	10 hours	90 days before equipment delivery	Site Plans will be provided by the Product Office
6	Complete critical power drawing package: -NCP approval -volts -amps -phase -frequency -reflected harmonics -inrush current -normal kva -peak kva -power factor	6.4	AXX-4XX AUA-460	10 hours	90 days before equipment delivery	Product Office issue NCP for connection to critical power

Number	PRE-INCO Tasks	PIP Paragraph Source	Responsible Individual	Time To Complete	Due Date	Comments
7	Complete cabling mods drawing package: -wall, ceiling & floor penetrations -circuit breaker panels affected -additional power and circuit breaker requirements -determine wire runs -unique drilling requirements -grounding, bonding, and shielding -cable tray and conduit requirements -telecommunications connection requirements	6.3	AXX-4XX AUA-460	10 hours	90 days before equipment delivery	
8	Review other project implementations to identify cross project impacts for: -facility -AF operations -AT operations -training -installation schedules	13.2	AF POC AT POC	32 hours	90 days before equipment delivery	Subject for Site Survey
9	Prepare CCD's	9.0	AUA-460	40 hours	NTL 60 days before equipment delivery	

Number	PRE-INCO Tasks	PIP Paragraph Source	Responsible Individual	Time To Complete	Due Date	Comments
10	Provide updated site specific drawings and documents to the installment contractor: -floor plan layouts -facility blueprints -grounding/bonding locations -surveys -shielding requirements	6.0	AXX-4XX F&E Engineer	8 hours	60 days before equipment delivery	Comments to contractor on site specific drawings
11	Complete physical facility modifications (Site-Prep)	6.9	AXX-4XX	40 hours	complete before equipment delivery	40 hours if contractor needed
12	Schedule installation team kickoff meeting: -date -attendees -contractor rep -site reps -regional POC	13.1	AXX-4XX AF POC AT POC	1 hour	30 days before equipment delivery	
13	Update project activity network	12	AXX-4XX RAPM	16 hours	30 days before equipment delivery	Update PIP for RTP
14	Generate implementation schedule for each site	11	AUA-460 Site POC	TBD	TBD	Site implementation schedule generated by Product Office

Number	PRE-INCO Tasks	PIP Paragraph Source	Responsible Individual	Time To Complete	Due Date	Comments
15	Identify attendees for training courses required. Develop training schedule compatible with personnel availability, facility constraints, operational milestones and project activation dates	8.3	AUA-460 AF POC AT POC NWS POC	4 hours	30 days after site survey	review by phases
16	Determine support equipment prior to delivery -elevator sizes and capacities -door openings -stair well sizes -staging area requirements -dollies -temporary shelter	13.2.2.2	site POC	8 hours	at site survey	Address at site survey
17	Develop installation team kickoff agenda: -security passes/badges -parking -number and type of vehicles -special driver training requirements -Transfer, loading, and unloading requirements -contractor clearance list w/ssn's etc. -work day -in house contact list -training schedule -issue resolution & tracking -contractor space	13.1	AF-POC AT-POC Site POC	2 hour	Before Site Survey	

Number	INCO Tasks	PIP Paragraph Source	Responsible Individual	Time To Complete	Due Date	Comments
1	Establish Facilities Source Data File (FRDF)	5	F&E Engineer Sector POC	40 hours	TBD	
2	Update AT operational procedures for new equipment & software	4.2	AXX-5XX ATP AOS	40 hours	TBD	Review with AT and AOS. Coordinate with unions.
3	Update facility maintenance operating procedures for project hardware	3.1.2	AUA-460 AF POC	8 hours	TBD	Coordinate with unions
4	Review the JAI procedures (FAA Order 6030.45) and establish team	1.4 13.2.6	AUA-460 AXX-4XX AF POC	4 hours	Before System Familiarization	
5	Coordinate CAI Plan	5	AUA-460	N/A	N/A	Product Office is responsible for coordination of CAI Plan

Number	INCO Tasks	PIP Paragraph Source	Responsible Individual	Time To Complete	Due Date	Comments
6	Familiarization training	8.3	AUA-460 TOR ATX-100	TBD	TBD	Coordinate with contractor
7	Integration phase testing requirements: - Identify integration phase testing personnel - Generate testing discrepancy list - Issue preliminary test report - Conduct the contractor acceptance inspection (CAI) - Update FRDF - Clear CAI discrepancies - Update project schedule - Complete CAI	 8.2.1 9.5 9.5 13.2.3 5 13.2.3 11.3 9	AUA-460 AXX-4XX AXX-5XX	 12 hours 8 hours	before field Familiarization test	
8	Develop Test Plans and Procedures: - OT&E and Field Familiarization Test Plans - Etc.	9	Reg AF Div	40 hours	before field Familiarization test	

Number	INTEGRATION	PIP Paragraph Source	Responsible Individual	Time To Complete	Due Date	Comments
1	Close out any outstanding contractor acceptance inspection (CAI) discrepancies.	13.2.6	AUA-460	N/A		AUA-460 is responsible for close out of outstanding CAI discrepancies.
2	Identify field Familiarization phase testing personnel	13.2.5	Site POC	2 hours	before equipment delivery	
3	Conduct integrated testing	13.2.4	AXX-4XX	40 hours	Before completion of JAI	
4	Generate trouble reports	9.5.2	AUA-460 AF Sector	20 hours	Before completion of JAI	
5	Clear trouble reports	9.5.2	AUA-460	20+	Before completion of JAI	Product Office is responsible for clearing trouble reports
6	Update facility drawings to reflect current "as built" configuration	13.2.4.1	AUA-460	24 hours	complete before JAI	
7	Achieve IOC	9	AXX-4XX	N/A		IOC is achieved upon completion of Integration / Equipment Removal Tasks 1 through 9

Number	FIELD FAMILIARIZATION Tasks (IOC - ORD)	PIP Paragraph Source	Responsible Individual	Time To Complete	Due Date	Comments
1	Complete training	8.3	AUA-460	40 hours	Before System Familiarization	
2	Conduct Familiarization testing	9	AXX-4XX	40 hours	TBD	
3	Generate trouble reports	9	AXX-4XX	10 hours	during field Familiarization test	
4	Clear trouble reports	9	AUA-460	TBD	TBD	Product Office is responsible for clearing trouble reports Time to Complete and Cost depends on the number of problems identified.

Number	Equipment Removal	PIP Paragraph Source	Responsible Individual	Time To Complete	Due Date	Comments
1	Replaced workstation disposal	13.2.7	AUA-460	8 hours	After ORD	Contractor is responsible for removal of workstations , cables, and etc being replaced
2	Remove Debris	13.2.7	AUA-460	8 hours	After ORD	Contractor is responsible for removal of debris

Appendix B

ACRONYMS

Appendix B ACRONYMS

A

ACCC
Area Control Computer Complex 19
ACF 21
Area Control Facility 5
AF
Airway Facility 9
AFSS
Automated Flight Service Station 19
ANW
Weather and Flight Service Systems 2
ARSR
Air Route Surveillance Radar 4
ARTCC
Air Route Traffic Control Center 3, 5
ATC
Air Traffic Control 3, 4
ATCS
Air Traffic Control Specialists 3
ATCSCC
Air Traffic Systems Control Center 3
ATCT
Air Traffic Control Tower 19
ATWRT
Air Traffic Weather Requirements Team 3

B

BLM
Bureau of Land Management 13

C

CAI
Contractor Acceptance Inspection 1
CBD
Commerce Business Daily 65
CDRL
Contract Data Requirements List 12
CFWSU
Central Flow Weather Service Unit 3
CM
Configuration Management 53
CONUS
Continental United States 19
COTS
Commercial-Off-The-Shelf 9
CWSU
Center Weather Service Unit 3

D

DLP
Data Link Processor 19
DSR
Display System Replacement 4
DT&E
Development Test and Evaluation 45

E

E&R
Exchange and Repair 12
E-Mail
Electronic Mail 12
EOF
Emergency Operating Facility 19

F

F&E
Facilities and Equipment 13
FAA
Federal Aviation Administration 1, 3
FAATSAT
FAA Telecommunications Satellite 21
FSDPS
Flight Service Data Processing System 19

G

GAI
Global Atmospherics Inc. 15
GNAS
Generic National Airspace System 21

H

HIPS
HRPT Image Processing Subsystem 13
HRM
Human Resources Management 41
HRPT
HTSC
Harris Technical Services Corporation 9
HWDS
Harris Weather Data Service 3

I

INCO
Installation and Checkout 1
IOC
Initial Operational Capability 1
ITWS
Integrated Terminal Weather System 21

J

JPL
Jet Propulsion Laboratory 6

L

LCC
Life Cycle Cost 37
LCN
Local Communication Network 19
LOA

Letter of Agreement 15, 16
LRU
Line Replaceable Unit 9, 10

M

MDT
Maintenance Data Terminal 19
MTBF
Mean-Time-Between-Failure 9
MTTR
Mean-Time-To-Repair 9, 12
MWP
Meteorologist Weather Processor 2, 6

N

NADIN
National Airspace Data Interchange Network 19
NARACS
National Radio Communications System 19
NAS
National Airspace System 1
NDI
Non-Development Item 9
NEXRAD
NIDS
NEXRAD Information Dissemination Service 3
NIMS
NMCE
Network Monitor and Control Equipment 19
NOTAM
Notice to Airmen 15, 16
NWS
National Weather Service 6

O

OJT
On-the-Job Training 1
ORD
Operational Readiness Demonstration 1
OT&E
Operationa Test and Evaluation 45

P

PIP
Program Implementation Plan 1
PSN
Packet Switching Network 19

Q

QA
Quality Assurance 53

R

R&M

Reliability and Maintainability 9
RAPM
Regional Associate Program Manager 73
RCE
Radio Control Equipment 19
RF
RMMS
Remote Maintenance Monitoring System 12
RWP
Real-Time Weather Processor 6
RX

S

SAT
Site Acceptance Test 46, 53

T

TMU
Traffic Management Unit 4
TOR
Technical On-Site Representative 15, 74
TRACON
Terminal Radar Approach Control Facility 19

V

VSCS
Voice Switching and Control System 19

W

WARP
Weather and Radar Processors 1
WMSCR
Weather Message Switching Center Replacement 6
WSR
Weather Service Radar 4
WSR-88D
Weather Service Radar-88D 13

Appendix C

SOURCES

Sources

AFR-300	Comments from AFR-300, Logistics Management
AUA-400	Comments from AUA-400, WARP Product Office
AP	WARP Acquisition Plan, dated March, 1995
ATR-130	Comments from ATR-130, Air Traffic Plans and Requirements
CBA	WARP Cost Benefit Analysis, dated March , 1995
FAA Order 1810.1F	Acquisition Policy, dated March, 1993
FAA Standard 036B	Preparation of Program Implementation Plans, dated May , 1994
HFP	WARP Human Factors Plan, dated October, 1994
ILSP	WARP Integrated Logistic Support Plan, draft dated March, 1995
IPG	Implementation Process Guidelines, dated June 1994
MNS	WARP Mission Need Statement, dated March, 1995
MRD	WARP Maintenance Requirements Document, undated
MWP PIP	Meteorologist Weather Processor Project Implementation Plan, dated August , 1989
NAS-SS-1000	National Airspace System, System Specification, dated February 1993
PMP	WARP Program Master Plan, dated August 1994
RMP	WARP Risk Management Plan, dated November, 1993
Spec	WARP System Specification, FAA-E-2898, dated July, 1995
SOW	WARP Statement of Work, dated july, 1996
TEMP	WARP Test and Evaluation Master Plan, dated July, 1995

U.S. Department
of Transportation

**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

**FORWARDING AND RETURN
POSTAGE GUARANTEED**

Official Business
Penalty for Private Use $300