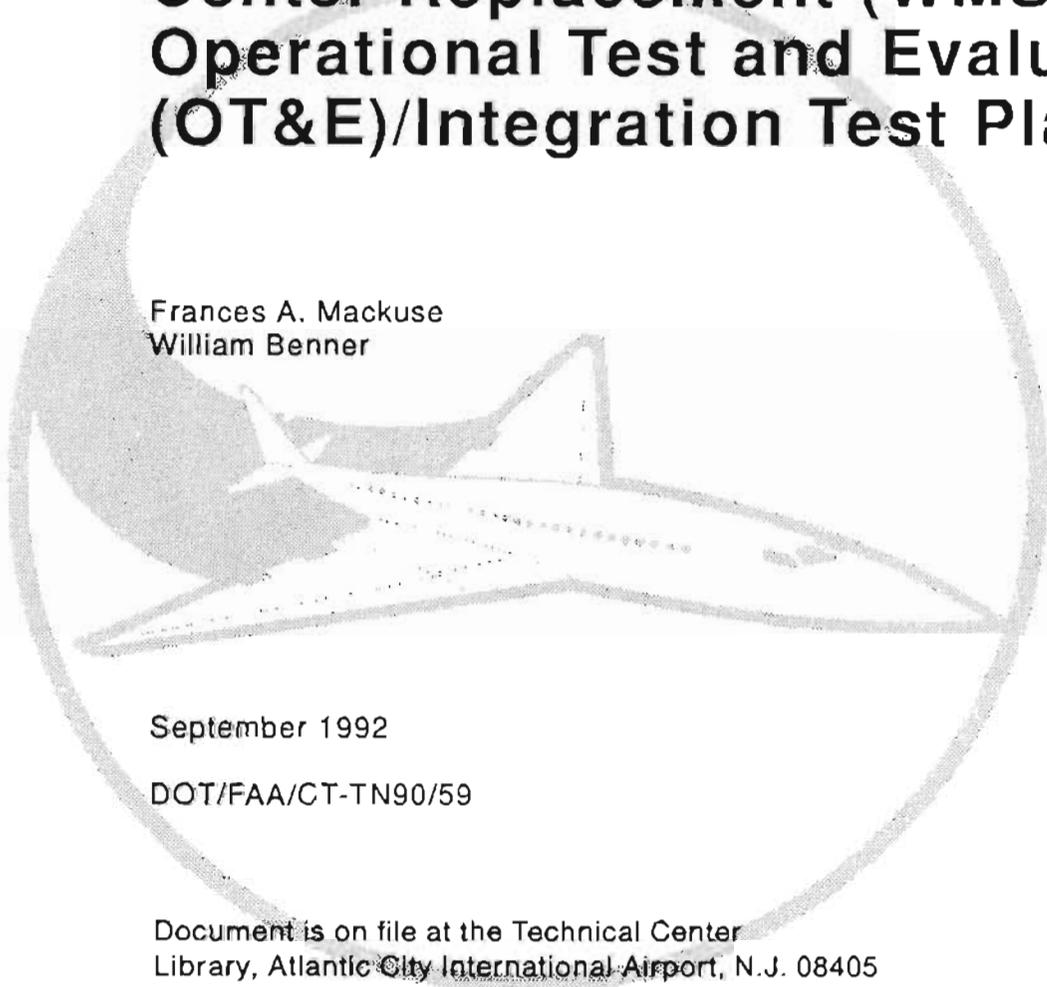


ate technical note

Weather Message Switching Center Replacement (WMSCR) Operational Test and Evaluation (OT&E)/Integration Test Plan

Frances A. Mackuse
William Benner



September 1992

DOT/FAA/CT-TN90/59

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16. Abstract The Weather Message Switching Center Replacement (WMSCR) will serve as the Federal Aviation Administration (FAA) gateway for the receipt and distribution of weather data and Notice to Airmen (NOTAM) within the National Airspace System (NAS). In December 1981, the FAA chartered a comprehensive NAS Plan for modernizing and improving air traffic control (ATC) and airway facilities through the year 2000. As part of the NAS Plan in 1983, the Air Traffic Service operation and requirements for the WMSCR were published. The purpose of the WMSCR system is to replace the current Weather Message Switching Center (WMSC) system in Kansas City, Missouri. It will support all functions related to weather processing presently performed by the WMSC. In addition, the WMSCR will collect NOTAMs from the Automated Flight Service Station (AFSS) environment for processing by the Consolidated NOTAM System Processor (CNSP) and will store and distribute the processed NOTAMs received from the CNSP. The WMSCR will be comprised of two identical nodes and the National Weather Service Telecommunications Gateway (NWSTG) WMSCR Interface Device (NWID). The nodes will be located at the National Aviation Weather Processing Facility (NAWPF) sites at Salt Lake City, Utah and at Atlanta, Georgia. The NWID will be located at Leesburg, Virginia. Each node will have the capability of servicing the entire geographical airspace system 24 hours a day, 7 days a week.					
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EXECUTIVE SUMMARY

As part of the National Airspace System (NAS) Plan, the Weather Message Switching Center Replacement (WMSCR) system will replace the current Weather Message Switching Center (WMSC) system in Kansas City, Missouri. In December 1981, the Federal Aviation Administration (FAA) chartered a comprehensive NAS Plan for modernizing and improving air traffic control (ATC) and airway facilities (AF) through the year 2000.

The WMSCR will support all functions related to weather processing presently performed by the WMSC, and store and distribute processed Notice to Airmen (NOTAM) received from the Consolidated NOTAM System Processor (CNSP). The WMSCR System will rely on the NAS Data Interchange Network Packet Switched Network (NADIN PSN) for the majority of communications support. The WMSCR functions as the FAA gateway to and from the National Meteorological Center (NMC) via the National Weather Service Telecommunications Gateway (NWSTG). Therefore, the WMSCR will be the source of weather products for the NAS.

The WMSCR system consists of two identical nodes and the NWSTG WMSCR Interface Device (NWID). The nodes will be located at the National Aviation Weather Processing Facility (NAWPF) sites in Salt Lake City, Utah and in Atlanta, Georgia. The NWID is to be installed at Leesburg, Virginia. Each node will provide geographical redundancy and will increase operational availability. Each WMSCR node serves approximately half the system. If one node fails, the surviving node assumes complete system operation.

The WMSCR will be capable of continuous 24-hour-a-day, 7-day-a-week operation. It is planned to become operational in 1992, and the system lifetime is anticipated to be at least 10 years.

1. INTRODUCTION.

As part of the National Airspace System (NAS) Plan, the Weather Message Switching Center Replacement (WMSCR) system will replace the current Weather Message Switching Center (WMSC) system in Kansas City, Missouri. The WMSCR will perform all current weather data handling functions of the WMSC. In addition, the WMSCR will collect Notice to Airmen (NOTAM) from the Automated Flight Service Station (AFSS) environment for processing by the Consolidated NOTAM System Processor (CNSP) and will store and distribute the processed NOTAMs received from the CNSP.

The WMSCR system will rely on the NAS Data Interchange Network Packet Switched Network (NADIN PSN) for the majority of communications support. The WMSCR functions as the Federal Aviation Administration (FAA) gateway to and from the National Meteorological Center (NMC), via the National Weather Service Telecommunications Gateway (NWSTG). Therefore, the WMSCR system will be the source of weather products for the NAS.

The WMSCR system consists of two identical nodes and the NWSTG WMSCR Interface Device (NWID). The nodes will be located at the National Aviation Weather Processing Facility (NAWPF) sites at Salt Lake City, Utah, and at Atlanta, Georgia. The NWID is to be installed at Leesburg, Virginia.

Each node will provide geographical redundancy and will increase operational availability. Each WMSCR node serves approximately half the system. If one node fails, the surviving node assumes complete system operation.

The WMSCR will be capable of continuous 24-hour-a-day, 7-day-a-week operation. It is planned to become operational in 1992.

1.1 PURPOSE.

The purpose of the Operational Test and Evaluation (OT&E)/Integration Test Plan is to provide the overall test philosophy and approach as well as to define the testing activities necessary to ensure the integration of the WMSCR system within the NAS environment. To accomplish this objective, the WMSCR, an end-state subsystem, must be operationally integrated with existing NAS subsystems.

The OT&E/Integration Test Plan defines the overall planning, coordination, criteria and general methods for the WMSCR OT&E/Integration test activities. These test activities include detailed testing requirements to verify the NAS-SS-1000 requirements, Volumes I to V, as applicable, Air Traffic Service (ATS) operational requirements and NAS Interface Requirements Document (IRD) system-level requirements. The WMSCR NAS system-level requirements are cross-referenced in the WMSCR Test Verification Requirement Traceability Matrix (TVRTM). (See appendix A.)

Detailed test procedures will be prepared as a separate document in accordance with FAA Standard O24a, Preparation of Test and Evaluation Documentation.

1.2 AUTHORITY TO CHANGE.

This plan has been produced by the Weather and Remote Maintenance Monitoring Systems Branch, ACN-250, at the FAA Technical Center. Modifications/revisions to this plan after initial approval shall be proposed in writing to the Communications/Navigation/Surveillance Division, ACN-200. The proposal shall clearly document the section number of the plan, the information currently contained in the plan, and the proposed modification. The reason for the proposed modification shall also be defined. The ACN-200 office shall maintain a record of all dispositions and subsequent revisions to the plan.

2. APPLICABLE DOCUMENTS.

This section lists the applicable documentation and reference materials which relate to the contents of this plan.

2.1 FAA DOCUMENTS.

2.1.1 FAA Specifications.

FAA-E-2764C	Weather Message Switching Center Replacement System Specification, July 1990
FAA-E-2770b	Specification National Airspace Data Interchange Network Packet Switched Network, April 29, 1988
NAS-SS-1000	NAS System Specification Functional and Performance Requirements for the National Airspace System (Volumes I-V)
NAS-DD-1000	National Airspace System, Level 1, Design Level Document
NAS-SR-1000	National Airspace System Requirements Specification

2.1.2 FAA Standards:

FAA-STD-024a	Preparation of Test and Evaluation Documentation August 17, 1988
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2.1.3 FAA Orders:

FAA Order 7032.3	Air Traffic Service Operational Requirements for Weather Message Switching Center Replacement (WMSCR)
FAA Order 1810.4A	FAA NAS Test and Evaluation Program, February 14, 1989
FAA Order 6090.1	Development and Implementation of RMS with the National Airspace System, June 1988

FAA Order 1100.145B	Program Technical Report Procedures, March 4, 1988
FAA Order 7110.10J	Flight Services, April 4, 1991
<u>2.1.4 Other FAA Documents:</u>	
WMSCR MTP	WMSCR Master Test Plan Draft, April 21, 1988
NAS-MD-110	Test and Evaluation (T&E) Terms and Definitions for the National Airspace System
NAS-IR-43020001	NADIN/X.25 Packet Mode User's Interface Requirements Document IRD, February 20, 1991
NAS-IR-90022507	WMSCR/National Weather Service Telecommunications Gateway IRD, February 27, 1987
NAS-IR-25042507	WMSCR/Aviation Weather Processor (AWP) IRD, February 19, 1987
NAS-IR-92020000	WMSCR/Coded Time Source CTS Users' IRD, March 1, 1990
NAS-IR-94022507	WMSCR/Packet Network Users' IRD, February 20, 1991
NAS-IR-94032507	WMSCR/Asynchronous PAD User IRD, November 20, 1986
NAS-IR-25072511	WMSCR/Real-Time Weather Processor (RWP) IRD, February 20, 1991
NAS-IR-25082507	WMSCR/ADAS IRD, February 20, 1991
NAS-IR-94012507	WMSCR/NADIN Message Switched Network Users February 20, 1991
NAS-IR-25072503	WMSCR/Data Link Processor (DLP) IRD, February 20, 1991
NAS-IR-25072505	WMSCR/Consolidated NOTAM System Processor (CNSP) IRD, February 20, 1991
NAS-IR-51030002	Maintenance Processor Subsystem to Automation Subsystems IRD, March 1988
NAS-IR-25072401	WMSCR/Traffic Management Processor IRD, February 20, 1991

2.2 OTHER DOCUMENTS.

ANSI X.3.66	American National Standards Institute
FIPS PUB 71	Advanced Data Communications Control Procedures
FIPS PUB 78	Guidelines for Implementing ADCCP
International Telegraph and Telephone Consultative Committee (CCITT)	
CCITT Recommendation X.25	Interface between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for Terminals Operating in the Packet Mode on Public Data Networks, 1984
CCITT Recommendation X.224	Transport Protocol Definition for Open System Interconnection, January 1984
CCITT Recommendation X.21bis	Use on public data networks of Data Terminal Equipment (DTE) which is designed for interfacing to synchronous V-series modems
Electronic Industries Association (EIA)	
EIA-530	High speed 25-position interface for DTE and DCE, March 1987
RS-232-D	Interface between the DTE and DCE employing Serial Binary Data Interchange, January 1987
International Standards Organization (ISO)	
ISO/OSI 7498	Information Processing Systems-Open Systems Interconnection-Basic Reference Model, dated 1984
ISO/OSI 8073	Information Processing Systems-Open Systems Connection-Oriented Transport Protocol Specification
Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM):	
FCM-S2	Standard Formats for Weather Data Exchange Among Automated Weather Information Systems
WMO No. 386	Manual on the Global Telecommunication System

3. T&E PHILOSOPHY.

The WMSCR overall test and evaluation (T&E) philosophy will verify operational requirements at the system and subsystem levels in accordance with NAS-SS-1000, Volumes I through V, as applicable, and the WMSCR Master Test Plan (MTP) Verification Requirement Traceability Matrix (VRTM). The success criteria for these requirements will be detailed in the OT&E/Integration test procedures.

Additionally, the T&E philosophy will verify the WMSCR system capability to properly interface and function with other NAS subsystems and to ensure that the WMSCR will be operationally effective and suitable when implemented into the NAS.

FAA Order 1810.4A delegates the responsibility for OT&E/Integration testing to the Engineering Test and Evaluation Service, Communications/Navigation/Surveillance Division, ACN-200, Weather and Remote Maintenance Monitoring Systems Branch, ACN-250, at the FAA Technical Center.

At the present time, a WMSCR system is not scheduled for delivery to the FAA Technical Center; therefore, the WMSCR/OT&E Integration test will be conducted by ACN-250 at the designated operational test sites. In accordance with the MTP and FAA Order 1810.4A, the subsystems identified in this test plan will be tested. Where the actual subsystem is not available, emulation of that NAS subsystem will be used, except in those cases where the subsystem has not yet been baselined. In these particular cases, the NAS-SS-1000 requirements will be deferred.

ACN-250 is tasked by the Weather and Flight Service Station Engineering Division, Weather Processors Branch, ANW-130, to accomplish the WMSCR OT&E/Integration test. ACN-250 will support ANW-130 in the monitoring of the Factory Acceptance Test (FAT) and Site Acceptance Test (SAT). In addition, ACN-250 will monitor OT&E/Shakedown test. In agreement with ANW-130, operational and NAS requirements that may be verified during the conduct of the FAT and SAT test activities will not be duplicated during OT&E/Integration test.

4. T&E APPROACH AND CONCEPT.

To determine the overall interoperability of the WMSCR System within the NAS environment, integration testing requires an environment as near operational as possible. The WMSCR OT&E/Integration test will include verification to determine that the hardware/software will perform in a NAS environment and in accordance with NAS system-level and subsystem-level operational requirements.

A building block approach will be employed in the implementation of the WMSCR OT&E/Integration test process. This approach provides an orderly sequence of tests that establishes a baseline for subsequent WMSCR OT&E/Integration testing.

The WMSCR OT&E/Integration test approach will be guided by the ISO/OSI 7498 Open System Interconnect (OSI) Model. (See figure 4-1.)

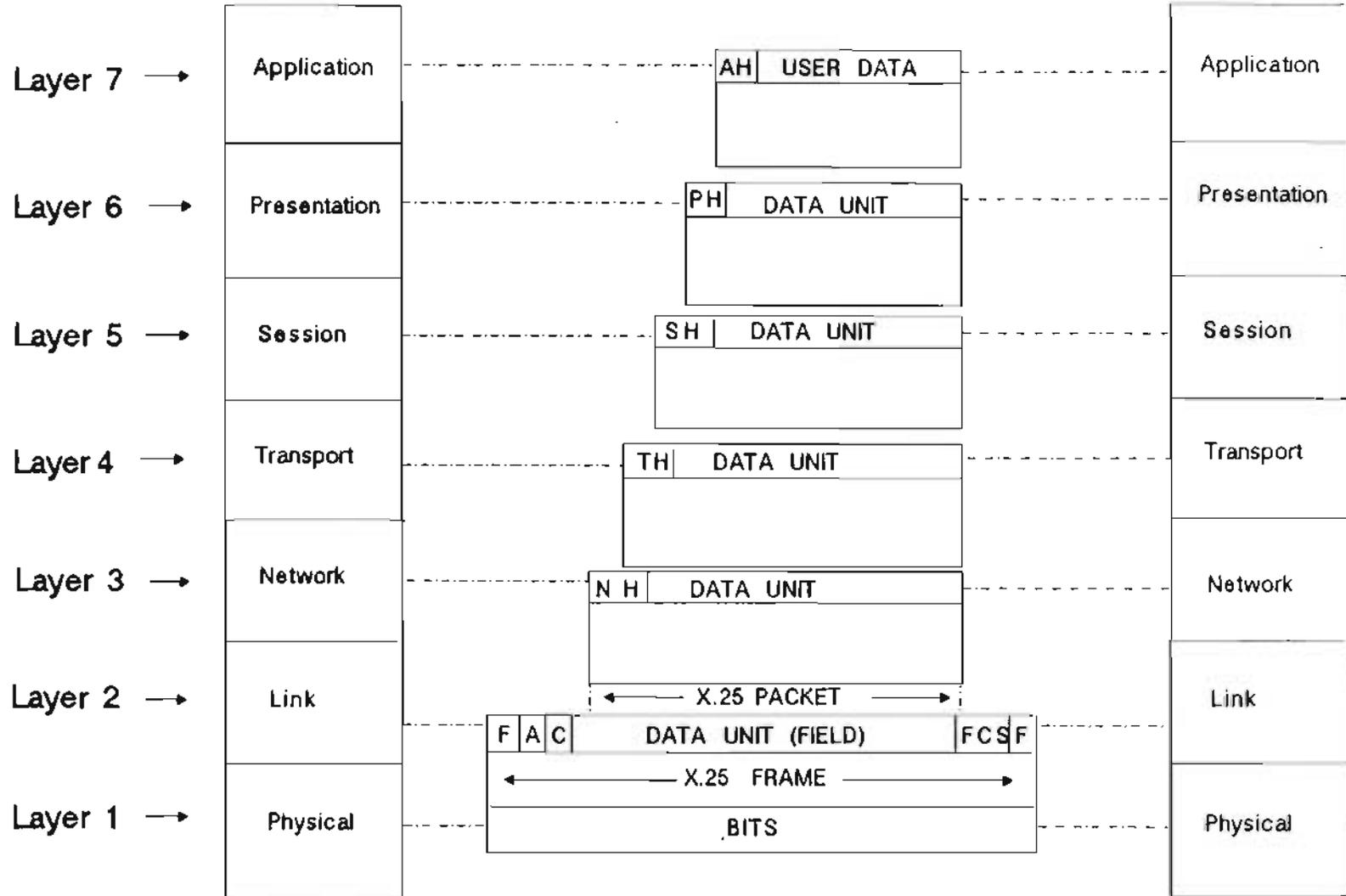


FIGURE 4-1. SEVEN LAYERS OF OSI

The following sequences will be used as a reference point to construct a test baseline for the operational WMSCR System. This baseline will include gathering a weather and NOTAM information database that will be used in conjunction with the distribution and communications functions addressed in paragraph 4.1.

a. The initial WMSCR Integration test will begin with a subset of WMSCR operator functions which will include start-up procedures, diagnostics and system configuration parameters.

b. WMSCR to NWSTG - This test will obtain and verify an operational database, in accordance with Federal Coordinator for Meteorological Service Standards (FCM-S2) and World Meteorological Organization (WMO) weather format standards. After obtaining a valid weather database, the WMSCR operator console will be exercised.

c. WMSCR to AWP - This test will verify that WMSCR sends and receives weather to/from the AWP and NOTAM data to/from the CNSP via the AWP.

d. WMSCR to Coded Time Source (CTS) - This test will verify synchronization with the coordinated CTS.

e. WMSCR to CNSP - This test will verify that the WMSCR can receive and store processed NOTAMS from the CNSP.

f. To complete the first building block of testing, the WMSCR OT&E/Integration test will complete the WMSCR to NADIN X.25 protocol conformance certification process as described in the NADIN II System Specification, FAA-E-2770b, paragraph 3.7.7.3. This will enable the WMSCR to connect to the NADIN PSN users for further testing.

Upon successful verification of the NAS requirements for the above sequences, WMSCR OT&E/Integration testing will verify the interface requirements of the users that employ the NADIN PSN as an intermediate pathway.

The WMSCR OT&E/Integration testing supports string testing through the NADIN PSN to the end-state subsystem; however, the OT&E/Integration testing does not assume responsibility for the success or failure of that string.

The WMSCR/NADIN PSN users by design have common interface characteristics. The testing of WMSCR/NADIN PSN users will verify the general requirements of each WMSCR node to distribute weather and NOTAM information to each of the users. There are unique weather and NOTAM requirements for each subsystem/user that will be tested. The WMSCR also collects data, such as observations, forecasts, and warnings from the WMSCR/NADIN PSN users, which are stored and further distributed. The WMSCR/NADIN PSN users can selectively request data from the WMSCR.

4.1 TEST CONFIGURATIONS AND CATEGORIES.

The WMSCR OT&E/Integration test will employ five configurations which represent logical groups to operationally test the WMSCR system into the NAS environment. The configurations will validate the communications function, (OSI layers 1-3). This function will provide for the acquisition and dissemination of weather products and NOTAM information over the interfacing communications network and dedicated circuits. The test configurations are as follows:

a. Test Configuration #1 will test the communications function of those NAS subsystems/users that are directly connected to a WMSCR node.

b. Test Configuration #2 will test the communications function of those NAS subsystems which interface to the WMSCR node as WMSCR/NADIN PSN users.

c. Test Configuration #3 will test the communications function of those NAS subsystems which interface to the WMSCR node as WMSCR/NADIN MSN users.

d. Test Configuration #4 will test the communications function of those NAS subsystems which interface to the WMSCR node as WMSCR/NADIN APAD users.

e. Test Configuration #5 will test the communication functions for the total system network of WMSCR subscribers/users.

Within each test configuration are test categories which represent the WMSCR subsystems/users. Each category will test the WMSCR processing and distribution function for weather and NOTAM message types and operational interface requirements. The test categories will provide a uniform interface for testing data formats and procedures for all communication circuits (OSI layers 4 and 7) independent of the data types, protocols, and formats in use on the circuit.

Throughout the OT&E/Integration test plan, TVRTM requirements are shown by the assigned TVRTM requirement number (xxxx). The same requirement number may appear in more than one test configuration/category. If a requirement is listed in more than one test configuration/category, then the requirement is partly satisfied by each test configuration/category that the requirement is assigned to.

For ease of identification, a letter has been assigned to each test category (e.g., Category A, Category B). These test configurations and test categories are organized to allow testing of common requirements. (See figure 4.1-1.) They are as follows:

Test Configuration #1: The subsystems/users directly connected to the WMSCR node include the following:

<u>Category</u>	<u>Subsystem/User</u>
A	WMSCR operator
B	National Weather Service Telecommunications Gateway (NWSTG)
C	Aviation Weather Processor (AWP)
D	Coded Time Source (CTS)
E	Consolidated NOTAM System Processor (CNSP)

Test Configuration #2: The subsystems that interface to the WMSCR node as WMSCR/NADIN PSN users include the following:

<u>Category</u>	<u>Subsystem/User</u>
F	Other WMSCR node
G	Central Flow Meteorologist Weather Processor (CFMWP)
H	Real-Time Weather Processor (RWP)
I	Automated Weather Observation System Data Acquisition System (ADAS)
J	Department of Defense (DOD)/Aviation Weather Network (AWN), Carswell Air Force Base
K	National Severe Storms Forecast Center (NSSFC)
L	Data Link Processor (DLP)
M	Maintenance Processor Subsystem (MPS)
N	Traffic Management Processor (TMP)
O	Meteorologist Weather Processor (MWP)
P	Direct User Access Terminal (DUAT)
Q	Graphics Weather Display System (GWDS)
R	External users (External to the NAS)

Test Configuration #3: The subsystems that interface to the WMSCR node, as WMSCR/NADIN MSN users, include the following:

<u>Category</u>	<u>Subsystem/User</u>
S	External users (e.g., Host)
T	International users (e.g., Aeronautical Fixed Telecommunications Network (AFTN))

Test Configuration #4: The subsystems that interface to the WMSCR node, as WMSCR/NADIN APAD users, include the following:

<u>Category</u>	<u>Subsystem/User</u>
U	External users (e.g., commercial airlines)

Test Configuration #5: Network of All Available Systems

<u>Category</u>	<u>Subsystem/User</u>
V	Total WMSCR System Performance, Capacity and Expansion

TEST CONFIGURATIONS AND TEST CATEGORIES																					
TEST CONFIGURATION #1 DEDICATED CIRCUIT					TEST CONFIGURATION #2 NADIN PSN USERS													TEST CONFIG. #3 MSN USERS		TEST CONFIG. #4 APAD	TEST CONFIG. #5 NETWORK
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
W M S C R O P E R A T O R	N M C	A W P	C T S	C N S P	O T H E R W M S C R	C F M W P	R W P	A D A S	A W N	N S S F C	D L P	M P S	T M P	M W P	D U A T	G W D S	E X T E R N A L U S E R S	E X T E R N A L U S E R S	I N T E R N A T I O N A L U S E R	E X T E R N A L U S E R	T O T A L S Y S T E M

FIGURE 4.1-1. WMSCR TEST CONFIGURATION AND TEST CATEGORIES

4.2 DETAILED TEST CONFIGURATIONS.

The five test configurations used in the WMSCR OT&E/Integration test are part of the building block test approach. Further details regarding the grouping of common data communication functions are defined below:

Test Configuration #1:

This test configuration uses dedicated circuits to provide the connectivity between the WMSCR node and subsystems/users. (See figure 4.2-1.) The following five types of circuits will be verified. These circuits provide error-free transmission of information between the WMSCR and subsystem/user.

- a. Digital Equipment Corporation (DEC) system interface to the WMSCR operator;
 1. Verify the operator can access both DEC 6220 processors, which compose a WMSCR node, via the DEC microserver.
- b. NWSTG via the NWID X.25 Protocol to the NWSTG;
 1. The physical layer requirements will verify the EIA-RS-232; the operating speed (9.6kb/s to 19.2 kb/s); and the CCITT Recommendation X.21bis.
 2. The data link layer requirements will verify the Link Access Procedure for Balanced Operation (LAPB) included in CCITT Recommendation X.25; and that the link level parameters are operationally selectable.
 3. The network layer requirements adhere to 1980 X.25 Recommendation.
 4. The general format layer requirements will verify the packet format in accordance with section 5 of CCITT Recommendation X.25. The packet level parameters default window size will be 2, selected from a range of 1 to 127; default packet size will be 128, selected from 64, 128 and 256.
- c. ANSI 3.66 Data Link Protocol for the AWP;
 1. The data link layer requirements will verify that the protocol conforms to FIPS PUB 71/FIPS PUB 78 (Class B asynchronous balance mode); and that the link level parameters are operationally selectable.
- d. RS-232 for the CTS;
 1. Verify the digital communications requirements are in accordance with RS-232;
- e. CNSP;
 1. This will include the same requirements as Configuration #1, section b, with the addition of the transport layer ISO 8073, Class 4 Procedures.

(1003) (2030)

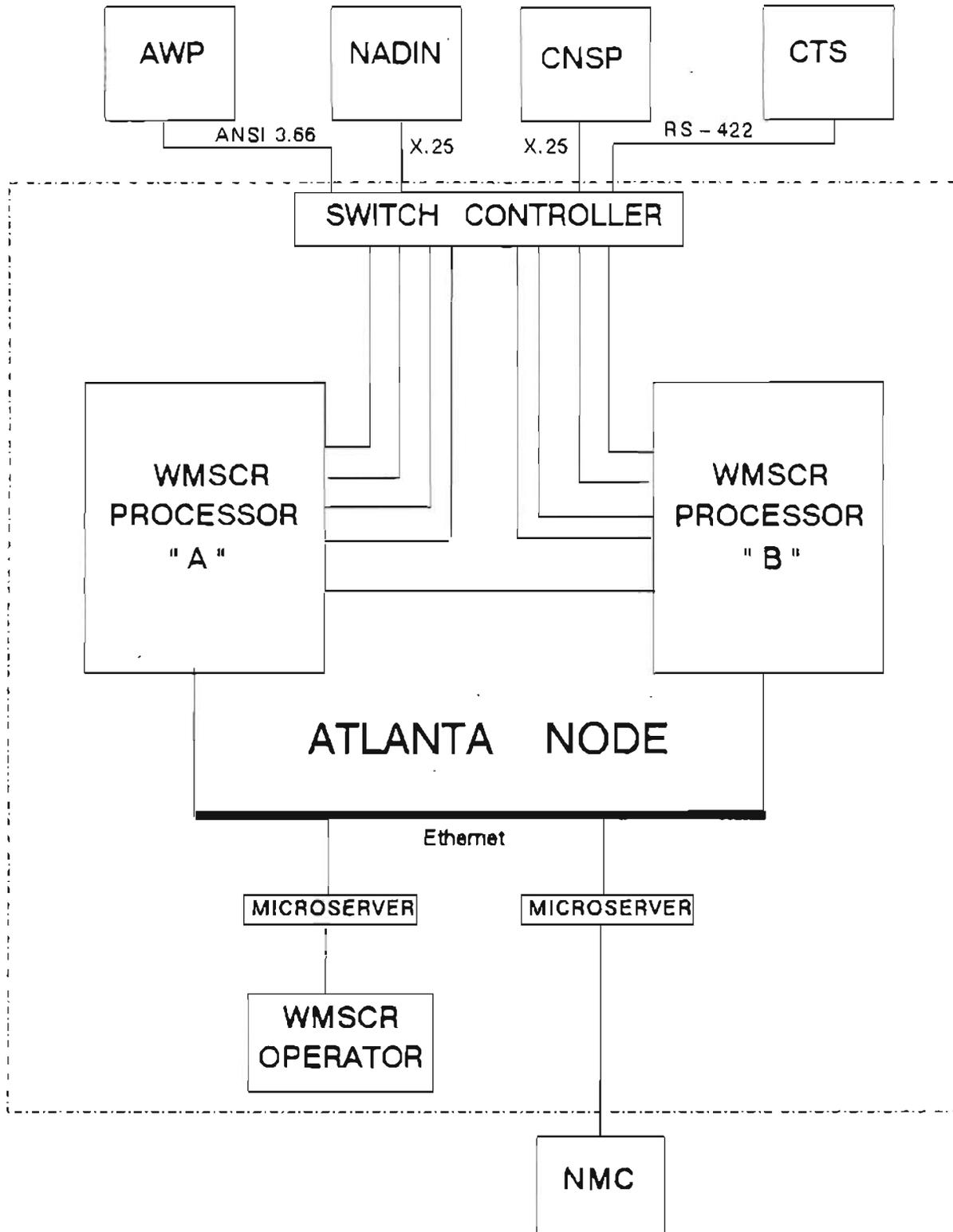


FIGURE 4.2-1. WMSCR TEST CONFIGURATION #1

Test Configuration #2:

Test Configuration #2 will begin after the completion of the NADIN X.25 protocol conformance certification process. The WMSCR/NADIN PSN users (category F through R), by design, have common interface characteristics. (See figure 4.2-2.)

The objectives of this test configuration are to verify the following:

- a. The network layer requirements will verify:
 1. The procedures for establishing, maintaining, and clearing of the network connection by means of transferring packets across the Data Terminal Equipment/Data Circuit-Terminating Equipment (DTE/DCE) interface.
 2. The data routing, circuit multiplexing, flow control, and error recovery for packets transmitted across the DTE/DCE interface.
- b. The data link layer requirements will verify:
 1. The reliable, error free, and efficient exchange of data in spite of errors which may occur in transmission.
 2. The LAPB and multilink procedure as specified in NAS-IR-43020001.

(1003)

Test Configuration #3:

This configuration supports data exchange with the NADIN Message Switching Network (MSN) users connected to the NADIN LA message switch. The objective of this test configuration is to verify the following:

- a. The network connection to the NADIN PSN gateway product distribution, data transfer, product transmission from the NADIN MSN users to the WMSCR, and termination of call after completion of message transmission.

Since the interface between the WMSCR and the NADIN MSN users will be implemented through the NADIN PSN (see figure 4.2-3), the data link and physical layers have been previously tested.

(1003)

WMSCR NODE

NADIN PSN USER

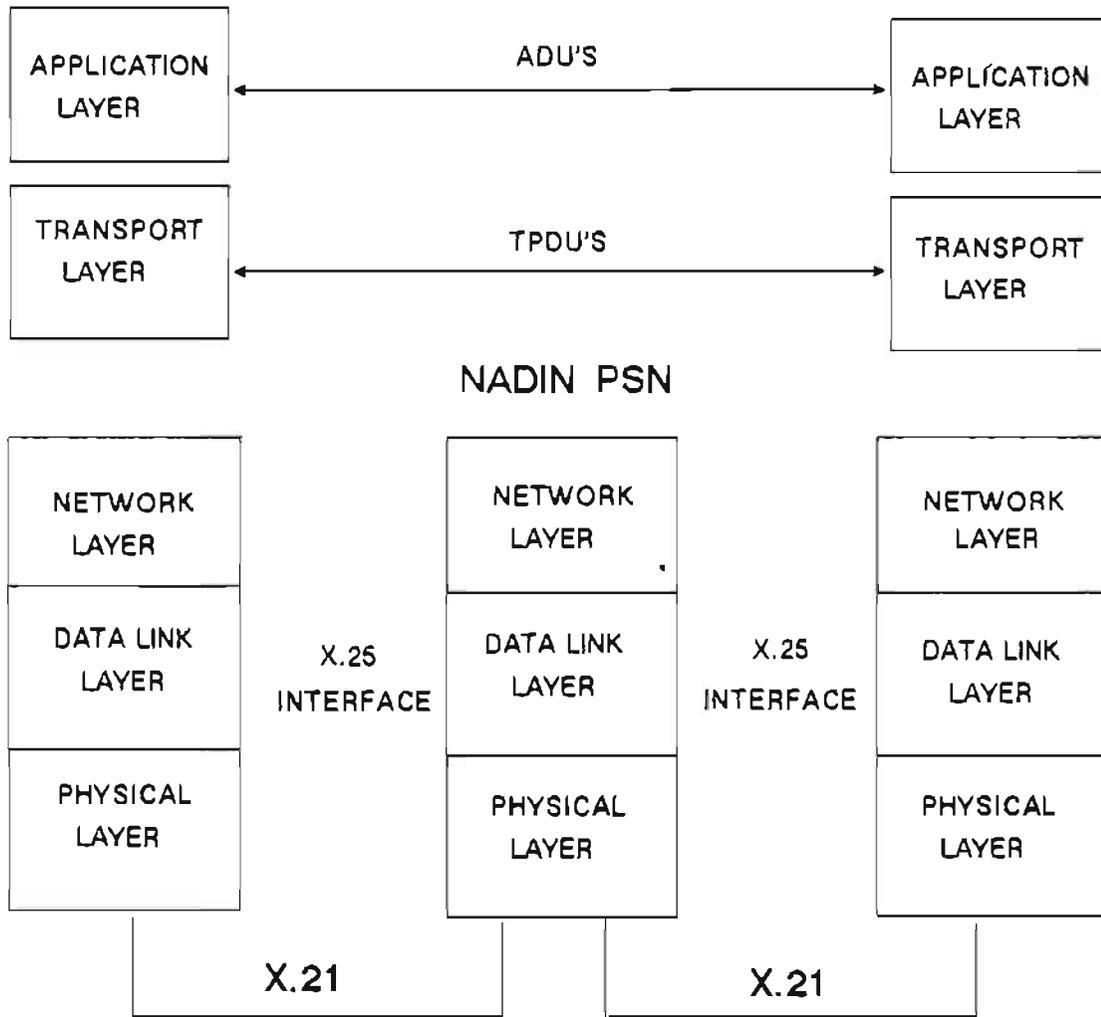


FIGURE 4.2-2. TEST CONFIGURATION #2 WMSCR/NADIN PSN USER

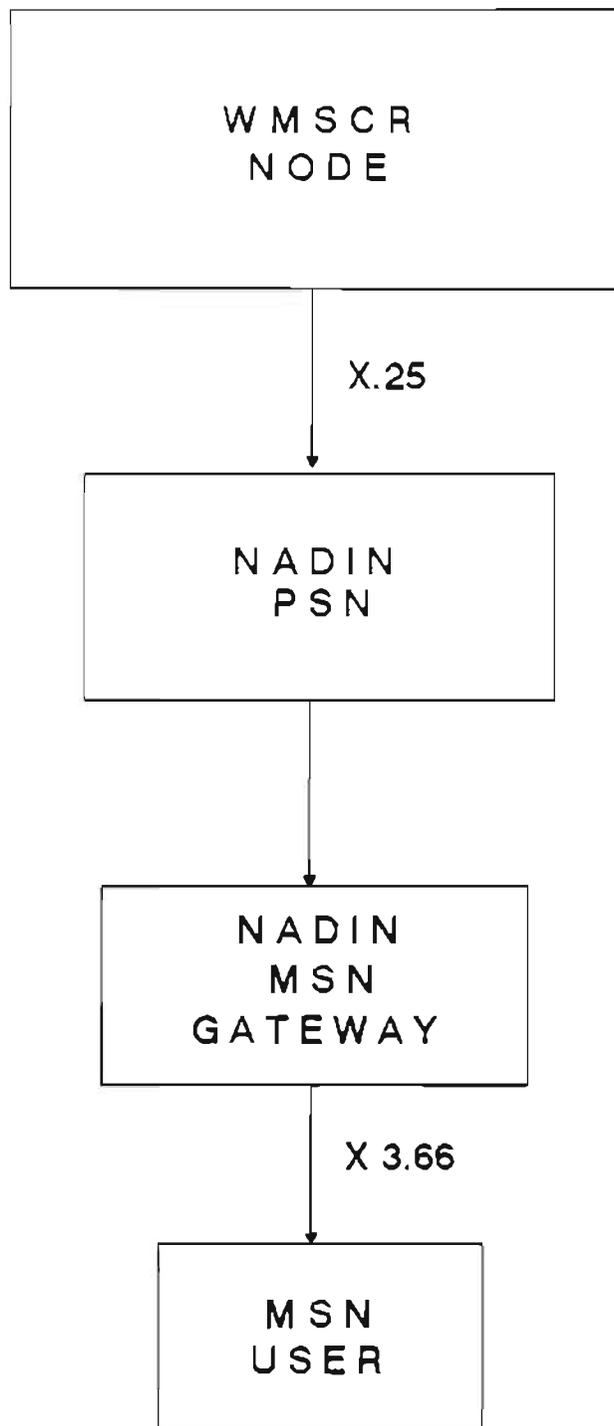


FIGURE 4.2-3. TEST CONFIGURATION #3 WMSCR/NADIN PSN MESSAGE SWITCH NETWORK USERS

Test Configuration #4:

The Asynchronous Packet Assembler/Disassembler (APAD) are part of the NADIN PSN and appear to WMSCR as packet network users. (See figure 4.2-4.) The APADs distribute alphanumeric weather and NOTAM data to the users through 1200-9600 bits per second (bps) asynchronous circuits. The objectives of this test configuration are to verify the following:

- a. The establishment of a call from the WMSCR system to each NADIN Asynchronous PAD device using the X.25 procedures specified in NAS-IR-43020001;
- b. The CCITT RECOMMENDATION X.29 procedure for Exchange of Control Information and User Data between a Packet Mode DTE and a Packet Assembly/Disassembly (PAD) Facility.

(1003)

Test Configuration #5:

Test configuration #5 consists of a network of all available systems that will simultaneously test the exchange of weather products with the community of WMSCR users.

(1003) (2020) (2021)

4.3 DETAILED TEST CATEGORIES.

Each test configuration has test categories which represent the WMSCR subsystems/users. These categories verify the WMSCR collection and dissemination of weather and NOTAM products across the operational interface. Each category includes a listing of the operational interface products.

The five primary functions to be tested in each category will be the application layer, the establishment of an application connection, product distribution, product request/reply, and error recovery. With the exception of categories A, C, and D, the functional characteristics of the WMSCR users are organized in accordance with the ISO 7498 reference model. Categories A and D use the DECNET architecture model which is functionally similar to the ISO 7498 reference model.

a. Application Layer: The application layer contains the parts of the application process that are responsible for performing information transfer. This layer defines the procedures for the exchange of weather and vector graphic products. The application layer directly uses the services provided by the underlying transport layer to transmit and receive the Application Data Unit (ADU). The ADU is the format used to transfer all data between the WMSCR and subsystems/users as specified in figure 4.3-1. An ADU consists of two parts, a header and an information portion. The ADU encapsulates the weather and vector graphic messages that are described in the following category descriptions.

b. Establishment of the Application Connection: Where applicable, the WMSCR system establishes an application connection by requesting a transport connection to the intended WMSCR subsystem/user through the transport layer. This transport connection will be verified to identify the source and destination reference number associated directly with the application connection being established.

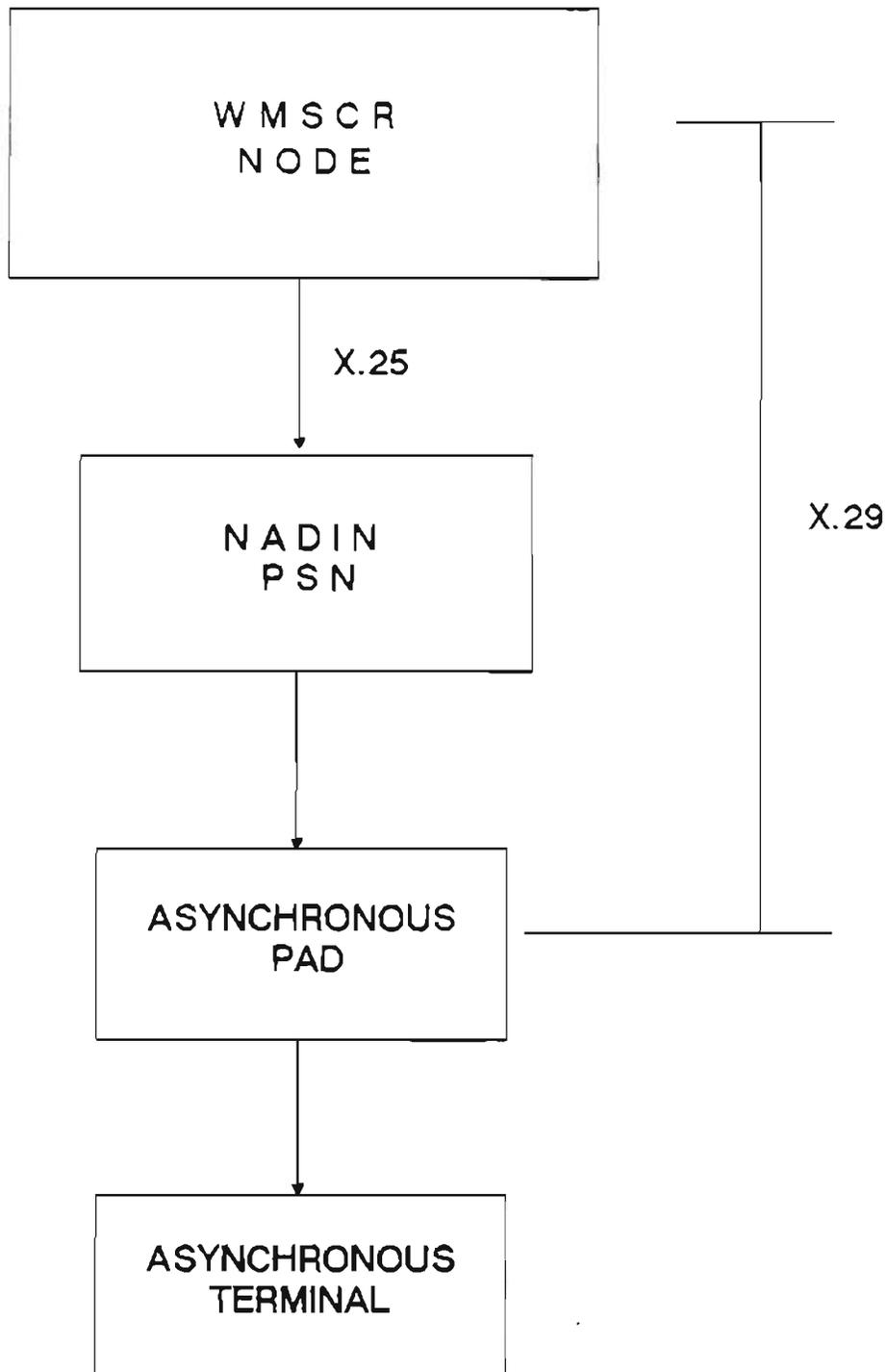


FIGURE 4.2-4. TEST CONFIGURATION #4 WMSCR/NADIN PSN ASYNCHRONOUS PAD USERS

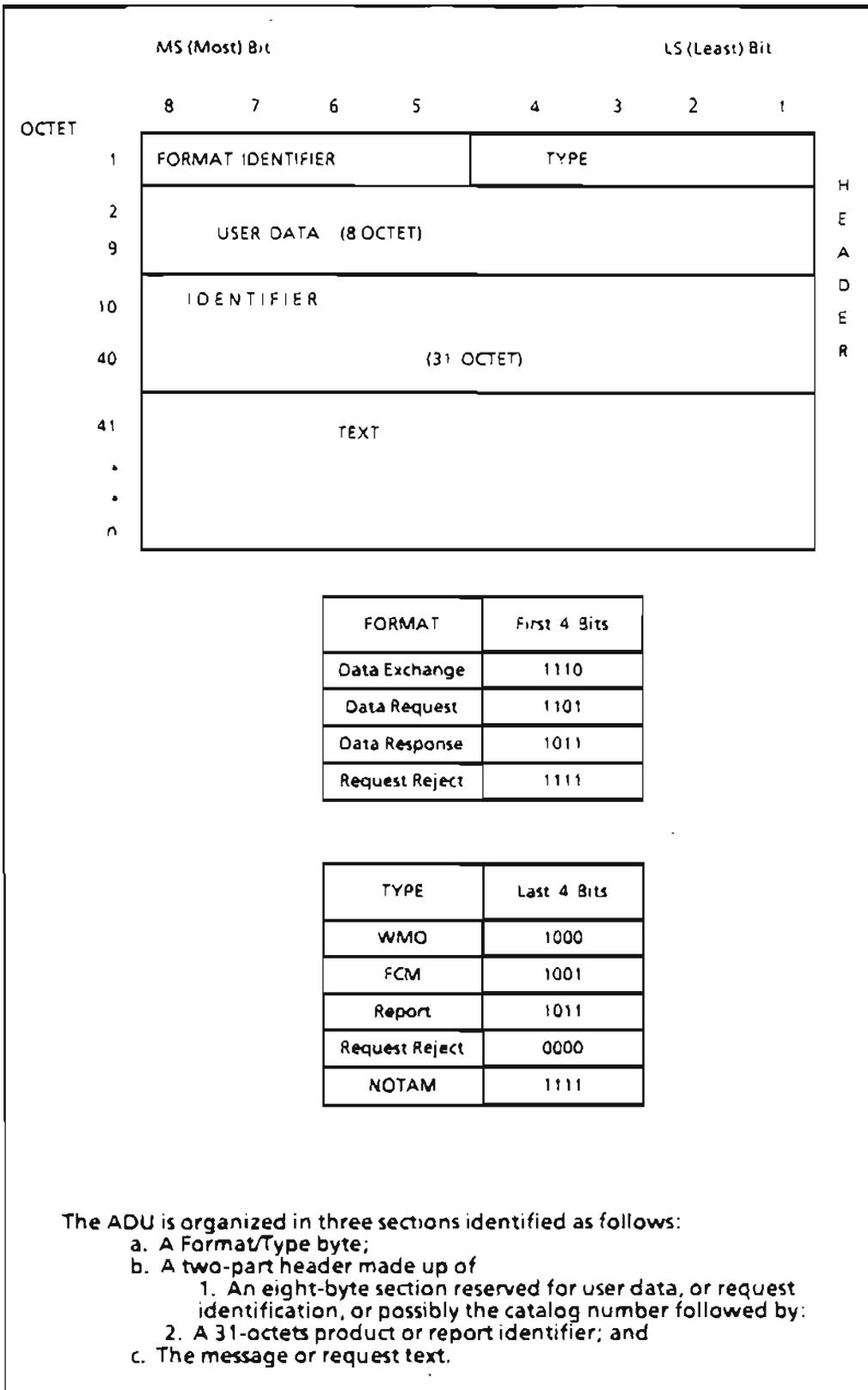


FIGURE 4.3-1. GENERAL FORMAT OF AN ADU

c. Product Distribution: The product distribution (PD) function of the application layer of the WMSCR node is to disseminate a predetermined set of products to each user. The PD function of the application layer of a WMSCR subsystem/user is to disseminate a predetermined set of products to a WMSCR node. This test configuration will capture this exchange by recording the ADU and verifying that the identifier for the product distribution is in the field of the ADU header for the two ADU types.

d. Product Request/Reply: The product Request/Reply capability allows the users to access the data stored in the WMSCR dynamic weather and NOTAM database(s). The Request/Reply transactions are contained within an ADU unit and will be recorded and verified for all testing categories.

e. Error Recovery: In the event of unsuccessful data delivery or network failure, the application layer will inform the subsystem of the failure.

(2007) (2009) (2010)

Note: The products listed in the following categories should be used as a general guide to National Weather Service (NWS) transmissions. Because product frequency and size are subject to periodic change, the list will be finalized at the time of OT&E/Integration testing.

The following categories (A - E) will be tested in accordance with Test Configuration #1:

4.3.1 Category A - WMSCR Operator.

The purpose of this category is to verify:

a. The capability for operator intervention to review, edit, and correct products when the validation process has detected errors.

b. The NAS Volume I, Appendix III Requirements:

1. The operator can monitor subsystem performance to provide the operator with data needed for maintenance and operations support of the WMSCR node; monitor the status and alarm conditions of the WMSCR; and control the selection of WMSCR equipment for maintenance purposes.

2. The operator has the capability to identify and replace the failed equipment.

3. The operator can change the operating mode, adjust the WMSCR parameters, and initiate a WMSCR diagnostic test.

The test operator will navigate through the WMSCR operator menus which will provide entry into the WMSCR operational status, diagnostics, utility functions, and alarm displays. The print function of the operator console will provide hard copy verification of the above requirements.

(1005) (1012) (1013) (1014) (1015) (1016) (2030) (2032) (2101) (2102)

4.3.2 Category B - WMSCR/NWSTG.

The purpose of this category is to verify:

- a. That each WMSCR node will receive identical meteorological data from the NWSTG.
- b. The data from the WMSCR nodes is multiplexed and transmitted to the NWSTG via the NWID. Note: The same circuits are utilized to send meteorological data to the WMSCR nodes from the NWSTG via the NWID.
- c. The data exchanged on these circuits are formatted according to the WMO and the FCM-S2 formats.
- d. The following products are exchanged across the operational interface:

NWSTG to WMSCR Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
International Civil Aviation Organization (ICAO) Weather Warning/Advisories	720	11/day
ICAO Synopses	720	752/day
ICAO Aerodrome Reports	720	70/hour
ICAO Air-Reports	720	60/day
ICAO Radar Reports	720	14/hour
ICAP Area Forecasts	1920	140/day
ICAO Route Forecasts	1920	4/day
ICAO Route Forecasts	1920	4/day
ICAO Terminal Area Forecasts	1200	744/day
ICAO Tabular Winds Forecast	2160	28/day
Upper Winds for Oceanic Control	7.2k	2/day
NWS 6-Hour Precipitation Forecast Product	53.6k	4/day
NWS Alphanumeric Hourly Forecast Products	22.48k	1/hour
NWS Alphanumeric Forecast Products (6/hrs)	54.16k	4/day
NWS Alphanumeric Forecast Products (24/hrs)	130.96k	2/day
NWS Alphanumeric Unscheduled Priority Message	330.7k	Unscheduled
NWS Alphanumeric Unscheduled Priority Message	330.7k	Unscheduled
NWS Alphanumeric Weather Information	TBD	TBD
NWS Surface Observations	448k	1/hour
NWS Terminal Forecasts	640	690/hour
NWS Gridded Winds/Temperature Aloft Forecast	4800k	2/day
NWS Area Forecasts	6.4k	2/day
NWS Prognostic Map Discussion	22.4k	4/day
NWS Synopsis	1.56k	48/hour
NWS Weather Warnings and Advisories	103.2k	1/hour
NWS Aviation Route Forecast	3MB	6/day
NWS Narrative Radar Reports	1.12k	136/hour
NWS Amendments	2.7k	107/hour

WMSCR To NWSTG Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
Center Weather Advisory (#1) (CWA)	1.6k	69/day
Meteorological Impact Statement (#1) (MIS)	1.6k	69/day
General Information Message (#2) (GIM)	1.2k	3/day
Automated Weather Observation System (AWOS)		
Hourly Surface WX Observation Message (#1)	1.6k	905/hour
AWOS Special Surface WX Observation Message (#1)	1.6k	95/hour
Pilot Weather Report (PIREPs) (#4)	720	430/hour
(1002) (1020) (1021) (1022) (1023) (1024) (1025) (2011) (2012) (2014) (2015) (2016) (2019) (2020) (2091) (2092)		

4.3.3 Category C - WMSCR/AWP.

The purpose of this category is to verify:

- a. That each WMSCR node transmits identical weather products and NOTAMs to its collocated AWP.
- b. The WMSCR receives NOTAMs and pilot reports from the AWP.
- c. The WMSCR supports the product download capability to replenish the database of each of the AWP.
- d. The following products are exchanged across the operational interface:

The AWP to WMSCR is a dedicated circuit, therefore, there are no ISO 7498 requirements for transport layer and network layer.

AWP to WMSCR Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
Notice to Airmen (NOTAMs) (D)	280	115/hour
PIREPs (#4)	740	610/hour
Weather Information Requests	TBD	TBD

WMSCR to AWP Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
NWS Aviation Route Forecast (#1)	8000K	6/day
ICAO Weather Warning/Advisories	720	11/day
ICAO Synopses	720	752/day
ICAO Aerodrome Reports	720	70/hour
ICAO Air-Reports	720	60/day
ICAO Radar Reports	720	14/hour
ICAO Area Forecasts	1920	140/day
ICAO Route Forecasts	1920	4/day
ICAO Terminal Area Forecasts	1200	744/day
ICAO Tabular Winds Forecast	2160	28/day
Department of Defense (DOD) Surface Observations	720	165/hour
DOD Terminal Forecasts	640	TBD
DOD Radar Narrative	TBD	TBD
DOD Hazardous Weather Information	TBD	TBD
AWOS Hourly Surface WX Observation Message (#1)	1.6K	905/hour
AWOS Special Surface WX Observation Message (#1)	1.6K	95/hour
PIREPs (#4)	720	430/hour
Processed NOTAMs	1.04K	165/hour
NWS Surface Observations	3448K	1 set/hour
NWS Terminal Forecasts	640	690/hour
NWS Gridded Winds/Temperature Aloft Forecast	4800K	2/day
NWS Area Forecasts	6.4K	2/day
NWS Prognostic Map Discussion	22.4K	4/day
NWS Severe Weather Outlook	12K	3/day
NWS Synopses	1.56K	48/hour
NWS Weather Warnings and Advisories	103.2K	1 set/hour
NWS Weather Depiction/Forecast Charts	1472.8K	2/day
NWS Narrative Radar Reports	1.12K	136/hour
NWS Amendments	2.7K	107/hour
Center Weather Advisory (#1)	1.6K	69/day
Meteorological Impact Statement (#1)	1.6K	69/day

(1005) (1009) (1031) (1032) (2014) (2015) (2016) (2017) (2019) (2074) (2075)

4.3.4 Category D - WMSCR/CTS.

The purpose of this category is to verify:

- a. Both WMSCR nodes are synchronized with the coordinated CTS.

(1045) (1046) (2040) (2067) (2068)

4.3.5 Category E - WMSCR/CNSP.

The purpose of this category is to verify:

- a. The NOTAMs originating in the AFSS environment are being sent (via the AWP) through the WMSCR to the CNSP for processing.

b. The CNSP transmits processed NOTAMS to the WMSCR for storage and distribution.

c. The following products are exchanged across the operational interface:

CNSP to WMSCR Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
Processed NOTAMS	1,040	165/hour

WMSCR to CNSP Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
NOTAMS	280	115/hour

The following categories (F-R) will be tested in accordance with test Configuration #2.

(1005) (2017) (2077) (2078)

4.3.6 Category F - WMSCR/OTHER WMSCR.

The purpose of this category is to verify:

a. Two WMSCR nodes, connected by a permanent virtual circuit, support the database, data exchange, and data communication requirements of the WMSCR system.

b. The WMSCR will maintain and update a weather database containing NWS data, PIREPs, CWSU generated products, AWOS hourly and special weather observations, in-flight advisories, and processed NOTAMS.

c. The WMSCR will provide all functions of the other WMSCR in the event of a node failure (degraded operations).

d. The exchange of data with the other WMSCR to maintain duplicate databases.

(2023) (2024) (2025) (2026) (2028) (2029) (2094) (2095)

4.3.7 Category G - WMSCR/CFMWP.

The purpose of this category is to verify the following products are exchanged across the operational interface:

CFMWP to WMSCR Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
General Information Message (#5)	1.6k	3/day

WMSCR to CFMWP Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
AWOS Hourly Surface Weather Observation	1.6k	905/hour
AWOS Special Surface Weather Observation	1.6k	95/hour
Center Weather Advisory	1.6k	69/day
General Information Message	1.6k	69/day
Hazardous Weather Area Outline	1.6k	21/hour
Meteorological Impact Statement	1.6k	69/day
PIREPs	720	430/hour
WFO Products	4.8k	1/hour

(2014) (2016) (2075) (2076)

4.3.8 Category H - WMSCR/RWP.

The purpose of this category is to verify:

- a. The WMSCR accepts RWP requests for data from the WMSCR database and that the WMSCR establishes a point-to-point connection to each RWP for bidirectional data exchange.
- b. The alphanumeric messages to and from the WMSCR/RWP are in WMO format.
- c. The graphics products to and from WMSCR/RWP are formatted in vector graphic format. Vector graphic products are formatted in accordance with FCM-S2 format.
- d. When the RWP returns to operational status, the option for a download request of weather products will be processed by the WMSCR.
- e. When a WMSCR node fails, the other WMSCR node will automatically take over product distribution responsibility of all RWPs.
- f. The following products are exchanged across the operational interface:

RWP to WMSCR Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
Center Weather Advisory	1.6k	3/day
Hazardous Weather Area Outline (#1)	1.6k	1/hour
Meteorological Impact Statement	1.6k	3/day
PIREPs (#4)	720	163/hour

WMSCR to RWP Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
Aircraft Reconnaissance Report	2.4k	2/hour
Center Weather Advisory	1.6k	69/day
DOD Hazardous Weather Information	26.4k	4/day
DOD Surface Observations	720	165/hour
DOD Terminal Forecasts	640	660/day
ICAO Aerodrome Reports	720	70/hour
ICAO Aircraft Reports	720	60/day
ICAO Area Forecasts	1920	140/day
ICAO Terminal Area Forecasts	1.6k	280/day
ICAO Weather Warning/Advisories	2.4k	11/day
NWS Alaska MOS Forecast	9.4k	2/day
NWS Alphanumeric Hourly Radar Products	15.5k	1/hour
NWS Alphanumeric Unscheduled Priority Message	4.8	1-12/hour
NWS Amendments	2.7k	107/hour
NWS Area Forecasts	9.6k	208/day
NWS Aviation Area Forecast (#2)	19.2k	2/day
NWS Extended Prog Discussion	6.4	4/day
NWS Gridded Winds/Temperature Aloft Forecast	4800k	2/day
NWS Hurricane/Tropical Storm Advisory	6.4k	3/day
NWS Offshore Aviation Forecast	6.4k	4/day
NWS Pop, Clouds, Ceiling and Winds	9.4k	2/day
NWS Satellite Discussion Products	40.0k	6/day
NWS Severe Weather Outlook	12k	3/day
NWS Sigmets and Airmets	4.8k	5/hour
NWS Significant Weather Plain Language	6.4k	30/day
NWS Subtropical Storm Advisories	4.8k	4/day
NWS Surface Observations	39k	1 set/hour
NWS Terminal Forecasts	284k	4/day
NWS Upper Wind Fallout Forecast	22.88k	2/day
PIREPs (#4)	720	430/hour
Upper Winds for Oceanic Control	123k	2/day
WFO Products	4.8k	1/hour

(1002) (2014) (2015) (2016) (2019) (2096) (2097)

4.3.9 Category I - ADAS.

The purpose of this category is to verify:

a. The transport protocol is in accordance with CCITT Recommendation X.224; Transport Protocol Data Unit (TPDU) transfer, transport connection, protocol error, error release, connection establishment.

b. An hourly network connection is established by the ADAS.

c. The WMSCR maintains a record of the status of the connection to each ADAS.

d. The WMSCR node accepts a transport connection from ADAS which is normally not serviced by this WMSCR node.

e. The following products are exchanged across the operational interface:

ADAS to WMSCR Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
Automated Surface Observation System (ASOS) Hourly Surface WX Observation Message	1.6k	137/hour
ASOS Special Surface WX Observation Message	1.6k	30/hour
AWOS Hourly Surface WX Observation Message (#1)	1.6k	79/hour
AWOS Special Surface WX Observation Message (#1)	1.6k	5/hour

(2014) (2015) (2071)

4.3.10 Category J - AWN.

The purpose of this category is to verify:

- a. The WMSCR can exchange Service A weather and request/reply service with AWN.
- b. The following products are exchanged across the operational interface:

AWN to WMSCR Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
Alphanumeric/Graphic Data Display Request (#2)	160	3/day
DOD Hazardous Weather Information	26.4k	4/day
DOD Surface Observations	720	165/hour
DOD Terminal Forecasts	640	660/day
PIREPs	720	5/hour

WMSCR to AWN Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
Alphanumeric Weather Information (#2)	506.2k	1/hour

(1002) (1026) (2014) (2015) (2016) (2038) (2072) (2073)

4.3.11 Category K - NSSFC.

The purpose of this category is to verify:

- a. The WMSCR can exchange Service A weather and request/reply service with NSSFC.
- b. The following products are exchanged across the operational interface:

NSSFC to WMSCR Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
NWS Weather Warnings and Advisories	5.6k	1/hour

WMSCR to NSSFC Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
DOD Hazardous Weather Information	26.4k	4/day
DOD Surface Observations	720	165/hour
DOD Terminal Forecasts	640	660/day

(1002) (2014) (2015) (2019) (2092) (2093)

4.3.12 Category L - DLP.

The purpose of this category is to verify:

a. The WMSCR accepts DLP requests for data from the WMSCR data base and that WMSCR establishes a point-to-point connection to each DLP.

b. That when the DLP returns to operational status, the option for a download request of weather products will be processed by the WMSCR.

c. That when a WMSCR node fails, the other WMSCR node will automatically take over product distribution responsibility of all DLPs.

d. The following products are exchanged across the operational interface:

WMSCR to DLP Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
AWOS Hourly Surface Weather Observation Message	1.6k	905/hour
AWOS Special Surface Weather Observation Message	1.6k	95/hour
DOD Hazardous Weather Information	26.4k	4/day
DOD Surface Observations	720	165/hour
DOD Terminal Forecasts	640	660/day
NWS Gridded Winds/Temperature Aloft Forecast	4800k	2/day
Hurricane/Tropical Storm Advisory	6.4k	3/day
NWS Radar Summary (#1)	19.9k	6/hour
NWS Sigmets and Airmets (#1)	2.4k	5/hour
NWS Surface Observations (#1)	39k	1 set/hour
NWS Terminal Forecasts (#2)	284k	4/day
NWS Weather Warnings and Advisories (#1)	5.6k	1/hour
PIREPs (#5)	720	430/hour
Processed NOTAMs	1.04k	165/hour

(1009) (2014) (2015) (2016) (2017) (2019) (2100)

4.3.13 Category M - MPS.

The purpose of this category is to verify:

- a. The Link Level Interface test verifies that the communication link between the WMSCR RMS and the MPS has been established.
- b. The Monitoring test verifies that the WMSCR RMS is properly reporting the WMSCR system status to the MPS, including all monitored parameters and fault conditions.
- c. The Alarm test verifies the response capability of the WMSCR RMS to system alarm/alert and state change conditions, and the successful transmission of alarm and state change messages to the MPS.
- d. The Diagnostics test verifies the capability of the WMSCR RMS to respond and execute diagnostic commands transmitted via the MPS interface.
- e. The Certification test verifies the capability of the WMSCR RMS to respond and execute certification commands transmitted via the MPS interface.
- f. The Performance test verifies that WMSCR RMS response times are within the limits defined in NAS-SS-1000.

(1012) (1013) (1014) (1015) (1016) (1048) (1049) (1050) (1051) (1052) (1053) (1054)
 (1055) (1056) (1057) (1058) (1059) (1060) (1061) (1062) (1063) (1064) (1065) (1066)
 (2033) (2034) (2035) (2065) (2066) (2086) (2087) (5004)
 (5005)

4.3.14 Category N - TMP.

The purpose of this category is to verify:

- a. The WMSCR will transfer NWS gridded winds and temperature aloft zero-hour forecast to the TMP.
- b. When a WMSCR node fails, the other WMSCR node will automatically take over product distribution responsibility to the TMP.
- c. The following products are exchanged across the operational interface:

WMSCR to TMP Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
NWS Gridded Winds/Temperature Aloft Forecast	4800k	2/day
(2098)		

4.3.15 Category O - MWP.

The purpose of this category is to verify the following products are exchanged across the operational interface:

MWP to WMSCR Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
Center Weather Advisory (#3)	1.6k	3/day
General Information Message (#1)	1.6k	3/day
Hazardous Weather Area Outline (#2)	1.6k	1/hour
Meteorological Impact Statement (#3)	1.6k	3/day
PIREPs	720	1/hour

WMSCR to MWP Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
AWOS Hourly Surface Weather Observation Message	1.6k	905/hour
AWOS Special Surface Weather Observation Message	1.6k	95/hour
Center Weather Advisory (#3)	1.6k	69/day
General Information Message (#1)	1.6k	66/day
Hazardous Weather Area Outline (#2)	1.6k	20/hour
Meteorological Impact Statement (#3)	1.6k	69/day
PIREPs	720	430/hour
WFO Products		

(2014) (2016) (2088) (2089)

4.3.16 Category P - DUAT.

The purpose is to verify the following products are exchanged across the operational interface:

DUAT to WMSCR Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
PIREPs (#4)	720	100/hour

WMSCR to DUAT Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
Hazardous Weather Area Outline (#3)	1.6k	21/hour
Processed NOTAMs	1.04k	165/hour

In addition to the above NAS requirements, the operational requirements for Service A will be verified.

(1009) (2016) (2079) (2080) (2081) (2086)

4.3.17 Category Q - GWDS.

The purpose of this category is to verify:

- a. The WMSCR will transmit hazardous weather area outline service to GWDS.

(2084)

Note: As of the writing of this document, there is no contract award for the GWDS system.

4.3.18 Category R - External Users.

The operational requirements for this category are defined in the NAS-IR-94022507. ACN-250 will select a Service A representative user, via the Service A Gateway, to verify the product distribution.

The purpose of this category is to verify:

- a. The following are authorized Service A products as referenced in FAA Order 7110.10J, Flight Services:

- 1. Meteorological information
- 2. NOTAMs

(1002) (1009) (1031) (1032) (2014) (2015) (2016) (2017) (2039) (2082) (2083)

4.3.19 Category S - NADIN MSN External Users.

The purpose of this category is to verify:

- a. The WMSCR application layer can perform ICAO conversion processing.
- b. The following products are exchanged across the operational interface:

MSN External Users to WMSCR Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
Alphanumeric/Graphic Data Display Request	160	5/hour
NOTAM Requests	560	3/hour
PIREPs	720	3/hour

WMSCR to MSN External Users Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
Center Weather Advisory	1.6k	69/day
DOD Hazardous Weather Information	26.4k	4/day
DOD Surface Observations	720	165/hour
DOD Terminal Forecasts	640	660/day
General Information Message (#4)	1.6k	69/day
Hazardous Weather Area Outline (#7)	1.6k	21/hour
Meteorological Impact Statement (#4)	1.6k	69/day
NWS Sigmet and Airmets	4.8k	5/hour
PIREPs (#4)	720	3180/hour
Processed NOTAMs	1.04k	165/hour

(1002) (1009) (2014) (2015) (2016) (2081) (2082)

4.3.20 Category T - NADIN MSN International Users.

The purpose of this category is to verify:

- a. The WMSCR application layer can perform ICAO conversion processing.
- b. The following products are exchanged across the operational interface:

International Users to WMSCR Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
Alphanumeric/Graphic Data Display Request	160	1/day
Alphanumeric Weather Information	2.6m	1/hour

WMSCR to International Users Messages and Message Frequency

<u>Message Name</u>	<u>Size</u>	<u>Frequency</u>
Alphanumeric Weather Information	2.6m	1/hour

(1002) (2011) (2014) (2015) (2016) (2037) (2058) (2059) (2060) (2061) (2062)
(2085) (2086)

4.3.21 Category U - APAD.

The operational requirements for this category are defined in the NAS-IR-94032507.

The purpose of this category is to verify:

- a. The WMSCR can deliver Service A products to a representative APAD user.

Data transmission will be one-way without end-to-end acknowledgment from the receiving NADIN APAD users. The APAD services do not support the ISO model transport layer 4.

(1002) (1009) (2014) (2015) (2016) (2082) (2083)

4.3.22 Category V - Total System.

The purpose of this category is to verify the following operational performance characteristics, operational capacity requirements, operational suitability, and system expansion requirements:

a. At a minimum, the following operational performance characteristics will be verified:

1. The WMSCR system node will maintain the following data types unless a cancellation is received:

<u>Data Types</u>	<u>Time Period</u>
Surface Observations	12 hours
Upper Air Observations	30 hours
PIREPs	6 hours
Forecast Data	30 hours
Meteorological Discussion Product	24 hours
Weather Warnings and Advisories	12 hours
NOTAMs	

2. The WMSCR will identify, validate, and make available for distribution any product:

- (a) Mean Time 15 seconds
- (b) Less than 30 seconds 95 percent of the time

3. The WMSCR will identify, validate, and make available for distribution any hazardous weather product:

- (a) Mean Time 1 second
- (b) Less than 3 seconds 95 percent of the time

4. The failed component will automatically be replaced within 10 seconds without degrading the system.

5. When the system operates in a failed or degraded mode, restoral action shall commence within 3 minutes.

6. Complete system startup within 3 minutes.

7. The WMSCR will distribute data according to priority levels.

(1005) (1006) (1007) (1008) (1010) (1027) (1029) (1030) (1033) (1035) (2004)
(2005) (2042) (2043) (2044) (2045) (2046) (2047) (2048) (2049) (2050) (2053)
(2054) (2056) (2057) (2058) (2059) (2060) (2061) (2062) (2063) (2064) (5001)

b. The following operational capacity requirements will be verified:

1. To provide for up to 150 separate domestic data types;
2. To provide for up to 3000 location for each domestic data types;
3. To provide for up to 5000 separate WMO bulletins.

(1036) (1037) (1038) (2004) (2008) (2009) (2020) (2021)

c. The following system expansion requirements will be verified:

1. To ensure that 100 percent expansion capability is possible without any changes in the system design characteristics. This is an Air Traffic (AT) Service Operational requirement.

(1004)

d. Operational Suitability:

1. The WMSCR will be capable of operating 24 hours a day, 7 days a week.

(1038) (1039) (1040) (1041) (1042) (1043) (2064)

4.4 SUBSYSTEM AVAILABILITY.

Currently the OT&E/Integration test plan addresses the NAS end-state system (see figure 4.4-1) and expansion to non-NAS external users. However, the final test configurations and categories may be tested with interim operational subsystems.

Configurations 1 through 5 are grouped by common testing requirements and, therefore, the replacement of subsystems with an interim operational subsystem will not effect the configuration testing requirements.

Furthermore, because the WMSCR has an on-line capability to tailor product distributions to individuals or groups of users, a replacement subsystem will not effect the category validation of the product distribution function. For example, the Service A user, whether it is a NAS end-state user or an interim user will receive the same Service A product distribution.

Currently there is a NAS Change Proposal (NCP) in progress to change the NAS end-state configuration. The WMSCR to other WMSCR will change from a NADIN permanent virtual circuit (PVC) to a dedicated circuit and the CNSP will change from a dedicated circuit to a PVC. However, the product exchanged via a dedicated circuit or a PVC will not effect the validation of the products exchanged.

If the NADIN PSN is not available prior to the start of OT&E/Integration testing, a commercial packet switching network service could provide an alternative to the NADIN PSN for testing of all configurations except for NADIN MSN Gateway users. NADIN MSN Gateway user requirements would be deferred until NADIN II becomes available.

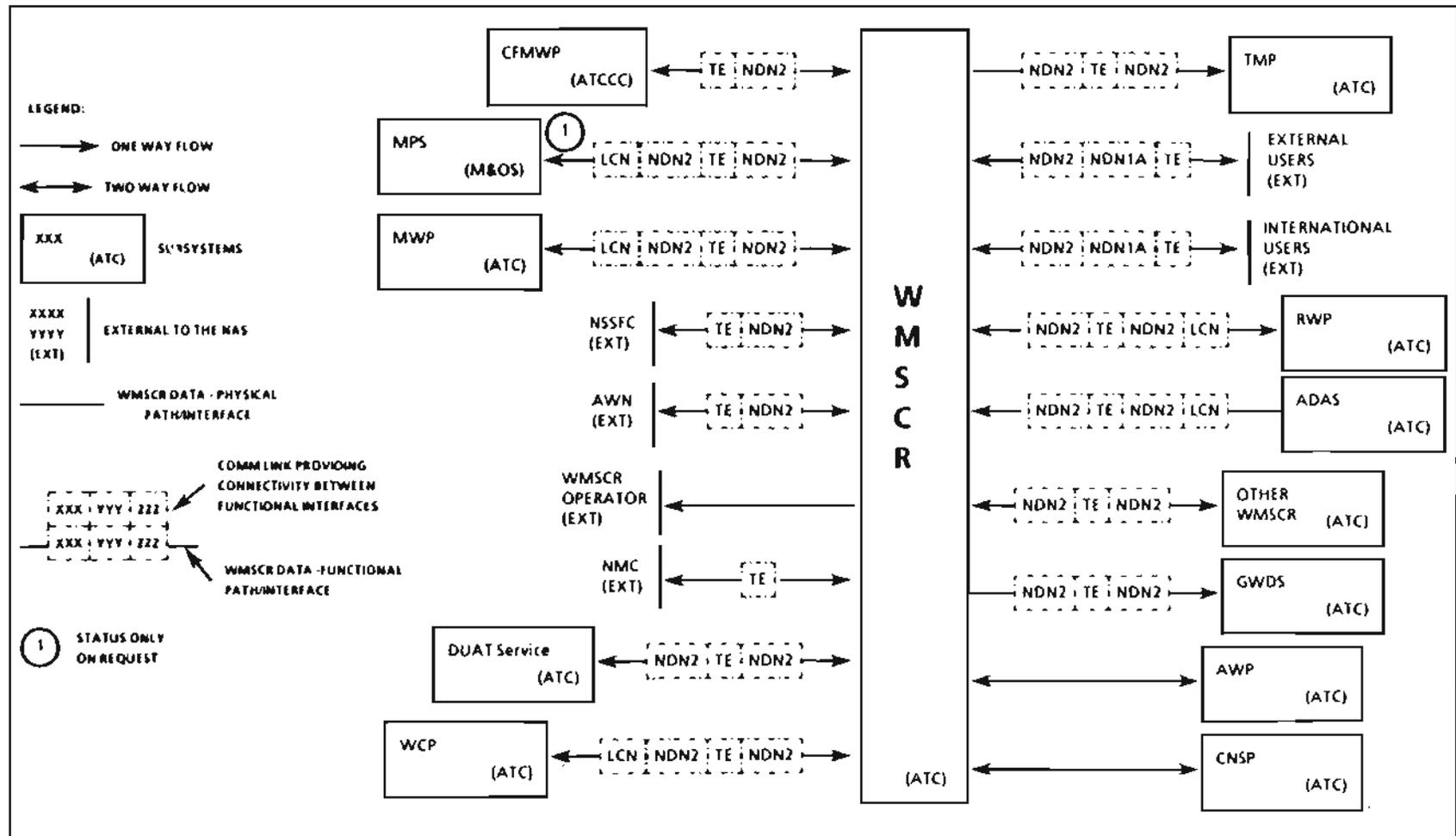


FIGURE 4.4-1. WMSCR NAS END-STATE INTERFACES

4.5 CRITICAL REQUIREMENTS.

The flow of weather and NOTAM data is the critical requirement for the WMSCR System. The dedicated interfaces that support this flow are considered critical. These interfaces include the following test categories:

- Category B - WMSCR/NWSTG
- Category C - WMSCR/AWP
- Category D - WMSCR/CTS
- Category E - WMSCR/CNSP
- Category F - WMSCR/Other WMSCR

4.6 VERIFICATION METHODS.

Methods of verification used to test the requirements identified in the TVRTM, appendix A, are taken from the NAS-SS-1000 and are defined as follows:

a. Test (T). Test is a method of verification wherein performance is measured during or after the controlled application of functional and/or environmental stimuli. Quantitative measurements are analyzed to determine the degree of compliance. The process uses laboratory equipment, procedures, items, and/or services.

b. Demonstration (D). Demonstration is a method of verification where qualitative determination of properties is made for an end-item including software and/or the use of technical data and documentation. The items being verified are observed but not quantitatively measured in a dynamic state.

c. Inspection (I). Inspection is a method of verification to determine compliance without the use of special laboratory appliances, procedures, or services, and consists of a nondestructive static-state examination of the hardware, software, and/or the technical data and documentation.

d. Analysis (A). This method of verification consists of comparing hardware or software design with known scientific and technical principles, procedures, and practices to estimate the capability of the proposed design to meet the mission and system requirements.

4.7 NAS QUALIFICATION STATUS.

If a NAS end-state requirement still exists at the time of OT&E/Integration testing and cannot be tested by live or simulated means, a "Q" will be assigned to this requirement. This "Q" status means the subsystem does not presently exist in the NAS; therefore, the requirement will be deferred and tested at a future date.

5. PROGRAM FLOW DIAGRAMS.

The WMSCR OT&E/Integration Test Flow Diagram, figure 5-1, graphically displays the flow and progression of activities of the WMSCR OT&E/Integration test.

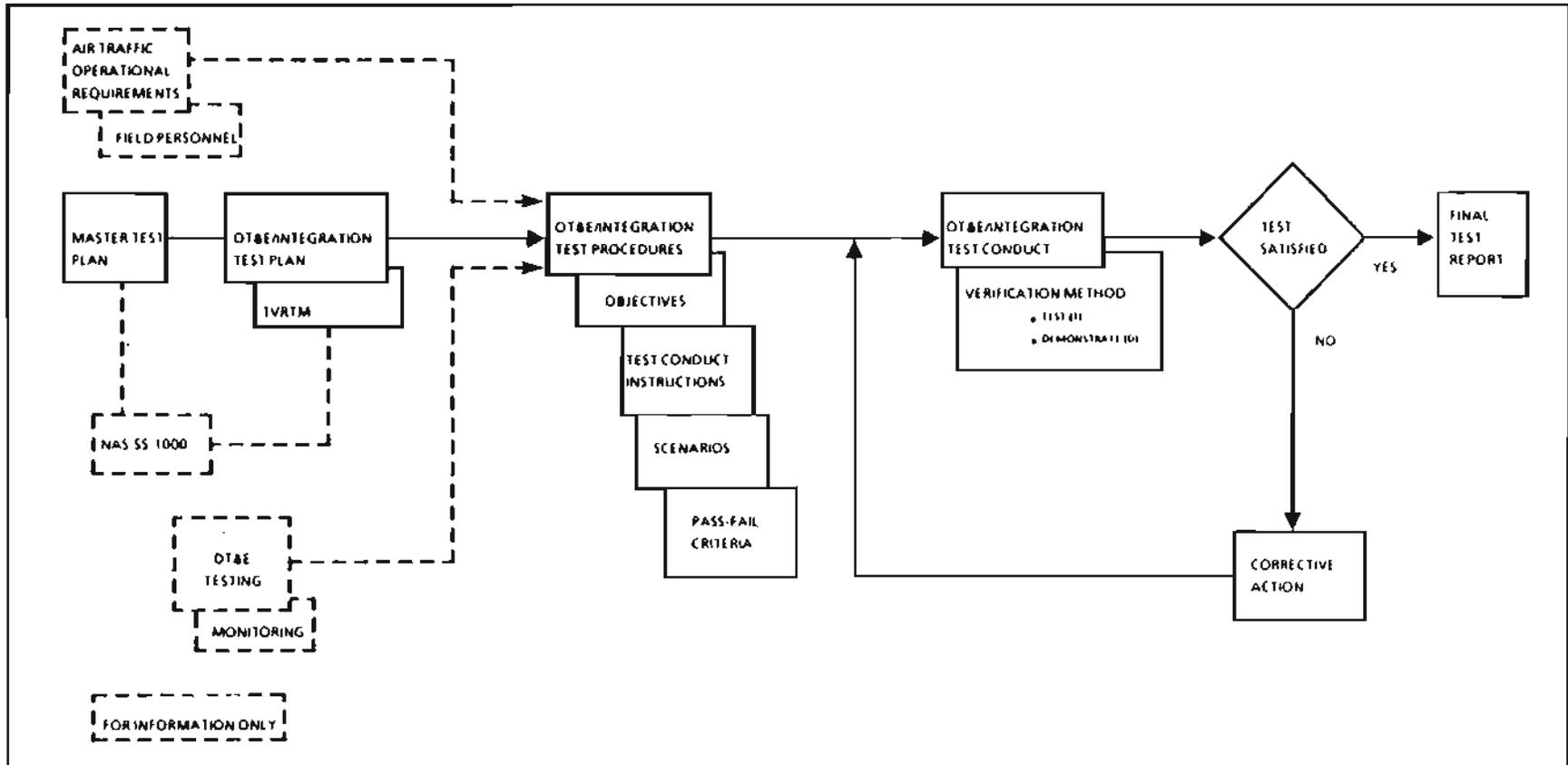


FIGURE 5-1. WMSCR OT&E/INTEGRATION TEST FLOW DIAGRAM

6. ORGANIZATIONAL RESPONSIBILITIES AND ROLES.

This section describes the responsibilities and roles of the FAA Technical Center and other participating organizations, including contract support personnel, who will be associated with the WMSCR OT&E/Integration Test activities.

6.1 GROUP RESPONSIBILITIES.

<u>Organization</u>	<u>Primary Roles/Functions</u>
ACN-250	Provides the test director who is responsible for overall test management activities of the WMSCR OT&E/Integration test. ACN-250 will serve as the focal point of control for each aspect of the testing defined in this plan which includes the following: ensures that the preparation of test plans and procedures are in accordance with FAA-STD-024a; conducts and directs the WMSCR OT&E/Integration test; prepares and maintains test logs and test result files and issues a final test report upon test completion; coordinates and schedules all integration activities; witnesses selected WMSCR tests; participates in status review meetings; provides a recommendation based on test results in support of the Executive Committee (EXCOM) Deployment Readiness Review (DRR) process.
ANW-130	Prepares a Program Directive with the FAA Technical Center to conduct the WMSCR OT&E/Integration test and approves the budget to fund this test activity; provides assistance and support to the implementation of this plan by reviewing test plans, procedures, test data, and test reports; issues project requirements for T&E (project VRTM). In conjunction with the test director, ANW-130 presents reviews to the Test Policy Review Board (TPRB) as required.
Contractor Support	Supports ACN-250 in developing test plans and procedures for the WMSCR OT&E/Integration test activities; provides support to the test director in the implementation of this plan in conducting and observing/monitoring testing activities as required; assists in the preparation of test logs, analysis of test results, and the test reports upon completion of testing.
SEIC	Supports ANW-130 in the WMSCR OT&E/Integration test activities as directed.
Harris	Provides assistance in determining causes and implementing solutions for hardware and software/firmware malfunctions during the WMSCR OT&E/Integration test activities.

6.2 ROLES.

This section defines the following testing roles:

- a. Test Director
- b. Test Manager
- c. Test Observers/Monitors
- d. Test Operators
- e. Test Support Group

6.2.1 Test Director.

The test director is responsible for the overall management of the WMSCR OT&E/Integration test effort and will provide test management guidance to members of the test team. The test director will maintain the ultimate authority over the specific test assigned. The test director will be responsible for ensuring that test results and noted deficiencies are fully documented.

The test director will review results of testing activities and provide recommendations in support of the EXCOM DRR process.

6.2.2 Test Manager.

The test manager is appointed by the test director and is responsible for upholding test schedules, and maintaining authority at the test site during test conduct. Duties include the following activities:

- a. Test personnel are available and properly trained to conduct the required test;
- b. Required equipment is available and in working order at the operational test sites;
- c. Requirements for on-site test support personnel are coordinated;
- d. Test activities are performed in accordance with approved test plans and procedures, and that test objectives are successfully fulfilled;
- e. Noted test discrepancies are logged and appropriate remedial action for resolution of test problems is recommended;
- f. Test logs/observer records are being documented properly;
- g. Test data for analysis is collected and test results are documented.

6.2.3 Test Observers/Monitors.

Technically qualified test observers/monitors to include field facility personnel will be assigned to monitor and record activities for specific WMSCR OT&E/Integration test activities. Test observers will also maintain test observer notes as well as other assigned data sheets.

6.2.4 Test Operators.

Test operators will be qualified personnel assigned to operate test positions during a particular test. They will be expected to follow the order of the test and record anomalies. For the conduct of these assessments/evaluations, the test operators will be under the direct supervision of the test manager.

Test operators will also assist in the following:

- a. Bringing up the system;
- b. Test setups and execution runs as detailed in the test procedures.

6.2.5 Test Support Group.

The WMSCR Test Support Group will consist of a group of specialists who are knowledgeable in specific testing area(s) and the WMSCR TVRTM requirements.

Personnel from this group will include field personnel and ACN-250/ANW-130 support contractors. This group will provide support to the test director in the implementation of this plan in conducting and observing/monitoring testing activities as required; assisting in the preparation of test logs and analysis of test results; and in preparing the test reports upon completion of testing.

7. DOCUMENTATION REQUIREMENTS AND CONTROL.

This section identifies the test documentation, reviews, and reports that will be necessary to support the WMSCR OT&E/Integration test to be conducted at the designated operational test site(s).

Examples of the specific forms discussed in this section may be found in appendix B of the plan.

7.1 DOCUMENTATION TREE.

The hierarchical dependencies of the primary documents used in the development of this plan are represented in figure 7.1-1, WMSCR OT&E/Integration Test Plan Documentation Tree. As noted from this figure, guidance for the format and content of the OT&E/Integration Test Plan was derived primarily from the following documents: FAA Order 1810.4A, FAA-STD-024a, NAS-MD-110, FAA-E-2764C, WMSCR FAA Master Test Plan, and the NAS Program Master Baseline Schedule.

FAA Order 1810.4A identifies the various organizational roles and responsibilities for performing testing activities throughout a project's life cycle, while FAA-STD-024a provides the standard for the preparation of the different types of OT&E documentation. NAS-MD-110 specifies the test terms and definitions utilized for the NAS.

The WMSCR OT&E/Integration Test Plan was developed by ACN-250 to ensure that the appropriate type and level of testing and evaluation is conducted as necessary to verify all of the requirements of the WMSCR TVRTM listed in appendix A.

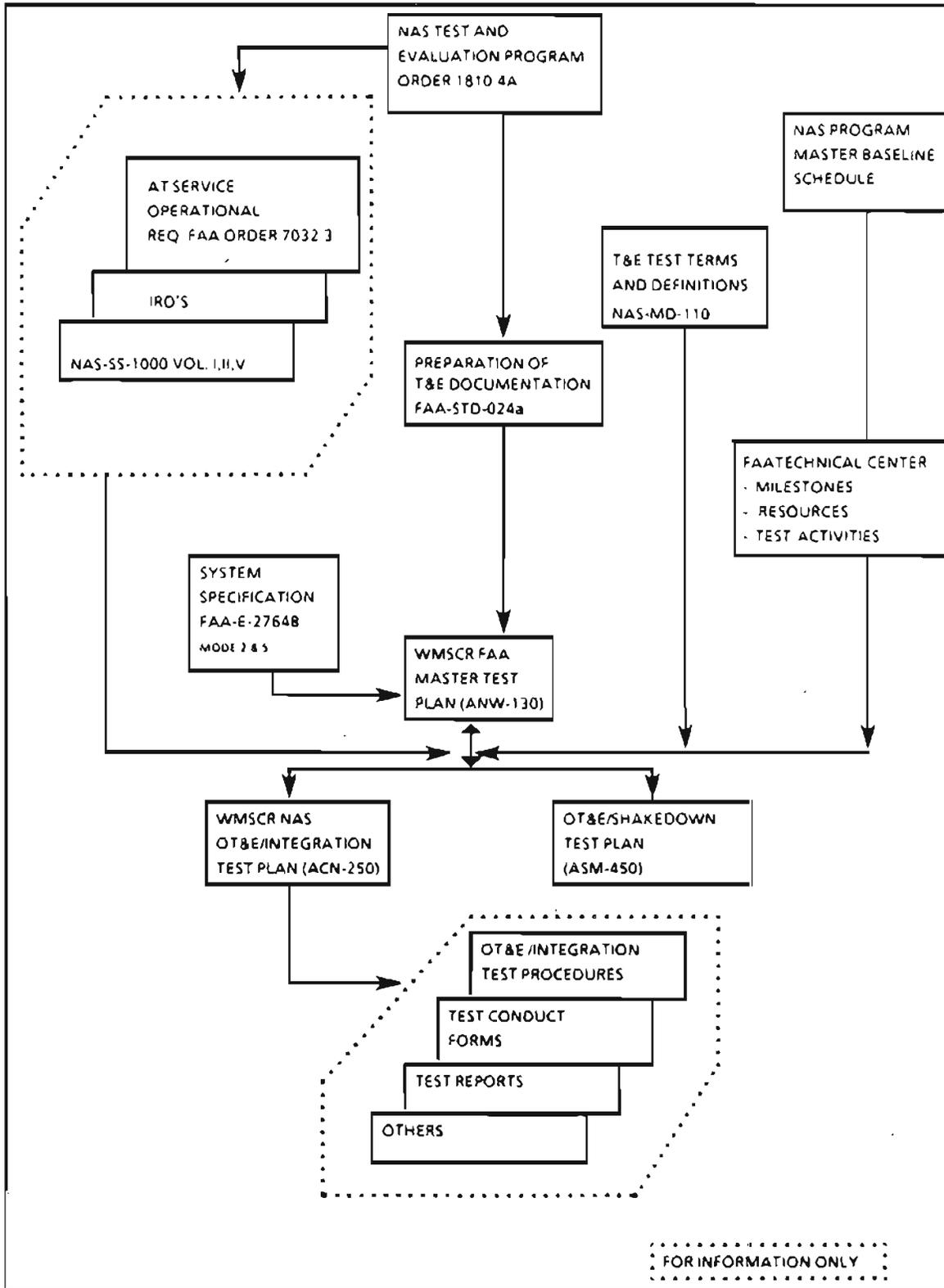


FIGURE 7.1-1. WMSCR OT&E/INTEGRATION TEST PLAN DOCUMENTATION TREE

7.2 OPERATING AND CONTROL DOCUMENTS.

7.2.1 Monitoring/Verifying of Development Test and Evaluation (DT&E).

As stated in section 3.0, when test results of lower-level testing (i.e., FAT/SAT) may be used to satisfy operational or NAS requirements, these requirements will not be duplicated. When this is the case, the Contractor Test Case identification number and supporting documentation for traceability for the verification of this TVRTM requirement will be noted in the OT&E/Integration Test Procedures.

7.2.2 Test Procedures.

The WMSCR OT&E/Integration Test Procedures will contain step-by-step instructions for conducting the verification of requirements associated with each test configuration and category. To facilitate traceability, each test procedure (where applicable) will include the OT&E VRTM requirement number and the NAS IRD requirement number.

A protocol analyzer will be used to nonintrusively capture data transferred across the operational interface between the WMSCR and the subsystems and, therefore, will be an integral part of the test procedures. The test procedures will provide the pass/fail criteria. The protocol analyzer will provide visibility into the following:

- a. The physical layer - X.21bis, voltage/signaling levels,
- b. The data link layer - frame format and error recovery,
- c. The network layer - addressing, PVC and Switched Virtual Circuit (SVC),
- d. The transport layer - establish a connection with the user and delivery,
- e. The application layer - ADU format and product distribution.

From this data the pass/fail of the requirement will be determined.

In conjunction with field personnel, WMSCR operator test procedures will be developed to include:

- a. The Service A product mix for External users,
- b. Table of catalog numbers for WMSCR product distribution,
- c. ICAO addressing for MSN users.

7.2.3 Test Log.

A Test Conduct Log (see appendix B) will be prepared for each test category.

7.2.4 Test Observer/Monitor Record.

Test observer/monitor notes will be recorded on the Test Observer/Monitor Record (see appendix B) and signed by the observer.

7.2.5 Test Discrepancy Reports.

The test manager is responsible to ensure that all discrepancies observed during the tests are documented. The form located in appendix B should be used to document test discrepancies.

a. Program Technical Report - Form 6100.1 is initiated when a problem is related to a non-WMSCR subsystem/equipment maintenance-type discrepancy. FAA-OR-1100.145B, Program Technical Report Procedures, delineates the purpose and use of this form.

8. TRAINING.

Training of FAA Technical Center government and contractor support personnel will encompass various instructional processes in preparation for the testing of the WMSCR. Completed Commercial Off-The-Shelf (COTS) training which included Digital Equipment Corporation (DEC) Virtual Address Extension (VAX) user, Utilities, and DECNET; Sybase End user, Libraries, and APT Workbench.

Additional training will include the hands-on use of a protocol analyzer to monitor X.25 circuits installed at the FAA Technical Center. A simulator is currently under development to provide for a WMSCR Service A user.

In agreement with ANW-130, a WMSCR operator training course will be provided to FAA test and support personnel participating in the conduct of the WMSCR OT&E/Integration test activities.

9. TEST SUPPORT REQUIREMENTS.

9.1 INSTRUMENTATION.

The test and support equipment, used by the contractor (Harris Corporation) for the Factory and Site Acceptance testing, will be provided at the designated operational test site(s) for use in the WMSCR OT&E/Integration test. Interim contractor support to maintain the WMSCR system during the WMSCR OT&E/Integration test will be provided by Harris personnel. The test equipment to be used by ACN-250 for the WMSCR OT&E/Integration test has been defined as a protocol analyzer to capture live data being tested and printers, cables, and a personal computer to produce hard copies of data being tested. Any additional equipment needed will be defined in the test procedures.

9.2 DATA ANALYSIS.

Data analysis for test categories will be accomplished by comparison of actual test output data to the success criteria defined in the test procedures. The required data will be gathered from recording devices, (e.g. protocol analyzer), printed outputs, monitor displays, etc., by designated test team personnel during testing.

The protocol analyzer will be positioned to capture the data on the circuit between the WMSCR and NADIN PSN users (configurations 2 through 5). Analysis of this data captured at the operational interface will be the basis for pass/ fail criteria for the WMSCR.

The analysis of the data captured will produce a hard copy report of those weather products after the supervisory frames and unnumbered frames of the OSI model are removed. This group represents a sample of weather products captured across the operational interface within a given time interval. Statistical sampling techniques will be applied to verify the weather sample meets the 24 hour product distribution. The weather product sampling analysis will be based on the following criteria:

- a. The composition of the weather distribution (frequency),
- b. The format of the weather product (ADU),
- c. The size of the weather product,
- d. The confidence level of 95 percent.

9.3 TEST SITE CONFIGURATION.

The WMSCR OT&E/Integration test will be conducted by ACN-250 at the designated operational test sites. These test sites include the Air Route Traffic Control Center (ARTCC) at Leesburg, Virginia, the NAWPF in Atlanta, Georgia, and Salt Lake City, Utah. A portion of OT&E/Integration testing may be conducted at the FAA Technical Center for interfaces that connect to WMSCR via the Service A Gateway.

The WMSCR test site configuration will require the following:

- a. An operational WMSCR,
- b. Leased dedicated circuits and appropriate modems for connectivity to the NWID and WMSCR nodes,
- c. Available NADIN PSN with supporting Data Switching Exchange (DSE) nodal links,
- d. Available operational interfaces (interim or end-state),
- e. A protocol analyzer.

10. REVIEWS AND REPORTS.

The following subsections identify the reviews, meetings, and reports that will be conducted and/or completed prior to, during, and after the WMSCR OT&E/Integration test.

10.1 TEST READINESS REVIEW (TRR).

Prior to the start of the WMSCR OT&E/Integration test activities, a Test Readiness Review (TRR) shall be conducted and an overall assessment of the availability and completeness of the previous testing activities/results will be discussed.

In this review, the test director will present justification for assessment of the readiness of the test including, but not limited to, status of all necessary documentation, the resolution of comments/questions/problems, completion of configuration audits (software and hardware), availability of the WMSCR system, other system facilities, and resources.

10.2 TEST SCHEDULE STATUS REVIEW MEETINGS.

Test Schedule Status Review (TSSR) meetings are scheduled on a monthly basis to track the status of testing activities and keep ANW-130 advised of any outstanding issues/actions. These reviews are chaired by the ACN-250 Test Director, or a designee.

10.3 POST-TEST REVIEW.

This review will be held at the test site, upon test completion, by the WMSCR OT&E/Integration test team. It will be chaired by the test manager and attended by all test personnel. This meeting will review the results of the test activity. Any discrepancies, anomalies, and exceptions which were recorded during the test will be discussed during this review.

10.4 DRR.

A DRR will be scheduled and conducted in accordance with the FAA T&E process. Upon completion of the WMSCR OT&E/Integration test, ACN-250 will provide recommendations to the DRR EXCOM.

10.5 QUICK LOOK REPORTS.

These reports will be completed by the test manager, following the analysis of the test data. A Quick-Look Test Report will be produced for each test configuration. Each report will give the early status information for the system while the analysis process is still underway. Each Quick Look Report will be completed 15 working days from the completion of each WMSCR OT&E/Integration test configuration.

10.6 FINAL TEST REPORT.

The WMSCR test director will be responsible for preparing a Final Test Report. A draft report will be delivered to the project manager after the completion of testing. The Final Test Report will document the results of the detailed test analysis, and assess the conformance of each test to defined criteria.

The status of problems identified previously in the Quick Look Test Reports will be reviewed. An assessment will be made on the tested system and any suggested corrective actions will be recommended. The Final Test Report will be completed 30 working days from the completion of the WMSCR OT&E/Integration test.

11. SCHEDULES.

This section presents the schedules for the WMSCR OT&E/Integration test based on the WMSCR Project Master Baseline Schedule (PMBS) activities in appendix C.

The function of this schedule is to provide strategic schedule direction to all activities. It identifies the major tasks to be accomplished within a given test area, as listed below, and identifies task durations of the test, start-stop dates, and a major performance measurement point between each.

The scheduled major test areas are:

- a. DT&E testing,
- b. PAT&E testing,
- c. OT&E/Integration testing,
- d. OT&E/Shakedown testing.

The schedule enables the test director to provide detailed schedule guidance to the test groups and ensures that the PMBS milestones are supported and fulfilled. Status is measured against this schedule and flows up to the PMBS for impact assessment.

12. TVRTM.

The TVRTM is an essential part of the WMSCR OT&E/Integration test process. It reflects all of the OT&E requirements and serves as the single tracking tool accounting for their evaluation/assessment throughout the OT&E cycle. The TVRTM will be maintained as required by ACN-250 until the WMSCR OT&E/Integration Test activities are completed.

The following definitions are provided for better user understanding of the TVRTM:

NAS-SS-1000 Volume I, II & V Requirements. Requirement statements per the NAS System-Level Specifications are identified in three sections. Section 1, Volume I; Section 2, Volume II; and Section 3, Volume V. The section number appears on the first line of the TVRTM.

Requirement #. Number assigned for ease of identification. This number will appear in the detailed test configurations/categories where this NAS requirement will be satisfied (sections 4.2 and 4.3).

Paragraph #. The source paragraph number of the NAS System-Level Specification for that specific requirement.

Description. The entire requirement verbatim from the above paragraph number.

VM. See paragraph 4.4 of this OT&E/Integration Test Plan.

NAS Qualification Status. "Q" deferred qualification requirements (subsystem does not presently exist in the NAS); "P" previously qualified (exists in the NAS but will not be redemonstrated); "R" previously qualified and will be redemonstrated.

C/NC. This column identifies whether or not the requirement is critical for the WMSCR system. A C indicates that the requirement is critical, and NC indicates that it is not critical.

TEST PROCEDURES IDENTIFICATION. This column is reserved for references to the captions in the OT&E/Integration Test Procedures which apply to a specific test category. When a specific reference should be cited, the test identification number will appear in this column.

NAS-SS-1000 VOLUME (#) CROSS-REFERENCE. In the second part of the TVRTM, Volume I requirements, those paragraphs in any one of the five volumes (including others within Volume I) which duplicate or incorporate the same testing requirements are identified by paragraph number in this column.

REMARKS. This column explains or amplifies relevant information per requirement where necessary. Remarks cite specific paragraphs from the WMSCR System Specification, FAA-E-2764C, as identified by the symbol o, and include the appropriate IRD references.

12.1 MAINTENANCE AND CONTROL.

The TVRTM contained in appendix A will be maintained by ACN-250. Editorial corrections, general enhancements, and changes in allocation to configurations/categories will be incorporated as necessary.

Modifications to this TVRTM as a result of changes to the MTP VRTM or the NAS-SS-1000 will be made as required.

13. ABBREVIATIONS AND ACRONYMS.

ADAS	AWOS Data Acquisition System
ADU	Application Data Unit
AF	Airway Facilities
AFSS	Automated Flight Service Station
AFTN	Aeronautical Fixed Telecommunications Network
APAD	Asynchronous PAD Users
ARTCC	Air Route Traffic Control Center
ASOS	Automated Surface Observation System
AT	Air Traffic
ATC	Air Traffic Control
ATS	Air Traffic Service
AWN	Aviation Weather Network
AWOS	Automated Weather Observation System
AWP	Aviation Weather Processor
bps	bits per second
C	Critical
CAT	Category
CCITT	International Telegraph and Telephone Consultative Committee
CFMWP	Central Flow Meteorologist Weather Processor
CNSP	Consolidated NOTAM System Processor
COTS	Commercial Off-The-Shelf
CTS	Coded Time Source
CWA	Central Weather Advisory
D	Demonstration
DCE	Data Circuit Terminating Equipment
DEC	Digital Equipment Corporation
DLP	Data Link Processor
DOD	Department of Defense
DRR	Deployment Readiness Review
DSE	Data Switching Exchange
DTE	Data Terminal Equipment
DT&E	Development Test and Evaluation
DUAT	Direct User Access Terminal
EIA	Electronic Industries Association
EXCOM	Executive Committee
FAA	Federal Aviation Administration
FAT	Factory Acceptance Test
FCM	Federal Coordinator for Meteorological Service
GIM	General Information Message
CWDS	Graphics Weather Display System
ICAO	International Civil Aviation Organization
ICD	Interface Control Document
IRD	Interface Requirements Document
ISO	International Standards Organization
LAPB	Link Access Procedure for Balanced Operation
MIS	Meteorological Impact Statement
MPS	Maintenance Processor Subsystem
MSN	Message Switch Network (NADIN MSN Subscribers)
MTP	Master Test Plan
MWP	Meteorologist Weather Processor
NADIN	NAS Data Interchange Network
NAS	National Airspace System

NAWPF	National Aviation Weather Processing Facility
NC	Non-Critical
NCP	NAS Change Proposal
NMC	National Meteorological Center
NOTAM	Notice to Airmen
NSSFC	National Severe Storms Forecast Center
NWID	NWSTG WMSCR Interface Device
NWS	National Weather Service
NWSTG	NWS Telecommunications Gateway
OFCM	Office of the Federal Coordinator for Meteorological Services and Supporting Research
OT&E	Operational Test and Evaluation
PAD	Protocol Assembler Disassembler
PAT&E	Production Acceptance Test and Evaluation
PD	Product Distribution
PIREP	Pilot Weather Report
PMBS	Project Master Baseline Schedule
PSN	Packet Switched Network
PVC	Permanent Virtual Circuit
RWP	Real-Time Weather Processor
SAT	Site Acceptance Test
SVC	Switched Virtual Circuit
T	Test
T&E	Test and Evaluation
TMP	Traffic Management Processor
TPRB	Test Policy Review Board
TSSR	Test Schedule Status Review
TVRTM	Test Verification Requirements Traceability Matrix
VAX	Virtual Address Extension
VRTM	Verification Requirement Traceability Matrix
WMO	World Meteorological Organization
WMSC	Weather Message Switching Center
WMSCR	Weather Message Switching Center Replacement

APPENDIX A

WMSCR NAS TEST VERIFICATION TRACEABILITY MATRIX (TVRTM)

NAS-SS-1000 VOLUME I REQUIREMENTS						
REQM'T#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/NC	REMARKS •Para REF to FAA-E- 2764c
1001	3.2.1.1.4.1	The WMSCR provide weather services to the user/specialist:	X			Lead-in paragraph
1002	3.2.1.1.4.1.A	Accept weather information from external subsystem that support NAS specialist and users.	D		NC	
1003	3.2.1.1.4.1.B	Collect and/or sense weather information that pertains to the area of NAS responsibility for terminal and enroute operations.	D		NC	
1004	3.2.1.1.4.1.C	Provide the capacity and flexibility to support future growth and expendability.	A		NC	• 3.3.1.1.3
1005	3.2.1.1.4.1.E	Accept input from specialists including annotations or remarks to existing weather information or commands to generate specific weather products.	D		NC	
1006	3.2.1.1.4.1.F	Maintain current, trend, and forecast weather information for the area of NAS responsibility.	D		NC	

VERIFICATION METHODS & TEST PLAN IMPLEMENTATION: T = TEST D = DEMONSTRATION A = ANALYSIS I = INSPECTION
L = VERIFIED BY LOWER LEVEL PARA. REQMT X = NOT APPLICABLE

NAS QUALIFICATION STATUS: Q = DEFERRED QUALIFICATION REQUIREMENTS (DOES NOT EXIST IN NAS NOW)
P = PREVIOUSLY QUALIFIED (EXISTS IN NAS BUT WILL NOT BE RE-DEMONSTRATED)
R = PREVIOUSLY QUALIFIED AND WILL BE RE-DEMONSTRATED

NAS-SS-1000 VOLUME I REQUIREMENTS						
REQM'T#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/NC	REMARKS •Para REF to FAA-E- 2764c
1007	3.2.1.1.4.1.N	Archive weather information for use in event reconstruction and accident investigation.	D		NC	
1008	3.2.1.1.4.1.P	Maintain NOTAM information for the area of NAS responsibility.	D		C	
1009	3.2.1.1.4.1.Q	Provide access to NOTAM information for the area of NAS responsibility.	D		C	
1010	3.2.1.1.8.1.3	The WMSCR shall provide data and voice recording and playback capabilities for archiving and reconstruction purposes.	A		C	Voice Requirements Not addressed in FAA-E-2764c
1011	3.2.1.1.9.1	Provide remote maintenance monitoring (RMM);	X			Lead-in paragraph
1012	3.2.1.1.9.1.A	The WMSCR shall continually monitor subsystem performance to obtain the data needed by specialists for maintenance and operations support.	D		NC	
1013	3.2.1.1.9.1.B	The WMSCR shall provide the status of subsystems to specialists and shall generate an alarm upon the deviation of designated parameters from prescribed limits.	D		NC	

VERIFICATION METHODS & TEST PLAN IMPLEMENTATION: T = TEST D = DEMONSTRATION A = ANALYSIS I = INSPECTION
L = VERIFIED BY LOWER LEVEL PARA. RQMT X = NOT APPLICABLE

NAS QUALIFICATION STATUS: Q = DEFERRED QUALIFICATION REQUIREMENTS (DOES NOT EXIST IN NAS NOW)
P = PREVIOUSLY QUALIFIED (EXISTS IN NAS BUT WILL NOT BE RE-DEMONSTRATED)
R = PREVIOUSLY QUALIFIED AND WILL BE RE-DEMONSTRATED

NAS-SS-1000 VOLUME I REQUIREMENTS						
REQM'T#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/NC	REMARKS •Para REF to FAA-E- 2764c
1014	3.2.1.1.9.1.C	The WMSCR shall provide the capability for a specialist on-site or at an off-site location to control selected subsystems for maintenance purposes.	D		NC	
1015	3.2.1.1.9.1.D	The WMSCR shall provide the specialist the capability to identify the line replaceable unit causing an equipment failure.	D		NC	
1016	3.2.1.1.9.1.G	The WMSCR shall provide the specialist access to the monitoring, control, and data management capabilities of the NAS as required and as authorized by administrative directives.	D		NC	
1017	3.2.1.2.4	Provide services to the user/specialist for weather and NOTAM information:	X			Lead-in paragraph • 3.1.4.3.3.3.
1018	3.2.1.2.4.A	Acquire weather and NOTAM information	X			Lead-in paragraph
1019	3.2.1.2.4.A.4	Collect NWS generated data as follows:	X			Lead-in paragraph
1020	3.2.1.2.4.A.4.A	Terminal forecasts, at least once every 6 hours.	T		C	
1021	3.2.1.2.4.A.4.B	Area forecasts, at least once every 12 hours.	T		C	

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NAS-SS-1000 VOLUME I REQUIREMENTS						
REQM'T#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/NC	REMARKS •Para REF to FAA-E- 2764c
1022	3.2.1.2.4.A.4.C	Winds aloft forecasts, at least once every 12 hours.	T		C	
1023	3.2.1.2.4.A.4.D	Current surface weather observations, at least once every minute.	T		C	
1024	3.2.1.2.4.A.4.E	Current weather conditions aloft, at least once every 5 minutes.	T		C	
1025	3.2.1.2.4.A.4.F	Weather warnings and advisories, within 15 seconds, after generation.	T		C	
1026	3.2.1.2.4.A.5	Collect DOD generated data on current surface weather observations at least once every minute.	T		NC	
1027	3.2.1.2.4.B	Disseminate weather and NOTAM information:	X			Lead-in paragraph
1028	3.2.1.2.4.B.1	Weather information classified as hazardous or potentially hazardous shall be available.	X			Lead-in paragraph
1029	3.2.1.2.4.B.1A	Within one minute from the time WMSCR receives the hazardous weather information.	T		C	

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NAS-SS-1000 VOLUME I REQUIREMENTS						
REQM'T#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/NC	REMARKS •Para REF to FAA-E- 2764c
1030	3.2.1.2.4.B.1B	Within two minutes from the time WMSCR receives the hazardous weather information.	T		C	
1031	3.2.1.2.4.B.4	Current surface weather observation information shall be available to non-local area specialist and users and updated at least once per hour.	T		C	
1032	3.2.1.2.4.B.5	Weather conditions aloft information shall be available to non-local area specialists and users upon request and updated at least once per hour.	T		C	
1033	3.2.1.2.4.B.6	Locally stored weather/aeronautical information to be accessible to the users with or without aid of a specialist with mean response time of 3s, 99%tile of 5s, & max response of 10s, from the time of request.	T		C	• 3.1.4.3.3.3.6
1034	3.2.1.2.4.C	Maintain weather and NOTAM information.	X			Lead-in paragraph
1035	3.2.1.2.4.C.5	Maintain NOTAMS until expired, expired NOTAMS shall be purged within 1 hour.	T		C	

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NAS-SS-1000 VOLUME I REQUIREMENTS						
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1036	3.2.1.2.4.E	WMSCR shall perform all processing required to produce and/or complete a description of the current, trend, or predicted wx conditions by:	X			Lead-in paragraph
1037	3.2.1.2.4.E.4	Filtering, decoding, editing & reformatting acquired wx data to facilitate its operational use.	D		C	
1038	3.2.1.2.4.G	The WMSCR shall archive all weather information in accordance with section 3.2.1.2.8.3.	T		C	
1039	3.2.1.2.8.3	Provide data and voice storage, recording, and playback capabilities for reconstruction purposes as follows:	X			Lead-in paragraph
1040	3.2.1.2.8.3.A	Record all specified operational voice and data info for support of analysis e.g., incident/accident investigation.	D		C	
1041	3.2.1.2.8.3.B	Retrieve and playback all specified recorded data and voice information requested by an authorized specialist as follows:	X			Lead-in Paragraph

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REQM'T#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/NC	REMARKS •Para REF to FAA-E- 2764c
1042	3.2.1.2.8.3.B.1	Voice recordings retrievable within 30 minutes from on-line storage and within 60 minutes from off-line storage.	T		NC	
1043	3.2.1.2.8.3.B.2	Data recordings retrievable from off-line storage.	D		NC	
1044	3.2.1.2.8.4	Provide a standard time signal as follows:	X			Lead-in paragraph
1045	3.2.1.2.8.4.B	Provide a coded time signal source accurate to within 10 ms of universal time coordinated (UTC).	T		C	
1046	3.2.1.2.8.4.C	Provide interfacing capabilities to the coded time signal and synchronization in accordance with Volumes II through V of NAS-SS-1000.	I		C	
1047	3.2.1.2.9	Provide remote maintenance monitoring capabilities as follows:	X			Lead-in paragraph
1048	3.2.1.2.9.A	The WMSCR shall provide the capability to continually monitor the status, alarms/alerts and performance data of selected subsystems.	T		NC	

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NAS-SS-1000 VOLUME I REQUIREMENTS						
REQM'T#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/NC	REMARKS •Para REF to FAA-E- 2764c
1049	30.1.1.1.S	WMSCR shall provide for the monitoring of designated subsystem performance parameters.			NC	TVRTM Requirement Item 1012
1050	30.1.1.2.S	WMSCR shall provide subsystem operating status data including configuration and mode of operation.			NC	TVRTM Requirement Item 1012
1051	30.1.1.3.S	WMSCR shall provide subsystem status reports that contain only state changes and alarms/alerts in response to a subsystem status request.			NC	TVRTM Requirement Item 1012
1052	30.1.1.4.S	WMSCR shall automatically provide for the accumulation of current subsystem status and performance data in a local data file.			NC	TVRTM Requirement Item 1012
1053	30.1.1.5.S	WMSCR shall provide subsystem data in response to requests from RMMS subsystems.			NC	TVRTM Requirement Item 1012
1054	30.1.1.6.S	WMSCR shall provide an alarm when any designated WMSCR subsystem monitored parameter is out of tolerance.			NC	TVRTM Requirement Item 1013

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1055	30.1.1.9.S	WMSCR shall provide a return-to-normal alarm when an initial alarm condition is cleared.			NC	TVRTM Requirement Item 1013
1056	30.1.1.10.S	WMSCR shall provide an alert when selected subsystem parameters are outside a predetermined range.			NC	TVRTM Requirement Item 1013
1057	30.1.1.11.S	WMSCR shall provide the capability to set or change ranges for subsystem alarm or alert parameters.			NC	TVRTM Requirement Item 1013
1058	30.1.1.12.S	WMSCR shall provide for the disabling of a subsystem alarm or alert by a specialist on-site.			NC	TVRTM Requirement Item 1014
1059	30.1.1.13.S	WMSCR shall report the disabling of a subsystem alarm or alert as performance data.			NC	TVRTM Requirement Item 1014
1060	30.1.1.14.S	WMSCR shall provide subsystem certification data in response to a certification exercise.			NC	TVRTM Requirement Item 1016
1061	30.1.1.15.S	WMSCR shall provide subsystem diagnostic data in response to a diagnostic test request.			NC	TVRTM Requirement Item 1016

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1062	30.1.1.18.S	WMSCR shall provide for the control to change the current operating mode of a subsystem to any other proper operating mode of a subsystem including on/off.			NC	TVRTM Requirement Item 1016
1063	30.1.1.19.S	WMSCR shall provide the capability to adjust selected subsystem parameters.			NC	TVRTM Requirement Item 1016
1064	30.1.1.20.S	WMSCR shall provide the capability to reset a subsystem.			NC	TVRTM Requirement Item 1016
1065	30.1.1.21.S	WMSCR shall provide for the initiation of subsystem diagnostic tests for the purpose of fault isolation.			NC	TVRTM Requirement Item 1016
1066	30.1.1.22.S	WMSCR shall provide for the initiation of subsystem certification exercises.			NC	TVRTM Requirement Item 1016

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NAS-SS-1000 VOLUME II REQUIREMENTS						
ITEM#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/ NC	REMARKS •Para REF to FAA-E- 2764c
2001	3.2.1.5.7	Weather Message Switching Center Replacement.	X			Title - WMSCR
2002	3.2.1.5.7.1	Functional characteristics:	L			Title-Functional Requirement
2003	3.2.1.5.7.1.1	Data Base				Lead-in paragraph
2004	3.2.1.5.7.1.1.1	Maintain and update a weather and NOTAM data base.	D D		C C	• 3.1.4.3.1
2005	3.2.1.5.7.1.1.2	The WMSCR shall identify hazardous weather products and provide them priority handling.	D		C	• 3.1.4.2.1.1
2006	3.2.1.5.7.1.2	Formatting:	X			Title
2007	3.2.1.5.7.1.2A	Reformat weather header data as appropriate for distribution.	D		C	• 3.1.4.2.5
2008	3.2.1.5.7.1.2B	Identify and process formats:	L			Lead-in paragraph
2009	3.2.1.5.7.1.2.B.1	Standard aviation observations (SAO).	D		NC	• 3.1.4.2.2.1.3.1.2
2010	3.2.1.5.7.1.2.B.2	World meteorological organization (WMO).	D		NC	• 3.1.4.2.2.1.3
2011	3.2.1.5.7.1.2.B.3	International Civil Aviation Organization (ICAO)	D		NC	• 3.1.4.2.2.1.3

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2012	3.2.1.5.7.1.2.8.4	Other formats as defined by the Office of the Federal Coordination for Meteorology (OFCM).	D		NC	• 3.1.4.2.2.1.3
2013	3.2.1.5.7.1.3	Data collection and distribution.				Lead-in paragraph
2014	3.2.1.5.7.1.3.1.a	Surface observations from NAS, NWS, DOD, and international sources.	D		C	• 3.1.4.2.4 • 3.1.4.2.2.1
2015	3.2.1.5.7.1.3.1.b	Forecast data for terminals, areas, surface, and upper air features from NAS, NWS, DOD, and international sources;	D		C	• 3.1.4.2.4 • 3.1.4.2.2.1
2016	3.2.1.5.7.1.3.1.c	Upper air observations including PIREPs from NAS, NWS, DOD, and international sources.	D		C	• 3.1.4.2.4 • 3.1.4.2.2.1
2017	3.2.1.5.7.1.3.1.d	Processed NOTAMS from CNSP	D		C	• 3.1.4.2.4 • 3.1.4.2.2.1
2018	3.2.1.5.7.1.3.1.e	Processed NOTAMS from AWP	D		C	• 3.1.4.2.4 • 3.1.4.2.2.1
2019	3.2.1.5.7.1.3.1.f	Weather warnings and advisories from NAS, DOD, NWS, and international sources.	D		C	• 3.1.4.2.4 • 3.1.4.2.2.1

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2020	3.2.1.5.7.1.3.2	The WMSCR shall distribute data to the NAS, NWS, DOD, and international and external users.	D		C	• 3.1.4.2.4
2021	3.2.1.5.7.1.3.3	The WMSCR shall provide for the collection and distribution of data according to a priority scheme.	D		C	• 3.1.4.2.1.1
2022	3.2.1.5.7.1.4	Weather information is redundant to each node for the receipt, validation of header data, and distribution of weather & NOTAMs:	X			Lead-in paragraph Title, Lead-in paragraph
2023	3.2.1.5.7.1.4.A	NAS Subsystems	D		NC	• 3.1.4.2.2.2
2024	3.2.1.5.7.1.4.B	External Users	D		NC	• 3.1.4.2.2.2
2025	3.2.1.5.7.1.4.C	National Weather Service	D		C	• 3.1.4.2.2.2
2026	3.2.1.5.7.1.4.D	International Agencies	D		NC	
2027	3.2.1.5.7.1.5	Backup:	X			Title
2028	3.2.1.5.7.1.5A	Provide all functions of the other WMSCR in the event of a failure.	D		C	• 3.1.4.4.1.3.2
2029	3.2.1.5.7.1.5B	Exchange data with the other WMSCR in order to maintain duplicate data bases.	D		C	

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NAS-SS-1000 VOLUME II REQUIREMENTS						
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2030	3.2.1.5.7.1.6	The WMSCR shall provide the capability for operator intervention to review, edit, and correct products in which the validation process has found error.	D		NC	• 3.1.4.2.2.2
2031	3.2.1.5.7.1.	Maintenance monitoring				Lead-in paragraph
2032	3.2.1.5.7.1.7.1	The WMSCR shall monitor its health and status, equipment alarms/alerts, certification, and diagnostic test data.	D		NC	• 3.1.4.4.1.1.1 • 3.1.4.4.1.4.8
2033	3.2.1.5.7.1.7.2	The WMSCR shall respond to requests from the maintenance processor subsystem (MPS) for system health and status.	D		NC	• 3.1.4.4.1.5.1 • 3.1.4.1.4.9
2034	3.2.1.5.7.1.8	The WMSCR shall transmit maintenance data.	D		NC	• 3.1.4.1.4.9 • 3.4.2.4
2035	3.2.1.5.7.1.9	The WMSCR shall respond to MPS requests for status information/maintenance data.	D		NC	• 3.1.4.4.1.5.1 • 3.4.2.4
2036	3.2.1.5.7.1.10	Provide request/reply service to the following authorized external users:	X			Lead-in Paragraph
2037	3.2.1.5.7.1.10a	International users via AFTN.	D		NC	• 3.1.4.3.3.4.1
2038	3.2.1.5.7.1.10b	Military users via AWN Carswell AFB.	D		NC	• 3.1.4.3.3.4.1

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2039	3.2.1.5.7.1.10c	External users (e.g., airlines).	D		NC	• 3.2.4.3.3.4.1.5
2040	3.2.1.5.7.1.11	The WMSCR shall maintain a real-time clock synchronized with the universal coordinated time to support journaling of system activities, and synchronization of data bases with the other WMSCR and other subscribers.	D		C	• 3.1.4.3.1.2.2 • 3.3.2.6 • 3.1.4.3.5.1
2041	3.2.1.5.7.2	Performance Characteristics:	L			Lead-in Paragraph
2042	3.2.1.5.7.2.1	The WMSCR shall maintain the following data types listed unless a cancellation is received.	T		NC	• 3.1.4.3.4.1
2043	3.2.1.5.7.2.1a	Surface observations, including hourly, specials, and urgent specials - 12 hours.	T		NC	• 3.1.4.3.4.1
2044	3.2.1.5.7.2.1b	Upper air observations, not including pilot reports (PIREPS) - 30 hours.	T		NC	• 3.1.4.3.4.1
2045	3.2.1.5.7.2.1c	PIREPS - 6 hours.	T		NC	• 3.1.4.3.4.1
2046	3.2.1.5.7.2.1d	Forecast data, e.g., terminal forecasts, winds, and temperature aloft, center weather advisories - 30 hours.	T		NC	• 3.1.4.3.4.1

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NAS-SS-1000 VOLUME II REQUIREMENTS						
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2047	3.2.1.5.7.2.1e	Meteorological discussion products, e.g., mission impact statements, area forecasts, etc. - 24 hours.	T		NC	• 3.1.4.3.4.1
2048	3.2.1.5.7.2.1f	Weather warnings and advisories, e.g., AIRMETS, SIGMETS, - 12 hours.	T		NC	• 3.1.4.3.4.1
2049	3.2.1.5.7.2.1	The period of retention shall be measured from the time the product is accepted by the WMSCR.				
2050	3.2.1.5.7.2.2	The WMSCR shall identify, validate, and make available for distribution any product in a mean time of 15 seconds and less than 30 seconds 95 percent of the time.	D		NC	• 3.1.4.2.6 • 3.1.4.2.6.1
2051	3.2.1.5.7.2.3	The WMSCR shall identify, validate, and make available for distribution any hazardous weather product or response to a data request in a mean time of 1.0 seconds and less than 3.0 seconds 95 percent of the time.	A T		NC	• 3.1.4.2.6 • 3.1.4.2.6.1
2052	3.2.1.5.7.2.4	Message distribution				Title

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2053	3.2.1.5.7.2.4.1	The WMSCR shall distribute data according to the following priority levels:				Lead-in paragraph
2054	3.2.1.5.7.2.4.1a	1 (highest), (Reserved).	D		NC	<ul style="list-style-type: none"> • 3.1.4.2.4 • 3.1.4.2.1.1
2055	3.2.1.5.7.2.4.1b	2, Consisting of Urgent specials, weather warnings and advisories (SIGMETS, AIRMETS, etc.), center weather advisories, mission impact statements.	D		NC	<ul style="list-style-type: none"> • 3.1.4.2.4 • 3.1.4.2.1.1
2056	3.2.1.5.7.2.4.1c	3, Consisting of Special surface observations, NOTAMS.	D		NC	<ul style="list-style-type: none"> • 3.1.4.2.4 • 3.1.4.2.1.1
2057	3.2.1.5.7.2.4.1d	4, Consisting of Surface and upper air observations, terminal forecasts, area forecasts, winds, and temperatures aloft, PIREPs.	D		NC	<ul style="list-style-type: none"> • 3.1.4.2.4 • 3.1.4.2.1.1
2058	3.2.1.5.7.2.4.1e	5 (lowest), Consisting of NOTAM summaries, data rebuild responses.	D		NC	<ul style="list-style-type: none"> • 3.1.4.2.4 • 3.1.4.2.1.1
2059	3.2.1.5.7.2.4.2	Priority 1 (highest), Consisting of DOD Flash, ICAO SS.	D		NC	<ul style="list-style-type: none"> • 3.1.4.2.2.1.3.1.1
2060	3.2.1.5.7.2.4.2	Priority 2, Consisting of DOD immediate, ICAO DD.				

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NAS-SS-1000 VOLUME II REQUIREMENTS						
ITEM#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/ NC	REMARKS •Para REF to FAA-E- 2764c
2061	3.2.1.5.7.2.4.2	Priority 3, Consisting of DOD Priority, ICAO, FF.				
2062	3.2.1.5.7.2.4.2	Priority 4, Consisting of DOD Routing, ICAO GG.				
2063	3.2.1.5.7.2.4.2	Priority 5 (lowest), Consisting of ICAO JJ.				
2064	3.2.1.5.7.2.5	The WMSCR shall operate 24 hours a day, 7 days a week.	D		C	
2065	3.2.1.5.7.2.6	The WMSCR shall maintain an off-line journal of all system activity for a period of 15 days.	D		NC	<ul style="list-style-type: none"> • 3.1.4.3.5 • 3.1.4.3.5.1
2066	3.2.1.5.7.2.7	The WMSCR shall generate and transmit maintenance data in accordance with response times specified in 3.2.1.1.4.2.1, 3.2.1.1.4.2.2, 3.2.1.1.4.2.3, and 3.2.1.1.4.2.7 in Volume V of NAS-SS-1000.	A T		NC	<ul style="list-style-type: none"> • 3.1.4.1.4.9
2067	3.2.1.5.7.2.8	The WMSCR shall synchronize to the NAS standard time reference in accordance with 3.2.1.2.8.4 in Volume I of NAS-SS-1000.	T		C	<ul style="list-style-type: none"> • 3.1.4.1.4.14
2068	3.2.1.5.7.2.8	The WMSCR shall be capable of 1 second timing resolution (minimum).				

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NAS-SS-1000 VOLUME II REQUIREMENTS						
ITEM#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/ NC	REMARKS • Para REF to FAA-E- 2764c
2069	3.2.1.5.7.3	The WMSCR shall interface functionally and physically as shown in Figure 3.2.1.5.7.3-1.	X			Title
2070	3.2.1.5.7.3-1	WMSCR interfaces characteristics	X			Table
2071	3.2.1.5.7.3-1.A	ADAS to WMSCR	D		NC	• 3.1.4.1.4.10/NAS-IR-25082507
2072	3.2.1.5.7.3-1.B	AWN to WMSCR	D		NC	• 3.1.4.1.4.7/NAS-IR-94022507
2073	3.2.1.5.7.3-1.C	WMSCR to AWN	D		NC	• 3.1.4.1.4.7/NAS-IR-94022507
2074	3.2.1.5.7.3-1.D	AWP to WMSCR	D		C	• 3.1.4.1.4.4/NAS-IR-25042507
2075	3.2.1.5.7.3-1.E	WMSCR to AWP	D		C	• 3.1.4.1.4.4/NAS-IR-25042507
2076	3.2.1.5.7.3-1.F	CFMWP to WMSCR	D		NC	See Para. 4.2.7
2077	3.2.1.5.7.3-1.G	WMSCR to CFMWP	D		NC	See Para. 4.2.7
2078	3.2.1.5.7.3-1.H	CNSP to WMSCR	D		C	• 3.1.4.1.4.5/NAS-IR-25072505

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NAS-SS-1000 VOLUME II REQUIREMENTS						
ITEM#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/ NC	REMARKS •Para REF to FAA-E- 2764c
2079	3.2.1.5.7.3-1.I	WMSCR to CNSP	D		C	• 3.1.4.1.4.5/NAS- IR-25072505
2080	3.2.1.5.7.3-1.J	DUAT SERV. to WMSCR	D		NC	• 3.1.4.1.4.7/NAS- IR-94022507
2081	3.2.1.5.7.3-1.K	WMSCR to DUAT SERV.	D		NC	• 3.1.4.1.4.7/NAS- IR-94022507
2082	3.2.1.5.7.3-1.L	EXT USER to WMSCR	D		NC	• 3.1.4.1.4.7/NAS- IR-94022507
2083	3.2.1.5.7.3-1.M	WMSCR to EXT USER	D		NC	• 3.1.4.1.4.7/NAS- IR-94022507
2084	3.2.1.5.7.3-1.N	WMSCR to GWDS	D		NC	No IRD for this interface
2085	3.2.1.5.7.3-1.O	INT'L USER to WMSCR	D		NC	• 3.1.4.1.4.8/NAS- IR-94032507
2086	3.2.1.5.7.3-1.P	WMSCT to INT'L USER	D		NC	• 3.1.4.1.4.8/NAS- IR-94032507
2087	3.2.1.5.7.3-1.Q	MPS to WMSCR	D		NC	• 3.1.4.1.4.9, 3.2.1.1.6.3-1

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NAS-SS-1000 VOLUME II REQUIREMENTS						
ITEM#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/ NC	REMARKS •Para REF to FAA-E- 2764c
2088	3.2.1.5.7.3-1.R	WMSCR to MPS	D		NC	• 3.1.4.1.4.9, 3.2.1.1.6.3-1
2089	3.2.1.5.7.3-1.S	MWP to WMSCR	D		NC	• 3.1.4.1.4.7/NAS- IR-94022507
2090	3.2.1.5.7.3-1.T	WMSCR to MWP	D		NC	• 3.1.4.1.4.7/NAS- IR-94022507
2091	3.2.1.5.7.3-1.U	NMC to WMSCR	D		C	• 3.1.4.1.4.3/NAS- IR-43020001
2092	3.2.1.5.7.3-1.V	WMSCR to NMC	D		C	• 3.1.4.1.4.3/NAS- IR-43020001
2093	3.2.1.5.7.3-1.W	NSSFC to WMSCR	D		NC	• 3.1.4.1.4.7/NAS- IR-94022507
2094	3.2.1.5.7.3-1.X	WMSCR to NSSFC	D		NC	• 3.1.4.1.4.7/NAS- IR-94022507
2095	3.2.1.5.7.3-1.Y	OTH WMSCR to WMSCR	D		C	• 3.1.4.1.4.1
2096	3.2.1.5.7.3-1.Z	WMSCR to OTH WMSCR	D		C	• 3.1.4.1.4.1
2097	3.2.1.5.7.3-1.AA	RWP to WMSCR	D		NC	• 3.1.4.1.4.7/NAS- IR-25072511

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NAS-SS-1000 VOLUME II REQUIREMENTS						
ITEM#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/ NC	REMARKS •Para REF to FAA-E- 2764c
2098	3.2.1.5.7.3-1.AB	WMSCR to RWP	D		NC	• 3.1.4.1.4.6/NAS- IR-25072511
2099	3.2.1.5.7.3-1.AC	WMSCR to TMP	D		NC	• 3.1.4.1.4.13/NAS- IR-25072401
2100	3.2.1.5.7.3-1.AD	WMSCR to DLP (WCP)	D		NC	• 3.1.4.1.4.12/NAS- IR-25072503
2101	3.2.1.5.7.3-1.AE	WMSCR to WMSCR OPR	D		NC	No IRD for this interface 3.1.4.4.2 3.1.4.4.2.1 3.1.4.4.2.2
2102	3.2.1.5.7.3-1.AF	WMSCR OPR to WMSCR	D		NC	No IRD for this interface 3.1.4.4.2 3.1.4.4.2.1 3.1.4.4.2.2

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VERIFICATION METHODS & TEST PLAN IMPLEMENTATION: T = TEST D = DEMONSTRATION A = ANALYSIS I = INSPECTION
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NAS-SS-1000 VOLUME V REQUIREMENTS						
ITEM#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/NC	REMARKS •Para REF to FAA-E- 2764c
5001	3.2.1.1.4.2.1	The WMSCR shall detect an alarm/alert condition, filter extraneous fluctuations, and provide an indication to the local status file within an average time of 2 seconds and a maximum time of 10 seconds.				TVRTM Requirement Item 2066
5002	3.2.1.1.4.2.2	The WMSCR shall detect a change of state, filter extraneous fluctuations, and provide an indication to the local status file within an average time of 2 seconds and a maximum time of 10 seconds.				TVRTM Requirement Item 2066
5003	3.2.1.1.4.2.3	The WMSCR shall collect the certification test data, diagnostic test data, monitored parameter data, or facility data for a single performance data report within an average time of 50 seconds and a maximum time of 4 minutes.				TVRTM Requirement Item 2066
5004	3.2.1.1.4.2.3	The performance data report shall be available in the local status file.				TVRTM Requirement Item 2066

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NAS-SS-1000 VOLUME V REQUIREMENTS						
ITEM#	Para. #	DESCRIPTION	V M	NAS QUAL STATUS	C/NC	REMARKS •Para REF to FAA-E- 2764c
5005	3.2.1.1.4.2.7	The WMSCR shall provide a positive indication of status for all subsystem operating modes that is derived from subsystem performance monitors.				TVRTM Requirement Item 2066

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APPENDIX B

SAMPLE FORMS

TEST CONDUCT LOG

SITE: ___ LEESBURG,VA ___ ATLANTA, GA ___ SALT LAKE CITY, UT

DEVICE/POSITION: _____ PAGE _____ of _____

TEST: _____ DATE: _____ / _____ / _____

TIME: _____

PROCEDURE STEP/ PAGE _____

ACTION OUTPUT PRODUCED _____

OBSERVATIONS NOTED _____

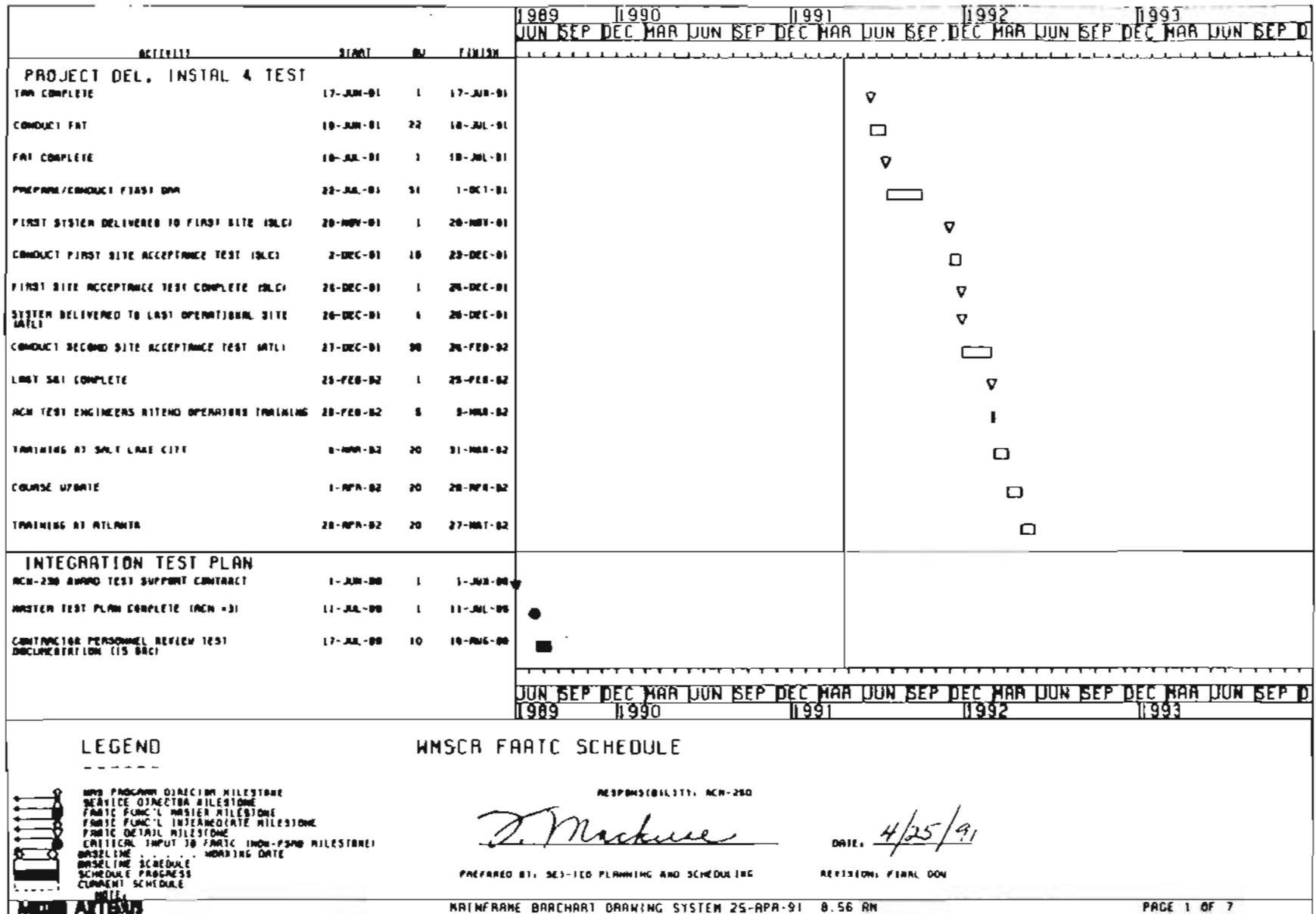
TEST MANAGER _____

PLEASE TYPE	PROGRAM TECHNICAL REPORT										<input type="checkbox"/> DUPLICATE PTR EXISTS	
TYPE OF REPORT	<input type="checkbox"/> TROUBLE	SITE: _____ LEESBURG _____ SALT LAKE CITY									<input type="checkbox"/> IMPROVEMENT	_____ ATLANTA
SUSPECTED SUBPROGRAM											SECTION	
MODEL	VERSION			SYSTEM TAPE ID							PRIORITY	
REFERENCE(S)						ATTACHMENT(S)						
DESCRIPTION OF PROBLEM												
ACTION TAKEN												
ORIGINATOR'S SIGNATURE AND ROUTING SYMBOL												

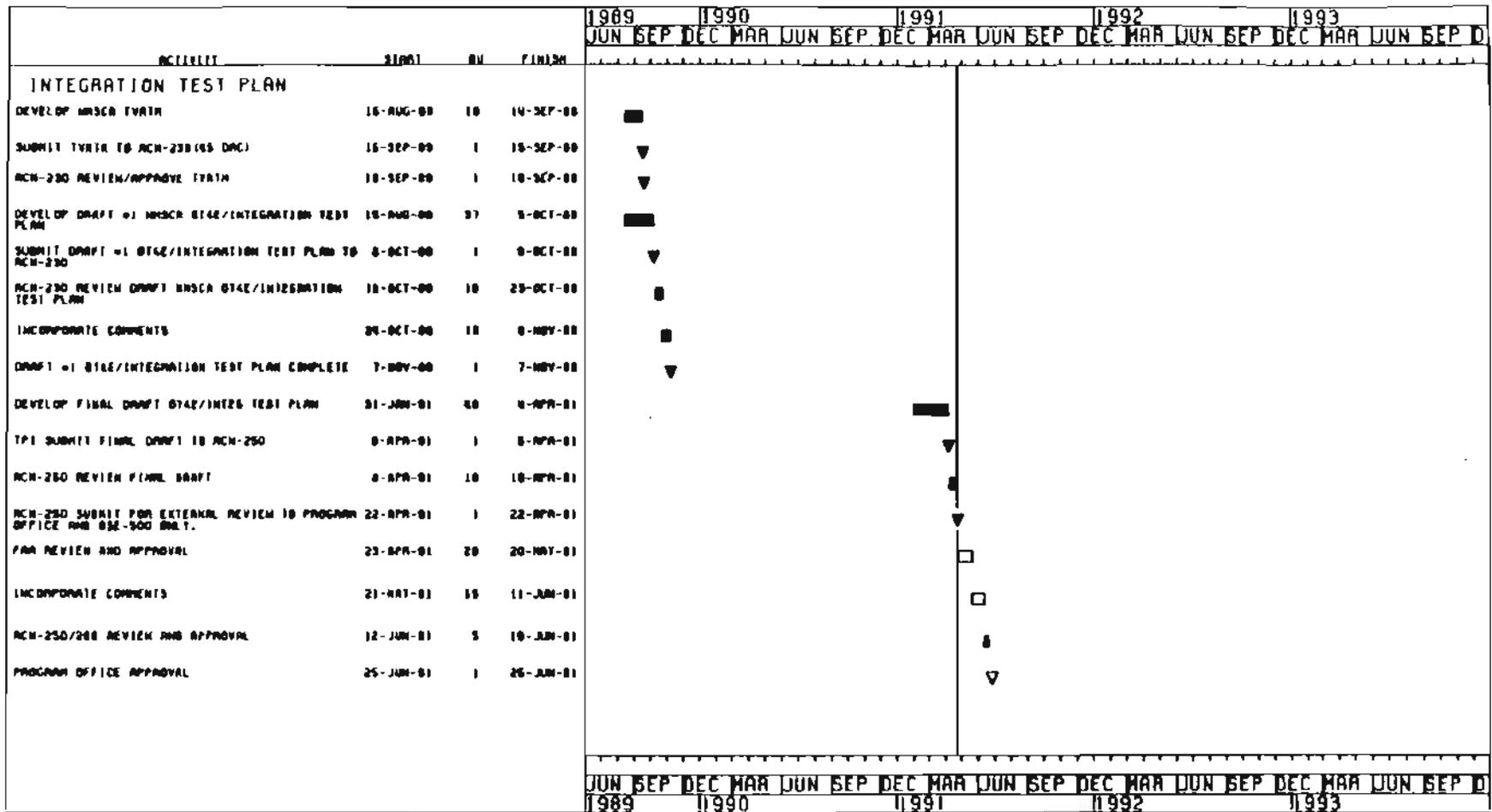
APPENDIX C

WMSCR PROJECT MASTER BASELINE SCHEDULE (PMBS)

C-1



C-2



LEGEND

- WMSCR PROGRAM MILESTONE
- SERVICE DIV ID MILESTONE
- ▼ PARIC FUNC'L MILESTONE
- ◀ PARIC FUNC'L INTERMEDIATE MILESTONE
- PARIC DISTAL MILESTONE
- CRITICAL INPUT TO PARIC IMON-PSAD MILESTONE
- BASELINE SCHEDULE MARKING DATE
- BASELINE SCHEDULE
- SCHEDULE PROGRESS
- CURRENT SCHEDULE

WMSCR FAATC SCHEDULE

RESPONSIBILITY: ACH-250

DATE: _____

PREPARED BY: SEA-1CB PLANNING AND SCHEDULING

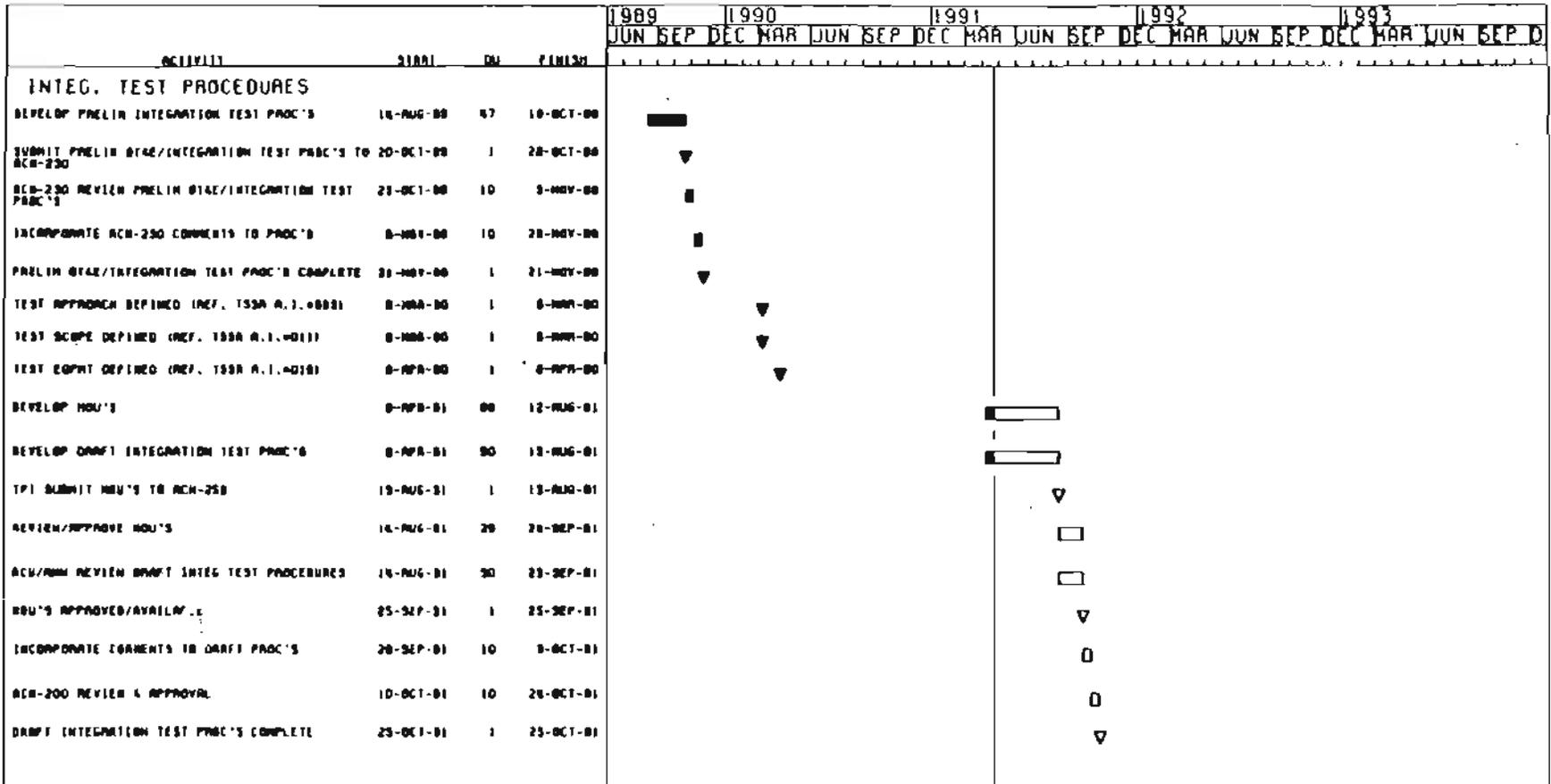
REVISION: FINAL 004

ARTEAS

MAINFRAME BARCHART DRAWING SYSTEM 25-APR-91 8.56 AM

PAGE 2 OF 7

C-3



JUN SEP DEC MAR JUN SEP DEC MAR JUN SEP DEC MAR JUN SEP DEC MAR JUN SEP O
 1989 1990 1991 1992 1993

LEGEND

- HAS PROGRAM DIRECTION MILESTONE
- SERVICE DIRECTION MILESTONE
- FRATIC PLM-1 MASTER MILESTONE
- FRATIC PLM-1 INTERMEDIATE MILESTONE
- FRATIC DETAIL MILESTONE
- CRITICAL INPUT TO FRATIC (NON-PSND MILESTONE)
- BASELINE WORKING DATE
- █ BASELINE SCHEDULE
- █ SCHEDULE PROGRESS
- █ CURRENT SCHEDULE

WMSCR FRATIC SCHEDULE

RESPONSIBILITY: ACM-250

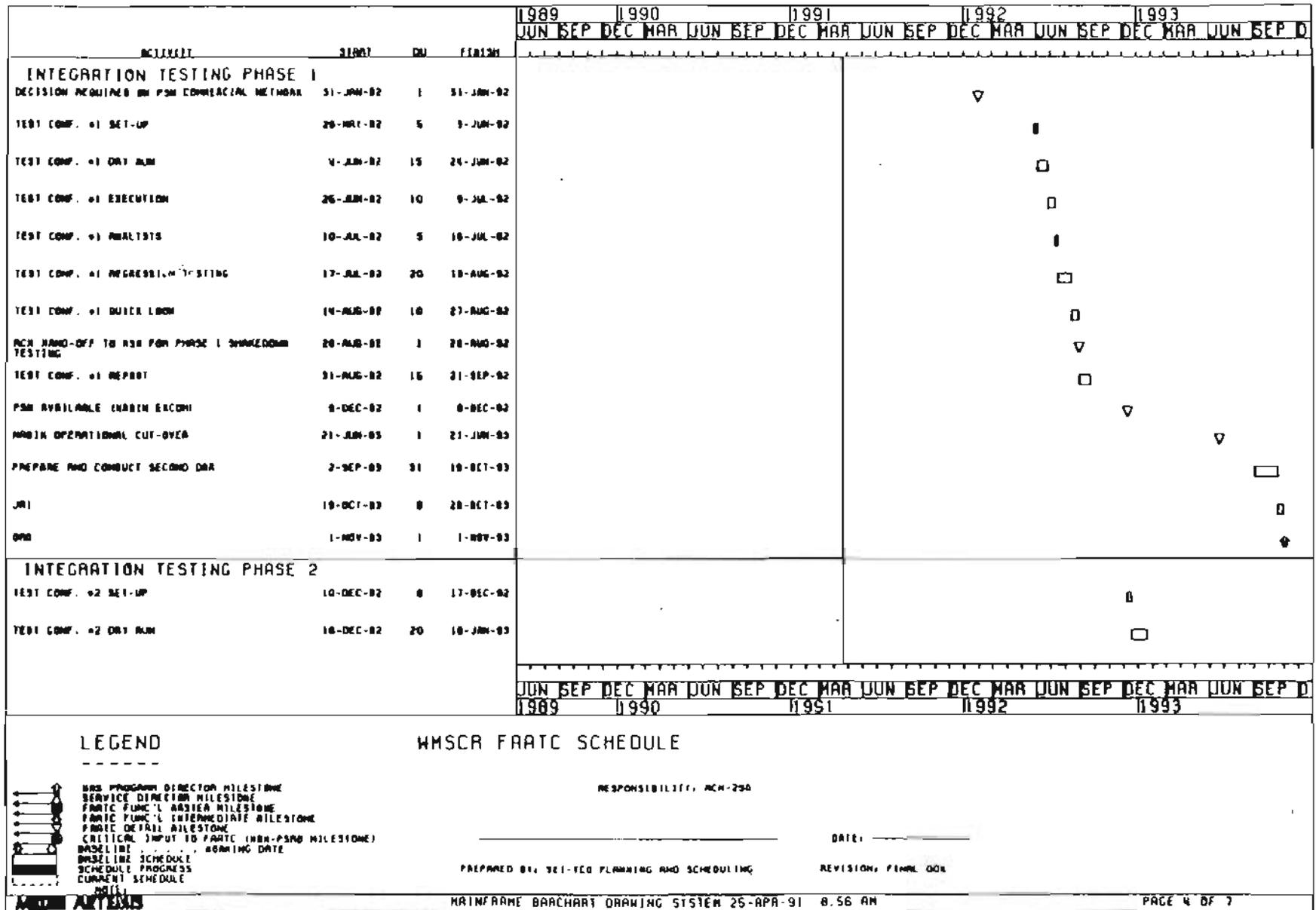
DATE: _____

PREPARED BY: SET-ICD PLANNING AND SCHEDULING REVISOR: FINAL DOK

MAINFRAME BARCHART DRAWING SYSTEM 25-APR-91 0.56 AM

PAGE 3 OF 7

C-4



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ACTIVITY	START	DU	FINISH	1989				1990				1991				1992				1993			
				JUN	SEP	DEC	MAR																
INTEGRATION TESTING PHASE 2																							
TEST CONF. #2 EXECUTION	20-JAN-83	10	2-FEB-83																				□
TEST CONF. #2 ANALYSIS	5-FEB-83	5	8-FEB-83																				■
TEST CONF. #2 QUICK LOOK	10-FEB-83	5	17-FEB-83																				□
TEST CONF. #3 SET-UP	10-FEB-83	10	24-FEB-83																				□
TEST CONF. #3 DRT RUN	25-FEB-83	5	5-MAR-83																				■
TEST CONF. #3 REPORT	10-FEB-83	15	10-MAR-83																				□
TEST CONF. #3 EXECUTION	6-MAR-83	5	10-MAR-83																				■
TEST CONF. #3 ANALYSIS	11-MAR-83	3	15-MAR-83																				■
TEST CONF. #4 SET-UP	18-MAR-83	3	18-MAR-83																				■
TEST CONF. #4 DRT RUN	18-MAR-83	3	23-MAR-83																				■
TEST CONF. #4 EXECUTION	24-MAR-83	3	28-MAR-83																				■
TEST CONF. #3 QUICK LOOK	18-MAR-83	10	28-MAR-83																				□
TEST CONF. #4 ANALYSIS	28-MAR-83	1	28-MAR-83																				▽
TEST CONF. #4 QUICK LOOK	30-MAR-83	5	5-APR-83																				■
TEST CONF. #5 SET-UP	30-MAR-83	10	12-APR-83																				□

LEGEND

- MIS PROGRAM DIRECTOR MILESTONE
- SERVICE DIRECTOR MILESTONE
- ◐ BASIC PLAN'L MILESTONE
- ◑ BASIC PLAN'L INTERMEDIATE MILESTONE
- ◒ BASIC DETAIL MILESTONE
- ◓ CRITICAL INPUT TO PARTC (NON-PSAB MILESTONE)
- BASELINE WORKING DATE
- ▣ BASELINE SCHEDULE
- ▤ SCHEDULE PROGRESS
- ▥ CURRENT SCHEDULE
- ▧ NOTE

WMSCR PARTC SCHEDULE

RESPONSIBILITY: RCH-250

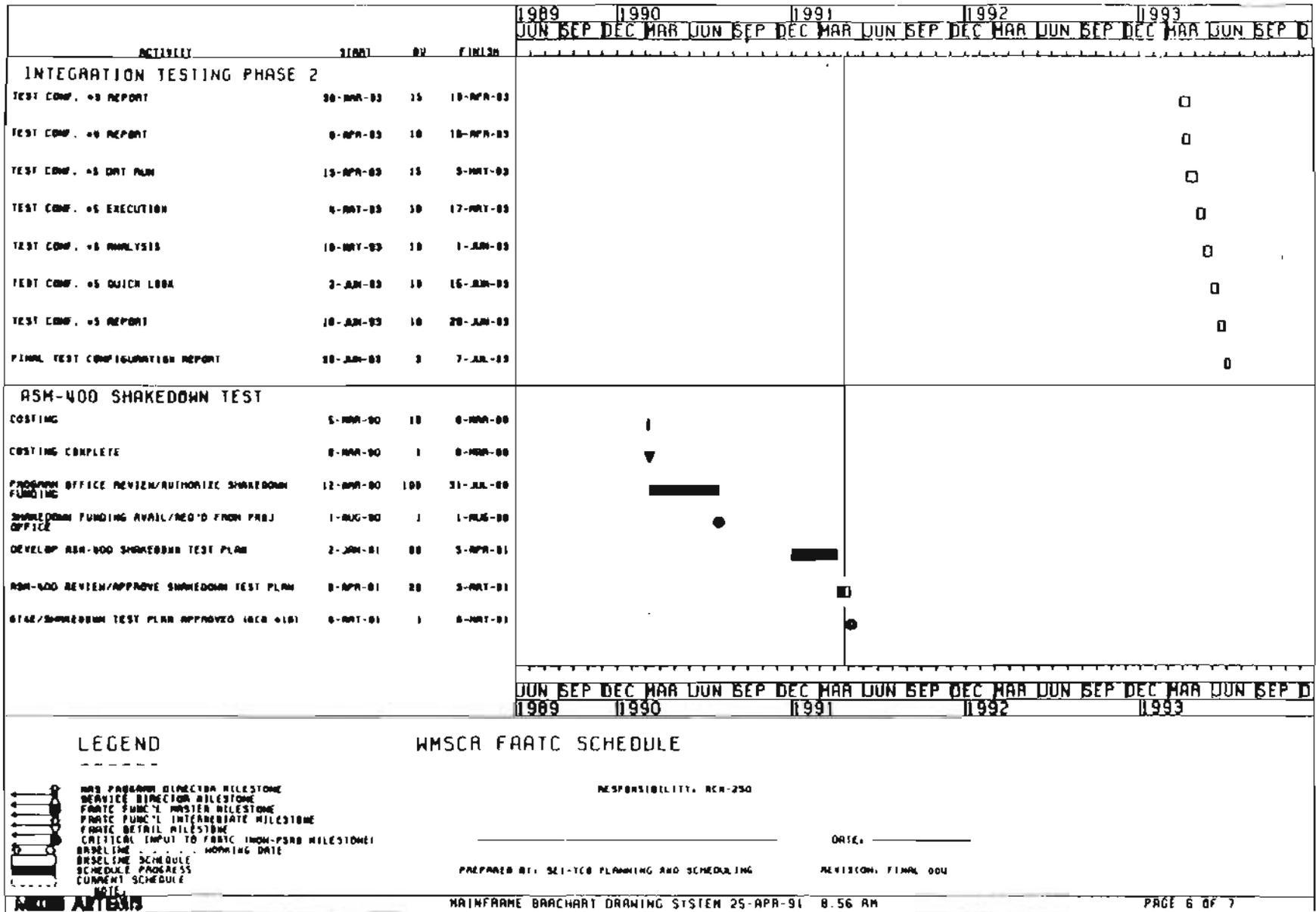
DATE: _____

PREPARED BY: SET-TCO PLANNING AND SCHEDULING

REVISION: FINAL 004

ARTIS

C-6



NEW ARTS

APPENDIX D
GLOSSARY OF TERMS

Addresses - A special sequence set of bits or characters assigned to a specific terminal within a communications network, or on a multiterminal circuit, for the purpose of routing messages to a specific destination(s).

Analysis - This method of verification consists of comparing hardware or software design with known scientific and technical principles, procedures, and practices to estimate the capability of the proposed design to meet the mission and system requirements (NAS-SS-1000, Vol 1).

Application Data Unit - The Application Data Unit (ADU) is the data unit associated with the highest layer of the (ISO/OSI) model. It consists of the presentation layer (or next lower layer) and the application header.

Application Layer - Layer 7 of the OSI model. Provides access to the OSI environment for users and also provides distributed data processing services.

Asynchronous User - Asynchronous users are a group of WMSCR subscribers connected via a protocol converter located at each of the NADIN II packet network nodes. These users consist of airlines and commercial subscribers of the "604" service. Each asynchronous subscriber receives data in 7-bit ASCII code with parity in asynchronous format (one start bit and one stop bit). The asynchronous protocol is output-only with no error-checking protocol.

Circuit - A communications pathway between two systems or subscribers. A circuit can be a physical pathway consisting of copper wire, microwave equipment, and the like. It can be a conceptual entity representing the pathway over a communication utility such as a packet switch network.

Data Circuit-Terminating Equipment - (DCE) In a data station, the equipment that provides the signal conversion and coding between the data terminal equipment (DTE) and the line. The DCE may be separate equipment or an integral part of the DTE or of intermediate equipment.

Data Link Layer - Layer 2 of the OSI model. Provides for the reliable transfer of information across the physical link. Sends blocks of data (frames) with the necessary synchronization, error control, and flow control.

Data Terminal Equipment - (DTE) That part of a data station that serves as a data source, data sink, or both.

Dedicated Link - A connection between two systems that is dedicated to that purpose. This is as opposed to a link that uses a communications utility such as the NADIN II packet switch network.

Demonstration - If a requirement is validated by test during first article qualification testing and the requirements has enough significance that it is "retested" during acceptance test. When this acceptance testing can be indicated in the Verification Requirement Traceability Matrix (VRTM) as a demonstration. In general, software functional requirements are validated by demonstration since the functionality must be observed through some secondary media.

External Interfaces - Interfaces between the NAS and systems and subsystems outside the NAS (NAS-SS-1000, Vol 1).

FCM-S2 Format - Federal coordinator for Meteorologist Services and Supporting Research, standard formats for weather data exchange among automated weather information systems. The Weather Message Switching Center Replacement (WMSCR) will handle vector graphics using FCM-S2 formats.

Functional Interface - Interfaces which interact across non-material boundaries and are described in terms of information transfer characteristics described in the International Standards Organization/Open System Interconnect (ISO/OSI), Seven Layer Model, (NAS-SS-1000, Vol 1).

Functional Requirement - Type of requirement that describes what the system must do to satisfy the operational requirements. A functional requirement must have an action verb and should have well defined inputs and outputs (NAS-SS-1000, Vol 1).

Header - The initial part of a product which contains fields that define the contents. Both World Meteorological Organization (WMO) and International Civil Aviation Organization (ICAO) formatted messages have headers.

Inspection - Inspection is a method of verification to determine compliance without the use of special laboratory appliances, procedures, or services, and consists of nondestructive static-state examination of the hardware, software, and/or technical data documentation (NAS-SS-1000, Vol 1).

Interface - A common functional and/or physical boundary where hardware/ software personnel interact (i.e., hardware end item with personnel) (NAS-SS-100, Vol 1).

Interface Control Documents - ICDs shall specify and control the design of interfaces between subsystems (NAS-SS-100, Vol 1).

Interface Requirement Documents - IRDs shall specify and control the requirements for interfaces between subsystems (NAS-SS-1000, Vol 1).

ISO/OSI Model - The ISO/OSI model is a seven-layer organizational mechanism for defining the procedures and formats for data exchange between two interconnecting systems.

Man-Machine Interface - Interfaces that encompass man-man/man-machine interaction involved in the command, control, operation, and maintenance of subsystems or end items (NAS-SS-1000, Vol 1).

Network Layer - A specific interface level in the design of a network architecture provided by a set of operating procedures (protocols) based on a design standard, that will support compatibility between equipment providing data communications and information transfer services between two or more data terminal equipments and two or more data communications equipments.

Operational Effectiveness - Operational effectiveness is the degree of successful accomplishment in meeting operational and technical requirements of a subsystem used by representative operational personnel. This is evaluated in the context of the organization, doctrine, tactics, and environment anticipated for the planned operational employment of the subsystem.

Operational Interface - Type of interface which interacts across a system boundary and defines the information and services exchanged. Operational interfaces are specified as part of the operational requirements and in the development of operations concept (NAS-SS-1000, Vol 1).

Operational Requirement - Type of requirement that qualifies and quantifies the services and products which must be provided to NAS users and NAS specialists. Operational requirements should be directly related to the NAS mission and may be impacted by a predetermined operations concept (NAS-SS-1000, Vol 1).

Operational Suitability - Operational suitability is the capability of a subsystem to be satisfactorily integrated and employed for field use. Considerations are given to subsystem operation by field personnel for compatibility, reliability, human performance factors, maintenance and logistics support, safety, and training requirements.

Operational Test and Evaluation (OT&E) - OT&E is test and evaluation conducted to evaluate the subsystem operational effectiveness and suitability including compatibility, interoperability, degraded operations, survivability, maintainability, and supportability. The OT&E also identifies deficiencies in NAS hardware, software human performance factors, or operational concepts. It encompasses an interactive process of risk reduction demonstrations and analysis and assures that NAS functionality as it existed prior to installation of a new subsystem is not degraded.

Physical Layer - Layer 1 of the OS model. Concerned with transmission of unstructured bit stream over physical medium. Deals with the mechanical, electrical, functional, and procedural characteristics of accessing the medium.

Presentation Layer - Layer 6 of the OSI model. Provides independence to the application processes from differences in data representation (syntax).

Session Layer - Layer 5 of the OSI model. Provides the control structure for communication between applications. Establishes, manages, and terminates connections (sessions) between cooperating applications.

System Level - This level of verification is conducted at the FAA Technical Center or key site. The verification will determine if the hardware to be deployed for site installation will perform in a NAS environment and in accordance with the NAS System Level Operational and Functional Requirements.

Transport Layer - Layer 4 of the OSI model. Provides reliable, transparent transfer of data between end points. Provides end-to-end error recovery and flow control.

WMO Format - A format for the exchange of alphanumeric information.

X.25 - A standard defining procedures in the lower three layers of the ISO/OSI model. These standards are used by the NADIN II Packet Network.

