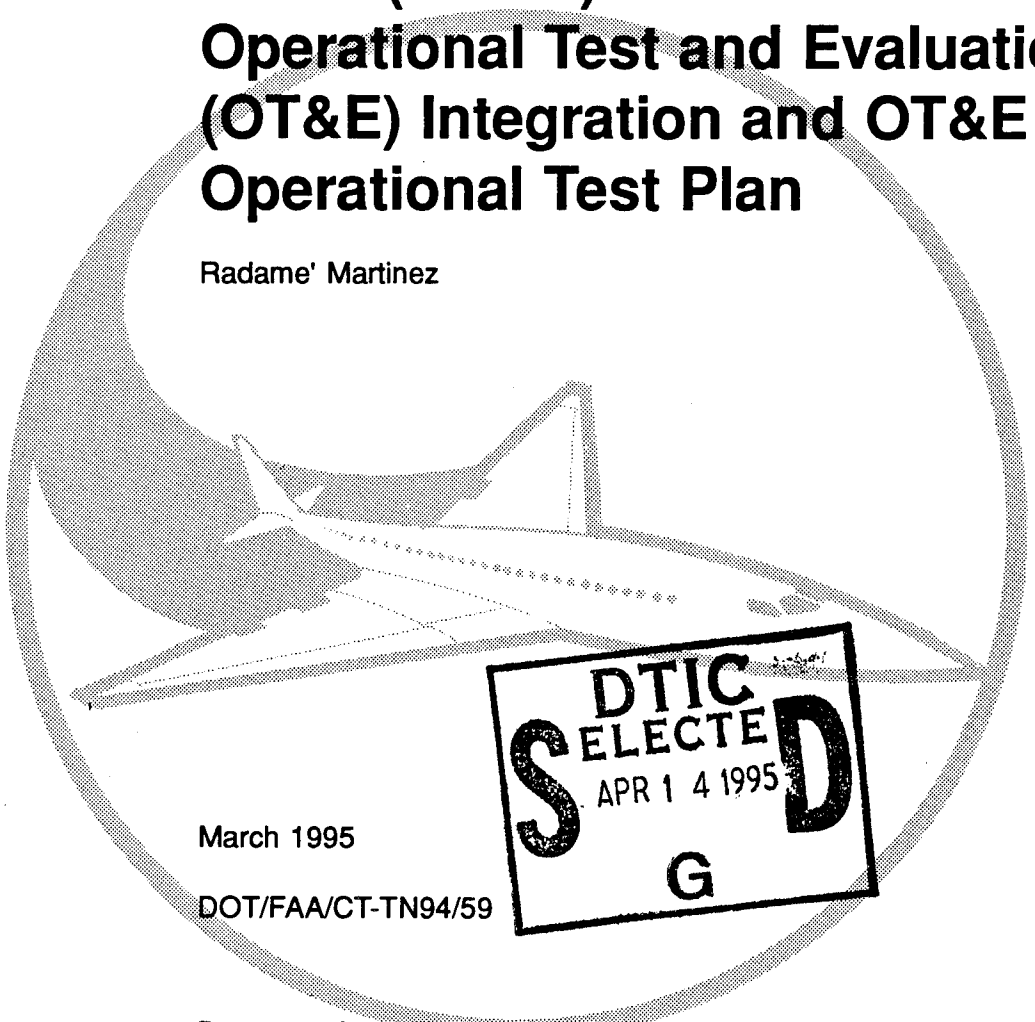
te technical note techn

Terminal Doppler Weather Radar (TDWR) Build 5B Operational Test and Evaluation (OT&E) Integration and OT&E Operational Test Plan

Radame' Martinez



DTIC
SELECTED
APR 14 1995
G

March 1995

DOT/FAA/CT-TN94/59

Document is on file at the Technical Center Library,
Atlantic City International Airport, N.J. 08405

U.S. Department of Transportation
Federal Aviation Administration
Technical Center
Atlantic City Airport, NJ 08405

DTIC QUALITY INSPECTED 5

19950413 043

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

NOTICE

This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for the contents or use thereof.

The United States Government does not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the objective of this report.

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT/FAA/CT-TN94/59		

4. Title and Subtitle	5. Report Date
Terminal Doppler Weather Radar (TDWR) Build 5B Operational Test and Evaluation (OT&E) Integration and OT&E Operational Test Plan	March 1995
	6. Performing Organization Code
7. Author(s) Radame Martinez, ACW-200; Steven Viveiros, SAIC; Donne Wedge, SAIC; Peter Guthlein, DI	8. Performing Organization Report No. DOT/FAA/CT-TN94/59
9. Performing Organization Name and Address U.S. Department of Transportation Federal Aviation Administration FAA Technical Center Atlantic City International Airport, NJ 08405	10. Work Unit No. (TRAIS)
	11. Contract or Grant No.
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address U.S. Department of Transportation Federal Aviation Administration FAA Technical Center Atlantic City International Airport, NJ 08405	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The Terminal Doppler Weather Radar (TDWR) Build 5B Enhancement Operational Test and Evaluation (OT&E) Integration and OT&E Operational Test Plan provides the overall philosophy and approach to Build 5B OT&E testing, and identifies OT&E objectives, responsibilities, and resources.

The TDWR Build 5B Enhancement provides connectivity to the Low Level Wind Shear Alert System (LLWAS) III to display LLWAS III data along with TDWR hazardous weather data on TDWR Geographic Situation Displays (GSD) and Ribbon Display Terminals (RDT).

The TDWR Build 5B OT&E is scheduled to occur at the TDWR sites in Denver, CO, November and December 1994, and in Orlando, FL, spring 1995.

17. Key Words	18. Distribution Statement
Terminal Doppler Weather Radar (TDWR) Build 5B Operational Test and Evaluation (OT&E) Low Level Wind Shear Alert System	Document is on file at the Technical Center Library, Atlantic City International Airport, NJ 08405

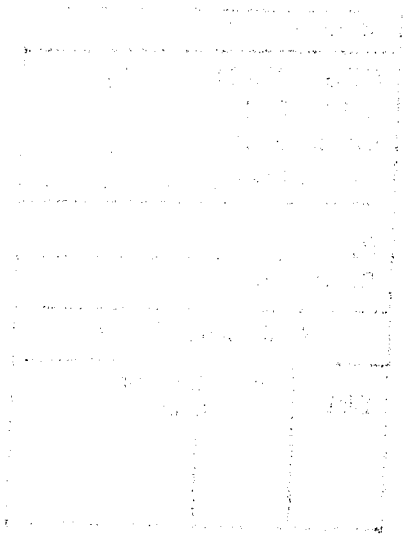
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	60	

TABLE OF CONTENTS

Accesion For
NTIS CRA&I [X]
DTIC TAB [ ]
Unannounced [ ]
Justification per form 50
By
Distribution /
Availability Codes
Dist | Avail and / or Special
A-1

LIST OF ILLUSTRATIONS

LIST OF TABLES



EXECUTIVE SUMMARY

This document presents the Terminal Doppler Weather Radar (TDWR) Build 5B Operational Test and Evaluation (OT&E) Operational and OT&E Integration Test Plan. This test plan is written in accordance with FAA-STD-024a and FAA Order 1810.4B, and provides the overall philosophy and approach to TDWR Build 5B OT&E testing. Plus, this test plan identifies OT&E objectives, responsibilities, and resources.

TDWR Build 5B further enhances Build 5A by adding an interface to the Low Level Wind Shear Alert System Phase III (LLWAS III) to display LLWAS II and/or LLWAS III wind products along with TDWR hazardous weather data on TDWR Geographical Situation Displays (GSD) and Ribbon Display Terminals (RDT). Other Build 5B enhancements include:

1. TDWR/LLWAS III Integration Algorithm,
2. Microburst Shear Integration Algorithm (MSIA),
3. 15-day archiving and archive data playback,
4. Microburst Detection Algorithm (MDA) parameter changes,
5. Programmable alarm timeouts,
6. Enhanced Base Data Display (BDD) capabilities, and
7. Upgraded operating systems (OS) for the Harris (Harris OS 6.1) and SUN work stations (SunOS 4.1.3u1).

TDWR Build 5B OT&E is scheduled to occur at the TDWR site in Denver, CO, from August to September 1994. Additional OT&E will be conducted in Orlando, FL, during spring 1995 to thoroughly evaluate the effectiveness of the MDA parameter changes, MSIA, and TDWR/LLWAS III Integration Algorithm. After successful completion of Build 5B OT&E, the Build 5B enhancements will be installed at an LLWAS II site to verify that Build 5A functionality has not been degraded.

1. INTRODUCTION.

The Terminal Doppler Weather Radar (TDWR) is one project of the National Airspace System (NAS) Plan, whose overall goal is the modernization and improvement of the government systems supporting aviation commerce in the United States. In the end-state of the NAS Plan, the TDWR will send weather product information to air traffic control (ATC) computers at the Tower Control Computer Complex (TCCC). Also, in the end-state, a mechanism will be provided to transmit TDWR hazardous weather information directly to pilots. The end-users of TDWR outputs are local, approach, and departure controllers, their supervisors, and pilots. In the interim NAS, the TDWR product information will be displayed to air traffic specialists; i.e., controllers and controllers' supervisors.

The Build 5 enhancement is intended to enable the TDWR to further meet the goals of the NAS Plan. This will be accomplished by interfacing the TDWR to the Low Level Wind Shear Alert System (LLWAS) and by improving existing TDWR functionality.

The Build 5 enhancement for the TDWR is being implemented in two stages: Build 5A and Build 5B. Build 5B includes all Build 5A enhancements plus several other enhancements, identified in section 1.1. This test plan addresses only that functionality included in Build 5B. In addition, this test plan has been tailored to address only those Operational Test and Evaluation (OT&E) Integration, OT&E Operational, and NAS-SS-1000 requirements not previously verified during baseline and Build 5A OT&E. However, some of the aforementioned requirements will be reverified to ensure baseline performance has not been degraded by the Build 5B enhancements.

OT&E Integration and OT&E Operational testing has been completed on the baseline TDWR system, as well as the Build 5A enhancement. All NAS-SS-1000 requirements successfully verified during previous OT&E will be identified as such in the Test Verification Requirements Traceability Matrix (TVRTM) included in appendix A. Some of these requirements will be verified again to ensure that the baseline system performance has not been degraded.

1.1 BACKGROUND.

Build 5B will provide an interface to the LLWAS Phase II (LLWAS II) and Phase III (LLWAS III). LLWAS II consists of six sensors and a computer system to process wind information. LLWAS III consists of up to 29 sensors and a computer system to process wind information. Build 5B will accept LLWAS II or LLWAS III Center Field Wind (CFW) and runway threshold winds and display them on the TDWR Display Functional Unit (DFU) which is composed of a Geographical Situation Display (GSD) and up to eight Ribbon Display Terminals (RDT). Other Build 5B functionalities include:

a. TDWR/LLWAS III Integration Algorithm;

b. Microburst Shear Integration Algorithm (MSIA);

c. 15-Day archiving and archive data playback;

d. Microburst Detection Algorithm (MDA) parameter changes;

1. Minimum divergence segments of 4,
2. Minimum alarm segments of 5,
3. Minimum alarm delta v of 10 m/s,
4. Minimum storm top altitude of 1.5 km,
5. Minimum storm cell area of 2 mi^2,
6. Storm overlap test (dry cell),
7. Storm centroid distance of 3 km;

e. Programmable alarm timeouts;

f. Enhanced Base Data Display (BDD) capabilities;

g. Upgraded operating systems (OS) for the Harris (Harris OS 6.1) and SUN work stations (SunOS 4.1.3u1).

1.2 TEST PHILOSOPHY.

The Federal Aviation Administration (FAA) conducts OT&E in accordance with FAA Order 1810.4B to evaluate the subsystem operational effectiveness and suitability including compatibility, interoperability, degraded operations, survivability, maintainability, and supportability. OT&E also identifies deficiencies in NAS hardware, software, human performance factors, and/or operational concepts. OT&E consists of three phases: Integration, Operational, and Shakedown. Only OT&E Integration and OT&E Operational phases will be addressed in this test plan. OT&E Shakedown activities will be addressed in the AOS-230 TDWR Build 5B OT&E Shakedown Test Plan. Division of responsibilities for FAA OT&E Integration and OT&E Operational testing are illustrated in figure 1.2-1. Since Build 5B is an enhancement to the TDWR baseline system, only those blocks not shadowed will be evaluated.

1.2.1 OT&E Integration.

OT&E Integration consists of testing NAS System End-to-End performance, specifically, NAS-SS-1000, volume I system level and volumes II through V subsystem level requirements as identified in the TDWR Test and Evaluation Master Plan (TEMP) Verification Requirements Traceability Matrix (VRTM). This testing establishes NAS baseline performance (end-to-end) or verifies that previously existing NAS performance has not been degraded. To the greatest extent possible the subsystem will test in a NAS system equivalent environment.

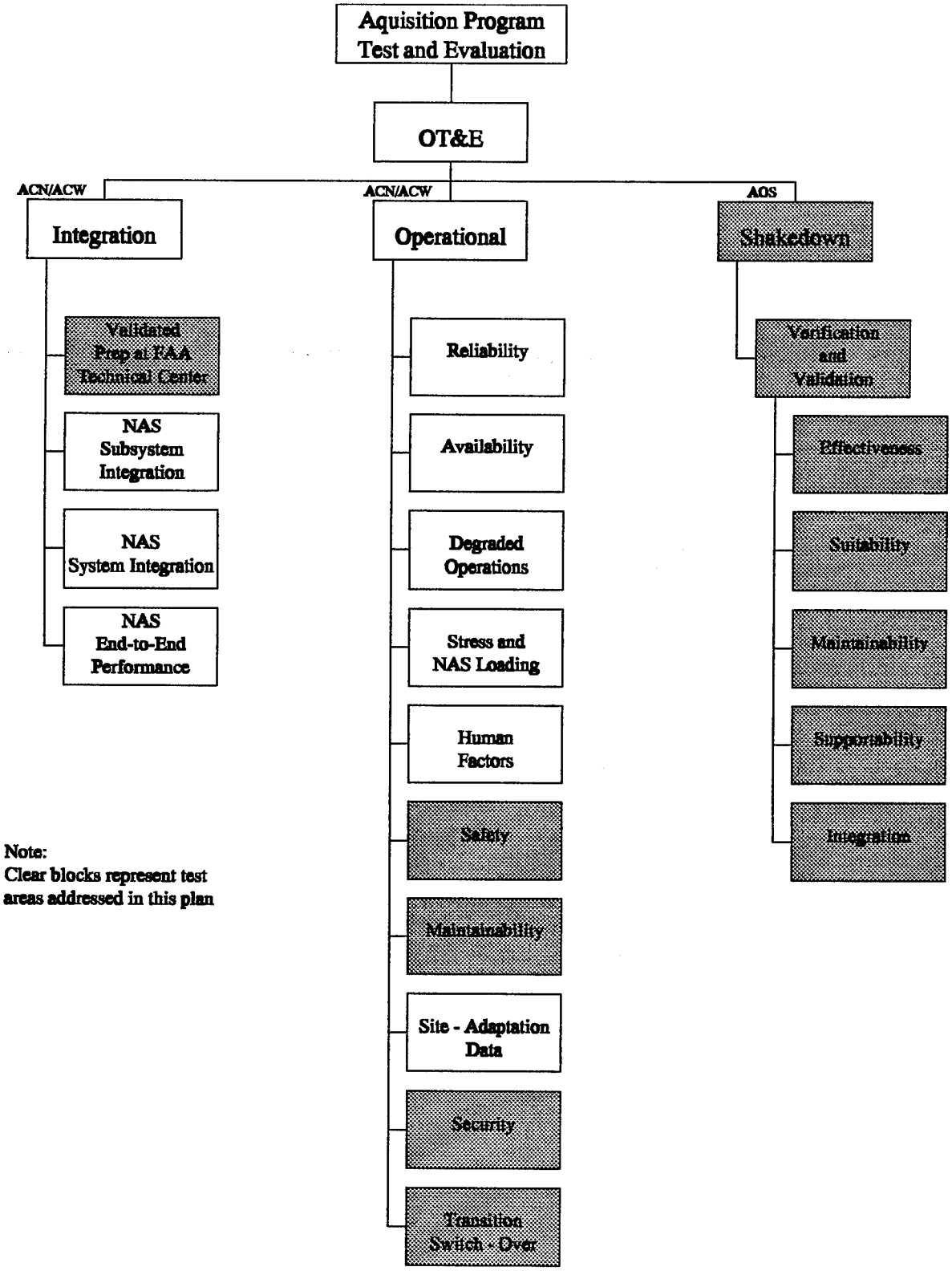


FIGURE 1.2-1. FAA OT&E TEST PHILOSOPHY

OT&E Integration will be conducted at the Denver, CO, TDWR site (DVX) will address and evaluate the readiness of the system for integration and transition into the field. In addition, this activity will evaluate the system performance in critical test areas, test the limits of system performance, and provide operational performance benchmarks.

The OT&E Integration effort is conducted with the following objectives:

a. Verify the TDWR's capability to properly interface and function with the associated NAS subsystems, including hardware, software, operational, and maintenance activities;

b. Ensure the detection of interface design problems;

c. Minimize site problems by comprehensive integration testing and evaluation;

d. Verify the requirements of the NAS System Specification.

1.2.2 OT&E Operational Testing.

OT&E Operational testing is to verify the operational effectiveness and suitability of the equipment with user's participation. Aspects of this testing are as follows:

a. Reliability and availability;

b. Degraded operations and operational utilization scenarios;

c. Stress and NAS loading testing of all interoperable subsystems;

d. Human factors;

e. Site-adaptation;

f. Weather Detection Performance.

OT&E Operational testing employs system users to assess operational suitability and effectiveness of the subsystem in the NAS environment. Testing will be conducted at DVX in accordance with established OT&E requirements. This testing will evaluate system functions, data entry and display devices, Human Engineering, Computer-Human Interface, training, training documentation for ATC operations, systems maintenance, and support operations. Test will be structured in a building block fashion starting with an evaluation of basic functions and operations, and progressing to evaluations during complex integrated operations.

The OT&E Operational test objectives are:

a. Verification and validation of the operational requirements;

b. Evaluation and determination of the effect of the segment under test on the operational mission;

c. Identification and evaluation of the safety factors involved during transition and determination that transition can be achieved safely;

d. Evaluation of the subsystem's operations and maintenance with respect to the variations in site configuration and adaptation;

e. Assessment of the subsystem's capability to support current and future modifications.

1.2.2.1 Reliability and Availability.

OT&E will be conducted to verify that Build 5B does not degrade diagnostics accuracy, Mean Time Between Failure (MTBF), and Mean Time Between Critical Failure (MTBCF).

1.2.2.2 Degraded Operations.

This test is conducted to determine the acceptability of the resultant operational degradation when failures are induced in the system. This includes validation of shutdown procedures, startup procedures, degraded operations procedures, and operational impact of the data preservation function upon recovery.

1.2.2.3 Stress and NAS Loading.

This test estimates the levels of stress and NAS loading provided by the operational environment.

1.2.2.4 Human Factors.

This test estimates the degree of accommodation to which the interaction of personnel with the system in the operational environment is needed. Test and evaluation (T&E) should explore such factors as the physical interaction of personnel with a system, interactions with procedures, workloads, and operational environments.

1.2.2.5 Site Adaptation.

This test ensures that site data unique to each applicable NAS facility has been correctly developed, updated, and installed in the system.

1.3 PURPOSE OF TEST PLAN.

The purpose of this plan is to ensure that comprehensive OT&E Integration and OT&E Operational testing is conducted. This plan describes the test program, identifies organizational responsibilities, and provides a basis for the development of OT&E Integration and OT&E Operational test procedures.

1.4 SCOPE OF TEST PLAN.

This plan provides for comprehensive testing of the Build 5B enhancement to the current TDWR system to ensure it satisfies user and NAS requirements. It describes the OT&E Integration and OT&E Operational test processes for ensuring this enhancement meets applicable subsystem/system requirements allocated in NAS-SS-1000, volumes I, III, and V.

1.5 DOCUMENT OVERVIEW/ORGANIZATION.

This paragraph describes each section of the test plan.

Section 1: Introduction. This section provides an introduction to the TDWR Build 5B OT&E Integration and OT&E Operational Test Plan. In addition, it provides the purpose and scope of the test plan.

Section 2: Documents. All documents directly referenced in the plan and all other documents related to this plan are listed in this section.

Section 3: System Description. This section provides a brief system overview including a block diagram. It also identifies the current and future interfaces.

Section 4: Test Program Description. This section describes the OT&E approach and concept, test environment, and test descriptions.

Section 5: Test Management. This section defines the roles and responsibilities, training, test conduct, test reports, schedules, and personnel resource requirements.

Section 6: Acronyms and Abbreviations. All acronyms and abbreviations used throughout this document will be listed in this section.

Appendix A: This appendix is a detailed TVRTM.

Appendix B: A detailed Build 5B Test Schedule is presented in this appendix.

2. DOCUMENTS.

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

2.1 REFERENCED DOCUMENTS.

FAA-E-2806/1	TDWR Specification, November 12, 1992, with Specification Change Notice (SCN) 1, January 2, 1993.
NAS-SS-1000	NAS System Specification, Volume I, Functional and Performance Requirements for the National Airspace System General, October 1992.
NAS-SS-1000	NAS System Specification, Volume III, Functional and Performance Requirements for the Ground-to-Air Element, February 1993.
NAS-SS-1000	NAS System Specification, Volume V, Functional and Performance Requirements for the National Airspace System Maintenance and Operations Support Element, October 1992.
NAS-IR-31023105 Part 2, Rev. A	LLWAS Phase II to TDWR Interface Requirements Document (IRD).
NAS-IR-31023105 Part 1, Rev. C	LLWAS Phase III to TDWR IRD, December 7, 1993
NAS-IC-31055103-00	TDWR Remote Monitoring Subsystem (RMS)/Maintenance Processor Subsystem (MPS) Interface Control Document (ICD).
NAS-IC-31055104-00	TDWR/Maintenance Data Terminal (MDT) ICD.
NAS-IC-31052201-00	TDWR/Tower Control Computer Complex (TCCC) ICD.
FAA-STD-024a	Preparation of Test and Evaluation Documentation, August 17, 1987.
No. 1810.4B	FAA NAS Test and Evaluation Policy, October 22, 1992.

2.2 BACKGROUND DOCUMENTS.

TDWR TEMP	TDWR Build 5 Enhancement Test and Evaluation Master Plan (TEMP), November 1993.
NAS-MD-110	Test and Evaluation (T&E) Terms and Definitions for the NAS, March 27, 1987.

NAS-MD-790	Remote Maintenance Monitoring System Interface Control Document Maintenance Processor Subsystem to Remote Monitoring Subsystem Concentrators, June 10, 1986.
NAS-MD-793	Remote Maintenance Monitoring System Functional Requirements for the Remote Monitoring Subsystem (RMS), June 10, 1986.
D001-Bld5-2	TDWR Contractor's Master Test Plan (CMTP) Build 5 Addendum, January 12, 1993.
B022-Bld5-1A	Build 5 Software Requirements Specification Radar Product Generation (RPG) Software, CSCI-2 CGG551591, Revision A, November 19, 1992.
B022-Bld5-2B	Build 5 Software Requirements Specification RMS Software, CSCI-3 CGG551592, Revision B, June 30, 1993.
B022-Bld5-3B	Build 5 Software Requirements Specification Display Computer (DPL) Software, CSCI-4 CGG551594, Revision B, June 24, 1993.

3. SYSTEM DESCRIPTION.

The primary goal of the TDWR is to enhance the safety of air travel through the timely detection and reporting of hazardous wind shear in and near the terminal approach and departure zones of an airport. Specific sources of hazardous wind shear to be detected are microbursts and gust fronts. The secondary goal of the TDWR is to improve the management of air traffic in the terminal area through the forecast of gust front induced wind shifts at the airport, as well as detection of precipitation.

3.1 SYSTEM OVERVIEW.

3.1.1 Equipment Description.

The TDWR can be functionally divided into three subsystems: Radar Data Acquisition (RDA), Radar Product Generation/Remote Monitoring Subsystem (RPG/RMS), and the DFU.

The RDA function performs the radar data collection, detection, signal processing, clutter suppression, control monitoring, and error detection subfunctions for the TDWR system. The RDA consists of the Antenna Group (ANT) which includes the Radome, Pedestal Assembly, Tower Assembly, Reflector Assembly, Servo Control Unit (SCU), and Moving Target Simulator (MTS). The RDA also includes the microwave pallet and redundant Transmitters (XMT), Receiver/Exciters (REX), and Digital Signal Processors (DSP).

The RPG/RMS functions process moment/dwell data from the RDA, exchange control and status signals with the RDA, transmit data to the DFU, and provide the interfaces to LLWAS II/III, RMMS/MDT, and TCCC.

The DFU equipment consists of a GSD for viewing weather products, and from zero to eight alphanumeric RDT for viewing alert messages. GSD capabilities also include range scale selection, recentering of displayed products, selection of runway configuration, and archiving of weather products.

3.1.2 Equipment Architecture.

The TDWR system is configured into Hardware Configuration Items (HWCI) and Computer Software Configuration Items (CSCI). A TDWR HWCI and CSCI block diagram is included in figure 3.1.2-1.

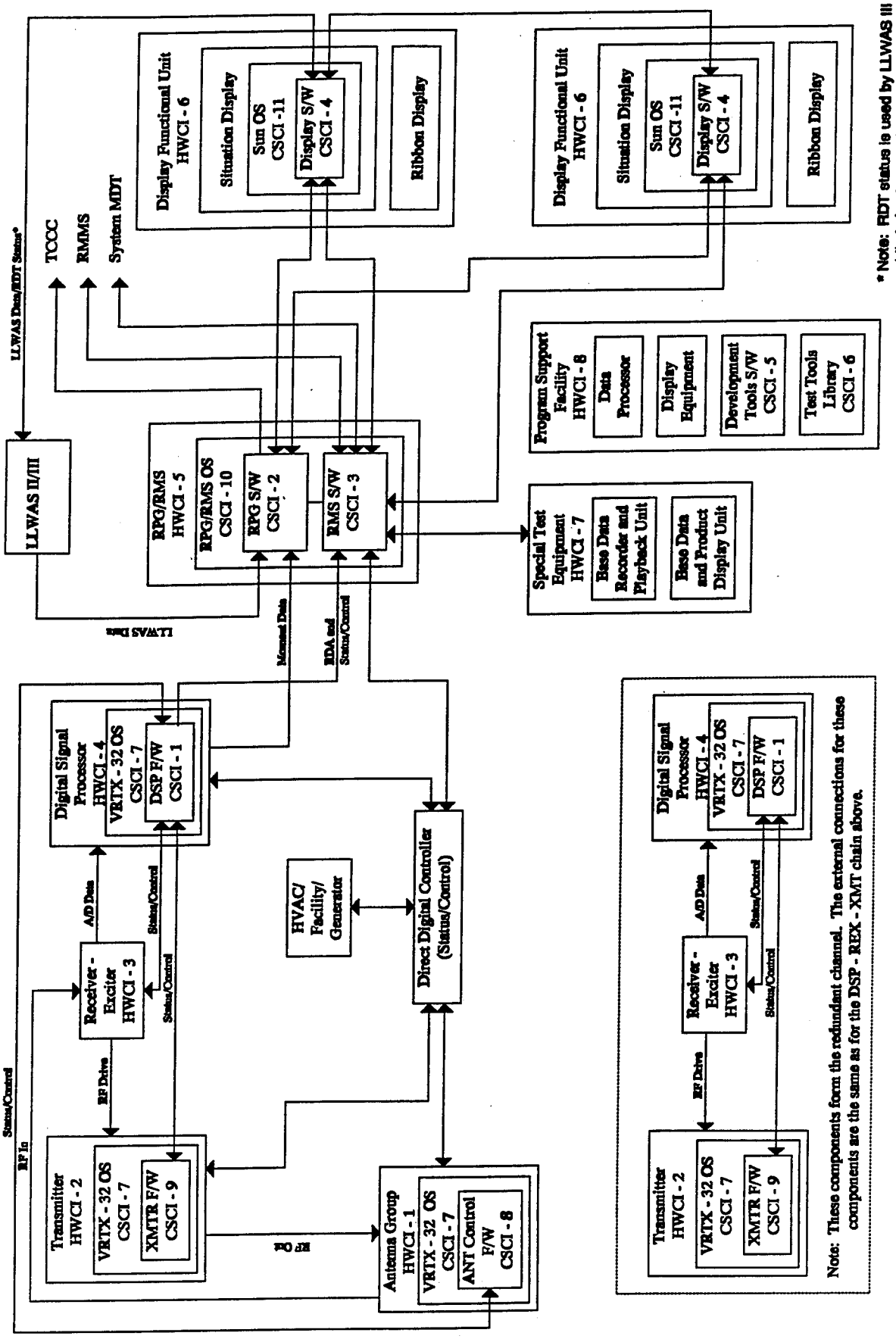


Figure 3.1.2-1 HWCI/CSCI Diagram

The software consists of operational and nonoperational software. Operational software consists of operating systems (which are Commercial-Off-the-Shelf (COTS) products), application software Computer Software Configuration Item(s) (CSCI), and firmware CSCIs. The commercial operating systems are VRTX-32 Operating System (CSCI-7) for the 68020 single board computers, the Data Processing Operating System (CSCI-10) for the RPG/RMS, and the Display System Operating System (CSCI-11) for the DFU. Nonoperational software which is not part of TDWR site installations consists of the Software Development Tools (CSCI-5) and the Test Tools Library (CSCI-6).

The HWCIs consist of the following:

a. Antenna Group (ANT) HWCI-1
b. Transmitter (XMT) HWCI-2
c. Receiver-Exciter (REX) HWCI-3
d. Digital Signal Processor (DSP) HWCI-4
e. Radar Product Generator/Remote Monitoring Subsystem (RPG/RMS) HWCI-5
f. Display Functional Unit (DFU) HWCI-6
g. Special Test Equipment (SPT) HWCI-7
h. Program Support Facility (PSF) HWCI-8

The CSCIs consist of the following:

A. Operational Software

1. Application Software

a. Digital Signal Processor (DSP) CSCI-1
b. Radar Product Generator (RPG) CSCI-2
c. Remote Monitoring Subsystem (RMS) CSCI-3
d. Display Computer (DPL) CSCI-4
e. Antenna Control (ANT) CSCI-8 (Firmware)
f. Transmitter Control (XMT) CSCI-9 (Firmware)

2. Operating Systems

a. VRTX-32 Operating System (VTX) CSCI-7
b. Data Processing Operating System (DPO) CSCI-10
c. Display System Operating System (UNIX_UNX) CSCI-11

B. Nonoperational Software

1. Software Development Tools (SDT) CSCI-5
2. Test Tools Library (TTL) CSCI-6

3.2 INTERFACES.

Build 5B will provide external interfaces to LLWAS II/III, Remote Maintenance Monitoring Subsystem (RMMS), Maintenance Data Terminal (MDT), and Tower Computer Control Complex (TCCC). These interfaces are shown in figure 3.2-1.

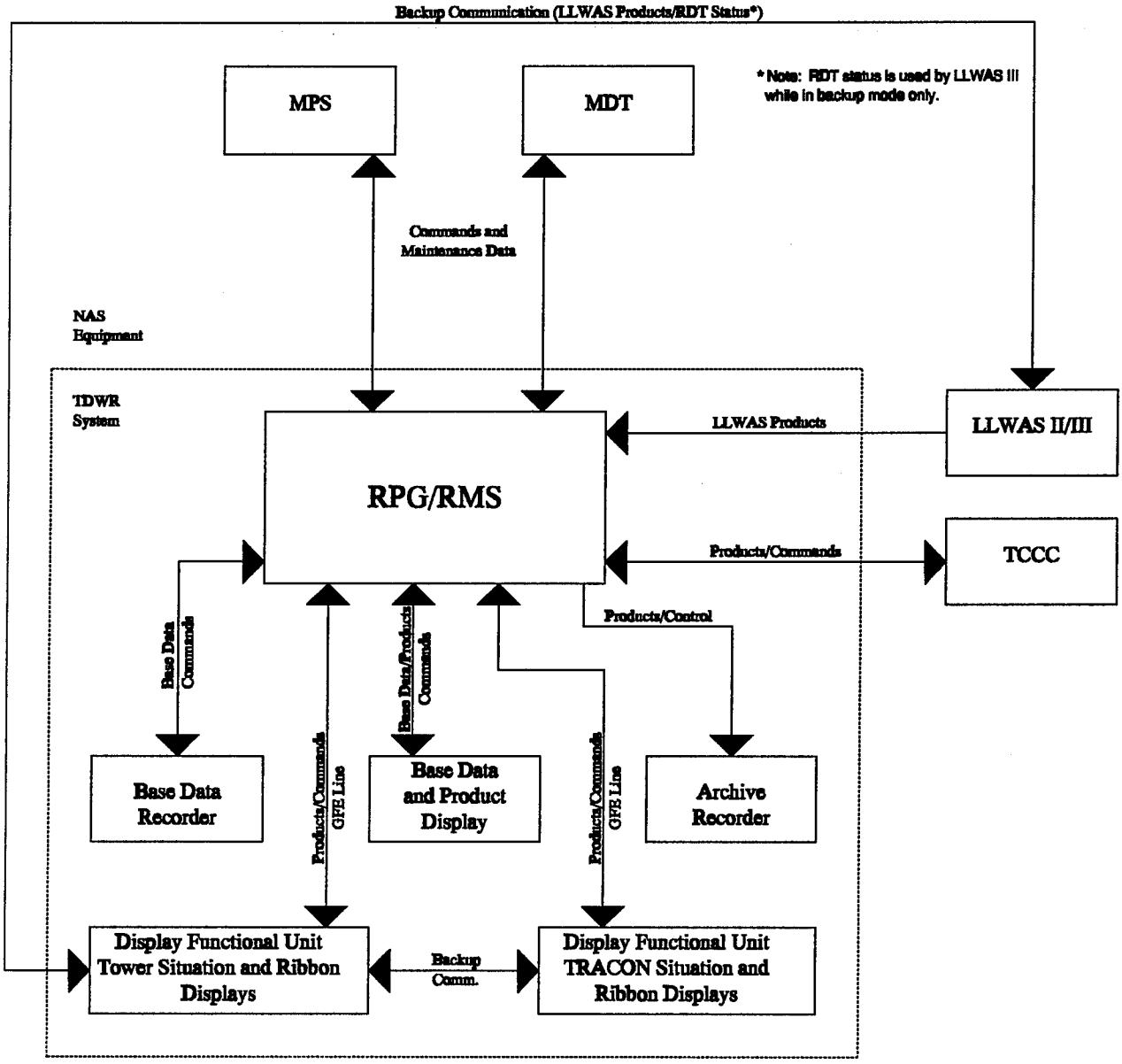


FIGURE 3.2-1. TDWR EXTERNAL INTERFACES

3.2.1 LLWAS II.

The TDWR to LLWAS II communications interface will consist of a primary and backup interface, and is described in NAS-IR-31023105, Part 2, Revision A. The primary interface will connect the TDWR RPG to the LLWAS Tower Display port on the LLWAS processor. The backup interface will connect the TDWR Tower GSD to the LLWAS Spare port on the LLWAS processor. In the event of a primary interface failure, the switch-over from primary to backup will occur automatically. Both interfaces will operate at 1200 bits per second (bps). Figure 3.2.1-1 presents the TDWR--LLWAS II interface. Note: TE stands for transmission equipment.

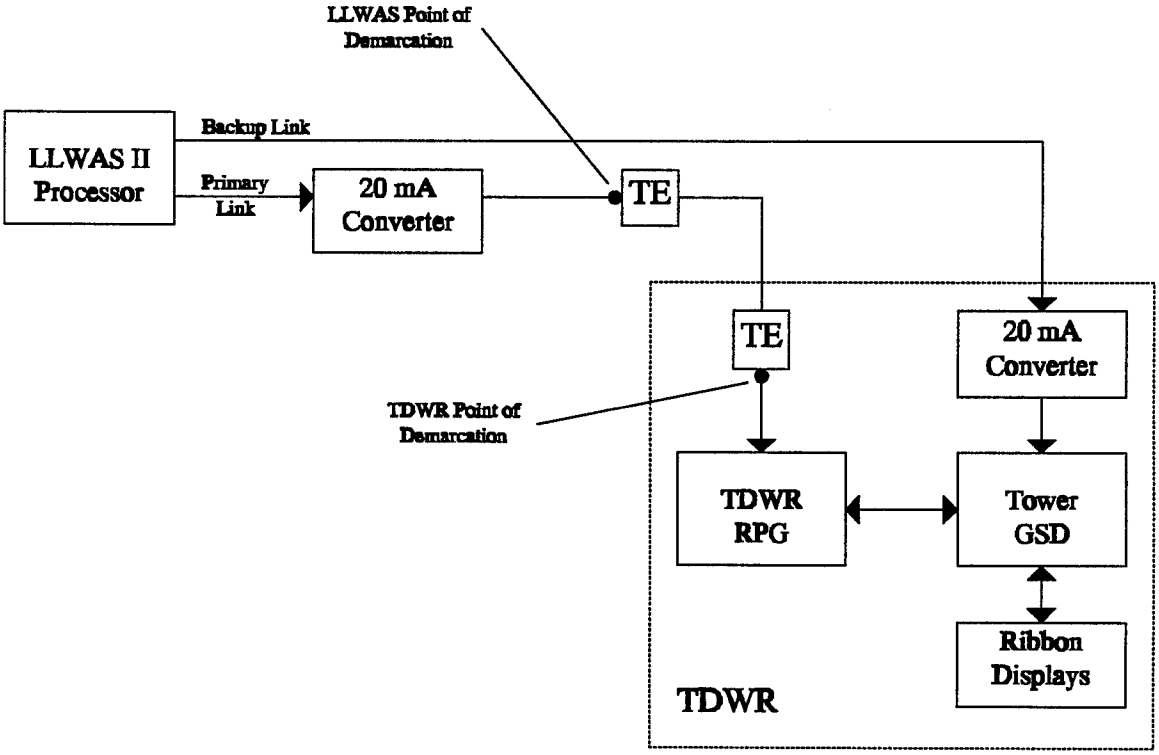


FIGURE 3.2.1-1. TDWR--LLWAS II INTERFACE

3.2.2 LLWAS III.

The TDWR to LLWAS III communications interface will consist of a primary and backup interface, and is described in NAS-IR-31023105, Part 1, Revision C. The primary interface will connect the TDWR RPG to the LLWAS processor. The backup interface will connect the TDWR Tower GSD to the LLWAS processor. In the event of a TDWR failure, the switchover from primary to backup will occur after active runways are configured using the LLWAS keypad. The GSD operator will then acknowledge the switchover to the backup link via a GSD menu indicating that TDWR is nonoperational. Both interfaces will operate at 9600 bps. Figure 3.2.2-1 presents the TDWR--LLWAS III interface. Note: TE stands for transmission equipment.

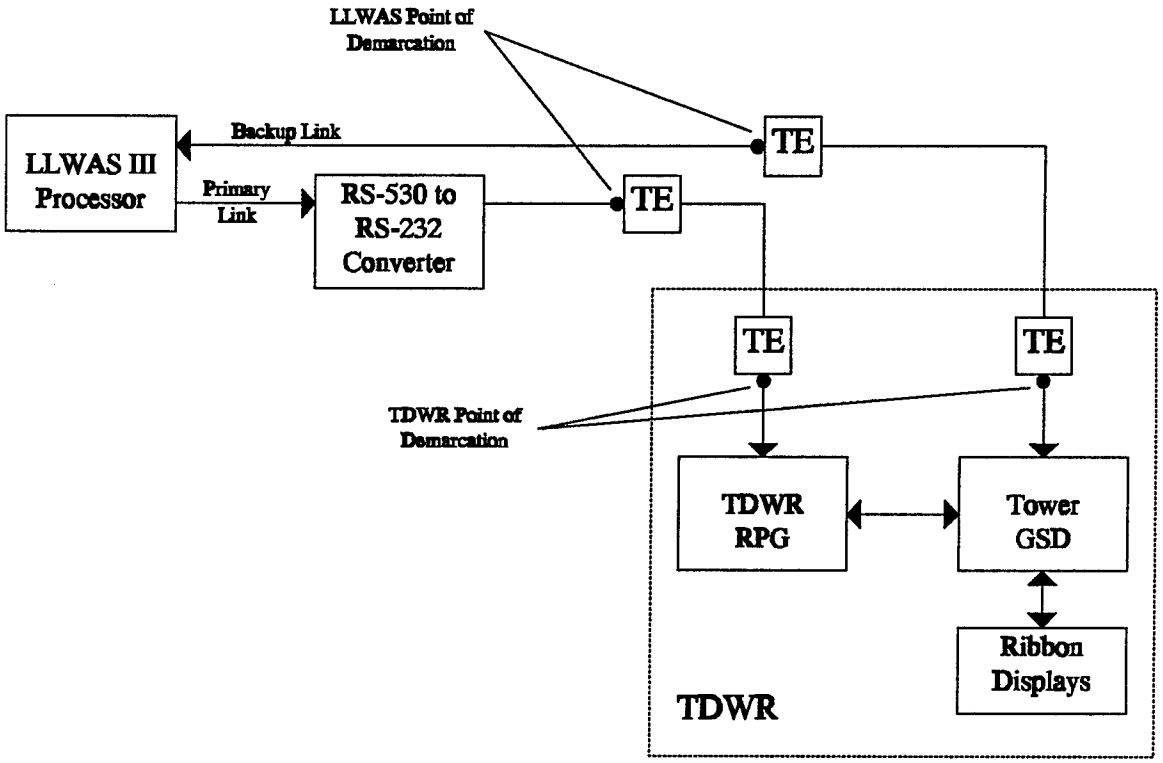


FIGURE 3.2.2-1. TDWR--LLWAS III INTERFACE

3.2.3 Remote Maintenance Monitoring Subsystem (RMMS).

The TDWR RPG/RMS provides the following interfaces:

a. RMMS: The RMMS utilizes the Maintenance Processor Subsystem (MPS) to remotely control and monitor the TDWR. This interface is described in NAS-MD-790 and NAS-MD-793.

b. MDT: The MDT is located at the TDWR site in the Concrete Masonry Unit (CMU) and is used to locally control and monitor the TDWR. This interface can operate at 1200, 2400, 4800, and 9600 bps.

These interfaces are presented in figure 3.2.3-1. Note: TE stands for transmission equipment.

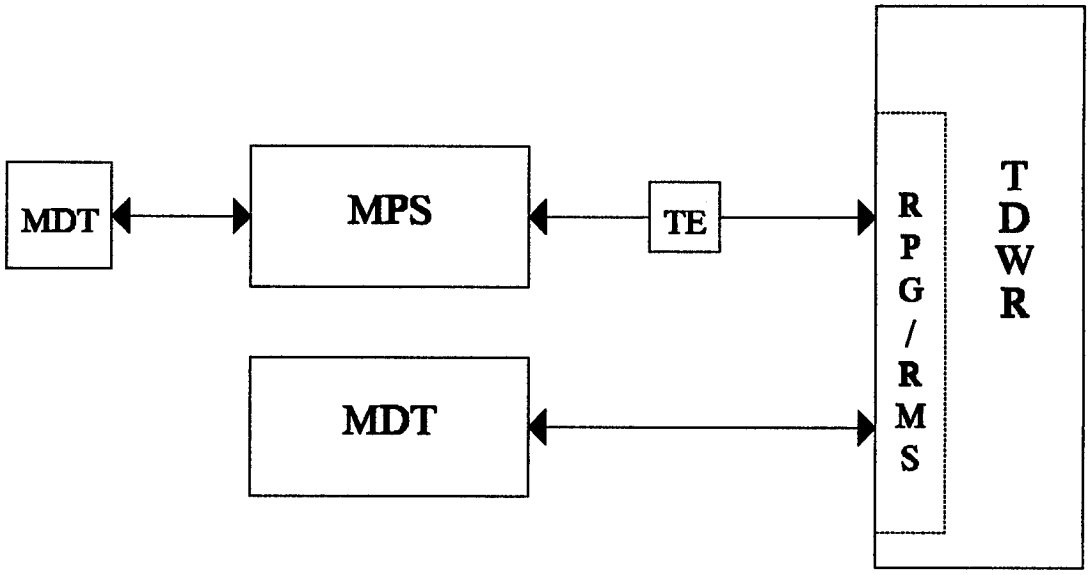


FIGURE 3.2.3-1. TDWR - MPS AND TDWR - MDT INTERFACES

3.2.4 Tower Control Computer Complex (TCCC).

The TDWR interfaces to TCCC which provides for transmission of products, equipment status, TDWR modes, and receipt of commands. When the TCCC becomes available, it will provide data to appropriate ATC facilities. It operates at 9600 bps and is described in NAS-IR-22013105, Revision E. This interface is presented in figure 3.2.4-1.

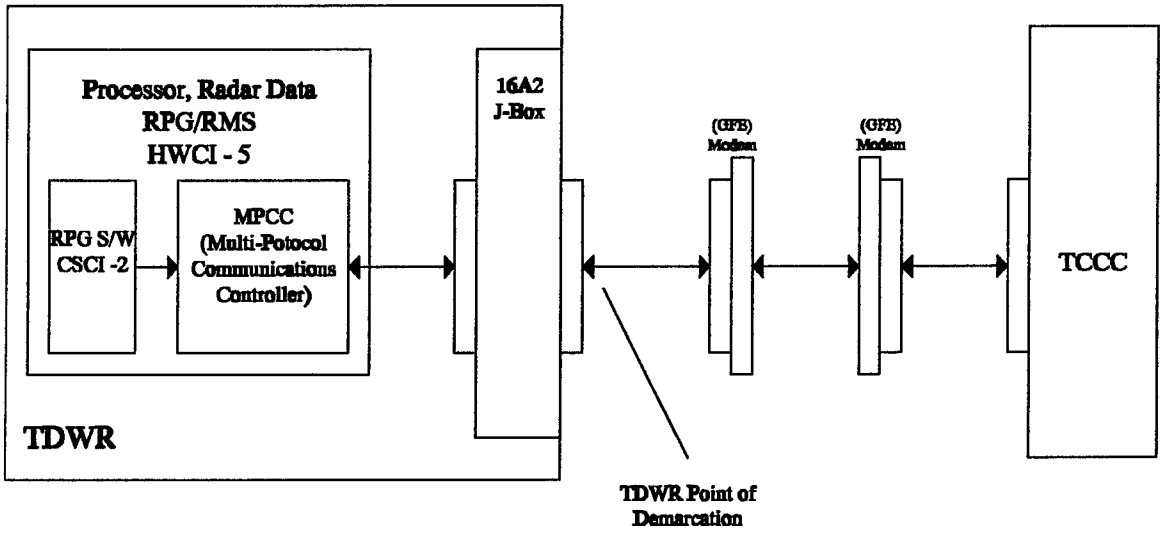


FIGURE 3.2.4-1. TDWR - TCCC INTERFACE

4. TEST PROGRAM DESCRIPTION.

4.1 APPROACH AND CONCEPT.

In order to determine the operability of the TDWR Build 5B enhancement with the NAS environment, OT&E Integration and OT&E Operational testing requires that the TDWR be installed in an operational environment with operational support. An operational environment refers to the configuration into which the TDWR must be integrated. For this reason, both live and/or simulated interfacing subsystems and equipment will be used. Air Traffic (AT) and Airways Facilities (AF) field site personnel will also be requested to participate in test efforts. These test efforts will include providing support in writing and executing the detailed test procedures that will be generated by ACW-200 to verify the requirements identified for testing. TDWR OT&E Integration and OT&E Operational testing will be performed using all interfaces available and appropriate to the TDWR system.

4.1.1 Operational Issues/Test Requirements Summary.

The following are issues related to the Build 5B enhancement:

a. LLWAS III wind information is accurately displayed on the GSDs and RDTs.

b. The MDA parameter changes increase the Probability of Detection (POD) and reduce the False Alarm Ratio (FAR).

c. The MSIA reduces overwarnings due to TDWR-generated microburst alerts.

d. The TDWR/LLWAS III Integration Algorithm generates more accurate Microburst Alerts (MBA) and Wind Shear Alerts (WSA) than either stand-alone system.

e. TDWR--LLWAS III link status is reported accurately to the MPS and MDT.

f. The performance of baseline Build 5A has not been degraded using Build 5B enhancements.

g. Archiving, programmable alarm timeouts, and enhanced base data display capabilities have been included in CSCI-4 Software Users' Manual.

All NAS-SS-1000 requirements related to TDWR have been included in the TVRTM in appendix A. The specific Build 5B requirements which will be tested during Build 5B OT&E are identified. Previously verified NAS requirements, which will not be fully tested during Build 5B OT&E, are also identified.

4.1.2 Preliminary Activities Leading to Testing.

Prior to OT&E Integration and OT&E Operational testing, ACW-200 shall prepare the Build 5B OT&E Integration and OT&E Operational test procedures. In addition, the Build 5B enhancement will have successfully undergone extensive Development Test and Evaluation (DT&E). This testing is conducted by the prime contractor and witnessed by the FAA. Finally, the prime contractor will install the Build 5B enhancement and successfully complete the Build 5B Interface Test at the TDWR site in Denver. The OT&E Integration and OT&E Operational test flow diagram is provided in figure 4.1.2-1.

4.1.3 Planning Considerations and Limitations.

Build 5B OT&E test conduct is contingent upon the completion of the LLWAS III to TDWR software being developed by LORAL. In addition, the testing of the TDWR--MPS interface described in paragraph 4.3.2.1 will be contingent upon the availability of the appropriate software.

4.2 TEST ENVIRONMENT.

The following paragraphs will describe the test facilities where the OT&E testing described in this plan will be conducted.

4.2.1 Test Location.

The Build 5B enhancement OT&E Integration and OT&E Operational testing will be conducted at Denver. Weather data will be collected at both Denver and Orlando sites.

4.2.2 Test Configuration.

The DVX TDWR is a typical site installation including all HWCIs (except HWCI-8) and all CSCIs (except CSCI-5 and CSCI-6) identified in paragraph 3.1.2. The CSCIs that were modified for Build 5B include CSCIs-2, 3, and 4. The only hardware addition for Build 5B is the portable archive data recorder (ADR) which connects to the DFU, (HWCI-6).

The TDWR Special Test Equipment (HWCI-7), Base Data Recorder (BDR) and BDD, will be utilized to record and playback TDWR base data.

4.2.3 Environmental Conditions.

A lack of convective weather during the scheduled test period could impact the validity of the weather performance test results. Should favorable test weather not occur, testing may have to be extended or moved to another site.

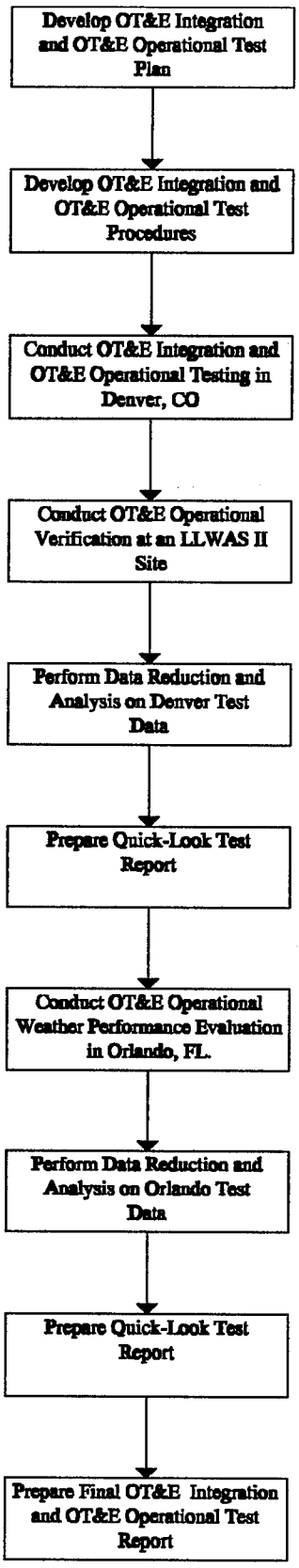


FIGURE 4.1.2-1. TDWR BUILD 5B OT&E FLOW

4.2.4 Test Analysis and Tools.

The TDWR Special Test Equipment will be used to record and playback data. More detailed information regarding test equipment may be found the TDWR Test Procedures.

4.2.5 Pass/Fail Criteria.

Pass/Fail criteria for each test will be included in the TDWR Test Procedures.

4.3 OT&E INTEGRATION TEST DESCRIPTIONS.

4.3.1 TDWR--LLWAS III Interface Test.

4.3.1.1 Test Objectives.

This test will verify that LLWAS III Center Field Wind (CFW), threshold winds, and Microburst/Wind Shear Alerts are accurately displayed on the TDWR GSDs and RDTs.

The following TVRTM requirements will be verified under this test:

3001, 3020, 3021, 3022, 3024, 3053.

4.3.1.2 Test Approach.

This test will utilize the LLWAS III playback function to play back a known LLWAS III weather scenario. The TDWR GSDs and RDTs will be monitored to verify the LLWAS III data was properly displayed. This test will performed for both primary (LLWAS III to RPG) and backup (LLWAS III to GSD) links.

4.3.2 TDWR--RMS/MPS Interface Test.

4.3.2.1 Test Objectives.

The objective of this test is to verify that the TDWR--MPS and the TDWR--MDT interfaces exist and are functional. ACN-100D, with assistance from ACW-200D, will conduct Build 5 OT&E Integration to verify NAS-SS-1000, Volume V requirements for the TDWR--MPS and TDWR--MDT interfaces after the baseline Interim Monitor and Control Software (IMCS) module has been completed and tested. The Build 5B modifications to the TDWR--MDT interface will be verified during OT&E Operational testing.

TVRTM requirement 3054 will be verified under this test.

4.3.2.2 Test Approach.

The system MDT will be used to control and monitor TDWR throughout Build 5B OT&E Integration and OT&E Operational testing. During OT&E Operational Degraded Operations scenarios, the LLWAS--RPG and LLWAS--DFU communications performance parameters will be verified using the system MDT.

4.3.3 TDWR--TCCC Interface Test.

The TDWR--TCCC interface was tested during Build 5B DT&E using a TCCC simulator. This test verified that TDWR transmitted graphic and alphanumeric products to the TCCC simulator. ACN-300, with assistance from ACW-200D, will perform OT&E Integration when the TCCC becomes available.

4.4 OT&E OPERATIONAL TEST DESCRIPTIONS.

4.4.1 System Reliability/Availability Test.

4.4.1.1 Test Objectives.

System operation will be monitored to verify that diagnostic accuracy, MTBF, and MTBCF are achievable in an operational environment. This data will be used to support the data collected during baseline OT&E Operational testing, as well as verify that the Build 5B enhancement has not degraded TDWR system reliability/availability.

4.4.1.2 Test Approach.

During Build 5B OT&E test conduct, all TDWR system failures will be recorded and classified as critical or noncritical. For system reliability tests, the TDWR will be run in a "hands-off" mode and it will be verified that any failures of interrelated NAS subsystems do not affect TDWR reliability. Diagnostics will be performed in event of a failure and all diagnostic results will be recorded. In the event of critical failure, system downtime will also be recorded.

4.4.2 Degraded Operations Test.

4.4.2.1 Test Objectives.

This test is conducted to determine the acceptability of the resultant operational degradation when failures are induced into the NAS system. Operational scenarios will be used to verify TDWR response to TDWR--LLWAS III failure modes.

4.4.2.2 Test Approach.

This test will verify that the TDWR responds properly during the following scenarios:

a. TDWR and LLWAS III operational,

b. TDWR operational and LLWAS III nonoperational,

c. TDWR nonoperational and LLWAS III operational, and

d. TDWR and LLWAS III nonoperational.

4.4.3 Stress and NAS Loading Test.

4.4.3.1 Test Objectives.

This test will demonstrate the TDWR response to stress and NAS loading provided by a weather scenario test tape operational environment.

4.4.3.2 Test Approach.

This test will stress the TDWR by utilizing all available interfaces during periods of hazardous weather activity. This test will involve playback of a weather scenario test tape with runways mapped to all lines of all RDTs. The LLWAS switchover override option will also be enabled to more closely simulate a live operational environment. In the event significant hazardous weather activity occurs during the test period, this test will be conducted using a live operational environment.

4.4.4 Human Factors Evaluation.

4.4.4.1 Test Objectives.

This test estimates the degree to which the interaction of personnel with the system in the operational environment is accommodated. OT&E will explore such factors as the physical interaction of personnel with the TDWR. In particular, the following will be evaluated:

a. The archive data recording and playback procedures;

b. The programmable alarm timeouts;

c. The switch over to the LLWAS--TDWR backup link procedures;

d. The RDT response upon failure of the GSD;

e. The changes to the display of graphics and alphanumerics due to the MSIA and TDWR--LLWAS III Integration Algorithm.

TVRTM requirement 3055 will be verified during this test.

4.4.4.2 Test Approach.

ACW-200D will monitor and observe tower and Terminal Radar Approach Control (TRACON) controllers and supervisors while using the LLWAS III/TDWR data. A questionnaire will be used to evaluate Build 5B function useability.

4.4.5 Site-Adaptation Verification.

4.4.5.1 Test Objectives.

This test ensures that site data unique to each applicable NAS facility has been correctly developed, updated, and installed in the system.

4.4.5.2 Test Approach.

Site parameters will be selected at random and compared against the Site Survey Reports. If necessary, site set-up utilities will be used

to verify these parameters. AOS-230 will assist in the generation of detailed test procedures, and will assist in test conduct.

4.4.6 Weather Performance Evaluation.

4.4.6.1 Test Objectives.

The objective of this test is to verify the TDWR meets operational suitability and reliability requirements in relation to its ability to detect hazardous weather.

The following TVRTM requirements will be verified under this test:

1001, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 3002, 3003, 3004, 3009, 3010, 3011, 3012, 3014, 3015, 3016, 3017, 3018, 3021, 3022, 3023, 3024, 3025, 3044, 3052.

4.4.6.2 Test Approach.

A meteorologist from the National Severe Storms Laboratory (NSSL) will conduct a weather performance evaluation. In particular, the performance of the MDA parameter changes, MSIA, and TDWR--LLWAS III Integration Algorithm will be evaluated.

4.4.7 TDWR--LLWAS II Verification.

4.4.7.1 Test Objectives.

This test will ensure that the introduction of the Build 5B enhancement does not degrade LLWAS II performance.

4.4.7.2 Test Approach.

The Build 5B enhancements will be installed at an LLWAS II site. Then, it will be verified that LLWAS II CFW and runway mapped sensor winds are accurately displayed on the TDWR GSDs and RDTs.

5. TEST MANAGEMENT.

5.1 ROLES AND RESPONSIBILITIES.

The following paragraphs shall describe the various organizations and personnel that will manage, conduct, and support the testing.

5.1.1 Test Management Organization.

5.1.1.1 Program Manager, ANR-500.

The Program Manager (PM) is responsible for management of the program. In particular, the PM has responsibilities for the OT&E Integration and OT&E Operational test effort as described in FAA Order 1810.4B. Specifically, the PM:

a. Manages the overall T&E program;

b. Arranges with the Associate Program Manager for Test (APMT) for T&E support, coordination, and monitoring;

c. Reviews and approves OT&E Integration and OT&E Operational test requirements, plans, procedures, and reports;

d. Monitors OT&E Integration and OT&E Operational Tests.

5.1.1.2 Technical Officer, ANR-900.

The Technical Officer is responsible for the technical direction of the TDWR program. Specific responsibilities include:

a. System Design;

b. Design Qualification Test and Evaluation;

c. Air Traffic Controllers Build 5B Enhancement Training;

d. Implementation;

e. Maintenance and Logistics Support.

5.1.1.3 APMT, ACW-200.

The APMT is responsible for management of the OT&E Integration and OT&E Operational test effort. In particular, the APMT has responsibilities for the OT&E Integration and OT&E Operational test effort as described in FAA Order 1810.4B. Specifically, the APMT:

a. Supports the development of test policy and test standards;

b. Acts as an agent of the PM to manage the T&E program. This includes establishing test schedules, coordination of tests,

ensuring that all test requirements are satisfied, and that tests are performed in accordance with approved procedures;

c. Coordinates with performing organizations and monitors OT&E activities;

d. Prepares OT&E Integration and OT&E Operational test requirements;

e. Prepares OT&E Integration and OT&E Operational test plans, procedures, and reports;

f. Directs and conducts OT&E Integration and OT&E Operational tests.

5.1.2 Other Participating Organizations.

5.1.2.1 Operation Support Service, AOS-230.

This organization identifies and develops OT&E Shakedown requirements. In addition, they are responsible for conducting OT&E Shakedown testing. They provide assistance and support during the OT&E Integration and OT&E Operational test effort by reviewing the OT&E Integration and OT&E Operational Test Plan, Test Procedures, and Test Reports. They also monitor OT&E Integration and OT&E Operational tests and optionally participate in OT&E Integration and OT&E Operational test conduct.

5.1.2.2 Air Traffic Plans and Requirements Service, ATR-120.

This organization provides operational expertise and planning for conducting and analyzing tests. They provide assistance and support during the OT&E Integration and OT&E Operational test effort by reviewing the OT&E Integration and OT&E Operational Test Plan and Test Procedures. They also provide personnel for conducting and/or monitoring OT&E Integration and OT&E Operational tests.

5.1.2.3 Regional Airway Facilities Division, AF.

This organization supports the APMT in the development of OT&E test requirements. In addition, they provide coordination support for test activities.

5.1.2.4 Office of Independent Operational Test and Evaluation Oversight, ATQ-1.

This organization performs an IOT&E oversight mission which includes: (1) independent assessment of system operational effectiveness and suitability; (2) verification that systems are satisfactorily tested and evaluated in a realistic operational environment; and (3) verification that technical and operational risks have been

sufficiently mitigated to warrant production, deployment, or commissioning.

5.1.2.5 Maintenance Automation Program Office, ANA-700.

This organization is responsible for providing the IMCS and conducting confidence testing.

5.1.2.6 Engineering, Test, and Evaluation Service, ACN-100.

This organization provides assistance and support during the OT&E Integration and OT&E Operational test effort by preparing and executing the RMS/MPS test procedures. They will then provide ACW-200 with a test report for inclusion into the OT&E Integration and OT&E Operational Test Report.

5.1.2.7 National Severe Storms Laboratory, NSSL.

This organization provides meteorological assistance and support during the OT&E Integration and OT&E Operational test effort by verifying TDWR base data and weather products. They will then provide ACW-200 with a test report for inclusion into the OT&E Integration and OT&E Operational Test Report.

5.1.3 Test Conduct Team.

5.1.3.1 Test Director, ACW-200.

The Test Director is appointed by the APMT. Specifically, the Test Director:

1. Ensures the OT&E Integration and OT&E Operational test effort follows the specific test plan and procedures;
2. Ensures all required equipment and personnel are available prior to the start of the test;
3. Ensures all relevant data for analysis is collected;
4. Maintains a daily test log;
5. Conducts pretest and post-test briefings;
6. Provides the status of all testing activities to the APMT.

5.1.3.2 Test Manager.

A Test Manager is not needed for the TDWR OT&E Integration and OT&E Operational testing.

5.1.3.3 Test Operators, ACW-200, AOS-230, ACN-100, AT, AF, NSSL.

Test Operators are responsible for manning the test positions during a particular test. They follow the test procedures and record all test results. In addition, they will assist the Test Director in maintaining the daily test log. The Test Operators report to the Test Director.

5.1.3.4 Test Monitors, ACW-200, ANR-900, AOS-230, ATR-120.

Test Monitors are responsible for ensuring that the test scenarios and procedures are being followed by the Test Operators. Test Monitors assist the Test Operators by reporting observations, assisting in the recording of measurements, and keeping track of day-to-day activities by maintaining test logs.

5.1.3.5 ATQ-1 Representative.

ATQ personnel perform the IOT&E oversight mission for this test in accordance with paragraph 5.1.2.4 of this document.

5.2 TRAINING.

The following paragraphs will describe the training needed to develop and execute the OT&E Integration and Operational test procedures.

5.2.1 Test Developer Training.

No formal TDWR training is required for test procedure development and execution. However, a thorough understanding of TDWR system operation including the use of the System MDT, RPG/RMS MDT, BDD, BDR, GSDs, and RDTs is required.

5.2.2 Test Participant Training.

Test participants should also be familiar with overall TDWR system operations including the MDTs, BDR, and all displays.

5.3 TEST CONDUCT.

5.3.1 Quality Control and Configuration Management.

ANR-900 will officially provide software. Version Numbers/Checksums will be provided before the start of testing.

5.3.2 Test Readiness Criteria.

ACW-200D will conduct Build 5B OT&E Integration and OT&E Operational tests after contractor on-site Design Qualification Tests (DQT) are completed and a configuration audit is performed.

5.4 TEST REPORTS.

The following subsections define the necessary reports that will be generated during OT&E Integration and OT&E Operational testing.

5.4.1 Individual Test Results Reporting.

Individual test results will be recorded by Test Operators in the spaces provided in each test procedure. At the conclusion of each test, a summary of the test results will be included in the test procedure.

5.4.2 Service Reports (SR).

The Test Director will ensure all test discrepancies and problems observed during testing are documented in SRs. The SRs will be forwarded to the Program Office for resolution. The SR format will be the same as in previous TDWR OT&E testing.

5.4.3 Periodic Test Status Reports/Briefings.

This paragraph identifies the type of briefings that will be conducted throughout OT&E Integration and OT&E Operational testing.

5.4.3.1 Pretest Briefings.

This briefing, chaired by the Test Director, will be scheduled immediately prior to the start of each test and attended by all personnel participating in the test. The pretest briefing will include the status of prerequisites, software, system equipment, test equipment, and a test summary.

The pretest briefing consists of a brief explanation of the type of test that will be conducted, what the test will attempt to accomplish, and the hardware/software configuration that will be utilized for the test. The pretest briefing will also accomplish the following:

a. Identify any needed changes, and red-line the procedures accordingly;

b. Review the hardware and software configurations of the test environment;

c. Ensure that all items in the material check list (contained in the test procedures) have been received;

d. Provide Service Report forms to attendees;

e. Generate a record of the pretest briefing.

5.4.3.2 Post-test Briefing.

This briefing will be conducted after test completion. It is chaired by the Test Director and attended by all test personnel. The purpose of the meeting is to review the results of the test activity. An assessment of the quality of the test and the impact of the problems (i.e., SRs) will be discussed during the review of the Test Director's post-test briefing package.

The post-test briefing package, prepared by the test director prior to the post-test brief, should consist of the following:

a. The "as-run" hardware and software configuration, how it differed from that stated in the procedures, and its significance to the test results;

b. Any deviations, planned and unplanned, in the test procedure steps and their significance to the test results. Procedure steps with problems noted and/or SRs initiated against them should be rescheduled for retest;

c. Any discrepancies, anomalies, and exceptions that were recorded during the test and their significance to the test results;

d. A summary of the outcome of the test. This summary can be derived by reviewing the test logs, test data, and SRs that were generated.

5.4.3.3 Status Telecons.

These status telecons will serve to keep the TDWR Test Support Group abreast of the status of OT&E Integration and OT&E Operational testing. These weekly telecons will be chaired by ACW-200 and will serve as a technical interchange of issues and concerns.

5.4.4 Quick Look Report.

A Quick Look report will be written within 15 working days after test completion. This report will include a description of the test, a summary of test activities, significant test results that are known at the time, and test result conclusions. It will provide an immediate indication of the outcome of the test and highlight test discrepancies noted during test execution and their significance.

The Quick Look Test Report will contain the following:

a. Quick Look Test Report title page;

b. Executive Summary;

c. Introduction;

d. OT&E Description;

e. Results;

f. Conclusions/Recommendations.

5.4.5 Final Report.

The TDWR Test Director will be responsible for preparing a Final Test report within 60 days after all OT&E testing is complete. The Final Test Report will document the results of detailed test analysis, and assess the compliance of each test to defined criteria. The status of problems identified previously in the Quick Look Test Reports will be updated, and a revised assessment will be made of their impact on the tested system, and the suggested corrective actions required. Any new problems discovered by detailed evaluation will be identified and their impact in the system described.

The Final Test Report will contain the following:

a. Final Test Report title page;

b. Executive Summary;

c. Table of Contents;

d. Introduction;

e. Documents referenced;

f. System Description;

g. Test Description;

h. Results and Discussion;

i. Conclusions;

j. Recommendations;

k. Acronyms and Abbreviations.

5.5 SCHEDULES AND PERSONNEL REQUIREMENTS.

This section includes the overall schedule of TDWR Build 5B OT&E events and personnel requirements for OT&E Integration and OT&E Operational testing.

5.5.1 Test Schedule.

This section presents the schedules for TDWR OT&E Integration and OT&E Operational activities. TDWR OT&E activities are traceable and supportive of the TDWR TEMP.

This schedule indicates the TDWR OT&E Test Activity as shown in appendix B. The schedule is developed, released, and controlled by the Test Director, ACW-200. The function of this schedule is to provide guidance for all TDWR activities. They identify the major tasks to be accomplished (e.g., Test Plan and Test Procedures complete) and identify task start and stop dates. This schedule enables the Test Director to provide detailed test status to the test groups.

5.5.2 Personnel Resource Requirements.

The personnel requirements for OT&E Integration and OT&E Operational test conduct are included in table 5.5.2-1.

TABLE 5.5.2-1 TDWR OT&E INTEGRATION and OT&E OPERATIONAL TEST SUPPORT PERSONNEL

ORGANIZATION	NO. OF PEOPLE	POSITION
ACW-200D	1	Test Director
ACW-200D	1/1	Test Monitor/Operator
AF Field Personnel	1-2	Test Operator
AOS-230	1-2	Test Monitor/Operator
ATR-120	1	Test Monitor/Operator
ACN-100	2	Test Operator
ATQ-1	1	Test Witness
NSSL	1	Test Monitor
ANR-900	1	Test Witness

Note: Not all of these organizations will be present during every test. The test procedures will identify appropriate personnel.

6. ACRONYMS AND ABBREVIATIONS.

A	Analysis
ACN	Engineering, Test, and Evaluation Service, FAA Technical Center
ACW	Weather and Primary Radar Division, FAA Technical Center
ADR	Archive Data Recorder
AF	Airways Facilities
ANR	Program Director for Weather Radar
ANT	Antenna
APMT	Associate Program Manager For Test
AOS	Systems Maintenance Service, FAA Aeronautical Center
AT	Air Traffic
ATC	Air Traffic Control
ATR	Air Traffic Plans and Requirements Service
ATQ	Office of Independent Operational Test and Evaluation Oversight
BDD	Base Data Display
BDR	Base Data Recorder
bps	Bits per second
CFW	Center Field Wind
CMTP	Contractor's Master Test Plan
CMU	Concrete Masonry Unit
COTS	Commercial-Off-the-Shelf
CSCI	Computer Software Configuration Item
D	Demonstration
DFU	Display Functional Unit
DPL	Display Computer Software
DPO	Data Processing Operating System
DQT	Design Qualification Test
DSP	Digital Signal Processor
DT&E	Development Test and Evaluation
DVX	Terminal Doppler Weather Radar site in Denver, CO
FAA	Federal Aviation Administration
FAAAC	Federal Aviation Administration Aeronautical Center
FAR	False Alarm Ratio
GSD	Geographical Situation Display
HWCI	Hardware Configuration Item
I	Inspection
ICD	Interface Control Document
IMCS	Interim Monitor and Control Software
IRD	Interface Requirements Document
LLWAS	Low Level Wind Shear Alert System

MBA	Microburst Alerts
MDA	Microburst Detection Algorithm
MDT	Maintenance Data Terminal
M&OS	Maintenance and Operations Support
MPS	Maintenance Processor Subsystem
MSIA	Microburst Shear Integration Algorithm
MTBF	Mean Time Between Failure
MTBCF	Mean Time Between Critical Failure
MTS	Moving Target Simulator
NAS	National Airspace System
NSSL	National Severe Storms Laboratory
OS	Operating System
OT&E	Operational Test and Evaluation
PM	Program Manager
POD	Probability of Detection
PSF	Program Support Facility
RDA	Radar Data Acquisition
RDT	Ribbon Display Terminal
REX	Receiver/Exciter
RMMS	Remote Maintenance Monitoring System
RMS	Remote Monitoring Subsystem
RPG	Radar Product Generator
SCN	Specification Change Notice
SCU	Servo Control Unit
SDT	Software Development Tools
SFO	Sector Field Office
SPB	Site Program Bulletin
SPT	Special Test Equipment
SR	Service Report
T	Test
TCCC	Tower Control Computer Complex
TDWR	Terminal Doppler Weather Radar
T&E	Test and Evaluation
TE	Transmission Equipment
TEMP	Test and Evaluation Master Plan
TRACON	Terminal Radar Approach Control Facility
TTL	Test Tools Library
TVRTM	Test Verification Requirements Traceability Matrix
UNIX_UNX	Display System Operating System
VRTM	Verification Requirements Traceability Matrix
VTX	VRTX-32 Operating System
WSA	Wind Shear Alert

x	Not Applicable
XMT	Transmitter

APPENDIX A
Test Verification Requirements Traceability Matrix

Terminal Doppler Weather Radar
NAS-SS-1000 Volume I Test Verification Requirements Traceability Matrix

Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
1001	3.2.1.1.1.1.I	Air traffic control functional characteristics - Disseminate weather data	x	I	Build 5A and 5B
1002	3.2.1.1.4.1.B	Weather functional characteristics - Collect/Sense weather information	x	x	Verified during 1992 TFT&E
1003	3.2.1.1.4.1.D	Weather functional characteristics - Display weather information	x	T	Build 5A and 5B
1004	3.2.1.1.4.1.G	Weather functional characteristics - Classify weather information	x	T	Build 5A and 5B
1005	3.2.1.1.4.1.H	Weather functional characteristics - Alert specialists of hazardous weather	x	T	Build 5A and 5B
1006	3.2.1.1.4.1.I	Weather functional characteristics - Disseminate weather information	x	T	Build 5A and 5B
1007	3.2.1.1.4.1.K	Weather functional characteristics - Generate weather products	x	T	Build 5A and 5B
1008	3.2.1.1.4.1.N	Weather functional characteristics - Archive weather information	x	T	Build 5B
1009	3.2.1.1.8.1.3	Data and voice archiving	x	T	Build 5B
1010	3.2.1.2.4.A.1	Weather performance characteristics - Detect surface weather conditions aloft	x	x	Verified during 1992 TFT&E
1011	3.2.1.2.4.A.2.B	Weather performance characteristics - Terminal	x	x	Verified during 1992 TFT&E

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

Terminal Doppler Weather Radar
NAS-SS-1000 Volume I Test Verification Requirements Traceability Matrix

Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
1012	3.2.1.2.4.B.1.A	Weather performance characteristics - Classify weather information as hazardous - terminal	x	T	Build 5A and 5B
1013	3.2.1.2.4.C.4.A	Weather performance characteristics - Hazardous weather information - terminal operations	x	T	Build 5A and 5B
1014	3.2.1.2.4.E.1	Weather performance characteristics - Derive weather products from raw data	x	T	Build 5A and 5B
1015	3.2.1.2.4.E.2	Weather performance characteristics - Weather processing using automated weather detection systems	x	T	Build 5A and 5B
1016	3.2.1.2.4.F.2	Weather performance characteristics - Real-time depiction of weather conditions	x	T	Build 5A and 5B
1017	3.2.1.2.4.F.3	Weather performance characteristics - Wind shift warning	x	T	Build 5A and 5B
1018	3.2.1.2.4.F.4	Weather performance characteristics - Hazardous weather warning	x	T	Build 5A and 5B
1019	3.2.1.2.4.G	Weather performance characteristics - Archive all weather data	x	T	Build 5B
1020	3.2.1.2.8.4.B	NAS time standard performance characteristics - Provide synchronization on non-ATC processors	x	x	Verified during 1992 TFT&E
1021	3.2.1.2.8.4.C	NAS time standard performance characteristics - Provide interfaces to synchronization and coded time signal	x	x	Verified during 1992 TFT&E

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

Terminal Doppler Weather Radar
NAS-SS-1000 Volume III Test Verification Requirements Traceability Matrix

Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
3001	3.2.1.2.5.1.1	Functional characteristics - Receive weather products from LLWAS	T	x	Build 5A and 5B
3002	3.2.1.2.5.1.2.A	Identify weather phenomena - Microburst	x	I	Build 5A and 5B
3003	3.2.1.2.5.1.2.B	Identify weather phenomena - Gust front	x	I	Build 5A and 5B
3004	3.2.1.2.5.1.2.C	Identify weather phenomena - Precipitation	x	I	Build 5A and 5B
3005	3.2.1.2.5.1.2.D	Identify weather phenomena - Storm motion	x	x	Storm motion unavailable
3006	3.2.1.2.5.1.3.A	Measure weather phenomena - Reflectivity	x	x	Verified during 1992 TFT&E
3007	3.2.1.2.5.1.3.B	Measure weather phenomena - Mean radial velocity	x	x	Verified during 1992 TFT&E
3008	3.2.1.2.5.1.3.C	Measure weather phenomena - Spectrum width	x	x	Verified during 1992 TFT&E
3009	3.2.1.2.5.1.4.A	Weather data processing - Type of weather	x	I	Build 5A and 5B
3010	3.2.1.2.5.1.4.B	Weather data processing - Location of weather	x	I	Build 5A and 5B
3011	3.2.1.2.5.1.4.C	Weather data processing - Velocity of weather	x	I	Build 5A and 5B
3012	3.2.1.2.5.1.4.D	Weather data processing - Severity of weather	x	I	Build 5A and 5B
3013	3.2.1.2.5.1.4.E	Weather data processing - Direction of storm motion	x	x	Storm motion unavailable
3014	3.2.1.2.5.1.5.A	Generate weather products - Microburst map	x	I	Build 5A and 5B
3015	3.2.1.2.5.1.5.B	Generate weather products - Microburst message/alarm	x	T	Build 5A and 5B
3016	3.2.1.2.5.1.5.C	Generate weather products - Gust front map	x	I	Build 5A and 5B
3017	3.2.1.2.5.1.5.D	Generate weather products - Gust front message/alarm	x	T	Build 5A and 5B
3018	3.2.1.2.5.1.5.E	Generate weather products - Precipitation	x	I	Build 5A and 5B
3019	3.2.1.2.5.1.5.F	Generate weather products - Storm motion map	x	x	Storm motion unavailable

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

Terminal Doppler Weather Radar
NAS-SS-1000 Volume III Test Verification Requirements Traceability Matrix

Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
3020	3.2.1.2.5.1.5.1.A	LLWAS data integration - Receive	T	x	Build 5A and 5B
3021	3.2.1.2.5.1.5.1.B	LLWAS data integration - Generate	T	T	Build 5A and 5B
3022	3.2.1.2.5.1.5.1.C	LLWAS data integration - Validate	T	T	Build 5B
3023	3.2.1.2.5.1.5.1.D	LLWAS data integration - Merge	T	T	Build 5B
3024	3.2.1.2.5.1.5.1.E	LLWAS data integration - Transmit	T	T	Build 5A and 5B
3025	3.2.1.2.5.1.6	Generate alerts	x	I	Build 5A and 5B
3026	3.2.1.2.5.1.7	Disseminate weather data to TCCC	x	x	TCCC unavailable
3027	3.2.1.2.5.1.8	Remote maintenance monitoring	T	x	Deferred to ACN-100
3028	3.2.1.2.5.1.9	Operational status	x	x	Verified during 1992 TFT&E
3029	3.2.1.2.5.1.10	Operational control	x	x	Verified during 1992 TFT&E
3030	3.2.1.2.5.1.11	Standard time reference	x	x	Verified during 1992 TFT&E
3031	3.2.1.2.5.1.12	Growth and flexibility	x	x	DT&E results will be used.
3032	3.2.1.2.5.2.1	Performance characteristics - Detection envelope	x	x	Verified during 1992 TFT&E
3033	3.2.1.2.5.2.2.A	Resolution - Azimuth	x	x	Verified during 1992 TFT&E
3034	3.2.1.2.5.2.2.B	Resolution - Range	x	x	Verified during 1992 TFT&E
3035	3.2.1.2.5.2.2.C	Resolution - Elevation	x	x	Verified during 1992 TFT&E
3036	3.2.1.2.5.2.3.A	Accuracy - Azimuth	x	x	Verified during 1992 TFT&E
3037	3.2.1.2.5.2.3.B	Accuracy - Range	x	x	Verified during 1992 TFT&E
3038	3.2.1.2.5.2.3.C	Accuracy - Elevation	x	x	Verified during 1992 TFT&E
3039	3.2.1.2.5.2.4	System sensitivity	x	x	Verified during 1992 TFT&E

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

Terminal Doppler Weather Radar
NAS-SS-1000 Volume III Test Verification Requirements Traceability Matrix

Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
3040	3.2.1.2.5.2.5	Frequency	x	x	Verified during 1992 TFT&E
3041	3.2.1.2.5.2.6.A	Scanning strategies - 360 degrees	x	x	Verified during 1992 TFT&E
3042	3.2.1.2.5.2.6.B	Scanning strategies - Azimuth sector scans	x	x	Verified during 1992 TFT&E
3043	3.2.1.2.5.2.6.C	Scanning strategies - Range height indicator scan	x	x	Verified during 1992 TFT&E
3044	3.2.1.2.5.2.7	Archiving	x	T	Build 5B
3045	3.2.1.2.5.2.8	Alarm	x	x	Verified during 1992 TFT&E
3046	3.2.1.2.5.2.9	Update Rate	x	x	Verified during 1992 TFT&E
3047	3.2.1.2.5.2.9.1	Winds distribution	x	x	Verified during 1992 TFT&E
3048	3.2.1.2.5.2.10	Data destination - TCCC	x	x	TCCC unavailable
3049	3.2.1.2.5.2.11	Maintenance monitoring performance characteristics	T	x	Deferred to ACN-100
3050	3.2.1.2.5.2.12.A	Weather processing performance - Six level monitoring	x	x	Verified during 1992 TFT&E
3051	3.2.1.2.5.2.12.B	Weather processing performance - No data display	x	x	Verified during 1992 TFT&E
3052	3.2.1.2.5.2.12.C	Weather processing performance - Storm motion	x	x	Storm motion unavailable
3053	3.2.1.2.5.3.A	Functional/physical interfaces - LLWAS--TDWR	T	x	Build 5A and 5B
3054	3.2.1.2.5.3.B	Functional/physical interfaces - MDT--TDWR	I	x	Build 5A and 5B
3055	3.2.1.2.5.3.C	Functional/physical interfaces - TDWR--MDT	T	T	Integration: Deferred to ACN-100D Operational: Build 5A and 5B
3056	3.2.1.2.5.3.D	Functional/physical interfaces - MPS--TDWR	T	x	Deferred to ACN-100
3057	3.2.1.2.5.3.E	Functional/physical interfaces - TDWR--MPS	D	x	Deferred to ACN-100
3058	3.2.1.2.5.3.F	Functional/physical interfaces - TCCC--TDWR	x	x	TCCC unavailable
3059	3.2.1.2.5.3.G	Functional/physical interfaces - TDWR--TCCC	x	x	TCCC unavailable

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

Terminal Doppler Weather Radar
NAS-SS-1000 Volume V Test Verification Requirements Traceability Matrix

Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
5001	3.2.1.1.1.1.1a	An RMS shall collect subsystem key performance parameters in real time by use of hardware sensors, software sensors, or both from the subsystem of which it is an inherent part;	T	x	Deferred to ACN-100
5002	3.2.1.1.1.1.1d	The RMS shall collect self-test and monitoring information on the status, performance, and use of its own hardware and software for inclusion as part of the key performance or diagnostic performance parameters or both and make this data available to the MPS upon request;	T	x	Deferred to ACN-100
5003	3.2.1.1.1.1.1e	The RMS shall collect operating status and performance data that includes configuration and mode of operation from each subsystem within the subsystem of which it is an inherent part;	T	x	Deferred to ACN-100
5004	3.2.1.1.1.1.1f	When directed by the MPS or MDT, the RMS shall initiate diagnostic routines, then collect the results for transfer to the location specified by the requestor.	T	x	Deferred to ACN-100
5005	3.2.1.1.1.1.2	An RMS designed to monitor building parameters shall collect security data necessary to monitor a facility for physical intrusion.	T	x	Deferred to ACN-100
5006	3.2.1.1.1.1.3a	The RMS shall receive and recognize valid commands from either the MPS or the MDT including those to activate the functions given in 3.2.1.1.1.2.3;	T	x	Deferred to ACN-100
5007	3.2.1.1.1.1.3b	Upon request from an MDT, the RMS shall collect performance data for and switch control to the MDT;	T	x	Deferred to ACN-100
5008	3.2.1.1.1.1.3c	The RMS shall automatically disable alarms and alerts when in local mode.	T	x	Deferred to ACN-100

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

Terminal Doppler Weather Radar
NAS-SS-1000 Volume V Test Verification Requirements Traceability Matrix

Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
5009	3.2.1.1.1.1.1.4a	The RMS shall perform all collection functions including monitoring performance data, configuration data, and incoming requests at sampling rates which allow the system to detect changes commensurate with allocated RMS performance requirements;	T	x	Deferred to ACN-100
5010	3.2.1.1.1.1.1.4b	The RMS shall accept general messages and requests for data from either an MPS or an MDT.	T	x	Deferred to ACN-100
5011	3.2.1.1.1.1.2.1a	The RMS shall compare the measured values of the performance parameters of the subsystem with up to two sets of stored thresholds - one set defining the ideal operating range representing the best possible conditions and one set defining the acceptable operating range representing the minimum permissible conditions - and determine within which range the parameters reside. Each range will be defined by up to two values to include an upper and a lower limit;	T	x	Deferred to ACN-100
5012	3.2.1.1.1.1.2.1b	The RMS shall filter or average the performance parameters to prevent the declaration of alarms due to transient conditions;	T	x	Deferred to ACN-100
5013	3.2.1.1.1.1.2.1c	The RMS shall generate an alarm when a key performance parameter value is outside the acceptable operating range;	T	x	Deferred to ACN-100
5014	3.2.1.1.1.1.2.1d	The RMS shall generate an alert when a key performance parameter value is outside the ideal operating range but inside the acceptable operating range;	T	x	Deferred to ACN-100
5015	3.2.1.1.1.1.2.1e	In the event of simultaneous multiple alarm conditions all alarms are stored in the RMS and the RMS shall forward for transmission to the active interface all alarms on a first-in, first-out basis;	T	x	Deferred to ACN-100

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

Terminal Doppler Weather Radar
NAS-SS-1000 Volume V Test Verification Requirements Traceability Matrix

Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
5016	3.2.1.1.1.1.2.1f	The RMS shall monitor and check each and every key performance parameter value for an alarm or an alert condition at least once during each general status cycle. A general status cycle consists of collecting and evaluating all data necessary to determine the health of the system and reporting the results (i.e., alarms, alerts, or system okay) to the RMS/MPS interface or the RMS/MDT interface or both as required by the communications mode in effect. The time period in which the general status cycle must be completed shall be programmable from five (5) seconds to sixty (60) seconds in increments of five (5) seconds or less;	T	x	Deferred to ACN-100
5017	3.2.1.1.1.1.2.1g	The RMS shall monitor and check each and every key performance parameter value, detect any changes in value, and report the changed values to the RMS/MPS interface or the RMS/MDT interface or both as required by the communications mode in effect. The time period in which the general status cycle must be completed shall be programmable from ten (10) seconds to two (2) minutes in increments of ten (10) seconds or less;	T	x	Deferred to ACN-100
5018	3.2.1.1.1.1.2.1h	The RMS shall generate a general status message and a key performance parameter message at times which depend on the individual cycle time defined above;	T	x	Deferred to ACN-100
5019	3.2.1.1.1.1.2.1i	The RMS shall generate a return-to-normal message when a parameter causing an alarm or alert condition returns to its ideal operating range;	T	x	Deferred to ACN-100
5020	3.2.1.1.1.1.2.1j	The RMS shall determine if a monitored data point, status, or condition has changed between the sampling of parameter values and generate a state change message if the state has changed;	T	x	Deferred to ACN-100

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

Terminal Doppler Weather Radar
NAS-SS-1000 Volume V Test Verification Requirements Traceability Matrix

Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
5021	3.2.1.1.1.1.2.1k	An RMS shall initiate a diagnostic test of a subsystem, which includes fault isolation, in response to the appropriate command from an MPS or an MDT;	T	x	Deferred to ACN-100
5022	3.2.1.1.1.1.2.1l	The RMS shall initiate a fault recovery routine if an alarm or alert is generated.	T	x	Deferred to ACN-100
5023	3.2.1.1.1.1.2.2e	The RMS shall provide for the disabling of automatic log off of an MDT by an authorized operator;	T	x	Deferred to ACN-100
5024	3.2.1.1.1.1.2.2f	The RMS shall generate an access denied message to be sent to the MPS and to the originating device when an invalid user identification code or password is collected or when an unauthorized function is attempted;	T	x	Deferred to ACN-100
5025	3.2.1.1.1.1.2.2g	When an MDT is connected to or disconnected from an RMS, the RMS shall generate a state change message for transmission to the MPS;	T	x	Deferred to ACN-100
5026	3.2.1.1.1.1.2.2h	The RMS shall allow communications with an MDT via an external link only if processed through an MPS, including MDT's connected to a separate RMS.	T	x	Deferred to ACN-100
5027	3.2.1.1.1.1.2.3a	Upon receipt of a valid command from either the MPS or MDT, the RMS shall execute the control command;	T	x	Deferred to ACN-100
5028	3.2.1.1.1.1.2.3b	Upon receipt of a valid command from either an MDT or an MPS, the RMS shall change the current operating mode or configuration of a subsystem to the operating mode or configuration requested;	T	x	Deferred to ACN-100

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

Terminal Doppler Weather Radar
NAS-SS-1000 Volume V Test Verification Requirements Traceability Matrix

Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
5029	3.2.1.1.1.1.2.3c	Upon receipt of a valid command from either an MDT or an MPS, the RMS shall adjust the subsystem parameter as requested;	T	x	Deferred to ACN-100
5030	3.2.1.1.1.1.2.3d	Upon receipt of a valid command from either an MDT or an MPS, the RMS shall reset a subsytem or part of a subsystem;	T	x	Deferred to ACN-100
5031	3.2.1.1.1.1.2.3e	Upon receipt of a valid command from either an MDT or an MPS, the RMS shall disable an alarm or alert indication;	T	x	Deferred to ACN-100
5032	3.2.1.1.1.1.2.3f	Upon receipt of a valid command from either an MDT or an MPS, the RMS shall change the requested threshold values of the parameters being monitored;	T	x	Deferred to ACN-100
5033	3.2.1.1.1.1.2.3g	Upon receipt of a valid command from an onsite MDT, the RMS of single thread equipments shall switch from remote communication with the MPS to a local communication mode with the MDT, providing exclusive control of the subsystem from the MDT;	T	x	Deferred to ACN-100
5034	3.2.1.1.1.1.2.3h	Upon receipt of a valid command from an onsite MDT, the RMS of multithread (redundant) equipments shall provide communication and exclusive control without interruption of off-line units to the MDT monitoring of on-line equipments;	T	x	Deferred to ACN-100
5035	3.2.1.1.1.1.2.3i	Upon disconnect of an onsite MDT, the RMS shall automatically return to the remote communication mode with the MPS;	T	x	Deferred to ACN-100

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

Terminal Doppler Weather Radar
NAS-SS-1000 Volume V Test Verification Requirements Traceability Matrix

Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
5036	3.2.1.1.1.1.2.4b	The RMS shall compare filtered key performance parameter values with the two sets of threshold values as part of each General Status Cycle to determine if an alarm or alert condition has occurred. One set of threshold values is for alarm condition determination while the other set of thresholds is for alert condition determination.	T	x	Deferred to ACN-100
5037	3.2.1.1.1.1.2.4c	The RMS shall generate a report containing performance parameter values in response to a data request;	T	x	Deferred to ACN-100
5038	3.2.1.1.1.1.2.4d	The RMS shall generate a status report containing alarm and alert condition in response to a subsystem status request;	T	x	Deferred to ACN-100
5039	3.2.1.1.1.1.2.4e	The RMS shall generate a maintenance data message containing information requested by either an MDT or an MPS;	T	x	Deferred to ACN-100
5040	3.2.1.1.1.1.2.4f	The RMS shall provide a date in the form of month/day/year and universal time code (UTC) in the form of hours/minutes/seconds on each message and report;	T	x	Deferred to ACN-100
5041	3.2.1.1.1.1.2.4g	The RMS shall accept commands and requests from the MDT;	T	x	Deferred to ACN-100
5042	3.2.1.1.1.1.2.4h	The RMS shall generate the appropriate response to all commands;	T	x	Deferred to ACN-100
5043	3.2.1.1.1.1.2.4i	The RMS shall make available all command responses to the MPS or the MDT or both depending upon the nature of the request;	T	x	Deferred to ACN-100
5044	3.2.1.1.1.1.2.4j	The RMS shall prepare all messages for transmission in the appropriate protocol;	T	x	Deferred to ACN-100
5045	3.2.1.1.1.1.2.4k	The RMS shall convert sensor input information into values directly related to engineering units such that no scaling other than decimal placement shall be required of the receiving MPS or MDT;	T	x	Deferred to ACN-100

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

Terminal Doppler Weather Radar
NAS-SS-1000 Volume V Test Verification Requirements Traceability Matrix

Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
5046	3.2.1.1.1.1.2.4.1	The RMS shall contain two modes - a remote mode for communication solely with the MPS, a local mode for communication solely with the MDT, and a dual mode which provides all messages to both the MPS and the MDT while being controlled solely via the MDT interface.	T	x	Deferred to ACN-100
5047	3.2.1.1.1.1.3.1a	The RMS shall store all detected alarms and alerts until such alarm or alert condition no longer exist;	T	x	Deferred to ACN-100
5048	3.2.1.1.1.1.3.1b	The RMS shall be able to store key performance parameter values, diagnostic results, and operating mode data in temporary storage in preparation for transferring said information to the MPS;	T	x	Deferred to ACN-100
5049	3.2.1.1.1.1.3.1c	The RMS shall store terminal messages routed from an MDT to an MPS and routed from an MPS to the MDT until the transfer has been successfully received by the MPS or the MDT;	T	x	Deferred to ACN-100
5050	3.2.1.1.1.1.3.1d	The RMS shall store two sets of threshold values (each set to include: an upper limit, a lower limit, or both) with one set for alarm thresholds and one set for alert thresholds in nonvolatile storage;	T	x	Deferred to ACN-100
5051	3.2.1.1.1.1.3.1e	The RMS shall store general programs needed for filtering data, formatting messages, encoding messages, converting data, and addressing messages in nonvolatile storage;	T	x	Deferred to ACN-100
5052	3.2.1.1.1.1.3.1f	The RMS shall store cycle time intervals for each of the cycles required by 3.2.1.1.1.1.2.1f;	T	x	Deferred to ACN-100
5053	3.2.1.1.1.1.3.1g	The RMS shall maintain records of the value of each monitored parameter, periodically updating each record.	T	x	Deferred to ACN-100

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

Terminal Doppler Weather Radar
NAS-SS-1000 Volume V Test Verification Requirements Traceability Matrix

Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
5054	3.2.1.1.1.1.3.3a	The RMS shall store information needed to decode control and adjustment commands for that RMS;	T	x	Deferred to ACN-100
5055	3.2.1.1.1.1.3.3b	The RMS shall store the initialization data needed to initialize the subsystem including all site dependent parameters in non volatile memory;	T	x	Deferred to ACN-100
5056	3.2.1.1.1.1.3.3c	The RMS shall store all disable commands received until the alarm is re-enabled;	T	x	Deferred to ACN-100
5057	3.2.1.1.1.1.3.4a	The RMS shall store only filtered key performance parameter values obtained through monitoring;	T	x	Deferred to ACN-100
5058	3.2.1.1.1.1.3.4b	The RMS shall store alarm and alert threshold values, initialization tables, data required for interpreting addressing, and control and adjustment message function codes in non volatile storage;	T	x	Deferred to ACN-100
5059	3.2.1.1.1.1.3.4c	The RMS shall update stored performance parameter values and status data at least once during the general status cycle time interval, only keeping the most current equipment performance data;	T	x	Deferred to ACN-100
5060	3.2.1.1.1.1.3.4d	The RMS shall store, in nonvolatile memory, the data necessary for interpreting a message function code (the code within a message used by the RMS to determine the type of message);	T	x	Deferred to ACN-100
5061	3.2.1.1.1.1.3.4e	The RMS shall retrieve maintenance data stored in the RMS and deliver it to the requesting unit upon receipt of a valid command.	T	x	Deferred to ACN-100
5062	3.2.1.1.1.1.4.1a	The RMS shall transfer collected subsystem performance data and status messages to the MDT and MPS upon request;	T	x	Deferred to ACN-100

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

Terminal Doppler Weather Radar
NAS-SS-1000 Volume V Test Verification Requirements Traceability Matrix

Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
5063	3.2.1.1.1.1.4.1b	The RMS shall transfer performance parameter data as a data report to the MPS at a specified interval defined as the key performance parameter cycle time interval;	T	x	Deferred to ACN-100
5064	3.2.1.1.1.1.4.1c	At a specified interval defined as the general status cycle time interval, the RMS shall transfer general status information consisting of a subsystem identifier, a date and time-stamp, and an indication that the subsystem is either 1) in an alarm condition (red status), 2) in an alert condition (yellow status), or 3) operating properly (green status);	T	x	Deferred to ACN-100
5065	3.2.1.1.1.1.4.1d	The RMS shall transfer a state change message when such a change is determined and requires MPS notification. If appropriate, this message includes information indicating a specialist has logged on or off the RMS via an MDT;	T	x	Deferred to ACN-100
5066	3.2.1.1.1.1.4.1e	The RMS shall transfer the diagnostic performance parameter values to either the MDT or the MPS when requested. This request does not imply MPS control;	T	x	Deferred to ACN-100
5067	3.2.1.1.1.1.4.1f	If an alarm or an alert condition is detected, the RMS shall transfer the appropriate alarm or alert message containing measured parameter values to the MPS once.	T	x	Deferred to ACN-100
5068	3.2.1.1.1.1.4.2	All security alarms, either facility or data access, shall be transmitted to the MPS.	T	x	Deferred to ACN-100
5069	3.2.1.1.1.1.4.3a	The RMS shall transfer a message indicating a state change whether the change is due to an automatic process or a command;	T	x	Deferred to ACN-100
5070	3.2.1.1.1.1.4.3b	Upon receipt of an invalid command, the RMS shall transfer a message indicating that the received command is invalid to the source of the input;	T	x	Deferred to ACN-100

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

Terminal Doppler Weather Radar
NAS-SS-1000 Volume V Test Verification Requirements Traceability Matrix

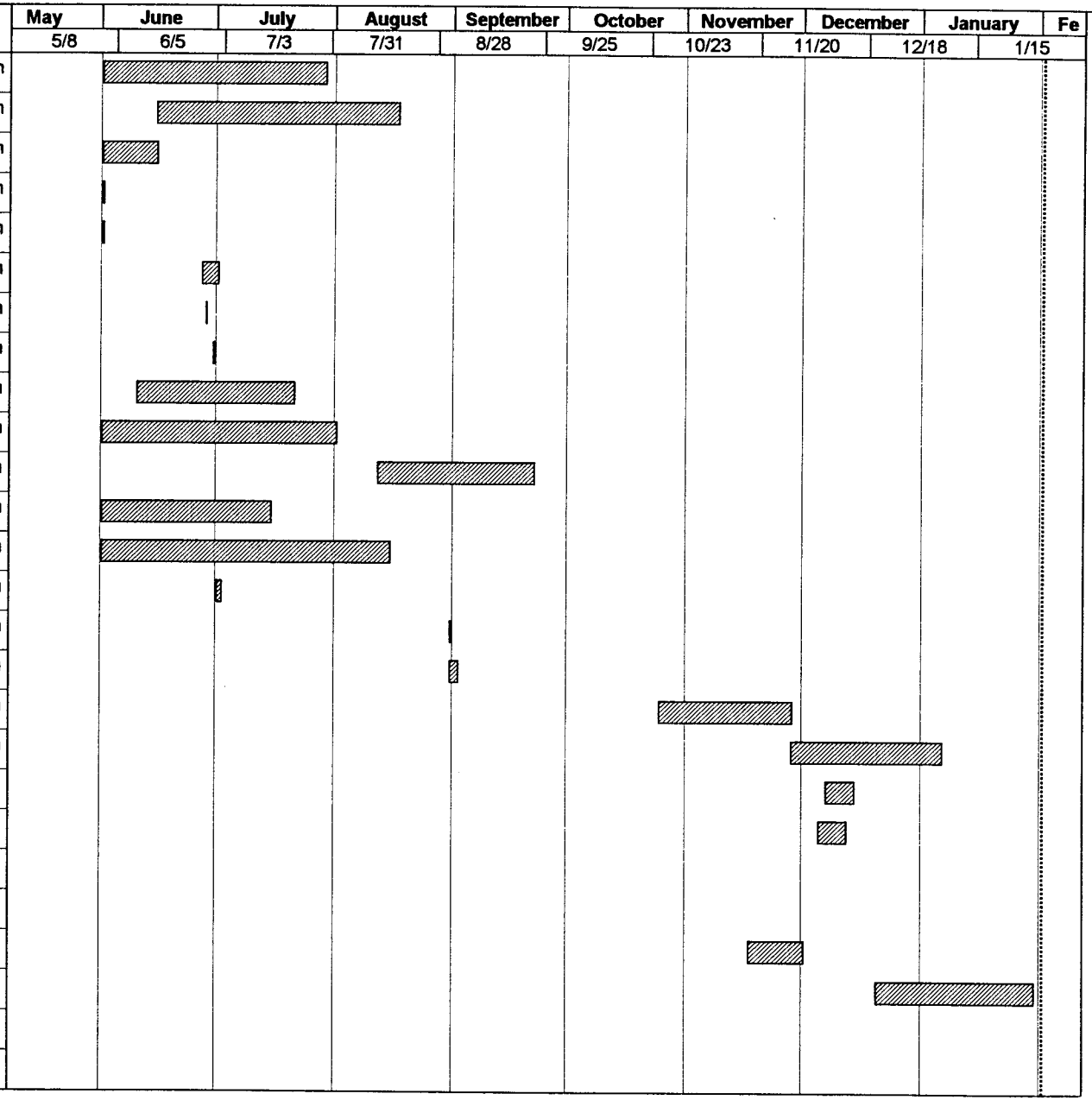
Reqt. ID#	NAS-SS-1000	Description/Title	Verification Level/Method		Remarks
			OT&E Integration	OT&E Operational	
5071	3.2.1.1.1.1.4.3c	The RMS shall report the disabling and enabling of an alarm or an alert as a state change.	T	x	Deferred to ACN-100
5072	3.2.1.1.1.1.4.4a	When an MDT is attached to the RMS port, the RMS shall provide the MDT operator access to the RMMS network provided that the operator satisfies the appropriate security procedures;	T	x	Deferred to ACN-100
5073	3.2.1.1.1.1.4.4b	The RMS shall transmit data in response to a valid request from the MPS and the MDT;	T	x	Deferred to ACN-100
5074	3.2.1.1.1.3a	The NAS subsystem containing the RMS shall contain a dedicated port for attachment of an MDT;	T	x	Deferred to ACN-100
5075	3.2.1.1.1.3b	No RMS function shall interfere with other functions of the RMS or the subsystem of which it is a part.	T	x	Deferred to ACN-100

Verification Methods: T=Test, D=Demonstration, A=Analysis, I=Inspection, x=Not Applicable

APPENDIX B
Test Schedule

Build 5B OT&E

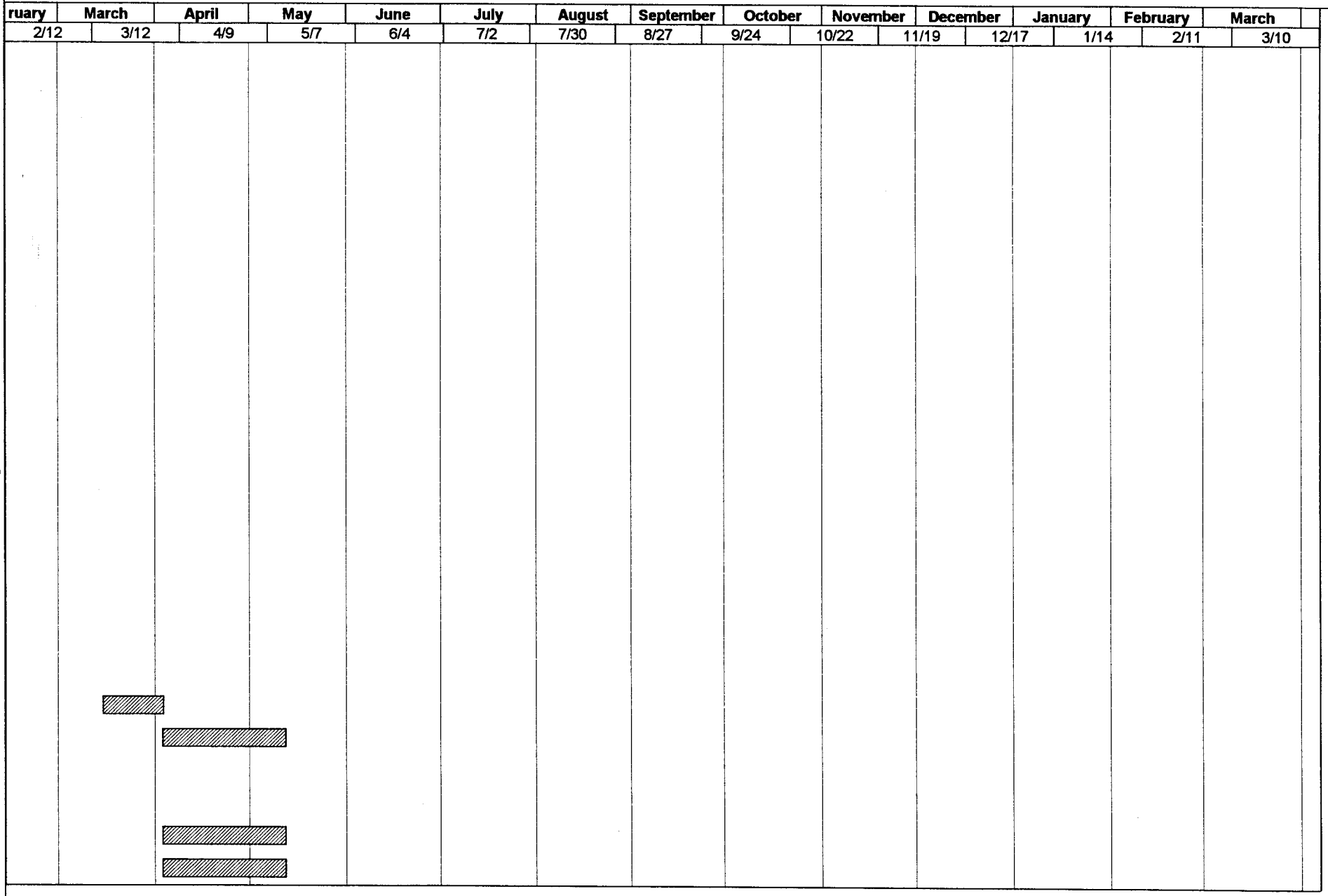
ID	Name	Dura	Scheduled Start
1	Build 5B OT&E INT/OPS Pla	43d	6/1/94 8:00am
2	Test Plan Review	46d	6/15/94 8:00am
3	ATC Questionnaire Draft	11d	6/1/94 8:00am
4	Interface Test (In-Plant) FQT	1d	6/1/94 8:00am
5	24 Hour Test FQT	1d	6/1/94 8:00am
6	Interface Test (On-Site) FQT	5d	6/27/94 8:00am
7	Coordination Meeting (DVX)	1d	6/28/94 8:00am
8	Coordination Meeting (MCO)	1d	6/30/94 8:00am
9	OT&E Shakedown Plan	30d	6/10/94 8:00am
10	Build 5B OT&E Test Procedu	44d	6/1/94 8:00am
11	Test Procedure Review	30d	8/12/94 8:00am
12	ATC Questionnaire Submitted	33d	6/1/94 8:00am
13	OT&E Shakedown Procedure	54d	6/1/94 8:00am
14	LLWAS III Avail DVX (Prototy	1d	7/1/94 8:00am
15	SR Planning Meeting	1d	8/31/94 8:00am
16	FCA/PCA	3d	8/31/94 8:00am
17	Build 5B OT&E INT/OPS Tes	25d	10/25/94 8:00am
18	OT&E Shakedown (Denver)	30d	11/28/94 8:00am
19	LLWAS II OT&E (IAH)	6d	12/7/94 8:00am
20	Build 5B OT&E Quick Look R	6d	12/5/94 8:00am
21	ATC Evaluation - Denver	14d	3/15/95 8:00am
22	Build 5B OT&E Final Report	30d	4/3/95 8:00am
23	Shakedown Quick Look Repor	11d	11/17/94 8:00am
24	Shakedown Final Report	30d	12/20/94 8:00am
25	Weather Testing (Orlando)	30d	4/3/95 8:00am
26	RMS OT&E Final Report	30d	4/3/95 8:00am



Project: BUILD 5B
Date: 2/1/95

Critical
Noncritical
Progress
Milestone
Summary
Rolled Up

Build 5B OT&E



Project: BUILD 5B
Date: 2/1/95

Critical
Noncritical
Progress
Milestone
Summary
Rolled Up