



**DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

TEST ENVIRONMENT DESCRIPTION (TED)

**FOR THE
NEXCOM ENGINEERING DESIGN MODEL (EDM)**

The NEXCOM Integrated Product Team, AND-360

RECORD OF CHANGES

Revision	Date	Action
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1.0 INTRODUCTION

This Test Environment Description (TED) provides the information on the capabilities of the William J. Hughes Technical Center (WJHTC) to support the Rapid Preliminary Development Effort (RPDE). The WJHTC will be the sight for vendor demonstrations of the NEXCOM System Engineering Design Model (EDM) equipment.

1.1 Background

The WJHTC is the national scientific test base for FAA research, development and acquisition programs. The Center conducts tests and evaluations in air traffic control, communications, navigation, airports, and aircraft safety and security. The center's activities include long-range development of innovative systems and concepts, development of new equipment and software, and in-service modifications of existing systems.

The WJHTC has several NEXCOM support laboratories. The NEXCOM Laboratory located in Building 70 hosts the NEXCOM Automated Radio Test bed. The NEXCOM Integration Laboratory (NIL) is collocated with the Radio Communication Equipment / Backup Emergency Communication (RCE/BUEC) Laboratory in the Technical and Administration (T&A) building located on the second (2nd) floor of the red brick laboratories area. Two additional Remote Communications Air/Ground (RCAG) locations are available if required.

Figure 1-1 shows a top-level illustration of the complete NEXCOM System.

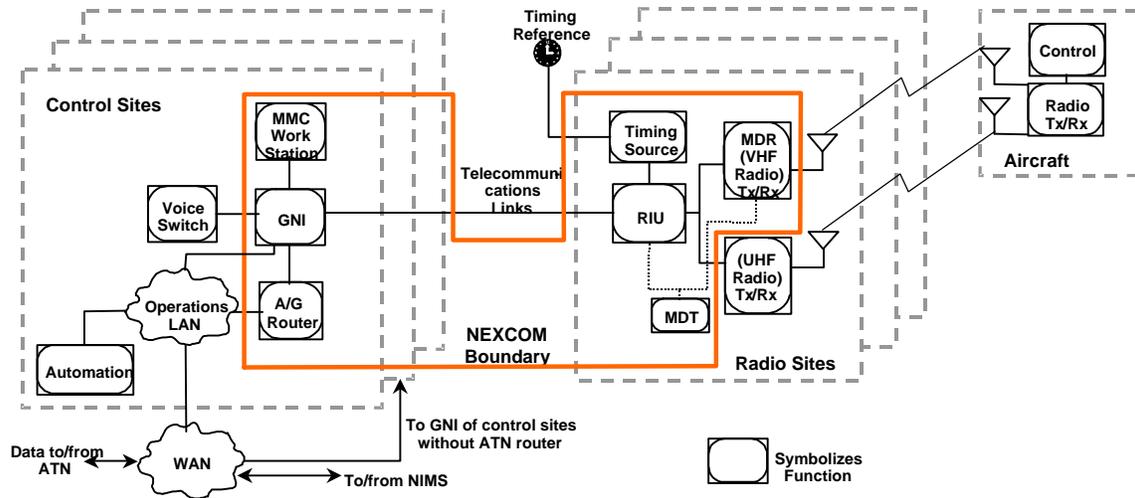


Figure 1-1
NEXCOM System Overview

1.2 Purpose

The purpose of the TED is to provide an overview of the EDM demonstration environment and an understanding of the WJHTC's ability to support vendor demonstration requirements. The vendor should include those capabilities the WJHTC's laboratories can support.

1.3 Scope

The TED identifies the interfaces and their functional capabilities the vendor could utilize to demonstrate EDM is in compliance with the Minimum Threshold Document (MTD).

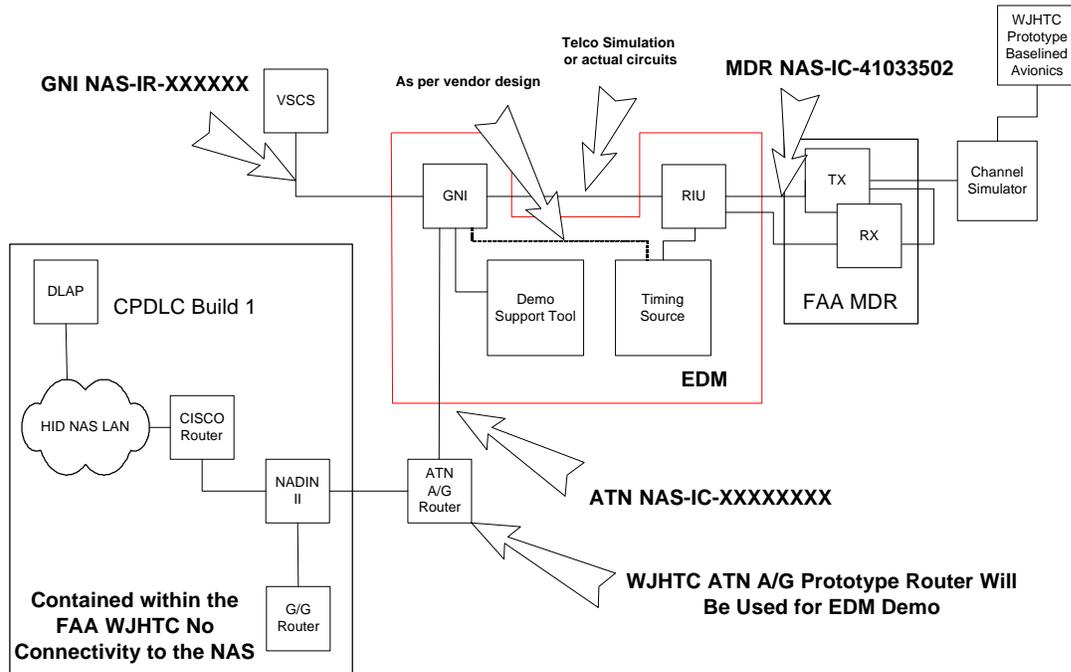


Figure 1-2

EDM Demonstration Environment

The EDM will be demonstrated at the WJHTC. The demonstration environment is illustrated in Figure 1-2.

The interfaces are described by a set of Interface Requirements Documents (IRDs) and Interface Control Documents (ICDs) as indicated in Figure 1-2. The WJHTC will review vendor provided demonstration procedures, witness the EDM demonstrations, and provide results to the Test Evaluation Team (TET) for evaluation.

1.4 Organization

Section 1 states the purpose and scope of the TED. For definitions, the reader needs to refer to Section 1.5 of the SRD.

Section 2 Reference Documents - Lists the applicable referenced documents.

Section 3 Test Environment - Lists the facilities, equipments, etc., that the vendor will be able to use to conduct their EDM demonstrations in compliance with the MTR.

Section 4 Quality Assurance Provisions- Is not applicable to this document.

Section 5 Preparation For Delivery- Is not applicable to this document.

Section 6 Notes- Is not applicable to this document.

2.0 APPLICABLE DOCUMENTS

Doc Number	Doc Title	Doc General Description
FAA-E-2958	NEXCOM System Requirements Document	Describes the complete NEXCOM System level requirements with Subsystem allocations.
NAS-IC-42014000	VSCS Interface Control Document	Describes the electrical and functional requirements for the VSCS to existing Radio Control Equipment interface.
NAS-IC-64024201	VSCS Interface Control Document	Describes the electrical and functional requirements for the VSCS to Backup Emergency Communications Equipment. (BUEC) interface.
NAS-IR-41044210	GNI to Existing VSCE Interface Requirements Document for the NEXCOM GNI	Describes the electrical and functional requirements for interfacing the GNI to the Existing Voice Switching and Control Equipment (VSCE)
NAS-IR-41044201	GNI to VSCS Interface Requirements Document for the EDM	Describes the electrical and functional requirements for interfacing the to Voice Switching and Control System (VSCS) Interface Requirements Document for the NEXCOM GNI Engineering Design Model (EDM)
NAS-IC-41033502	NEXCOM MDR to RIU Interface Control Document	Describes the electrical and functional requirements for interfacing the MDR to the RIU.
ACT33-ID-0001	ATN A/G Router Sub-Network Service Provider to Primary GNI Data port	Describes the design characteristics for the interfaces between the ATN A/G Subnetwork Services (A/G SNS) and the Primary Ground Network Interface Data (PGNI-D) port

3.0 TEST ENVIRONMENT

The following provides a high level description of the test environment available at the WJHTC. During actual vendor EDM Demonstration Technical Interchange Meetings (TIMs) the specific interface requirements for each vendor will be addressed.

3.1 Facilities

The William J Hughes Technical Center is adjacent to the Atlantic City International Airport just off the Atlantic City Expressway at exit #9. The NEXCOM Integration Laboratory is located in the T&A building.

3.1.1 NEXCOM Integration Laboratory

The NEXCOM Integration Laboratory (NIL) contains two VSCS and two Rapid Deployment Voice Switch (RDVS) operator positions with several Grim (12 volt), Intellect (contact closure) and BUEC radio control interfaces, a Telephone Network Simulator, actual telecommunications to buildings #70 and #196, and local access to radio facilities located in the Mock Tower of the T&A building. In addition, the vendors will have access to telephones, desk space, high-resolution video projector, and fax.

3.1.2 Remote Facilities

The NEXCOM Radio Laboratory, Building #70 and additional remote facilities can be used for simulated remote radio sites and/or diversity sites. Note: It has not been determined that actual RF radiation would be required to demonstrate the EDM diversity site functionality requirements.

3.2 Equipment

3.2.1 FAA Provided

The NIL will provide 115VAC, 60 Hz for vendor utilization during the EDM demonstrations. (Note: No DC power will be supplied.) Standard EIA-310 19" racks, several tables, and two workbenches will be provided for vendor utilization.

3.2.1.1 VSCS

The VSCS interface will be limited to the GRIM and BUEC interfaces as specified in the VSCS interface specifications (NAS-IC-42014000, NAS-IC-64024201 respectively). (Note: The VSCS/GRIM/BUEC interfaces do not comply with the additional requirements of the NEXCOM SRD section for VSCE external system requirements. To demonstrate those additional requirements contained in the NEXCOM/VSCS interface specification (NAS-IR-XXXXXX) the vendor will be required to provide their own means (e.g. Demo Support Tool) of accomplishing the demonstrations.)

3.2.1.2 MDR

The FAA will provide production NEXCOM Multimode Digital Radios (MDR) (transmitters and receivers) for vendor utilization during the demonstrations. The quantity required will be addressed in future FAA/Vendor Technical Interchange Meetings (TIMs).

3.2.1.3 ATN A/G Router

The WJHTC's prototype ATN A/G Router (NAS-IC-XXXXXX) will be provided for vendor utilization during vendor demonstrations.

3.2.1.4 Prototype Avionics

The baselined prototype Avionics Radio will be limited to emulating the following: DSB-AM (25 KHz); VDL Mode 3, 4V and 2V2D configurations.

3.2.1.5 Telephone Network Simulator

The NIL will provide a TAS1200 Series II Telephone Network Simulator for emulating the various telephone line variations subject to the VG-6 specification. The TAS could be utilized by vendors to demonstrate that the GNI to RIU communications can accommodate the performance variations of VG telecommunications lines.

3.2.1.6 Leased Telco

The quantity of required lines needs to be identified by vendors at least a year prior to vendor demonstrations to allow sufficient time for the WJHTC to procure the lines.

3.2.1.6.1 Analog

Leased Telco VG-6 zero loss lines (0/0 TLP) will be available between the NIL and the remote facilities (if requested by vendors and required) for demonstration. These lines will comply with FAA Order 6000.22A, VG-6 NT requirements.

3.2.1.6.2 Digital

Leased 56 kbps digital service may be acquired (if requested by vendors and required) for demonstrations. This will be a Class 69a, EIA RS-530, 25 pin, 56 kbps DDC service. This service will comply with FAA Order 6000.47A, DDC requirements.

3.2.1.7 Channel Simulator

The MDRs and Aircraft Radio will be connected via RF cabling and RF attenuators. Standard configuration would include 2 fixed 30dB attenuators and a variable attenuator capable of up to an additional 100dB of attenuation for a single RF channel capability. BUEC and Diversity Site Group demonstration will require an RF combiner and additional attenuators.

3.2.1.8 Simulators (Optional)

3.2.1.8.1 MDR Simulator

The MDR Simulator provides messages that an operational MDR would generate via scripts using a T1 link.

3.2.1.8.2 VSCS Simulator

The VSCS Simulator generates the signals normally seen by a present RCE when linked to a VSCS interface card.

3.2.1.8.3 ATN Simulator

The ATN Simulator supports messages called out in the GNI to ATN ICD.

3.2.2 Vendor Provided

The vendor should develop/provide the equipment needed to adequately demonstrate MTD for EDM. The distance between the unimpeded airspace and the NIL is approximately 250 feet if GPS is used. Therefore the vendor should have adequate cable and capabilities to obtain timing reference if required.

3.3 NIL Personnel

3.3.1 VSCS Operator

The NIL personnel will be available to assist vendors in the front panel utilization of the VSCS operator's position.

3.3.2 ATN A/G Router Operator

The NIL personnel will assist vendors in utilization of the WJHTC Prototype ATN A/G Router.

3.3.3 Prototype Avionics Operator

The NIL personnel will assist vendors in utilization of the WJHTC Prototype Avionics radio.

3.3.4 Channel Simulator

The NIL personnel will assist vendors in utilization of the Channel Simulator.

4.0 QUALITY ASSURANCE PROVISIONS

4.1 General

This topic not applicable to this document.

4.2 Responsibility for Verification

This topic not applicable to this document.

4.3 Reserved

4.4 Verification Methods

This topic not applicable to this document.

5.0 PREPARATION FOR DELIVERY

NEXCOM equipment will be delivered in accordance with section F of the contract/SOW.

6.0 NOTES

6.1 Definitions

This topic not applicable to this document.

6.2 Abbreviations and Acronyms

This topic not applicable to this document.