Dane County Contract Cover Sheet

RES 287
Significiant

Dept./Division	Public Safety Communications / DaneCom
Vendor Name	Harris Corporation
Vendor MUNIS #	3164
Brief Contract Title/Description	Upgrade system to version SR10A.7
Contract Term	unchanged
Total Contract Amount	$ 1,266,919.84

Contract # Admin will assign	10607O
Addendum	☒ **Yes** ☐ **No**

Type of Contract	
☒	**Dane County Contract**
☐	**Grant**
☐	**County Lessee**
☐	**County Lessor**
☐	**Intergovernmental**
☐	**Purchase of Property**
☐	**Property Sale**
☐	**Other**

Purchasing Authority			
☐ **$10,000 or under – Best Judgment** (1 quote required)			
☐ **Between $10,000 – $36,000 ($0 – $25,000 Public Works)** (3 quotes required)			
☒ **Over $36,000 ($25,000 Public Works)** (Formal RFB/RFP required)		**RFB/RFP #**	110100
☐ **Bid Waiver – $36,000 or under** ($25,000 or under Public Works)			
☐ **Bid Waiver – Over $36,000** (N/A to Public Works)			
☐ **N/A – Grants, Leases, Intergovernmental, Property Purchase/Sale, Other**			

MUNIS Req.		Org Code	CPPUBSAF	Obj Code	58161	Amount	$ 1,266,919.84
Req #		Org Code		Obj Code		Amount	$
Year		Org Code		Obj Code		Amount	$

Resolution		
A resolution is required if the contract exceeds $100,000 ($40,000 Public Works). A copy of the Resolution must be attached to the contract cover sheet.		
☐ Contract does not exceed $100,000 ($40,000 Public Works) – a resolution is not required.		
☒ Contract exceeds $100,000 ($40,000 Public Works) – resolution required.	**Res #**	287
☐ A copy of the Resolution is attached to the contract cover sheet.	**Year**	2020

Contract Review/Approvals

Initials	Dept.	Date In	Date Out	Comments
MG	**Received by DOA**	12/2/20		
	Controller			approvals from all departments via email
	Purchasing			attached herein
	Corporation Counsel			
	Risk Management			
	County Executive			

Dane County Dept. Contact Info		**Vendor Contact Info**	
Name	Rich McVicar	**Name**	Rodney Philgren
Phone #	608-283-2911	**Phone #**	630-270-2368
Email	mcvicar@countyofdane.com	**Email**	rphilgre@harris.com
Address	210 Martin Luther King Jr Blvd, Rm 109 Madison, WI 53703-3342	**Address**	340 Marshall Ave, Ste 104 Aurora, IL 60506

Certification: The attached contract is a:	
☒	Dane County Contract without any modifications.
☐	Dane County Contract with modifications. **The modifications have been reviewed by:**
☐	Non-standard contract.

Contract Cover Sheet Signature

Department Approval of Contract		
Dept. Head / Authorized Designee	**Signature**	**Date**
	Printed Name	
	Rich McVicar	

Contracts Exceeding $100,000

Major Contracts Review – DCO Sect. 25.11(3)

Director of Administration	**Signature**	**Date**
	Greg Brockmeyer	12/2/20
	Comments	
Corporation Counsel	**Signature**	**Date**
	David Gault	12/2/20
	Comments	

Goldade, Michelle

From: Goldade, Michelle
Sent: Wednesday, December 2, 2020 1:04 PM
To: Hicklin, Charles; Clow, Carolyn; Gault, David; Lowndes, Daniel; Krohn, Margaret
Cc: Stavn, Stephanie
Subject: Contract #10607O
Attachments: 10607O.pdf

Tracking:

Recipient	Read	Response
Hicklin, Charles		
Clow, Carolyn		Approve: 12/2/2020 1:04 PM
Gault, David	Read: 12/2/2020 2:10 PM	Approve: 12/2/2020 2:13 PM
Lowndes, Daniel		Approve: 12/2/2020 1:11 PM
Krohn, Margaret	Read: 12/2/2020 1:21 PM	Approve: 12/2/2020 1:26 PM
Stavn, Stephanie	Read: 12/2/2020 1:07 PM	

Contract #10607O
Department: Public Safety Communications
Vendor: Harris Corporation
Contract Description: Upgrade System to Version SR10A.7 (Res 287)
Contract Term: 1/4/21 – 12/31/22
Contract Amount: $1,266,919.84

Please review the contract and indicate using the vote button above if you approve or disapprove of this contract.

Thanks much,
Michelle

Michelle Goldade
Administrative Manager
Dane County Department of Administration
Room 425, City-County Building
210 Martin Luther King, Jr. Boulevard
Madison, WI 53703
PH: 608/266-4941
Fax: 608/266-4425
TDD: Call WI Relay 711

2020 RES-287

AUTHORIZING AGREEMENT WITH L3HARRIS CORPORATION FOR DANECOM RADIO SYSTEM UPGRADE

2010 RES-229 authorized Agreement #10607 with Harris Corporation to furnish an interoperable voice radio communications system, which went live in November of 2016.

An upgrade has been negotiated to migrate the system from the 2015 hardware and software platform to the 2021 version for approximately $1,300,000. Funds for the cost are available in the CPPUBSAF5161 Radio System Replacement account.

NOW, THEREFORE BE IT RESOLVED that the Dane County Clerk and the County Executive are hereby authorized to execute this amendment.

AMENDMENT 12 TO SYSTEM PURCHASE AGREEMENT BETWEEN HARRIS CORPORATION AND THE COUNTY OF DANE, WISCONSIN

THIS AMENDMENT 12 TO SYSTEM PURCHASE AGREEMENT (hereinafter "Amendment") is made and entered by and between **THE COUNTY OF DANE, WISCONSIN** ("County") and **HARRIS CORPORATION** ("Harris") now **L3HARRIS TECHNOLOGIES, INC.** ("L3Harris"), a Delaware Corporation acting through its Communication Systems Segment, with its principal place of business located at 221 Jefferson Ridge Parkway, Lynchburg, VA 24501.

WHEREAS, the County and L3Harris previously entered into that certain System Purchase Agreement dated February 7, 2011, ("Original Agreement") for the provision of the System by L3Harris to the County; and

WHEREAS, the Parties previously executed Amendment No. 01 through Amendment No. 11 (the Original Agreement and Amendments No 01 through No 11 are collectively the "Agreement"); and

WHEREAS, the Parties desire to enter into this Amendment for the purpose of supplementing the Agreement to provide for the terms and conditions regarding certain purchases of software, hardware, firmware, and services relating to installation of an upgrade of the System; and

NOW THEREFORE, for and in consideration of the mutual promises of the Parties and other good and valuable consideration, the receipt of which is hereby acknowledged, County and Provider agree as follows:

1. **System Upgrade.** The Parties agree Provider shall provide the goods and services necessary to upgrade the System. The obligations and rights of each Party and the details of the upgrade are further described and defined in the Upgrade Statement of Work ("System Upgrade"), which is attached hereto and incorporated herein as **Exhibit A**. Project shall begin on January 4, 2021.
2. **System Upgrade Price.** The price for the System Upgrade is **$1,266,919.84** ("System Upgrade Price").
3. **System Upgrade Proposal Price Validity.** The prices included in the proposal are valid for this Amendment if executed by both parties by 12/31/2020.
4. **Software FX and Maintenance Price.** Software FX and Maintenance price through December 31, 2022, as contained in Addendum 11, will not be altered with the execution of this System Upgrade. Purchase of additional equipment, and/or increase in scope, may impact maintenance prices in the future.
5. **Payment Terms.** The Provider shall invoice, and the County shall pay net 30 days, the System Upgrade Price in accordance with the invoice milestone schedule listed below. The invoice milestones listed herein shall supersede all milestone payments in the Agreement.
    a. Project Start (1/4/2021) – 10%
    b. CDR completed and Customer Accepted – 25%
    c. Shipment of Equipment – 20%
    d. Installation of Equipment Complete – 10%
    e. FATP completed and Customer Accepted – 15%

f. Final System Acceptance – 20%

6. **Original Agreement Changes.** The following sections from the Original Agreement shall not be applicable to this Amendment:

    a. System Purchase Agreement

        i. Section 40 – Liquidated Damages & Penalties – For the avoidance of doubt, this section shall not apply to Amendment.

7. **Relationship to the Agreement.** The terms and conditions of the Agreement, except as amended and/or supplemented by this Amendment, remain in full force and effect and shall be applicable to this Amendment. Any ambiguity between the provisions of this document and the Agreement shall be interpreted in favor of fulfilling the meaning given to the provisions of the Agreement.

8. **Counterparts.** This instrument may be executed in one or more identical counterparts. Documents signed and transmitted electronically shall be deemed original and binding documents.

[*Signatures Follow*]

Intending to be bound hereby, the Parties hereto have caused this Amendment to be executed, as of the latest date below, by the Parties' duly authorized representatives.

L3HARRIS TECHNOLOGIES, INC.	**THE COUNTY OF DANE, WISCONSIN**
By: Lori A. Rodriguez	By: _____
Name: Lori Rodriguez	Name: _____
Title: Principle, Contracts	Title: _____
Date: December 2, 2020	Date: _____

EXHIBIT A
STATEMENT OF WORK

TABLE OF CONTENTS

STATEMENT OF WORK

Overview

DaneCom provides mission critical communications to first responders serving the people of Dane County. Vital to these services is the L3Harris P25 VHF system. The system also interfaces with three local agencies, Sun Prairie, Middleton, and Fitchburg. The primary and secondary VIDA cores are located at City County Building (CCB) and Madison Community (UW) Tower.

Due to several sub systems, from many different manufacturers, approaching or already in a state of end of life/end of support (EOL/EOS), the system is critically in need of update. In order to reliably operate the system, and ensure essential operational performance, DaneCom must migrate their current SR10A.1 platform to SR10A.7. Along with the L3Harris platform release update, several subsystems need an upgrade/replacement. New features such as ISSI roaming, DFSI interface, and Unitrends system backup will also be realized during this update.

This proposal includes the equipment and services required to upgrade the following:

- Primary and secondary Network Switching Center (NSC) replacements at City County Building (CCB) and EDC.
- Backhaul MPLS router replacement (Qty 11) (Due to end of life)
- Network refresh at sites and dispatch center (Due to end of life)
  - Dane County (Routers – 11 Qty + 4 Qty, Switches – 33 Qty + 6 Qty + 1 Qty)
  - Agencies (Routers – 3 Qty, Switches 3 Qty)
- Site upgrade (Qty – 11)
  - Site software upgrade
  - Network Sentry Upgrade
    - Dane County's SR10A.7 system operations require a minimum of eleven (11) Win 10 Gen IV VIDA Network Sentries (NWS) - one per site.
    - Given Rockdale, Stoughton, WJJO and Deforest already have Gen IV NWSs running Win 7, this proposal includes the necessary licenses and services (Qty 4) to upgrade the Win 7 boxes to Windows 10.
    - NWS assembly replacement will be provided for the Seven (7) NWSs for Dane.
    - With Madison Community Tower and CCB consolidating into Madison UW and Verona sites, the exact number of IO points required to be monitored is unknown at this point. Depending on the usage, IO points can be accurately evaluated, and any additional NWSs required can be ordered as part of the change order process during the Upgrade Plan Review (UPR).

Note: The first two additions would only require assembly kit replacement as the County can leverage their existing brackets, cabling, cross connect and other hardware parts from CCB and Madison County Tower. However, anything above and beyond the two units would require a complete package replacement.

- Sun Prairie has a Gen II NWS that does not qualify for a kit replacement. Hence, services and equipment to cover a complete NWS package for Sun Prairie (Qty 1) will be provided.
- Fitchburg has a GEN III NWS and L3Harris has included NWS IV assembly kit replacement with services to get the box upgraded.

Note: VIDA NWS assembly includes only the network sentry box and Win 10 license. This is not a complete kit and does not include cabling, cross connect panel or other hardware paraphernalia.

- MME replacement (Qty 2)
- SpectraCom GPS receiver replacement
- Site Ru netclocks - Qty 12
- Core non-Ru netclocks – Qty 4

> Network First Gateways – software upgrade to SR10A.7
- Dane – (Qty 3), Agencies – (Qty 4)

> Dispatch Symphony console upgrade (Qty 50)
- Dane County OS upgrade to Windows 10 followed by software upgrade (Qty 40)
- Agencies Windows 10 upgrade followed by software upgrade (Qty 10)

> ISSI redundancy

> Encompass gateway to support DFSI interface with 10 talkpaths

> Unitrend backup servers (2 Qty to support redundancy)

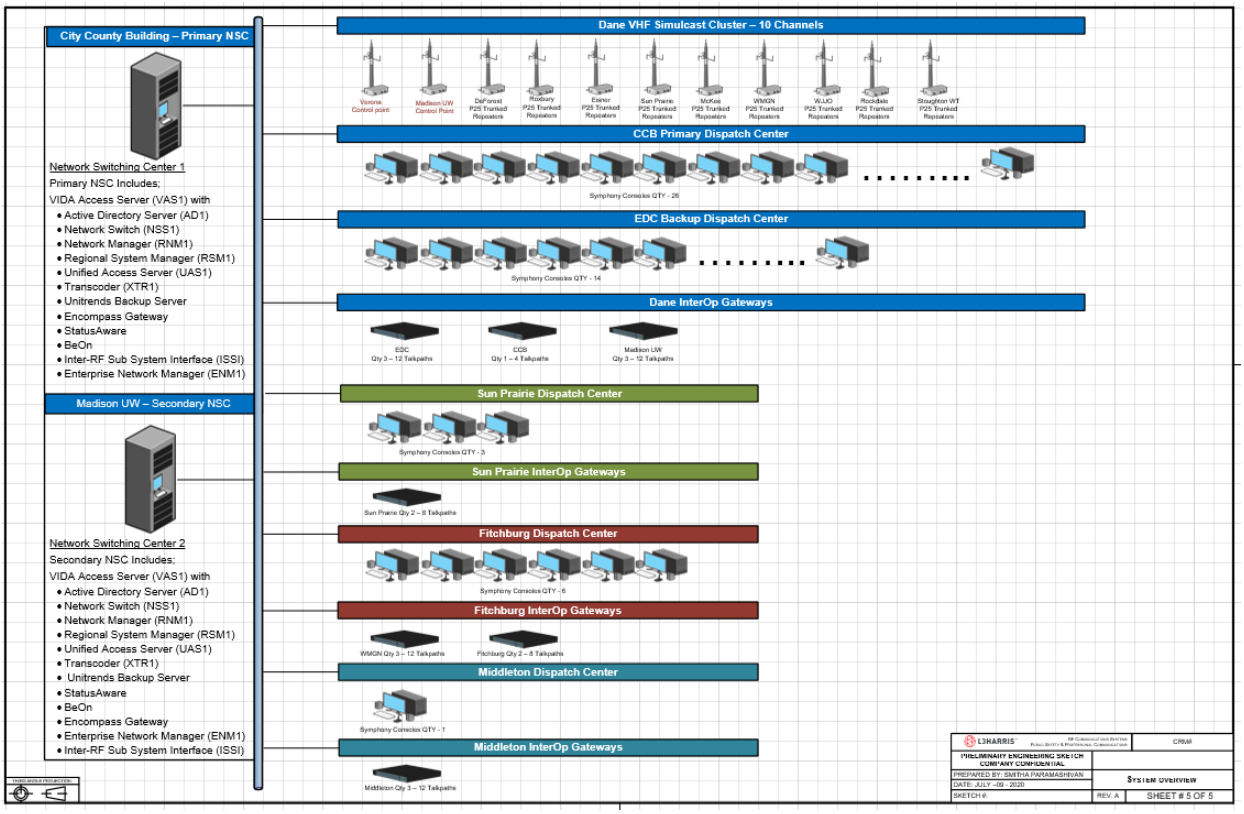
System Features

BASELINE UPGRADE SOLUTION

SR10A.7 HA-NSC VIDA CORE

Figure 1 represents Dane County's SR10A.7 system.

Figure 1. Dane County SR10A.7 System Diagram



The SR10A.7 VIDA core performs all the mission critical services required for a public safety LMR communication environment. The core resides on the VIDA Application Server (VAS) configured using the VMware vSphere hypervisor. VMware vSphere allows a single server to simultaneously run multiple operating systems (OS), each in an independent environment called a virtual machine (VM). The VAS automatically allocates the appropriate; RAM (memory), storage, and networking resources for each VM.

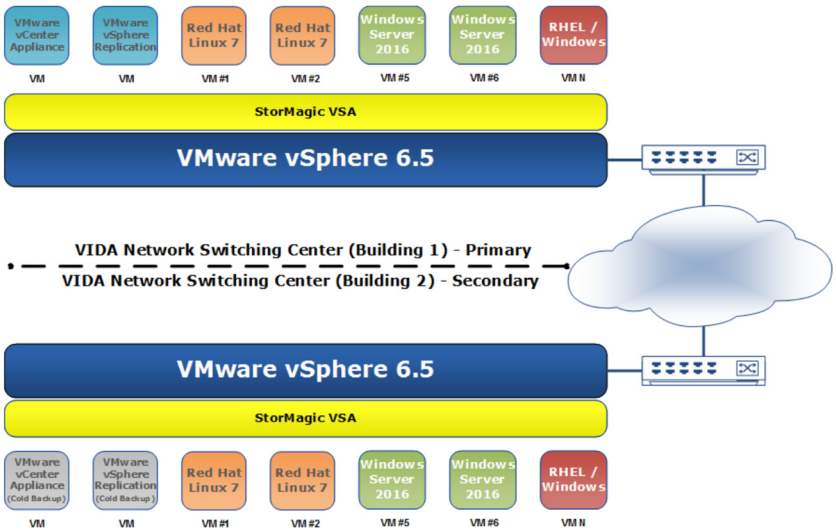
The hypervisor allows virtual machines residing on the VAS to operate with a degree of independence from the underlying physical hardware. Since virtual machines are decoupled from a specific set of physical hardware, virtualization allows for consolidation of physical computing resources (such as CPUs, memory, storage, and networking) into pools of resources that can be dynamically allocated to the VMs it supports.

Geographically-Separated Location HA provides a backup NSC that can be geographically separated from the main NSC. It provides for hardware and geographic redundancy. Location HA ensures network operation continues even if an entire building housing the primary NSC is compromised.

The VIDA cores are configured based on the following concept:

- Critical services perform automatic failover to standby VMs.
- Non-critical services require manual failover.

Figure 2. Typical VIDA Premier VAS with Geo-Separated Location HA



L3Harris VIDA Premier NSC with Geographically Split-High Availability Redundancy

The VIDA solution provides full service high availability failover. For critical services on the primary core, the secondary core takes over in failover. VIDA provides robust performance without compromise; therefore, failover does not mean failure. VIDA networks employ the means to meet mission critical reliability, availability, and maintainability requirements, utilizing centralized services that can include geographically split redundant servers. When operating at distinctly separate geographic and judiciously separated locations (yet fully network interconnected), the system will provide automatic failover capability if a network switch becomes dysfunctional because a server, network, or physical location no longer functions. The High-Availability service on the VIDA core ensures expeditious failover of call routing, ensuring that communications continue with minimal impact to users.

The new VIDA SR10A.7 NSC solution incorporates the use of virtual machines (VM) in the server core. The system block diagram illustrates how virtual machines are arranged to support multiple applications at the same time.

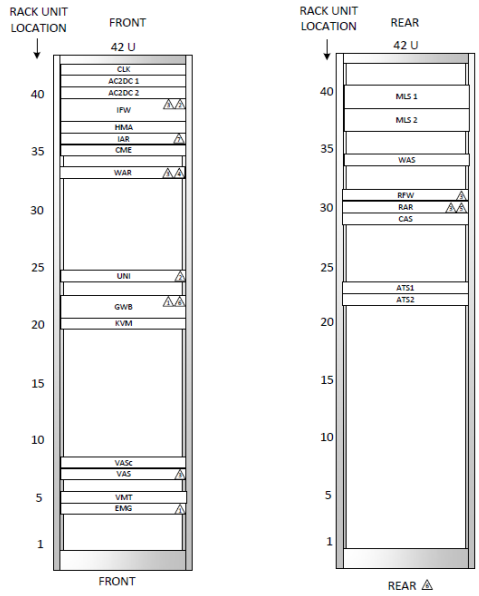
The virtualized servers automatically allocate the appropriate processing, memory and networking resources for each application. The virtualized servers within the VIDA core perform all of the mission critical services required, while reducing hardware, increasing efficiency, and making the most out of the resources for the network.

Virtual servers provide the flexibility and control to manage resources more effectively, reduce costly down time, and provide that extra level of system resilience with key services to keep mission critical users operational. Additionally, a virtual server environment has a number of IT-centric benefits that fully support operations expected in an IT environment, including server redundancy, services monitoring, backup/restore capability and installation/upgrade processes.

The following services are bundled into the standard SR10A.7 VIDA core offering:

- Voice Network Controller (VNIC) – Voice packet switching application
- Unified Administration Server (UAS) – System administration and provisioning

- Regional Network Manager (RNM) – Network Alarm management
- Active Directory – Network security (access control and group profiles)
- Transcoder – Translates between varying vocoders in the digital domain (ADPCM for legacy systems, full rate AMBE, half rate AMBE and BeOn)
- BeOn Foundation – Interfaces radio systems to commercial 3G and 4G carriers
- SUMS 2.0 – Network security (patch management)
- Device Manager – Software configuration for infrastructure
- Activity Warehouse (AW)



REF. DES.	LOCATION (R.u. No.)	LOCATION IN CABINET (FRONT/REAR)	DESCRIPTION	HARRIS NUMBER	VENDOR
CLK	42	Front	Spectracom Netclock	A30-1338-001	SPECTRACOM
AC2DC 1	*41*	*Front*	*Power Supply, Nokia 7705 SAR*	*CM-027501-100105*	*DURACOMM*
AC2DC 2	*40*	*Front*	*Power Supply, Nokia 7705 SAR*	*CM-027501-100105*	*DURACOMM*
IFW	*38*	*Front*	*ASA 5506-X Security Plus Appliance*	*14032-0003-07*	*CISCO*
HMA	*37*	*Front*	*Cisco 881 Router with AC Power*	*14032-0001-76*	*CISCO*
IAR	*36*	*Front*	*Cisco 1100 Router with AC Power*	*14032-0001-86*	*CISCO*
CME	*35*	*Front*	*Cisco 4321 Router -With UC License*	*14032-0001-56*	*CISCO*
WAR	33	Front	Cisco 4321 Router – with Encryption	14032-0001-57	CISCO
RFW	*31*	*Rear*	*Cisco ASA5508X With Security Plus License*	*14032-0003-70*	*CISCO*
RAR	30	Rear	Cisco 3650-24TS-S	14032-0002-07	CISCO
CAS	29	Rear	Cisco 2960-48TT-L	A30-1841-001	CISCO
UNI	*24*	*Front*	*Unitrends RS606 Backup Appliance*	*14033-0004-01*	*UNITRENDS*
ATS 1	*23*	*Rear*	*Automatic Transfer Switch*	*A30-9997-004*	*SERVER TECH*
ATS 2	*22*	*Rear*	*Automatic Transfer Switch*	*A30-9997-004*	*SERVER TECH*
GWB	*21*	*Front*	*Interop Gateway*	*CM-013189-001_B*	*TTM Technologies*
KVM	*20*	*Front*	*Monitor/Keyboard/Mouse/KVM Switch*	*CM-009172-006*	*TRIPPLITE*
VASc	*8*	*Front*	*VIDA Application Server*	*14031-0001-72*	*DELL*
VAS	7	Front	VIDA Application Server	14031-0001-70/71/72	DELL
VMT	*5*	*Front*	*VIDA Management Terminal*	*14031-0001-73*	*DELL*
EMG	*4*	*Front*	*EDACS Migration Gateway*	*14031-0001-73*	*DELL*
MLS 1	*39*	*Rear*	*Nokia 7705*	*14032-0009-01*	*Nokia*
MLS 2	*37*	*Rear*	*Nokia 16 PORT T1/E1*	*CM-027501-100001*	*Nokia*

Items italicized are optional

BASELINE VIDA CYBERSECURITY

The upgraded Dane County system will include security services natively incorporated in the new SR10A.7 system, plus upgraded versions of services found in the legacy system. These include:

- Active Directory (AD)
- Certificate Authority
- McAfee® Endpoint Security and ePolicy Orchestrator (ePO)
- Security Update Management Service (SUMS)
- Firewalls

Active Directory

Microsoft Active Directory (AD) controls access to Dane County network, authenticating users and devices to restrict unauthorized network access. AD authentication is extended to UNIX servers with the integration of One Identity Authentication Services Unix agents, and to networking devices (i.e. Cisco)

through the remote authentication dial-in user service (RADIUS). Active Directory is hosted on redundant virtual servers on the VIDA Application Server (VAS) in the VIDA Core to ensure service availability. Active Directory Group Policy Objects (GPOs) implement security policies, allowing centralized management of baseline security controls in accordance with generally accepted industry standards. The GPOs incorporated in the SR10A.7 release improve the security posture of the system over that of the legacy system.

Certificate Authority

The Windows Certificate Authority (CA) is used in the Dane County Core to provide mutual authentication for web services, and Kerberos authentications for users and systems. The CA is integrated with the AD server to leverage capability, reduce costs, and reduce maintenance of hardware and software.

Anti-Malware and Host Intrusion Detection

The Dane County network will be protected from viruses, malware and zero-day threats by McAfee Endpoint Security. It replaces the VirusScan Enterprise solution used in the legacy system. McAfee Endpoint Security provides both anti-virus and host intrusion detection system (HIDS) functionality and will be installed on all workstation and server operating systems used in the network.

McAfee Endpoint Security monitoring and distribution functions are centrally managed and automated through the use of McAfee's ePolicy Orchestrator (ePO). The ePO server is a virtual machine running on the VIDA Application Server in each Core. The ePO secure web-based console is accessible by any authenticated administrator from any Dane County System Management Terminal.

Patch Management – Software Update Management Service (SUMS)

The Software Update Management Service (SUMS) is L3Harris' solution for managing and implementing system software changes to remediate vulnerabilities. SUMS is a component of the legacy system and will continue to be provided with the system upgrade. Since many malware attacks and exploits target known software defects (bugs), it will be important to regularly patch the Dane County network to prevent exploitation of those vulnerabilities. Patching, however, can negatively affect the operational performance of critical communications LMR systems. To reduce this risk, L3Harris tests patches in a controlled verification and validation laboratory environment prior to production rollout. SUMS provide automated network distribution of the updates.

Firewalls

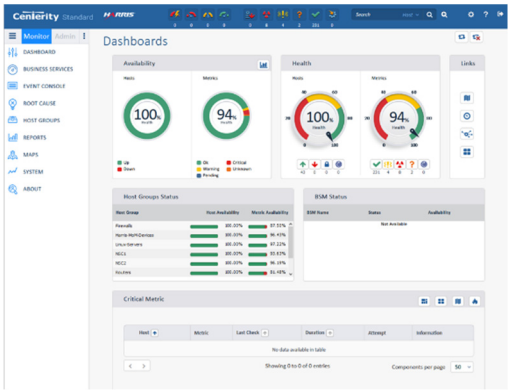
Cisco ASA 5506 appliances provide boundary firewall services and VPN access between the Dane County network and external networks.

ADDITIONAL FEATURES

Additional NSC Servers, Services & Functionality

ENTERPRISE NETWORK MANAGER (ENM)

The L3Harris Enterprise Network Manager (ENM) is an all-in-one network management monitoring platform suited for the entire enterprise; including servers, operating systems, network appliances, database applications and more. It informs and alerts users regarding the state of the network, applications, and hardware through a single web browser interface. The ENM configures for redundancy, operating on both VIDA Cores.



ENM uses the Centerity Monitor Standard software application developed by Centerity Systems. The software installs as a Virtual Machine (VM) on the L3Harris VIDA Application Server (VAS), located at the VIDA Premier Core. The ENM provides extensive server management tools and redundancy for managing the VIDA network. The ENM provides direct management of third-party devices and interfaces directly with the L3Harris Regional Network Manager (RNM) for a unified management system.

L3Harris has determined that the County could require 1900 end point checks to configure and monitor the entire enterprise at the ENM. However, this number could be superfluous depending on the usability. We suggest the County to get acclimatized with the application and assess the requirements and usability so that an optimal number could be obtained for the end points in the future.

Checks over 250 require enhanced offering. Figure 3 describes the different ENM offerings that the County can choose from. Once the Tier is determined, the County can obtain the required pricing information through L3Harris Team.

Figure 3. L3Harris standard ENM offerings

NUMBER OF END POINT CHECKS	LEVEL	FALCON MODEL NUMBER	TIER
250	Base	VS-SH6J	Base
350 to 700	Enhanced	VS-SH6K	Small
750 to 1000	Enhanced	VS-SH6L	Medium
1250 to 3000+	Enhanced	VS-SH6M	Large

STATUSAWARE

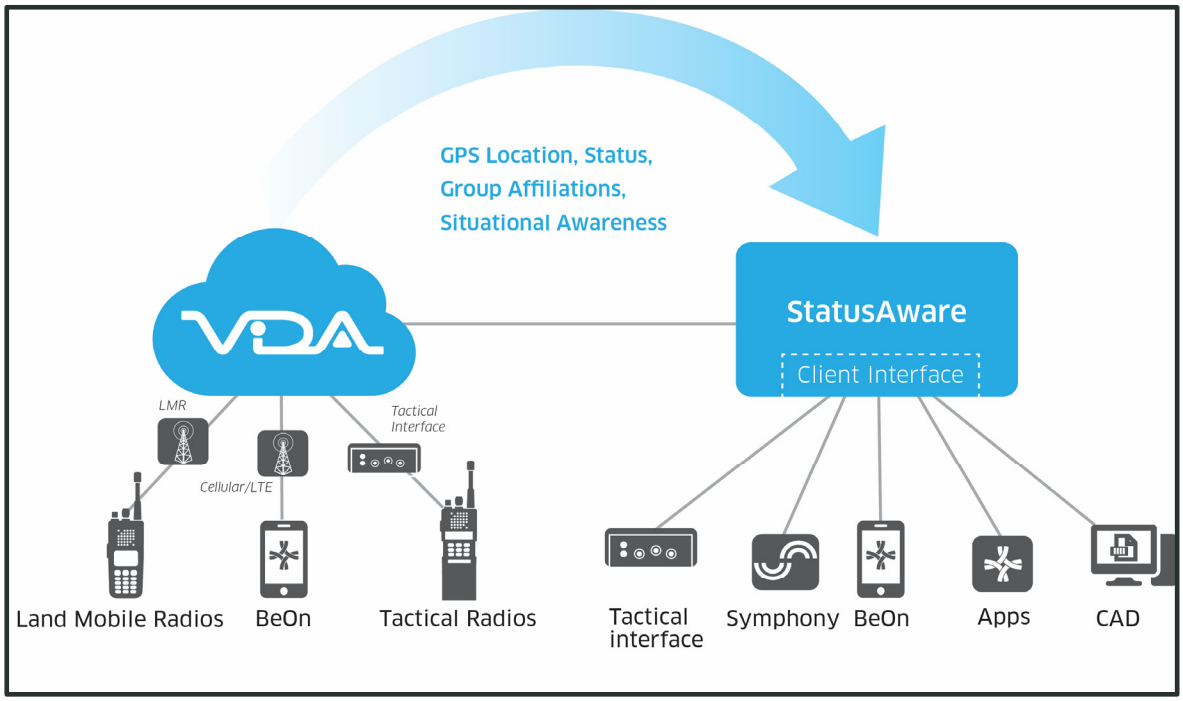
L3Harris StatusAware is a centralized service hosted on the VAS server that collects GPS location information from various communication devices called ‘presentities’, stores it into a central presence service database and notifies the updates to the subscribed applications called ‘watchers’. Previously, CAD/AVL vendors were responsible for providing the Location Service Host System (LSHS) function that

contacted each radio, initiated location updates, received the updates and then forwarded to the mapping function. The StatusAware service (SA-Svc) takes over the LSHS function removing the need to develop and maintain an interface to each radio type in the VIDA system.

SA-Svc provides a single-entry point which reports presence information of various presentities such as P25 radios, BeOn Clients, and Symphony consoles to the subscribed watchers. Applications such as Automatic Vehicle Location (AVL) applications, Computer Aided Dispatch (CAD) systems, or even presentities can subscribe to the SA-Svc to get status updates. The presence service collects information regarding locations, unit availability, permissions, capabilities, and affiliations (e.g., talk group, site, etc.). It is capable of maintaining GPS location updates and other presence data of up to 32,000 unique LMR radio IDs, up to 5,100 simultaneous client connections, 5,000 BeOn clients, and 100 L3Harris clients. Up to 1,000 presentities may be in each watcher's subscription list at any given time. Figure 4 illustrates the Status Aware interface to the VIDA network.

Figure 4. L3Harris StatusAware

A convergence of customizable GPS location updates and Situational Awareness that results in user efficiency and safety.



GPS Updates from P25 Radios

SA-Svc can support Tier 2 operation on P-25 radios complying to TIA/EIA Project 25 standards. In this approach, SA-Svc manually polls the end devices for GPS information on a pre-programmed cadence interval. As a response, the end devices send out data packets with GPS information adding data load to the system. Data-intense operations require careful bandwidth and capacity planning as they add a substantial amount of load on the network. L3Harris MASTR V base stations can now support high-velocity Autonomous Data Channel (ADC) feature that can allocate up to six (6) dedicated FDMA channels exclusively for data communications keeping the voice communication intact.

Alternatively, L3Harris has a unique and innovative proprietary solution called In-Band GPS. This feature allows the radios to push GPS updates during the voice calls by embedding extra data in the active working channel. In-band GPS is unique to L3Harris radios, and allows the system to operate much more efficiently than by utilizing the Tier 2 GPS location update standard.

Scope of Work

L3Harris will provide the scope of services detailed below to upgrade the DaneCom system to SR10A.7 hardware and software:

- System Engineering
- Project Management
- Installation Services
- Training (SR10A.7 maintenance)
- Staging & Shipping

Upon order, L3Harris will build and configure the new NSCs, Vida Network Sentries and CISCO gear to standard L3Harris configuration. After successful staging and testing, L3Harris will ship the equipment to the customer site for installation into the designated equipment rooms.

The L3Harris team will power up the new equipment and perform a system health audit to verify proper installation and function of the new equipment. The L3Harris Team will then configure the new VIDA cores and prepare the system for cutover and acceptance testing.

BACKHAUL UPGRADE

- L3Harris will conduct an audit of the existing MPLS configuration.
- L3Harris will document the recommended changes from SR10A.1 to SR10A.7 based on results from the network audit.
- L3Harris will replace the Ten (10) MPLS V1 routers that are end of life with MPLS V2s running version 9. The Core MPLS routers will be replaced first followed by RF sites.
- The two sites, WJJO and Stoughton already have V2 chassis. The ethernet cards (2 Qty) on these routers are approaching end of life and will be replaced. The firmware on the two V2 routers will be upgraded to Version 9.

NETWORK UPGRADE

- L3Harris will conduct an audit of the existing NSC network configurations, WAN configurations, IP Plan and existing NSC drawings.
- L3Harris will document the recommended changes from SR10A.1 to SR10A.7 based on results from the network audit.
- L3Harris will develop factory network equipment configurations for the new core and validate these configurations during staging including implementing the existing WAN side of the WARs.

- L3Harris will provide standard VIDA NSC network equipment and configure new NSC WAR Routers to provide backward compatibility with existing site network equipment.
- The network gear at the sites and the dispatch center are approaching end of life in May 2021. L3Harris will provide a network refresh at all the 11 RF sites and 2 dispatch centers for Dane, and 3 dispatch centers for the local agencies.
- Network refresh to Dane and local agencies
  - Dane County
  - Dane County (Routers – 11 Qty + 4 Qty, Switches – 33 Qty + 6 Qty + 1 Qty)
    - Sun Prairie – Router – 1 Qty, Switch – 1 Qty
    - Middleton – Router – 1 Qty, Switch – 1 Qty
    - Fitchburg – Router – 1 Qty, Switch – 1 Qty

Spare network equipment replacements are not included in this proposal.

CORE UPGRADE

L3Harris will replace existing CCB and Madison UW Tower NSC cores with new SR10A.7 primary and secondary NSC cores, respectively. These are VIDA Premier NSC cores with location High Availability (HA). The NSC will be comprised of multiple Virtual Servers running in a VM-Ware environment on a single VAS Server. The new SR10A.7 NSCs will include the routers and firewalls to provide network interface to the system backhaul.

L3Harris will leverage the existing network infrastructure, site equipment and reuse valid L3Harris licenses across the system.

Engineering services are included in the Dane County Facility for Power-Up, Final Configuration, Equipment Transition, and Functional Test (FATP) of new SR10A.7 HA-NSC

This SR10A.7 NSC includes Virtual Servers and applications that replicate the same level of functionality as the current legacy system.

Real-Time Applications and Services

- Voice Network Interface Controller (VNIC)
- Transcoding (XCDR)
- Inter System Integration (ISSI)
- BeOn Foundation (BeOn)

Administration and Management Applications and Services

- Unified Administration System (UAS)
- Regional Network Manager (RNM)

- Regional System Manager (RSMPro)

Baseline Cybersecurity Services

- Active Directory (AD)
- McAfee® ePolicy Orchestrator (ePO)
- Security Update Management Service (SUMS)

BeOn Foundation

DaneCom already has L3Harris BeOn Premier licenses capable of supporting up to 500 users. This proposal includes BeOn functionality and will reuse existing BeOn licenses.

ISSI Redundancy (New)

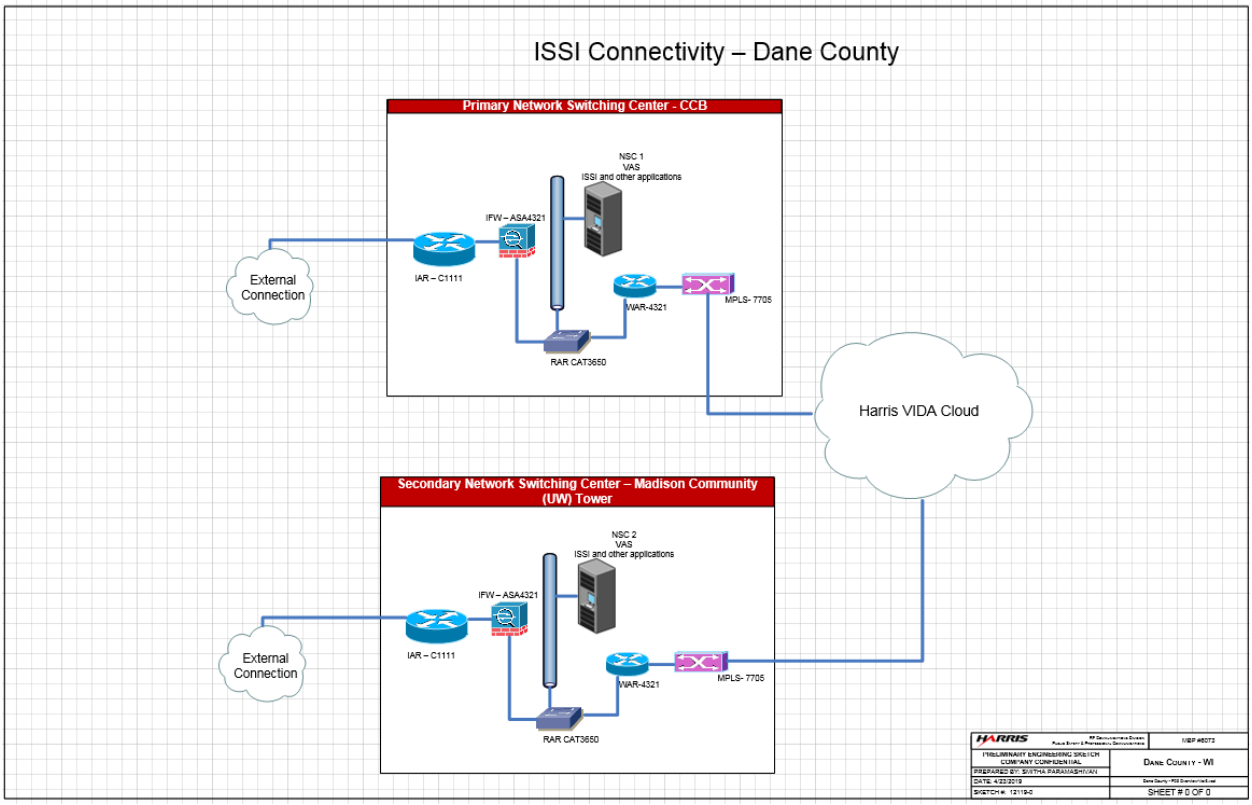
This proposal includes necessary product, equipment and services to support ISSI redundancy

L3Harris will leverage the existing licensing for ISSI software and two (2) external connections.

Necessary services for configuring Dane's side of primary and redundant ISSI is included in the pricing. However, the equipment and services required for the external entities are not part of this contract.

The De-Mark point for the secondary ISSI is the IFW interface ports. Dane County is responsible for connectivity to the external systems.

Figure 5. ISSI Network Connectivity – Dane County



StatusAware (New)

This proposal includes Status Aware offering with Software and licensing to support 100 devices.

StatusAware software and license to monitor the presence information of any 100 end points (P25 radios, BeOn mobile clients) at the external CAD/AVL applications. This contract does not include integration and testing services that is required to interface with external CAD/ AVL applications. When the County is ready to integrate StatusAware with CAD services, the necessary details shall be worked and priced accordingly between the County and the L3Harris Team.

This contract includes server and core components configuration to enable location monitoring of P25 radios (Tier 2 GPS updates) and BeOn mobile clients on BeOn windows User-Interface (UI) and/or Symphony consoles. L3Harris supports Tier 2 and In-Band GPS for GPS location monitoring of P25 radios on StatusAware. Only five to ten radios will be configured to test the setup and not the whole fleet.

Subscriber programming or In-Band GPS configuration is not part of this procurement.

Enterprise Network Manager (ENM) (NEW)

This proposal includes Base Enterprise Network Management offering with Software and licensing to support 250 checks.

Monitoring of 215 checks will be preconfigured by L3Harris during staging to monitor standard NSC functionality. Remaining 35 checks are available for the customer to configure as desired.

Digital Fixed Station Interface (New)

This proposal includes DFSI software and license to support ten talkpaths.

The DFSI interface and required configuration, design and pricing for the new Tait conventional system to be installed at Middleton are not included in this scope and shall be obtained once the local agency is ready for the upgrade.

Unitrend Backup Server (New)

This proposal includes two Unitrend information backing servers as part of the VIDA core.

Logging Recorder/Other Third-Party Interfaces

The scope of this proposal does not include equipment, software or services for logging recorders or other third-party interfaces. Verint V15.2 logging recorder interface has been validated against the L3Harris interface for SR10A.7. DaneCom is responsible for upgrading their logging recorder to be compatible with the SR10A.7 system. The existing core and talkgroup licenses for the two (2) Verint recorders are transferable at no additional cost.

CyberSecurity

> L3Harris will establish standard VIDA baseline cybersecurity as described by Active Directory, McAfee Anti-Virus, and SUMS services in System Description.

> Existing Active Directory user accounts will be migrated to the new system during the upgrade.

> Existing Active Directory Domain and Certificate Authority will be migrated to the new system during the upgrade.

CONTROL POINT AND SIMULCAST CELL UPGRADE

> Verona RF site upgrade to become a Distributed Control Point (DCP), leveraging license from City County Building (CCB).

> Install & Configure new MME Data Mobility Exchange at Verona RF site.

> Install & Configure new network equipment at Verona.

> Madison UW RF site upgrade to become a Distributed Control Point (DCP,) leveraging license from Madison Community (UW) Tower.

> Install & Configure new MME Data Mobility Exchange at Madison UW RF site.

> Install & Configure new network equipment at Madison UW RF site.

> Decommission CCB Control Point (CP) after upgrade.

> Decommission Madison Community (UW) tower CP site after upgrade.

SITE UPGRADE

> Replacement for a subset of the existing end of life SpectraCom GPS receivers is included in this proposal

- Site Ru netclocks – Qty 12
  - One of the two netclocks at all the eleven simulcast sites will be replaced (Qty 11)
  - One (1) Ru netclock is available as a spare
- Core non-Ru netclocks – Qty 4
  - Two (2) non-Ru netclocks will be replaced as part of the Vida Cores
  - Two (2) non-Ru netclocks are included as spares

Note: Depending on the EOL status and maintenance contract, security updates/patching capabilities for these netclocks shall be worked during the Upgrade Plan Review (UPR).

> Station code will be upgraded to latest version.

> Network Sentry Upgrade

- Dane County's SR10A.7 system operations require a minimum of eleven (11) Win 10 Gen IV VIDA Network Sentries (NWS) - one per site.
- Given Rockdale, Stoughton, WJJO and Deforest already have Gen IV NWSs running Win 7, this proposal includes the necessary licenses and services (Qty 4) to upgrade the Win 7 boxes to Windows 10.
- NWS assembly replacement will be provided for the Seven (7) NWSs for Dane.
- With Madison Community Tower and CCB consolidating into Madison UW and Verona sites, the exact number of IO points required to be monitored is unknown at this point. Depending on the usage, IO points can be accurately evaluated, and any additional NWSs required can be ordered as part of the change order process during the Upgrade Plan Review (UPR).

Note: The first two additions would only require assembly kit replacement as the County can leverage their existing brackets, cabling, cross connect and other hardware parts from CCB and Madison County Tower. However, anything above and beyond the two units would require a complete package replacement.

- Sun Prairie has a Gen II NWS that does not qualify for a kit replacement. Hence, services and equipment to cover a complete NWS package for Sun Prairie (Qty 1) will be provided.
- Fitchburg has a GEN III NWS and L3Harris has included NWS IV assembly kit replacement with services to get the box upgraded.

Note: VIDA NWS assembly includes only the network sentry box and Win 10 license. This is not a complete kit and does not include cabling, cross connect panel or other hardware paraphernalia.

> Dispatch Upgrade

- A total of 50 Symphony consoles will be reimaged to Windows 10 and upgraded to SR10A.7 software;
  - CCB (Qty 21),

- EDC (Qty 14),
- Test Consoles (Qty 5)
- Local Agencies (Qty 10)
- Sun Prairie (Qty 3)
- Middleton (Qty 1)
- Fitchburg (Qty 6)

Acceptance Testing

L3Harris will perform system acceptance testing per the attached functional acceptance test plan (FATP). The L3Harris Upgrade Team notifies the Dane County when installation and upgrade are complete, and the system is ready for acceptance testing.

System Documentation

L3Harris will provide typical as-built documentation for system upgrades which include:

- Rack configuration drawings,
- Revised network schematics,
- S/W Audit
- Configuration Files
- Technical Manuals and Users Guides for the new components

Migration Strategy

UPGRADE TO SR10A.7 – METHODOLOGY

The procedure for system upgrade usually consists of four main phases:

- Upgrade Preparation and Planning
- Core Infrastructure Replacement
- Network Updates
- Sites and Dispatch Upgrades

Each phase is completed and the system evaluate for stability before proceeding to the next phase. A summary of tasks required to provide trouble free migration is as follows:

Backhaul Upgrade – Through Replacement and Patching

MPLS routers with V1 chassis will be replaced with V2 chassis.

1. Review current MPLS configuration, capacity and hardware.
2. Identify current network equipment and design
3. Determine what network equipment can be re-used (if any) and what must be replaced
4. Replace any necessary hardware
5. Upgrade any hardware being re-used
6. Reconfigure network as required to support the upgrade path
7. Test and Burn-In new configuration to prove stability

Core Upgrade – Through Replacement

A core replacement will provide the quickest and most seamless upgrade. This method will allow off-site staging & testing to be performed and will ensure the core works as expected before delivery to site. Then, installing the new equipment rack in close proximity to the existing rack allows for straight forward network cable moves to put the new system into service.

The core replacement method of upgrade typically consists of the following basic steps:

1. Ensure current system HA capability is functioning properly
2. Migrate existing databases.
3. Split cores (NSC1 is Active)
4. Cutover NSC2
5. Failover to new NSC2
6. Preliminary Functional Testing
7. Burn-in period to prove stability
8. Cutover NSC1
9. Preliminary Functional Testing
10. Heath Check
11. Test and Burn-In new configuration to prove stability
12. Perform Functional Plan

Active Directory integration: For small to medium size upgrades the engineer will unjoin & rejoin peripherals (NWS's, consoles, SMT's) to the VIDA Active Directory domain. This is done to reduce service interruption while the cores are being replaced. Large systems with a large number of peripherals will require a different approach. In this case, special procedures are followed to migrate the existing Active Directory to the new cores.

Network – Review Current Network Configuration, Capacity and Hardware

Typical network upgrades follow the basic steps below:

1. Identify current network equipment and design

2. Determine what network equipment can be re-used (if any) and what must be replaced
3. Replace any necessary hardware
4. Upgrade any hardware being re-used
5. Reconfigure network as required to support the upgrade path
6. Test and Burn-In new configuration to prove stability

Simulcast Cell Upgrades

Each Simulcast cell must be upgraded (i.e. not site-by-site) If the cell has by-pass capability it is recommended to go into bypass to reduce service interruption. The basic order of upgrade is the same as for Multi-Site with some modifications:

1. Read out NWS, MME and Base station personalities for all sites
2. Upgrade Personalities to the desired version
3. Cross-Reference original and upgraded personalities for errors and/or required changes
4. Switch to Bypass and disconnect Bypass site from network
5. Upgrade All Base stations simultaneously
6. Write Upgraded Personality simultaneously
7. Upgrade MME's
8. Write Upgraded Personality
9. Upgrade NWS's
10. Write Upgraded Personality
11. Switch out of bypass
12. Confirm Functionality
13. Upgrade Bypass site while disconnected
14. Reconnect Bypass sit
15. Test Control Point Failover
16. Confirm Functionality

Simulcast cells should not experience differing behavior between upgraded vs. non-upgraded sites as they will be all be simultaneously upgraded to the same version of code. But there could still be issues when roaming between the simulcast cell and other older version sites

Dane County – Interoperable Voice Radio Communications System

Primary Network Switching Center

ISSI VM

Primary NSC

26 S… Consoles & Back-up Control Stations

WA R

Alcatel 7705

City County Building (CCB)

Secondary Network Switching Center

Seconda ry NSC

WA R

Alcatel 7705

Madison Community (UW) Tower

FIBER

Subsystem

Sun Prairie

SAR

3 Symphony Consoles

NWS V2

Middleton

SAR

1 Symphony Console

Fitchburg

SAR

6 Symphony Consoles

NWS V3

Backup Dispatch Center

SAR

…4 Symphony Consoles & Back-up Control Stations

9 Tx Sites

P25 Trunked VHF Countywide Voice System

Distributed Control Point(DCP) Site

DCP at Verona

Distributed Control Point(DCP) Site

DCP at Madison UW

MICROWAVE BACKHAUL

*

**

VHF Analog Paging System

9 Sites

UHF Siren Control System

Main and Backup

Conventional Analog Tactical Channels

VHF Conventional Mutual Aid System

3 TX Sites

5 RX Sites

HARRIS

* Brigham T1 Connectivity

** DeForest Fiber Connectivity

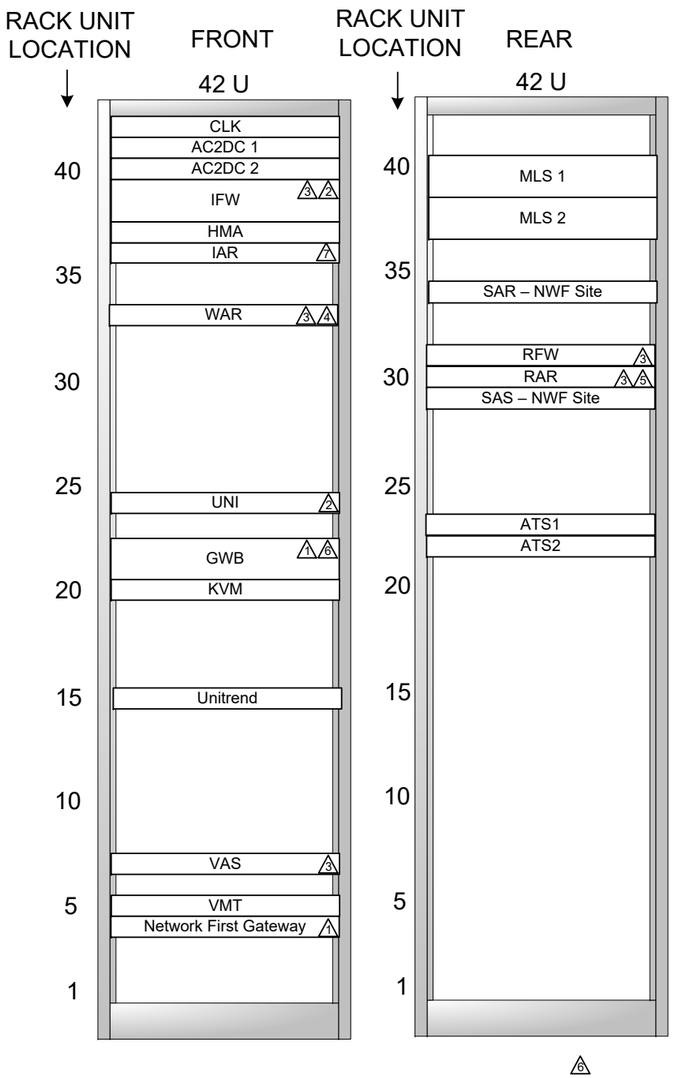
THIRD ANGLE PROJECTION

DANE COUNTY - WI

03_Dane County System Drawings_Final.vsd

L3HARRIS™ RF Communications Systems Public Safety & Professional Communications		CRM#
PRELIMINARY ENGINEERING SKETCH COMPANY CONFIDENTIAL		
PREPARED BY: SMITHA PARAMASHIVAN	**DANE RADIO SYSTEM**	
DATE: JULY –09 - 2020		
SKETCH #:	REV. A	SHEET # 1 OF 5

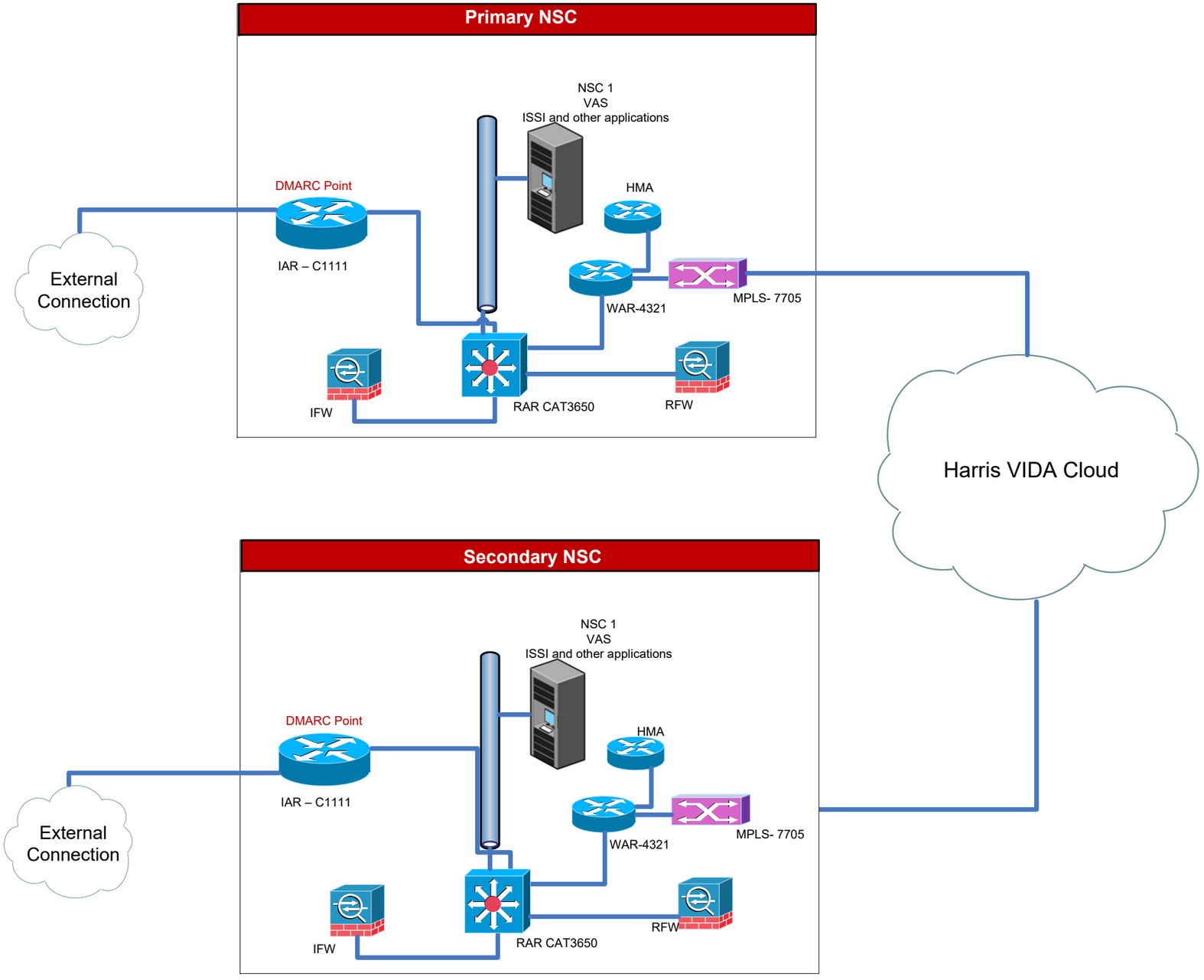
Dane SR10A.7 PLUS UPGRADE – NSC RACK- UP



L3HARRIS™ RF Communications Systems Public Safety & Professional Communications		CRM#
PRELIMINARY ENGINEERING SKETCH COMPANY CONFIDENTIAL		
PREPARED BY: SMITHA PARAMASHIVAN		NSC Rack Up
DATE: JULY –09 - 2020		
SKETCH #:	REV. A	SHEET # 2 OF 5

THIRD ANGLE PROJECTION

Dane SR10A.7 UPGRADE – ISSI CONNECTIVITY



THIRD ANGLE PROJECTION

L3HARRIS — RF Communications Systems, Public Safety & Professional Communications		CRM#
PRELIMINARY ENGINEERING SKETCH COMPANY CONFIDENTIAL		
PREPARED BY: SMITHA PARAMASHIVAN		ISSI
DATE: JULY –09 - 2020		
SKETCH #:	REV. A	SHEET # 3 OF 5

SR10A.7 System

Primary Network Switching Center & Control Point

21 Symphony Consoles, Back-up Control Stations & 5 Spare Consoles

Primary NSC includes
-Network Switching (NSS)
-Unified Admin. System (UAS)
-Central Manager System (CMS)
-Regional Network Mgr (RNM)
-Voice Network Interface Controller(VNIC)
-Site Management System(SMS)
-Unified Audio Card(UAC)
-Active Directory(AD)
-DFSI with 10 talkpaths

Border Firewal

WISCOM P25 System

WAR

Alcatel 7705

City County Building (CCB)

Secondary Network Switching Center & Control Point

Primary NSC includes
-Network Switching (NSS)
-Unified Admin. System (UAS)
-Central Manager System (CMS)
-Regional Network Mgr (RNM)
-Voice Network Interface Controller(VNIC)
-Site Management System(SMS)
-Unified Audio Card(UAC)
-Active Directory(AD)
-DFSI with 10 talkpaths

WAR

Alcatel 7705

External Internet

Border Firewal

Madison Community (UW) Tower

Backup Dispatch Center

14 Symphony Consoles & Back-up Control Stations

SAR

FIBER

FIBER

MICROWAVE BACKHAUL

VHF Simulcast Site — DeForest
Alcatel 7705 — P25 VHF Trunked Rptrs 10 Channels — NWS V4

VHF Simulcast Site — Roxbury
Alcatel 7705 — P25 VHF Trunked Rptrs 10 Channels — NWS V4

VHF Simulcast Site — Eisner
Alcatel 7705 — P25 VHF Trunked Rptrs 10 Channels — NWS V4

VHF Simulcast Site — Sun Prairie
Alcatel 7705 — P25 VHF Trunked Rptrs 10 Channels — NWS V4

VHF Distributed Control Point Site — Verona
Alcatel 7705 — P25 VHF DCP site — NWS V4

VHF Simulcast Site — McKee
Alcatel 7705 — P25 VHF Trunked Rptrs 10 Channels — NWS V4

VHF Simulcast Site — WMGN
Alcatel 7705 — P25 VHF Trunked Rptrs 10 Channels — NWS V4

VHF Distributed Control Point Site — Madison UW
Alcatel 7705 — P25 VHF Trunked Rptrs 10 Channels — NWS V4

VHF Simulcast Site — Stoughton WT
Alcatel 7705 — P25 VHF Trunked Rptrs 10 Channels — NWS V4

VHF Simulcast Site — Rockdale
Alcatel 7705 — P25 VHF Trunked Rptrs 10 Channels — NWS V4

VHF Simulcast Site — WJJO
Alcatel 7705 — P25 VHF Trunked Rptrs 10 Channels — NWS V4

HARRIS

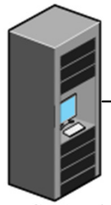
DANE COUNTY - WI

L3HARRIS — RF Communications Systems — Public Safety & Professional Communications — 01_Dane County System Drawings_Final.vsd CRM#

PRELIMINARY ENGINEERING SKETCH COMPANY CONFIDENTIAL	
PREPARED BY: SMITHA PARAMASHIVAN	P25 SYSTEM DESIGN
DATE: JULY –09 - 2020	
SKETCH #:	REV. A — SHEET # 4 OF 5

THIRD ANGLE PROJECTION

City County Building – Primary NSC



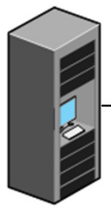
Network Switching Center 1

Primary NSC Includes;

VIDA Access Server (VAS1) with

- Active Directory Server (AD1)
- Network Switch (NSS1)
- Network Manager (RNM1)
- Regional System Manager (RSM1)
- Unified Access Server (UAS1)
- Transcoder (XTR1)
- Unitrends Backup Server
- Encompass Gateway
- StatusAware
- BeOn
- Inter-RF Sub System Interface (ISSI)
- Enterprise Network Manager (ENM1)

Madison UW – Secondary NSC



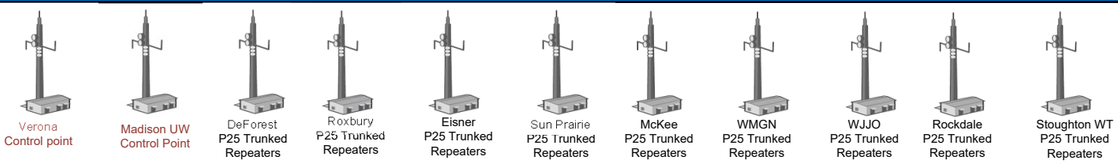
Network Switching Center 2

Secondary NSC Includes;

VIDA Access Server (VAS1) with

- Active Directory Server (AD1)
- Network Switch (NSS1)
- Network Manager (RNM1)
- Regional System Manager (RSM1)
- Unified Access Server (UAS1)
- Transcoder (XTR1)
- Unitrends Backup Server
- StatusAware
- BeOn
- Encompass Gateway
- Enterprise Network Manager (ENM1)
- Inter-RF Sub System Interface (ISSI)

Dane VHF Simulcast Cluster – 10 Channels



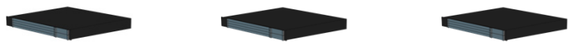
CCB Primary Dispatch Center

Symphony Consoles QTY - 26

EDC Backup Dispatch Center

Symphony Consoles QTY - 14

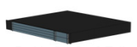
Dane InterOp Gateways



Sun Prairie Dispatch Center

Symphony Consoles QTY - 3

Sun Prairie InterOp Gateways



Sun Prairie Qty 2 – 8 Talkpaths

Fitchburg Dispatch Center

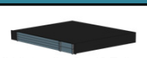
Symphony Consoles QTY - 6

Fitchburg InterOp Gateways

Middleton Dispatch Center

Symphony Consoles QTY - 1

Middleton InterOp Gateways



Middleton Qty 3 – 12 Talkpaths

THIRD ANGLE PROJECTION

L3HARRIS™ RF Communications Systems Public Safety & Professional Communications		CRM#
PRELIMINARY ENGINEERING SKETCH COMPANY CONFIDENTIAL		
PREPARED BY: SMITHA PARAMASHIVAN	SYSTEM OVERVIEW	
DATE: JULY –09 - 2020		
SKETCH #:	REV. A	SHEET # 5 OF 5

IMPLEMENTATION PLAN

Project Management Team

The L3Harris Team has implemented over 500 large-scale radio communications systems throughout the world. These systems include many of the largest networks for public-safety, utility, and transit customers in the industry. Given this decade long success, The L3Harris Team has a reputation for building strong, cohesive project teams

THE L3HARRIS TEAM

The below details describe The L3Harris Team assigned to the project. It also reflects the various support and management functions that will provide critical program and technical assistance throughout the course of the project. Following is a brief description of the key team members and the roles that they will perform.

Project Manager

This manager's primary responsibility is the successful implementation, integration, optimization, and acceptance of the project. The project manager will manage all phases of the project from the beginning through acceptance. He or she is responsible for ensuring the progress and quality of work, managing overall project cost, and processing any contract changes. All official communications regarding the project will be held between the project manager and Dane County.

Once the contract is signed, the project manager and the implementation team will work to prepare for the upcoming installation. The project manager will determine when site surveys are required and will assign a site survey team to begin work. Through the support of L3Harris' procurement, manufacturing, and order logistics functions, the project manager will ensure the ordering and shipping of materials and equipment. In addition, he or she will ensure that services are coordinated in support of the project schedule.

The project manager's responsibilities include but are not limited to the following:

- Managing all aspects of the project
- Setting up and managing the project team
- Conducting project activities according to the contract and within scope, quality, time, and cost constraints
- Developing a formal project schedule and updating it as necessary
- Reviewing, approving, and distributing all plan changes
- Managing risks
- Project Communications, team progress meetings, and issue resolution

System Engineer

The system engineer will have full technical responsibility for the technical implementation of the proposed system solution. He or she will be responsible for integrating standard L3Harris products as well as vendor products (agreed to in the system purchase contract). The system engineer will also participate in all technical review meetings and provide technical support to the project manager.

The system engineer will oversee the system acceptance test defined by the contract as the Acceptance Test Plan (ATP). In addition, the system engineer will provide technical support to the Technical Publications department for provision of as-built drawings and other technical documentation deliverables.

- Create an upgrade & transition plan to accomplish the desire system upgrade
- Order, stage, configure and test replacement equipment
- Oversee installation and power up of replacement equipment
- Perform network and core upgrades, transition new equipment in to service
- Provide instruction for site and dispatch upgrades as defined by the scope of work

PROJECT EXECUTION

Design Reviews

Kickoff Meeting and Preliminary Planning Review

The project manager will initiate the project with a Project Kick-off Meeting followed by a Preliminary Upgrade Planning Review.

The objectives of the meeting include:

- Introduction of all project participants
- Review of the roles of the project participants
- Review of the overall project scope and objectives
- Review of the current site status
- Review planned post-upgrade system configuration
- Review migration strategy and functional test plans
- Review of the project schedule

Figure 1. Upgrade/Implementation Review Responsibility Matrix

TASKS	L3HARRIS	DANE COUNTY	COMMENTS
Review SR10A.7 Upgrade Contract Requirements	X	X	
Identify Resources	X	X	
Prepare an SR10A.7 Core Design Document detailing the hardware, OS software and applications which will be provided	X		
Provide a System Upgrade Plan which includes Project Team roles, responsibilities, structures and tasks and delineating L3Harris and Dane county responsibilities	X		
Provide a Project Schedule	X		
Prepare SR10A.7 Test Plan	X		
Conduct Implementation Plan Review Meeting	X	X	
Approve* the SR10A.7 Design Document		X	
Approve* the System Upgrade Plan		X	
Approve* the Project Schedule. Project will not proceed without County approval, L3Harris will work with the County to secure an approved Project Schedule		X	

Manufacturing and Staging

The project team will procure material and schedule manufacturing using its Enterprise Resource Planning system. The factory will receive orders to manufacture the equipment. In addition, vendor/subcontractor items will be ordered. Factory specifications will define the test for each individual rack of equipment.

After manufacturing and test, factory technicians and system engineers will assemble the equipment in the factory staging facility. The system engineers will work with staging technicians to make all intra-rack connections for each site's equipment. Ethernet cable connections will simulate transmission networks and ensure the demo site equipment connects to the network switches and consoles. Technicians will set the IP addresses and verify operation of the network. Consoles will be set up to demonstrate dispatch operation. System levels will be verified, and all features will be tested to signify the system is ready for shipping.

Figure 2. Manufacturing Responsibility Matrix

TASKS	L3HARRIS	DANE COUNTY	COMMENTS
Place orders with the factory	X		
Place orders with key suppliers/vendors	X		
Manufacture all infrastructure equipment	X		

TASKS	L3HARRIS	DANE COUNTY	COMMENTS
Assemble, configure & test equipment in Lynchburg staging area	X		
Break down equipment and ship	X		
Receive equipment & provide temporary storage near NSC locations	X		

Shipping, Warehousing and Inventory

At the end of staging, the equipment will be prepared for delivery to Dane County. Each rack will be crated to ensure safe transportation. L3Harris arranges to ship equipment and materials to a customer-provided storage area near the point of installation where it will be received. At the storage area, the equipment is inventoried, and the material is collected for delivery to the installation sites.

Figure 3. Shipping, Warehouse & Inventory Responsibility Matrix

TASKS	L3HARRIS	DANE COUNTY	COMMENTS
Break down equipment and ship to storage area	X		
Provide temporary storage prior to installation	X		
Inventory equipment	X		
Validate L3Harris equipment inventory		X	
Collect all equipment on a per site basis, ready for the installation teams.	X		

System Installation, Upgrade and Transition

Upon completion of the upgrade planning reviews, the project team's first installation priority will be to work with the Dane County to coordinate the installation and upgrade activities.

The installation team will install the new equipment at the locations disclosed in the system design and integrate the proposed subsystems as described in the Scope of Work to provide an end-to-end network solution.

Systems for hardware replacement and installation include:

- Core Network Switching Center upgrade

Systems requiring software only upgrade include:

- P25 radio system/sites upgrade
- Dispatch consoles upgrade

The installation plans will be developed during the detailed planning phase of the project. The installation plan will coordinate all activities of the project team, minimizing conflicts and ensuring that system implementation proceeds efficiently. Where currently operational communications equipment

co-exists with the installation of new equipment, the project team will take great care to ensure that there is little or no disruption in service.

Disposition of Removed Equipment

All equipment currently owned by the County, which may be removed or replaced due to the system upgrade or for any other reason, shall remain the sole property of the County. As such, the County may disposition the equipment at the County's sole discretion.

Figure 4. System Upgrade Tasks

TASKS	L3HARRIS	DANE COUNTY	COMMENTS
Backup all the UAS, KMF, & RNM Databases	X		
Backup all the NSS (VNIC & HA), RSMPro (SMS, DM Repository, AW), & ISSI Personality/Configuration files	X		
Archive AW data	X		
Verify that all database backups are completed	X		
Ship equipment to NSC locations	X		
Provide install space adjacent to legacy NSC Cabinets		X	
Install new Servers in Racks/Cabinets	X		
Failover to Secondary NSC's	X		
Connect primary NSC's to Network	X		
Failover back to primary NSCs	X		
Confirm call processing with new primary NSCs	X	X	
Restart the UAS VM and ensure provisioning is working between devices within the primary NSC	X		
Complete post upgrade Tests and Burn-in for minimum 24 hours	X	X	
Conduct post Primary NSC upgrade meeting – proceed decision point.	X	X	
Upgrade secondary NSCs & Test	X		
Return decommissioned equipment to the customer	X		
Dispose decommissioned equipment		X	

Site & Dispatch Installation, Upgrade and Transition

Upon installation of new Network Core System, the system engineer will work with the on-site system support specialists to upgrade the sites and consoles in preparation for acceptance testing.

Figure 5. Sites & Consoles Upgrade Tasks

TASKS	L3HARRIS	DANE COUNTY	COMMENTS
P25 Radio Sites			
Upgrade 11 P25 Sites:			
> Channel Site Pro's	X		
> Network Sentry	X		
> MME	X		
> Upgrade (2) P25 sites to DCP sites	X		
Perform Site High Level Functional Test	X		
Upgrade remaining P25 Radio Sites	X		
Dispatch Console			
> Upgrade Test Console Application Software	X		
> Perform Console High Level Functional Tests	X		
> Upgrade remaining Dispatch Consoles	X		

Figure 6. System Optimization Matrix

TASKS	L3HARRIS	DANE COUNTY	COMMENTS
Verify P25 system levels and parameters are set	X		
Verify system database is installed and operating correctly	X		
Verify proper dispatch operation	X		
Verify proper P25 system functional operation	X		
Verify proper network switching operation	X		

Acceptance Testing

L3Harris has provided a Functional Acceptance Test Plan as a preliminary document. Prior to initiation of any Acceptance Testing, L3Harris and Dane County shall review this preliminary Acceptance Test Plans (ATP') and shall make mutually-agreeable modifications to ensure the ATP's test: i.) any system existing functionalities, features, or operations that may be impacted or altered by the upgrade and ii.) any new functionalities, features, or operations that are incorporated into the system as part of this upgrade that the County purchased previously or has purchased as part of this upgrade.

Any such revisions or additions shall be able to be completed as part of the FATP in a reasonable timeframe and with available test methods and tools.

We will perform systems acceptance testing per the agreed upon acceptance test plan (ATP). The L3Harris Team notifies Dane County when installation and optimization are complete, and the system is ready for acceptance testing.

The system engineer provides documentation defining each of the test areas. The ATP procedures contain a short description, test methodology, and a record form for logging results and acceptance signatures for each test. We use a punch list to document any issues found, so the team can quickly resolve them. Follow-up documents will show the correction of open items. Upon satisfactory completion of each testing phase, the project manager will present the system acceptance documentation to Dane County's project manager(s). With Dane County's approval, the project team, and Dane County, can proceed with cutover.

Figure 7 provides a detailed listing of those acceptance testing activities performed by L3Harris, and those activities to be performed by Dane County.

Figure 7. Acceptance Testing Responsibility Matrix

TASKS	L3HARRIS	DANE COUNTY
Provide appropriate team members to participate in acceptance tests		X
Inspect NSC site, noting discrepancies on the punch list	X	
Submit site inspection results	X	
Approve or reject site inspection results within 5 business days. L3Harris will work with county to remedy any issues regarding inspections as they relate to the acceptance test plan		X
Perform functional ATP	X	
Submit functional ATP results	X	
Verify Functional Acceptance Test Results		X

Final Acceptance

Upon the completion of acceptance test plan (ATP) tests, cutover, and submission of the final drawing package, the project manager submits the final system acceptance letter for Dane County to sign. With the final acceptance, the project manager arranges a meeting with the field service team to review maintenance support during the warranty period. The L3Harris Team provides the contact information and procedures used to obtain service during the warranty period.

Figure 8. Final Acceptance Responsibility Matrix

TASKS	L3HARRIS	DANE COUNTY
Removal of decommissioned legacy network, console, or site infrastructure equipment	X	
Submit final drawing package	X	
Submit letter of final system acceptance	X	
Provide warranty and contact information	X	
Meet with L3Harris to review warranty contact procedures		X
Meet with L3Harris to outline system support and services requirements		X
Accept final drawing package (within 5 business days)		X
Sign letter of final system acceptance (within 5 business days)		X

Major Tasks and Deliverables

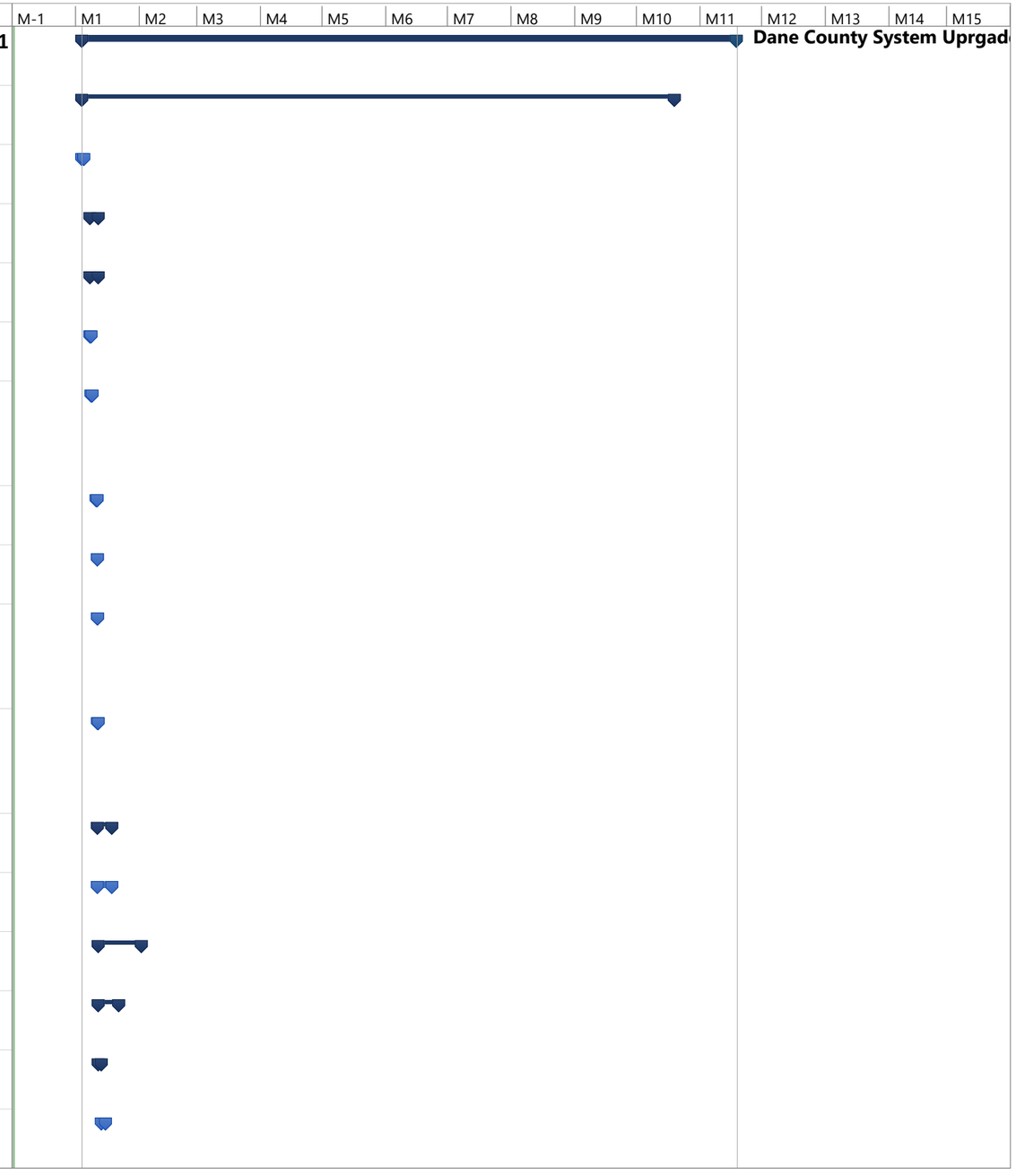
The High-Level tasks and Contractor deliverables will be as follows:

- Provide a detailed System Upgrade Plan which outlines the major upgrade steps delineating roles and responsibilities
- Provide Backout and Contingency Plans outlining alternative measures if upgrade(s) fail
- Provide a Project Schedule
- Prepare Upgrade Test Plan
- Conduct an Upgrade Implementation Plan Review Meeting
- Conduct regular progress meetings
- Audit and document current system hardware & software versions to ensure they are consistent with existing system information
- Backup system configurations & databases
- Supply new SR10A.7 Servers & Equipment per contracted scope of work
- Upgrade NSC Cores
- Support Upgrade and Test of Radio Sites (2)

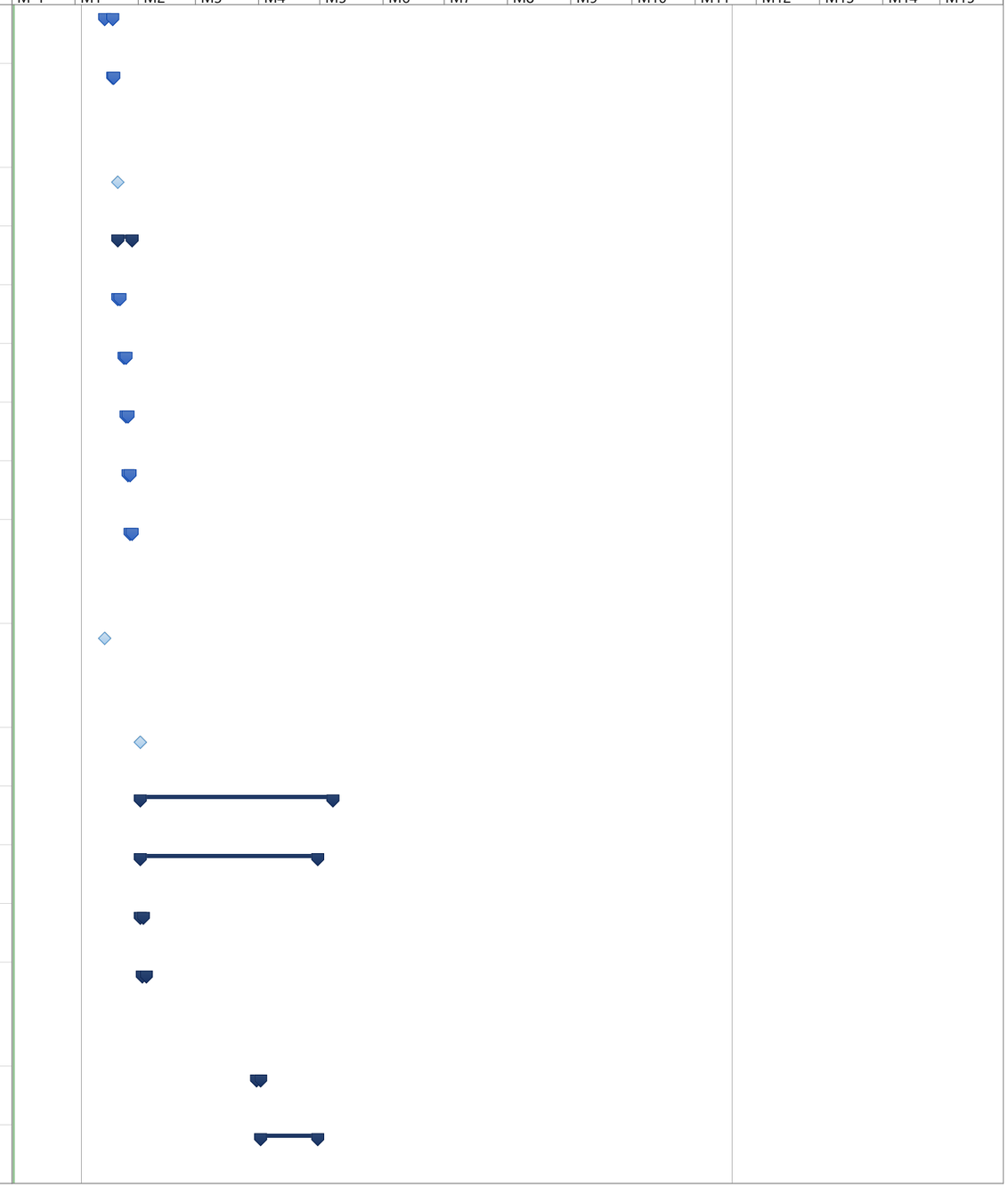
- Support Upgrade and Test of Dispatch Consoles (1)
- Execute Functional Acceptance Test Procedures on System with Upgraded Software
- Resolve any Acceptance Test Issues
- Provide updated documentation

** (1), (2) – As defined by Scope of Work*

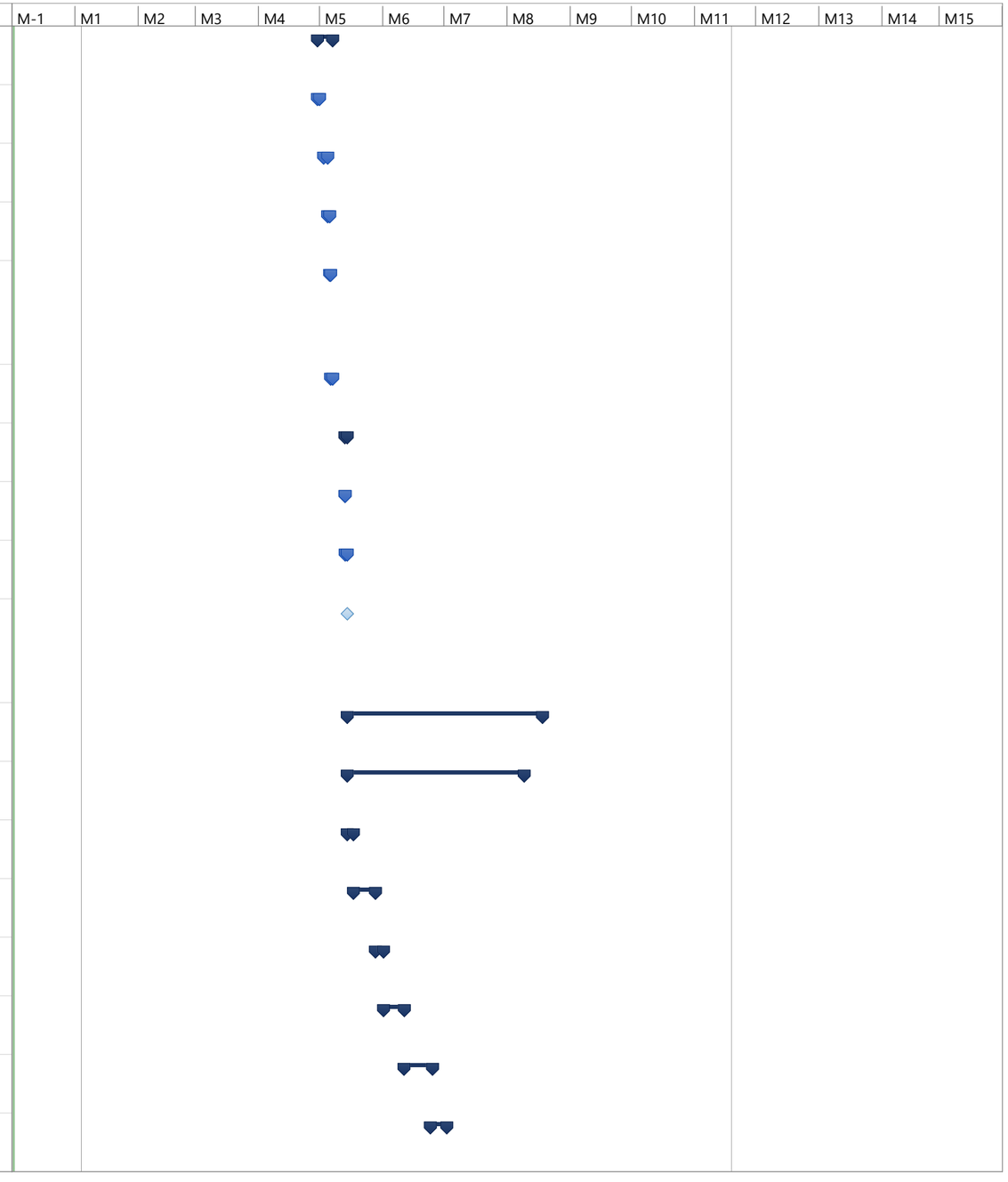
Task Name	Duration	Start	Finish
Dane County System Uprgade	**226.75 days**	**Mon 1/4/21**	**Thu 11/18/21**
Program Work Flow	**204.5 days**	**Mon 1/4/21**	**Tue 10/19/21**
Contract Sign	1 day	Mon 1/4/21	Mon 1/4/21
L3Harris Internal Contract Set-up	**2 days**	**Fri 1/8/21**	**Mon 1/11/21**
Contract & Technical Hand-Off	**2 days**	**Fri 1/8/21**	**Mon 1/11/21**
Prepare for Kick-off Meeting	0.5 days	Fri 1/8/21	Fri 1/8/21
Update Technical Rev & Risk Assessment Form (DCPSE101-f01)	0.5 days	Fri 1/8/21	Fri 1/8/21
Update Project records (DCPSE105-f01) form and folder	0.5 days	Mon 1/11/21	Mon 1/11/21
Conduct Kick-Off & Technical Hand-Off Meeting	0.25 days	Mon 1/11/21	Mon 1/11/21
Implementation Kick-off (Contract Hand-Off) Review Form (DCPPM003-f01)-Approved	0.13 days	Mon 1/11/21	Mon 1/11/21
Technical Design Handoff Review Form (DCPSE101-f06) Approved	0.13 days	Mon 1/11/21	Mon 1/11/21
Perform System Audit	**5 days**	**Mon 1/11/21**	**Mon 1/18/21**
System Audit & Health Check	5 days	Mon 1/11/21	Mon 1/18/21
Kick-off Meeting / Upgrade Plan Review	**15 days**	**Tue 1/12/21**	**Mon 2/1/21**
Internal Upgrade Plan Review (UPR)	**8 days**	**Tue 1/12/21**	**Thu 1/21/21**
Material Planning	**1.5 days**	**Tue 1/12/21**	**Wed 1/13/21**
Finalize Implementation Schedule	2 days	Wed 1/13/21	Fri 1/15/21



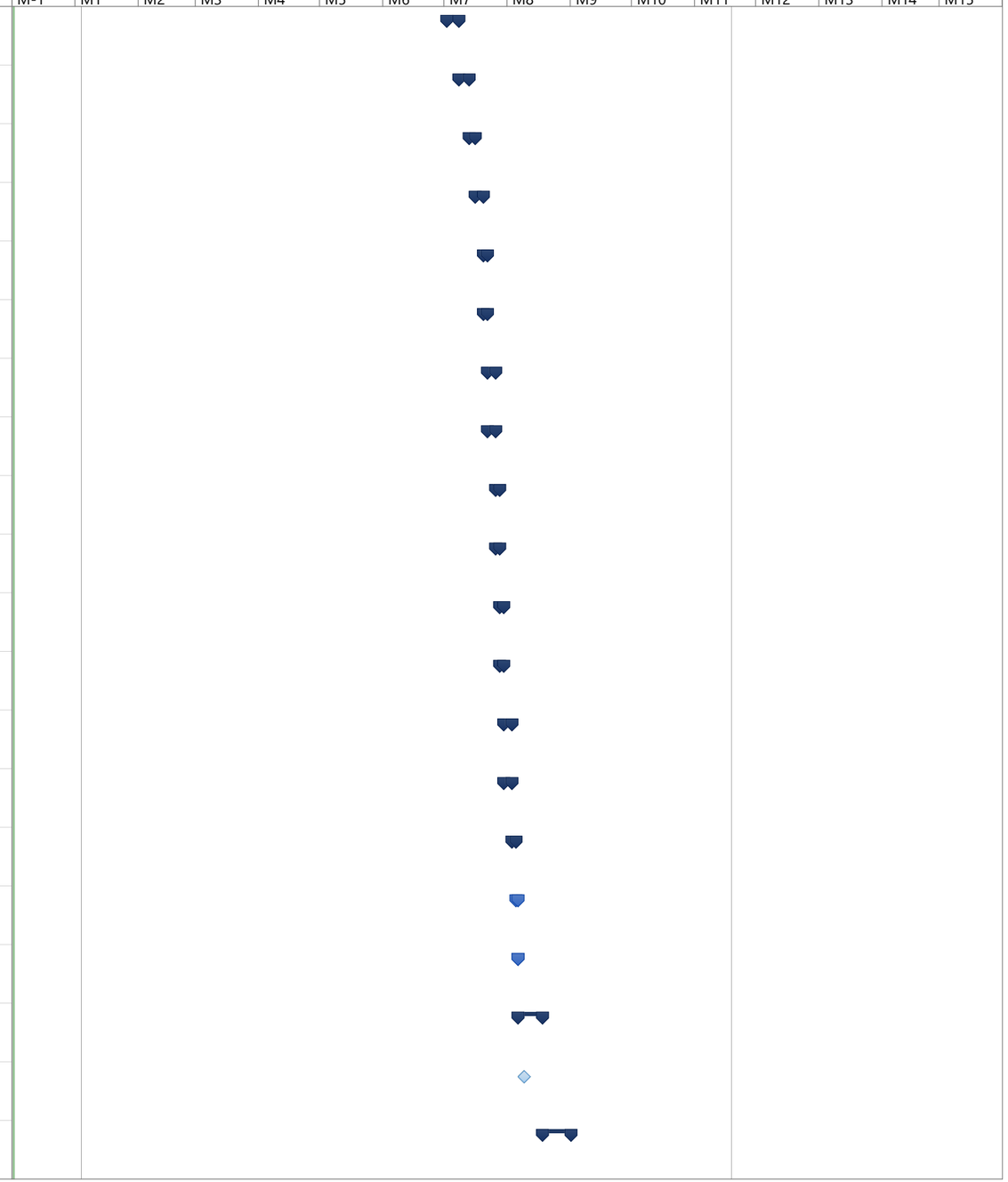
Task Name	Duration	Start	Finish
Prepare UPR Material	2 days	Fri 1/15/21	Tue 1/19/21
Conduct Internal Upgrade Plan Review Meeting and close out of any outstanding issues	0.5 days	Tue 1/19/21	Tue 1/19/21
UPR Form (DCPSE102-f06) Completed and Approved	0 days	Thu 1/21/21	Thu 1/21/21
Kick-off Meeting / Upgrade Plan Review (UPR)	**5 days**	**Fri 1/22/21**	**Thu 1/28/21**
Prepare for and finalize UPR documentation	1 day	Fri 1/22/21	Fri 1/22/21
Travel to Customer site for UPR	1 day	Mon 1/25/21	Mon 1/25/21
Conduct Kick-off Meeting / Upgrade Plan Review (UPR)	1 day	Mon 1/25/21	Tue 1/26/21
Return Home	1 day	Wed 1/27/21	Wed 1/27/21
Complete Action Items (Form DCPSE102-f03) identified in UPR	1 day	Thu 1/28/21	Thu 1/28/21
Networking / Cyber Security Design Support (Update hours with quote from NPS)	0 days	Fri 1/15/21	Fri 1/15/21
UPR Approved by Customer - Billing Milestone	0 days	Mon 2/1/21	Mon 2/1/21
Manufacturing and Staging	**68.25 days**	**Tue 2/2/21**	**Fri 5/7/21**
System Production	**63 days**	**Tue 2/2/21**	**Thu 4/29/21**
Place Orders	**1.5 days**	**Tue 2/2/21**	**Wed 2/3/21**
Production Readiness Review #1 - Review Order Prior to Assembly	**2 days**	**Wed 2/3/21**	**Thu 2/4/21**
LMR Manufacturing	**2 days**	**Tue 3/30/21**	**Thu 4/1/21**
LMR System Assembly and Staging	**20 days**	**Thu 4/1/21**	**Thu 4/29/21**



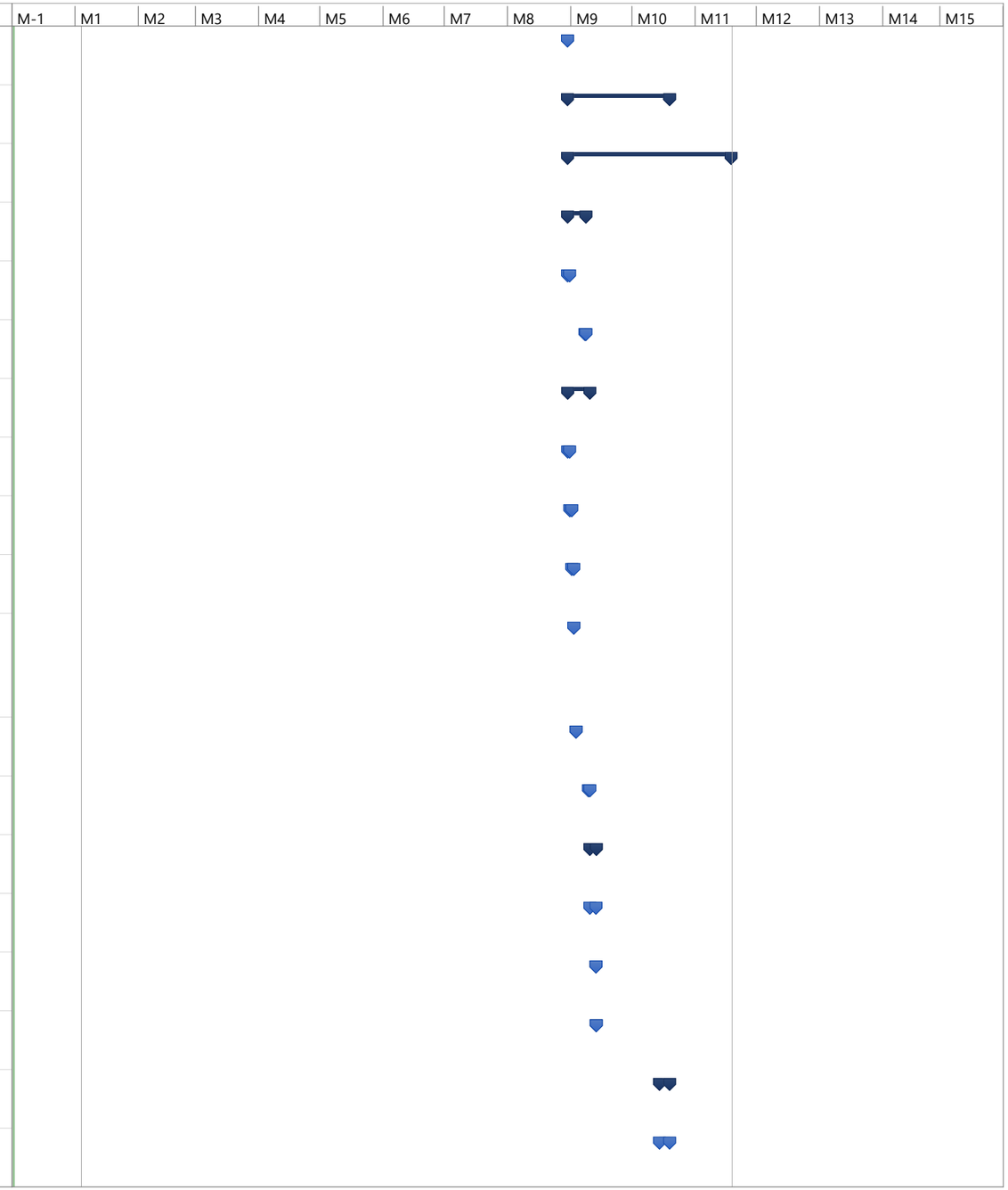
Task Name	Duration	Start	Finish
ISE Internal Factory Acceptance Testing	**5.25 days**	**Fri 4/30/21**	**Fri 5/7/21**
Travel to Lynchburg for IFAT	1 day	Fri 4/30/21	Fri 4/30/21
Conduct System Quality Audit (pre IFAT/CFAT)	2 days	Mon 5/3/21	Tue 5/4/21
Conduct Internal Factory Test (IFAT)	1 day	Wed 5/5/21	Wed 5/5/21
Preship Audit Form (DCPSE102-f08) Completed and Approved	0.25 days	Thu 5/6/21	Thu 5/6/21
Return home	1 day	Thu 5/6/21	Fri 5/7/21
Shipping and Warehousing of Equipment	**1.5 days**	**Thu 5/13/21**	**Fri 5/14/21**
Deliver to Storage Facility/Customer	0.5 days	Thu 5/13/21	Thu 5/13/21
Verify Equipment Inventory	1 day	Thu 5/13/21	Fri 5/14/21
System Shipment and Delivery Acceptance - Billing Milestone	0 days	Fri 5/14/21	Fri 5/14/21
System Installation / Optimization	**66.5 days**	**Fri 5/14/21**	**Wed 8/18/21**
System Install	**59.5 days**	**Fri 5/14/21**	**Mon 8/9/21**
Turn-Down Legacy Secondary Core	**1 day**	**Fri 5/14/21**	**Mon 5/17/21**
Install NSC Secondary	**8.5 days**	**Mon 5/17/21**	**Fri 5/28/21**
Turn-Down Legacy Primary Core	**1 day**	**Fri 5/28/21**	**Tue 6/1/21**
Install NSC Primary	**8.5 days**	**Tue 6/1/21**	**Fri 6/11/21**
Commissioning Turn Up	**10 days**	**Fri 6/11/21**	**Fri 6/25/21**
CCB Primary Dispatch	**6 days**	**Thu 6/24/21**	**Fri 7/2/21**



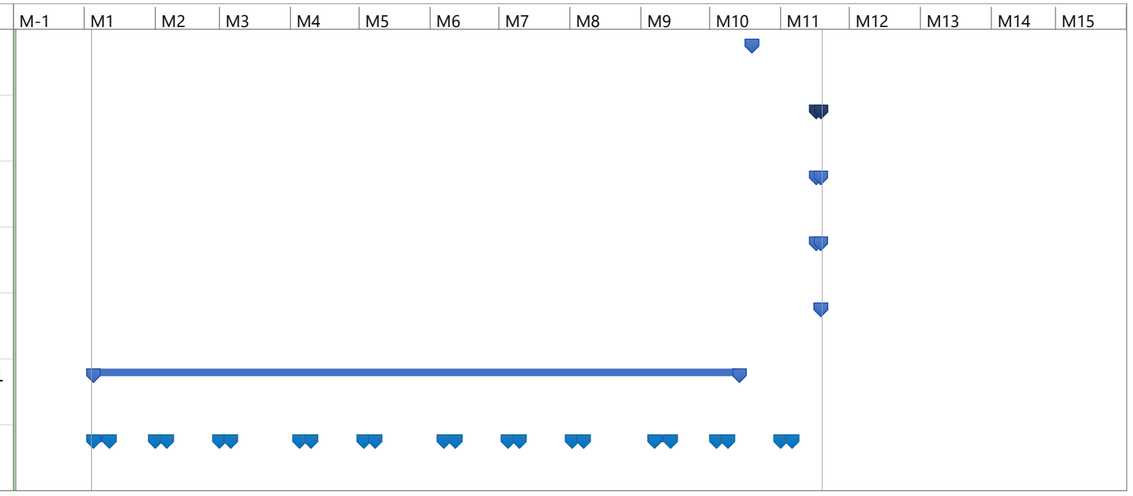
Task Name	Duration	Start	Finish
EDC Backup Dispatch	**4 days**	**Fri 7/2/21**	**Thu 7/8/21**
Sun Prairie Dispatch	**3 days**	**Thu 7/8/21**	**Tue 7/13/21**
Fitchburg Dispatch	**3 days**	**Tue 7/13/21**	**Fri 7/16/21**
Middleton Dispatch	**2 days**	**Fri 7/16/21**	**Tue 7/20/21**
Madison P25 RF Site	**2 days**	**Tue 7/20/21**	**Thu 7/22/21**
Roxbury P25 RF Site	**2 days**	**Tue 7/20/21**	**Thu 7/22/21**
Eisner P25 RF Site	**2 days**	**Thu 7/22/21**	**Mon 7/26/21**
Rockdale P25 RF Site	**2 days**	**Thu 7/22/21**	**Mon 7/26/21**
Sun Prairie P25 RF Site	**2 days**	**Mon 7/26/21**	**Wed 7/28/21**
Verona P25 RF Site	**2 days**	**Mon 7/26/21**	**Wed 7/28/21**
WMGN P25 RF Site	**2 days**	**Wed 7/28/21**	**Fri 7/30/21**
McKee P25 RF Site	**2 days**	**Wed 7/28/21**	**Fri 7/30/21**
StoughtonWT P25 RF Site	**2 days**	**Fri 7/30/21**	**Tue 8/3/21**
Defront P25 RF Site	**2 days**	**Fri 7/30/21**	**Tue 8/3/21**
WJJO P25 RF Site	**2 days**	**Tue 8/3/21**	**Thu 8/5/21**
All Sites Installed	1 day	Thu 8/5/21	Fri 8/6/21
System Installation Complete - Billing Milestone	1 day	Fri 8/6/21	Mon 8/9/21
System Optimization	**8 days**	**Fri 8/6/21**	**Wed 8/18/21**
Notify customer that system is ready for test	0 days	Mon 8/9/21	Mon 8/9/21
Acceptance Testing	**10 days**	**Wed 8/18/21**	**Wed 9/1/21**



Task Name	Duration	Start	Finish
Warranty Start	0.5 days	Mon 8/30/21	Mon 8/30/21
Final Acceptance with Customer	**35.25 days**	**Mon 8/30/21**	**Tue 10/19/21**
Transition to AMS, TAC, and Close	**57.25 days**	**Mon 8/30/21**	**Thu 11/18/21**
Warranty Transition to Customer	**5.94 days**	**Mon 8/30/21**	**Wed 9/8/21**
Prepare CCC Customer handoff package	1 day	Mon 8/30/21	Tue 8/31/21
Updated Warranty Transition documentation approved	0.44 days	Wed 9/8/21	Wed 9/8/21
Handoff to Harris TAC	7.7 days	Mon 8/30/21	Fri 9/10/21
As-Built Drawings completed (A&E, construction, etc.)	1 day	Mon 8/30/21	Tue 8/31/21
HW and SW Audit completed (DCPSE102-f09)	1 day	Tue 8/31/21	Wed 9/1/21
Prepare handoff documentation	1 day	Wed 9/1/21	Thu 9/2/21
Verify 3rd Party warranties are in effect and will cover the Harris Warranty period	1 day	Thu 9/2/21	Fri 9/3/21
Conduct Handoff Meeting	0.45 days	Fri 9/3/21	Fri 9/3/21
Updated Internal System Turnover Meeting Form Approved	0.25 days	Thu 9/9/21	Fri 9/10/21
Internal Handoff to Harris Warranty	**1.38 days**	**Fri 9/10/21**	**Mon 9/13/21**
Prepare Warranty Handoff Package	1 day	Fri 9/10/21	Mon 9/13/21
Conduct Internal Warranty Handoff Meeting	0.13 days	Mon 9/13/21	Mon 9/13/21
Internal Warranty Documentation (DCPSE102-f014) Updated and Approved	0.25 days	Mon 9/13/21	Mon 9/13/21
Internal Program Closure Tasks	3 days	Thu 10/14/21	Tue 10/19/21
Close all POs	3 days	Thu 10/14/21	Tue 10/19/21



Task Name	Duration	Start	Finish
Receive Final Payment	0.25 days	Tue 10/19/21	Tue 10/19/21
Final Internal Contract Closure	**2.25 days**	**Tue 11/16/21**	**Thu 11/18/21**
ISE to verify all final closure task have been completed	2 days	Tue 11/16/21	Thu 11/18/21
IPM to verify all final closure tasks for all internal departments have been completed	2 days	Tue 11/16/21	Thu 11/18/21
Closure form (DCPPM006-f04) Created and Approved	0.25 days	Thu 11/18/21	Thu 11/18/21
Customer and Project Support	200 days	Tue 1/5/21	Wed 10/13/21
PM Travel Time	**217 days**	**Tue 1/5/21**	**Fri 11/5/21**



INFRASTRUCTURE WARRANTY

Warranty Support

L3Harris warrants that that hardware and installation services furnished by L3Harris will be free from defects in material and workmanship. During the warranty period, if any component of the hardware or portion of the installation services fails, L3Harris will examine the failure and remedy by:

1. Repairing any defective component of the hardware;
2. Furnishing any necessary repaired or replacement parts;
3. Correcting the faulty installation at no additional cost to Dane County.

Warranty Coverage	INFRASTRUCTURE
Coverage Period	1 year
Commences	Upon Acceptance Date

Standard warranty response times are standard business days, 7:00 a.m. to 4:00 p.m. Central.

THIRD-PARTY WARRANTIES

Throughout the entire 1 (one) year of the infrastructure warranty period, L3Harris will act on behalf of Dane County to coordinate and settle warranty issues with third-party equipment and software original equipment manufacturers (OEM). Once the one (1) year infrastructure warranty period expires, the responsibility to secure any and all 3rd party maintenance renewal is solely Dane County's responsibility. If Dane County would like L3Harris to take on the 3rd party maintenance renewal services, L3Harris will quote Premium Technical Service (PTS) service which provides and additional 3 (three) years of 3rd party maintenance support services.

DEPOT REPAIR AND RETURN

The Depot Repair and Return service covers the cost to fix covered equipment at L3Harris or other third-party manufacturer's factories. This service is part of our 1 (one) year infrastructure warranty.

SPARE PARTS

Dane County shall purchase the recommend spare equipment, which is further detailed in the price section of this document. The spare equipment will ensure repairs and field troubleshooting can be performed as expeditiously as possible.

TECHNICAL ASSISTANCE CENTER

The L3Haris Technical Assistance Center (TAC) will provide telephone support during normal business hours 7:00 a.m. to 4:00 p.m. Central time. Monday through Friday. TAC is accessible through our Toll-Free 800 Hot-lin. Local technicians from General Communications are also on-call.

DEMAND SERVICES

Demand services are available when an unexpected event or situation occurs outside the scope of work and requires repairs from L3Harris, its agents, or partners. For demand services, Dane County will receive an invoice on a time and materials basis. Examples may include the following:

- Installation, updating, upgrading, maintaining, or removing software, hardware, or non-L3Harris infrastructure after initial installation.
- Repair of equipment damaged by vandalism, abuse, neglect, or noncompliance to L3Harris recommended practices, to the extent such equipment damage is not caused by L3Harris or any of its agents.
- Damages due to acts of God or other uncontrollable events
- Any other repair or service not outlined in the Scope of Work

FUNCTIONAL ACCEPTANCE TEST PLANS

FUNCTIONAL ACCEPTANCE TEST PLANS INCLUDES:

- System Test Plan
- Functional Test Procedures
- SR10A.7 NSC Functional Testing
- SR10A.7 Symphony Console Functional Testing

DANE COUNTY, WISCONSIN | SR10A.7 SYSTEM UPGRADE | DECEMBER 2, 2020

L3HARRIS™
FAST. FORWARD.

L3HARRIS™

SYSTEM TEST PLAN

Customer:
Dane County, Wisconsin

Prepared by:
S. Paramashivan

TABLE OF CONTENTS

FUNCTIONAL TEST ACCEPTANCE

This Functional Test Acceptance Procedure has been fully and successfully completed with all Action Items resolved.

Customer Representative	L3Harris Technologies Representative
Signature	Signature
Printed Name and Title	Printed Name and Title
Date	Date

Introduction

This System Test Plan is designed to validate the installation and functionality of a L3Harris P25 Trunked LMR System at SR10A.7 release.

This document defines the plan for conducting tests and analyzing the test results to show that the system satisfies the requirements of the applicable specification.

Tests are performed in the order they appear in the test plan and test procedures or as required by the L3Harris systems engineer. Test results will be recorded in the appropriate Test Procedure referenced by this document.

Test procedures prescribed have been developed and rigorously vetted by L3Harris engineering to provide extensive functional verification of the system features under test.

ROLES AND RESPONSIBILITIES

A team consisting of at least one L3Harris System Engineer and one Customer representative to act as a witness to the testing is required to execute the test plan. It may be necessary for a secondary team consisting of an additional L3Harris employee and Customer witness to be present at another location separate from the primary team to test certain features such as multisite calls or for the secondary team to initiate site alarms such that the primary team can observe them from a System Management Terminal (SMT).

A L3Harris employee will execute the test steps recorded in the test plan utilizing the LMR equipment with optional assistance from the Customer representatives. Additional personnel may attend as desired or as required to provide access or escort to certain locations such as RF shelters.

Access for the entire team must be provided to Customer facilities including, but not necessarily limited to, Network Switching Center (NSC) locations, RF site shelters, and dispatch locations. For secure facilities, appropriate access permissions must be granted prior to the testing events.

FUNCTIONAL TESTING CLARIFICATION

Final functional tests will be performed in the field after installation, both as part of equipment commissioning and overall final Functional Testing. Test results documentation will be from the final Functional Test Procedures.

TESTING PREREQUISITES

The LMR System shall be delivered and installed at the designated site locations. The System following installation shall be pre-certified by L3Harris and prepped as required to support test validation.

The dates/times of test execution shall be presented and agreed upon by L3Harris and Customer representatives as appropriate.

Product software of the appropriate system release version will have been installed on each platform.

For secure facilities, appropriate access permissions must be requested and granted prior to the testing events.

SYSTEMS AND SITES TO BE TESTED

The New SR10.4 NSC and Functionality of the Legacy P25 Trunking LMR system will be tested.

Functional testing is expected to take 1 or 2 days per site but may be completed sooner.

Final System Acceptance testing will take place at each of the RF Site locations. A site will be chosen to initiate the testing and all test procedures appropriate to the site will be executed and recorded.

Equipment is located at various locations across the facilities and is identified as the following:

SYSTEM/SITE LOCATION	ADDRESS OR BUILDING NUMBER	SYSTEM/EQUIPMENT DESCRIPTION
City County Building		NSC 1
Madison Community (UW) Tower		NSC 2
Verona		DCP Site
Madison UW		DCP Site

PASS/FAIL CRITERIA

Criteria for Pass / Fail is mitigated per execution of the Test Procedures in the Acceptance Test Plan. If a feature test is successfully executed, that feature is deemed to be compliant and results in a PASS. If a failure occurs, the failed test may be repeated to address missed steps or configuration requirements overlooked during execution.

If a certain piece of equipment is deemed to be malfunctioning, and a duplicate piece of equipment to be deployed is available to test the feature, the test may be executed on that piece of equipment while steps are taken to remedy the original equipment. If the feature test is successful in execution on the duplicate equipment, the feature will be deemed compliant and result in a Pass. At such time as the original piece of equipment is able to function as designed, the equipment will be retested to ensure compliance.

If a feature is found to be non-compliant, the feature non-compliance is to be addressed then re-tested. Until successful re-test, the feature is deemed to be non-compliant and results in a Fail.

If there is an inconsistency in operation observed during a test, the test may be executed again in order to determine the repeatability of the inconsistency. If the inconsistency is unable to be reproduced, the feature will be deemed compliant and result in a Pass. If the inconsistency persists but the test is successfully executed, the feature will be deemed compliant and result in a Pass.

If it is necessary to defer a test for any reason, it may be marked as Not Yet Evaluated (NYE). The test may be executed, with appropriate witnessing, at any time afterward to change the result to a Pass.

TROUBLE REPORTING

Any issues found during testing will first be recorded in the Comments section of the appropriate Test Procedures and then reported directly to the L3Harris Program Manager be logged in the project issues log for corrective action.

Failures must be appropriately addressed. For hardware failures occurring during test events, failed hardware will be removed from the System under Test and turned over to L3Harris quality organization for repair or replacement.

SAFETY

Reasonable safety precautions will be taken to insure personnel against harm while operating within and traversing the installations.

General safety guidelines for portable radios:

- Do not hold onto the antenna when the radio is powered on.
- Always keep the antenna at least 0.43 inches (1.1 cm) away from the body and 0.98 inches (2.5 cm) from the face when transmitting to ensure FCC RF exposure compliance requirements are not exceeded.
- Do not use the portable with a damaged or missing antenna. A minor burn may result if skin comes into contact with a damaged antenna. Replace a damaged antenna immediately. Operating a portable radio with the antenna missing could cause personal injury, damage the radio, and may violate FCC regulations.
- Use only manufacturer approved antennas. Use of unauthorized antennas, modifications or attachments could cause damage to the radio unit and may violate FCC regulations.
- RF energy from portable radios may affect some electronic equipment. Most modern electronic equipment in cars, hospitals, homes, etc., is shielded from RF energy. However, in areas in which you are instructed to turn off two-way radio equipment, always observe the rules. If in doubt, turn it off!

Environmental detriments are to be pointed out by L3Harris Engineering prior to testing if deemed applicable. Adjustments are to be remedied to the extent required to address any such deficiencies deemed to present a danger to either system performance or personnel safety. Examples include but are not limited to excessive temperature variations, contaminants, hazardous materials, or obstructions to LMR equipment.

Test Procedures

TOOLS / TEST EQUIPMENT

Any special tools necessary to operate/test the product will be supplied by L3Harris unless otherwise specified.

MODEL NUMBER	DESCRIPTION	SERIAL NUMBER
XG-75P	Single Band Radio	TBD
XG-75P	Single Band Radio	TBD
XG-75P	Single Band Radio	TBD
XG-75P	Single Band Radio	TBD
XL-200P	Multiband Radio	TBD
As Required	Additional Radios (as required for testing purposes)	TBD
Not Determined	Non-L3Harris Radios (Customer Supplied)	TBD

Other special test equipment as required.

MODEL NUMBER	DESCRIPTION	SERIAL NUMBER

BASELINE CONFIGURATION

The LMR system installed consists of a L3Harris IP-based P25 CAI digital trunked Land Mobile Radio communications system. The system is loaded with L3Harris system release version SR10A.7 software.

The L3Harris system includes a baseline configuration with predefined Test Agency & Group structure to support the defined test procedures. This Configuration is detaled in Functional Test Configuration Guide attached.

A list of system equipment hardware and software is included as Hardware & Software Audit Form attached.

A complete set of As-Built system schematics will be available during test and will include, but not limited to;

- System Block Diagrams
- Network Schematics
- Connection Diagrams

- Wiring and Cabling Schematics
- Rack Up Drawings

The following Test Procedures and Configuration Guide will be used to validate system functionality:

- SR10A.7 NSC Functional Test Procedures
- DCP Control Point Functional Test Procedures
- RF Sites Functional Test Procedures
- Symphony Console Functional Test Procedures

APPENDIX A – Acronyms and Definitions

AD Active Directory

AES Advanced Encryption Standard

ATP Acceptance Test Procedure

CAI Common Air Interface (usually in reference to P25)

CME Cisco Mobility Exchange (Telco Interconnect)

CNM Central Network Manager, a L3Harris product

Confirmed Call A confirmed call is a special type of call where the call is queued until all sites have resources available, or until the confirmed call timer expires (configurable, typically one or two seconds)

COTS Commercial Off The Shelf

CPC Channel Performance Criterion

DAQ Delivered Audio Quality

DES Digital Encryption Standard

LMR Enterprise Land Mobile Radio

ESN Electronic Serial Number (64 bits)

FDMA Frequency Division Multiple Access

GID Group ID (16 bit). This corresponds to a talkgroup. The Group ID is unique within a VNIC, and can be reused on other VNICs within the same WACN. Some of the older P25 documents refer to the GID as a Talkgroup ID (TGID)

HA High Availability

Individual Call An individual call is a private call between one user and another. It can be between two radios, or between one radio and a dispatch console

KEK Key Encryption Key

KID 16 bit Encryption Key ID

KMF Key Management Facility

KMM Key Management Message

LAN Local Area Network

MASTR V A L3Harris base station product

MES Mobile End System, a subscriber radio

MME Miniature Mobility Exchange, which consists of L3Harris software running on a SitePro card at the base site. The MME runs the SNDCP layer of the data protocol and is the equivalent of the P25 RFG (RF Gateway)

N(S) A 3 bit sequence number for the packet data unit

NSC Network Switching Center

NSS Network Switching Server

NWS Network Sentry

OTAP Over The Air Programming

OTAR Over The Air Rekeying

P25 Project 25, a suite of standards for digital radio communications, developed by the Association of Public Safety Communications Officials (APCO) under the TIA TR-8 engineering committee, and published as the TIA-102 set of documents

Priority Talkgroup The priority talkgroup selected on the subscriber device. Usually this is the talkgroup that the radio will transmit on when the user presses PTT

ProFile A L3Harris product used for configuring radios over the P25 radio channel

ProScan A L3Harris software algorithm used for radio roaming

PTT Push To Talk

RAR Regional Access Router

RF Radio Frequency

RNM Regional Network Manager

RSM Regional Site Manager, a server which runs the RSM, Activity Warehouse and Device Manager applications

RSSI Received Signal Strength Indicator

RVM Regional VIDA Manager, a server which runs the UAS and RNM applications

SAN Storage Area Network

SMT System Management Terminal.

SU Subscriber Unit. In the P25 world, an SU is a mobile or portable radio

SUT System Under Test

SUMS Security Update Management Service (a L3Harris product)

SUMSplus Version of SUMS

TAC Technical Assistance Center, a L3Harris service

TDMA Time Division Multiple Access

TEK Traffic Encryption Key

TGID Talkgroup ID (16 bit, equivalent to GID). The P25 documents usually use GID but some of the older documents use TGID

Traffic Controller Software entity which resides in a base station at the site and generates the P25 control channel

Tx Transmit

UAC Unified Audio Card

UAS Unified Administration Server

UKEK User Key Encryption Key

UPS Uninterrupted Power Supply

VAS VIDA Application Server

VIDA Voice, Interoperability, Data, Access (a L3Harris system product)

VLAN Virtual Local Area Network

VM Virtual Machine

VNIC Voice Network Interface Controller, the L3Harris voice switch

VPN Virtual Private Network

VTI VIDA Telephone Interconnect

WACN Wide Area Communication Network (20 bit network ID, part of SUID). This is a customer network which can include many VNICs

WAR Wide Area Router

Zeroize A P25 control channel command which causes the mobile radio to erase its encryption keys (but then requires manual loading to restore encryption keys)

L3HARRIS™

FUNCTIONAL TEST PROCEDURES

Customer:
Dane County, Wisconsin

Prepared by:
S. Paramashivan

TABLE OF CONTENTS

About This Document

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Prepared By:	S. Paramashivan

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- Transmit Frequency and Deviation
- Output and Reflected Power
- Receiver Sensitivity
- Receiver Multicoupler Gain (if applicable)
- Receiver Preamplifier Gain (if applicable)
- Combiner Loss (if applicable)
- Audio line out
- Audio line in

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CONTROL POINT MOVEMENT

DCP FORCED CONTROL POINT MOVEMENT

Purpose: This test will demonstrate the DCP system can move the control point in response to user command.

Expected Results: This test will verify that the Control Point can be moved from the active site to an alternate Control Point Site. After the control point is switched to the alternate Control Point the system should operate normally.

Setup: The DCP system is operating with an active control point and at least two sites are enabled to be the control point.

Execution:

1. Log into the RNM
2. In Network view identify the site which is the active control point.
3. Right click on the control point site icon and select" Change Control Point to Best Site Available".
4. Verify system is still functioning (i.e. voice calls can be made – between radios and a radio and console and optionally data calls can be made (e.g. radios can be 'pinged').
5. Verify that the RNM indicates a different site as control point and the previous control point is now a TX site. (note – a CP only site displays "zzzz" when it is not the active control point.)
6. On the RNM right click on the previous control point site and select "Change to be the Control Point".
7. Verify system is still functioning (i.e. calls can be made – between radios and a radio and console and optionally data calls can be made (e.g. radios can be 'pinged').
8. Verify that the RNM indicates the control point has moved to the site selected in step 6 and the previous control point is now a TX site. (note – a CP only site displays "zzzz" when it is not the active control point.)

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

DCP CONTROL POINT MOVEMENT IN RESPONSE TO FAULTS AT THE ACTIVE CONTROL POINT

Purpose: This test will demonstrate that the Control Point will move in response to failures at the active Control Point.

Expected Results: This test will verify that the DCP system will move the active Control Point to an alternate control point site when the active control point experiences failures. After the Control Point moves the old control point should drop into bypass and the rest of the system should operate normally as a Simulcast cluster.

Setup: The DCP system is operating with an active control point and is properly configured with at least two sites enabled to be the control point.

Execution:

1. Verify system is functioning (i.e. calls can be made – between radios and a radio and console and optionally data calls can be made (e.g. radios can be 'pinged').
2. At the control point site disconnect the 1pps cable from GPS B.
3. Verify the system is still functioning (i.e. calls can be made – between radios and a radio and console and optionally data calls can be made (e.g. radios can be 'pinged') and control point has not moved. The traffic controllers at the control point display 'CC xx' and 'TC xx' when idle; at a satellite site the traffic controllers display "TR xx' where xx is the channel number. (>
4. At the control point site disconnect the 1pps cable from GPS A.
5. Verify that the control point moved to next ranked site and the old control point is now in bypass. The traffic controllers at the control point display 'CC xx' and 'TC xx' when idle: Any channels that are configured to be active at the old control point site when it is in bypass will have all their status LED red. In bypass all the traffic controllers display 'CC xx' and 'TC xx' when idle and the status LED will be red.
6. Verify the RNM indicates the new control point and shows the old control point site is now in bypass.
7. Verify the simulcast system is still functioning (i.e. calls can be made – between radios and a radio and console and optionally data calls can be made (e.g. radios can be 'pinged').
8. If the old control point has channels active in bypass verify radios switched to this bypass site acquire the control channel and can communicate. (note – this step could be skipped; the bypass tests in sections 20.x will do this) >
9. Restore the connections to the GPS receivers at the site in bypass (the old control point site).
10. Verify that the site exits bypass and joins the simulcast cluster.

TEST RESULTS	
Tester:	
Date:	

Result:	☐ Pass	☐ Fail

P25 SIMULCAST BYPASS OPERATION

Program the MASTR V modules (both Control Points and Transmit Sites) to the Final Configuration. Refer to the installation manual for the guide to setting TX Traffic Controllers / CP Traffic Controllers personality parameters.

Verify the BYPASS plan has been reviewed and approved by customer representative. This procedure makes assumptions on bypass sites before implementation and test of the System. After WMS/Panther signal strength data collection, final decision will be made on the actual bypass "ON" and "OFF" sites.

Prepare a minimum of two terminal radios programmed to operate on the active BYPASS site and the main simulcast system.

SITE OFF – FINAL CONFIGURATION

Purpose: Confirm sites configured to be in the "OFF" condition during BYPASS are in the expected BYPASS mode.

Expected Results: The "OFF" site traffic controllers have no control channel.

Setup: Sites intended to be "OFF" in event of BYPASS must have all channels set to disabled (unchecked in Device Manager, TC personality).

Execution:

1. At one of the sites designated as an "off" site, create a condition to force BYPASS by disconnecting the router to MPLS connection. All other sites will have the HPAs disabled locally.

> Verify transmit site is in BYPASS mode.

> The Traffic Controller module display indicates "TC" instead of "TR". Note: TC= Working Traffic Channel, standalone mode, TR=Working Channel, simulcast mode, and Control Channel, simulcast mode is indicated by the transmit LED indicator.

2. Observe the repeater (station) Traffic Controller modules.

> Verify there is no active control channel.

> Verify no stations are keyed or producing RF power.

3. Restore the site to normal by returning the site to simulcast mode by reconnecting the router to MPLS connection.

> Verify transmit site is in normal simulcast mode. The Traffic Controller modules will indicate "TR(n)", where n is the channel number.

4. Repeat steps 1-3 for the remaining "OFF" bypass sites in the simulcast system under test.

TEST RESULTS	
Tester:	

Date:		
Result:	☐ Pass	☐ Fail

SITE ON (TRUNKING) – FINAL CONFIGURATION

Purpose: Confirm sites configured to be in the "ON" condition during BYPASS are in the expected BYPASS mode.

Expected Results: The "ON" site traffic controllers have a control channel and calls to terminal radios can be initiated.

Setup:

Execution:

1. Create a condition to force BYPASS by disconnecting the router to MPLS connection.

> Verify transmit site is in BYPASS mode. BYPS LED on Baseband module and the Traffic Controller module display indicates either "TC" or "CC" instead of "TR.

> Observe the stations/repeater Traffic Controller modules. Verify there is an active control channel on one of the Traffic Controller modules. The remaining repeater/stations Traffic Controller modules will indicate "TC".

> Verify the station appearing as control channel is keyed, producing RF power and modulated with control channel data.

> Verify a terminal radio set to the system programmed for the site in BYPASS with the correct site ID recognizes the site's control channel data.

2. Key the terminal radio on a group call.

> Verify a working channel assignment is made within the channel group allowed in the personality.

> Verify the call is heard on a second terminal radio set to the active BYPASS system.

3. Restore the site to simulcast mode by reconnecting the router to MPLS connection.

> Verify transmit site is in normal simulcast mode. Traffic Controller modules indicate "TR(n).

4. Repeat steps 1-3 for remaining "ON" bypass sites in the simulcast system under test.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

CONTROL POINT TRUNKING RESET CONTROL

Purpose: A properly set up Simulcast BYPASS system will disable CP Traffic Controller modules associated with active channels at a TX site operating in BYPASS. This keeps the remaining sites operating in Simulcast mode from being assigned to channels expected to be active at the site in BYPASS. Sites programmed to be OFF in BYPASS will not require any Traffic Controller modules to be held OFF.

Expected Results: This test will verify that the Control Point Traffic Controller modules will be held OFF corresponding to the active channels at a site, due to the TX site being in BYPASS.

Setup:

Execution:

1. Force a TX site that will become active into BYPASS by disconnecting the router to MPLS connection.

> Verify TX site is in BYPASS mode.

> Verify transmit site is in BYPASS mode. Traffic Controller module display indicates either “TC” or “CC” instead of “TR”.

> Verify the CP Traffic Controller modules on the channels intended to be OFF are held OFF.

2. Observe the RNM screen for the simulcast system.

> Verify the channels intended to be OFF at the Control Point are reported as OFF (RED).

3. Restore the site to simulcast mode by reconnecting the router to MPLS connection.

> Verify the TX site Traffic Controller modules revert to normal Simulcast.

> Verify the CP Traffic Controller modules associated with the site in BYPASS are returned to normal.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

BYPASS – SITE MINIMUM CHANNELS

Purpose: Confirm a site enters bypass when active channels fall below site minimum channels setting.

Expected Results: The site enters bypass mode.

Setup: Sites are configured with cluster minimum channels set to 6 and site minimum channels to 7.

Bypass Plan: TR Site 1 Ch 3,4,5; TR Site 2 Ch 6,7,8; TR site 3 Ch 9,10,11 TR Sites 4 and 5 dark.

Note Settings and bypass plan can be customer final settings; execution will have to adjust to accommodate those settings.

Execution:

1. At TR site 1 disable channels 8 - 11 using the TX disable switch on the PA (only channels 1-7 are still functioning).

> Verify system and site still functioning in simulcast; the disabled channels 8-11 are in alarm state at the control point site.

> At TR site 1 the Traffic Controller modules displays still indicates “TR” not “TC” or “CC”. Note: TC= Working Traffic Channel, standalone mode, TR=Working Channel, simulcast mode, and Control Channel, simulcast mode is indicated by the transmit LED indicator.

2. At the same site disable channel 7 using the TX disable switch on the PA.

> Verify system is still functioning in simulcast. Control Point ch 3,4 and 5 in alarm state.

> Verify TR site 1 is in bypass. The Traffic Controller module display indicates “TC” instead of “TR”. All channels status indicates alarm. Note: TC= Working Traffic Channel, standalone mode, TR=Working Channel, simulcast mode, and Control Channel, simulcast mode is indicated by the transmit LED indicator always on.

3. At the same site restore all channels back to service (enable the PA using the TX disable switch on the PA).

> Verify transmit site 1 is in normal simulcast mode. The Traffic Controller modules will indicate “TR(n)”, where n is the channel number.

> Verify all channels are in service at the control point.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

BYPASS – CLUSTER MINIMUM CHANNELS – TR SITE FAILURES

Purpose: Confirm all sites enter bypass when available channels fall below the cluster minimum channels setting. Depending upon the system size, bypass plan and which channels have been failed a subset of sites may subsequently come out of bypass and operate as a cluster before any channels are restored to service.

Expected Results: All site in the system enter bypass mode.

Setup: Sites are configured with cluster minimum channels set to 6 and site minimum channels set to 7 (these settings are normally lower; they are set high to simplify testing).

Execution:

1. At TR site 1 disable channels 9, 10 and 11 using the TX disable switch on the PA (8 channels are still functioning).

> Verify system and site still functioning in simulcast.

> The Traffic Controller module displays still indicates “TR” not “TC” or “CC”. Note: TC= Working Traffic Channel, standalone mode, TR=Working Channel, simulcast mode, and Control Channel, simulcast mode is indicated by the transmit LED indicator.

2. At TR site 3 disable channels 6, 7 and 8 using the TX disable switch on the PA (5 channels are still functioning).

> Verify All sites have entered bypass (the TCs display “TC” and “CC”, not “TR” and every channel status indicates failed at every site.

3. Enable the PAs at the sites using the TX disable switches.

> Verify the system recovers to simulcast mode with all transmit sites in normal simulcast mode. The Traffic Controller modules will indicate “TR(n)”, where n is the channel number.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

SITE ON (TRUNKING) – ENHANCED BYPASS FINAL CONFIGURATION

Purpose: Confirm sites configured to be in the "ON" condition during BYPASS are in the expected BYPASS mode and can connect to VNIC.

Expected Results: The "ON" site traffic controllers have a control channel and calls between terminal radios and dispatch can be made.

Setup:

Execution:

1. Create a condition to force BYPASS that does not disrupt network connectivity by logging into both GPS receivers and configuring their notifications to set the major alarm threshold to minimum satellites 12 and duration below threshold 5 seconds. This will cause the GPS receivers to set a major alarm after 5 seconds.

2. Configure Notifications from Spectracom GPS Receivers
3. Navigate to Management Notifications

4. In the **Events** window pane, click the **GPS** tab.
5. Set the Major Alarm Threshold as follows:
   a. Minimum Satellites.
   b. Duration Below Threshold.
6. Click: [Submit]

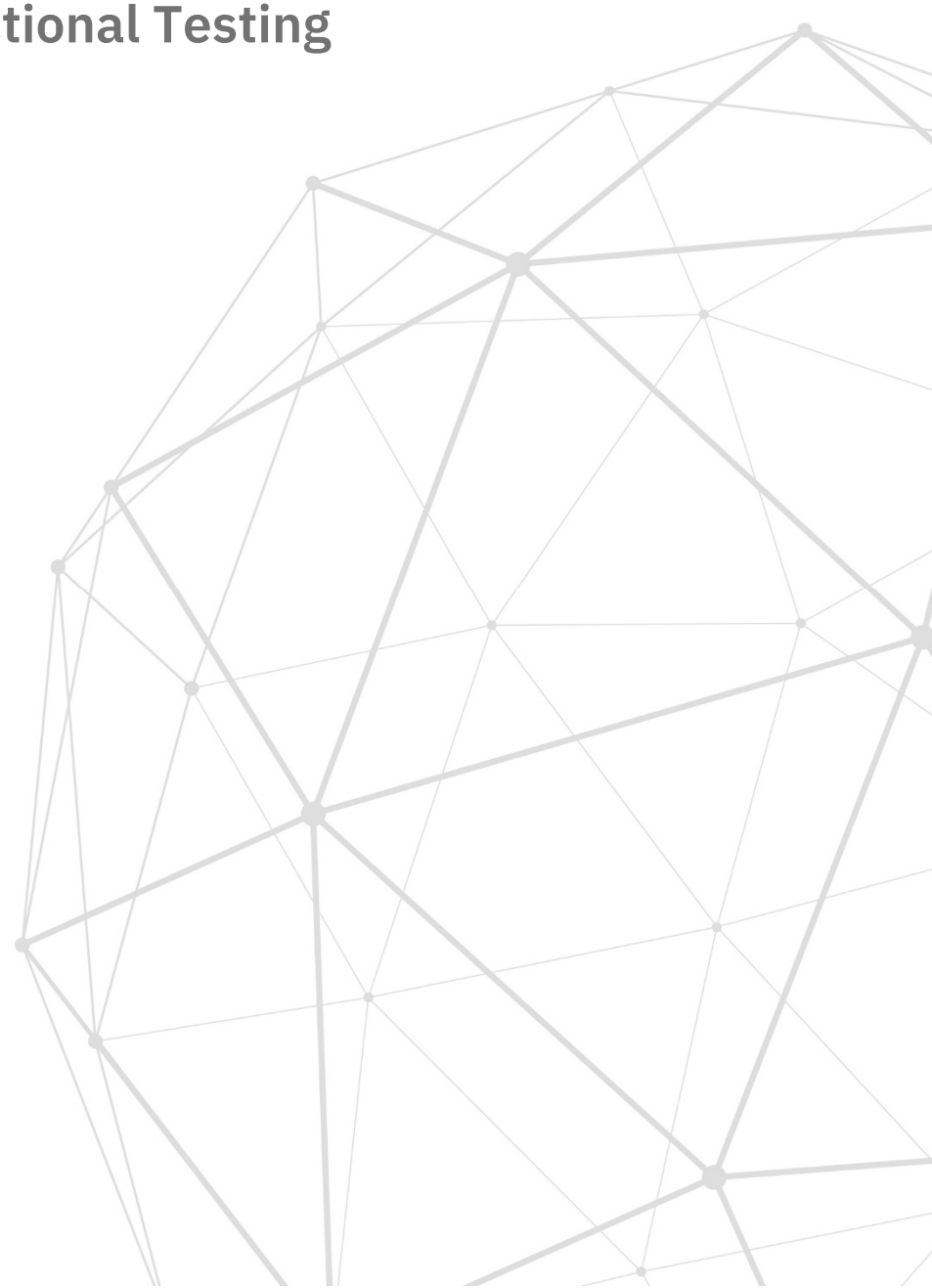
7. Verify transmit site is in BYPASS mode. The Traffic Controller module display indicates either "TC" or "CC" instead of "TR".
   - Observe the stations/repeater Traffic Controller modules. Verify there is an active control channel on one of the Traffic Controller modules. The remaining repeater/stations Traffic Controller modules will indicate "TC".
   - Verify the station appearing as control channel is keyed, producing RF power and modulated with control channel data.
   - Verify a terminal radio set to the system programmed for the site in BYPASS with the correct site ID recognizes the site's control channel data.
8. Key the terminal radio on a group call.
   - Verify a working channel assignment is made within the channel group allowed in the personality.
9. Restore the site to simulcast mode by restoring the GPS major alarm notification threshold to minimum satellites = 1 and duration = 345600 for both GPS receivers.
   - Verify transmit site is in normal simulcast mode. Traffic Controller modules indicate "TR(n).

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

L3HARRIS™

FUNCTIONAL TEST PROCEDURES

SR10A.7 NSC Functional Testing



Customer:
Dane County, Wisconsin

Prepared by:
S. Paramashivan

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Prepared By:	L3Harris Systems Engineering

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VIDA Universal Administration Server (UAS)

ACTIVE DIRECTORY CONTROL OF UAS USER ACCOUNTS

Purpose: Transition from managing UAS-user accounts in the UAS application to AD instead. New systems will be shipped w/ AD control instead of UAS application user control. Existing systems may choose to switch to AD control or continue to use the existing accounts in UAS.

Expected Results: Demonstrate UAS Login; the UAS uses Active Directory-configured user login with AD username and password.

Setup: All users configured in Active Directory prior to UAS Login. UAS Users are added to AD 'Active Directory Users and Computers' > within vida.local area > VIDA Users > VIDA Administrators > "each User defined here". For "User X", within "Properties" > "Member of" Tab; User X needs appropriate "VIDA UAS access group".

Execution:

1. Login into UAS with AD user login. Use AD username and password.
   UAS web login interface will pass username and password to Active Directory for authentication.

   > Verify user has logged into the UAS.

TEST RESULTS				
Tester:				
Date:				
Result:	☐	Pass	☐	Fail

CREATE AN AGENCY LEVEL ADMINISTRATOR ACCOUNT IN THE UAS

Purpose: Demonstrate the capability to create agency admin accounts in the UAS.

Expected Results: Test will create a new agency level administrator account.

Setup: Need system level access to an UAS or UAS client. Predefined agency and region in the UAS.

Execution:

1. Browse to the UAS at the address of 'https://s0u1uas.vida.local:8443/nas'
2. Log in with UAS administrator level account.
   > Verify that default accounts are created (see list below) and verify a default Agency administrative class, by selecting System/Administration/Admin User.
3. Select "Add" to display the Administration User Detail screen.
4. Enter a name (e.g., TestAgency), description, and password. Select save to download and click 'OK'.
5. Log out of the default account.
6. Log in with the new TestAgencyAdmin.
   > Verify access to account.
7. Log out of the Test AgencyAdmin.
8. Log in with the default account and delete the TestAgencyAdmin.

TEST RESULTS				
Tester:				
Date:				
Result:	☐	Pass	☐	Fail

PROVISION AGENCY WITH TALKGROUPS AND SUBSCRIBER UNITS IN THE UAS

Purpose: Demonstrate the capability to add talkgroups and users to the agency accounts in the UAS.

Expected Results: Test will show that a user can add a new talkgroup and users to the system.

Setup: System/region/agency level access to the UAS or a UAS client.

Execution:

1. Log into the UAS with one of the default accounts.
2. Select Agency 998, select 'R/W Talkgroup', to create a talkgroup.
3. Click 'Add' and then on the 'Talkgroup Detail' screen input the talkgroup ID from the table below. For any setting not listed, use the auto setting. Click OK and download.

   > Verify the talkgroup has been added to the list of talkgroups.

TG ID	NAME	DESCRIPTION	SPNI	PROPERTY ID	PRIORITY ID	COVERAGE	VALID COVERAGE
64454	64454ANA	Half Rate Low Priority	1	3	5	P25Sites_PSAPs	P25Sites_PSAPs

4. Using PuTTy on an SMT, log into a traffic controller at each control point for simulcast and each site for multisite and issue the command 'show gdb'.

   > Verify that Group 64454 exits in the traffic controller user data base.

5. Once the group has been verified, delete it from the UAS.

TEST RESULTS				
Tester:				
Date:				
Result:	☐	Pass	☐	Fail

DYNAMIC REGROUP FROM THE UAS

Purpose: Demonstrate ability to dynamically regroup subscriber units from the UAS.

Expected Results: Test will combine selected talkgroups into a single interop group.

Setup: Radios must have "Allow P25T Unsolicited Dynamic Regroup" checked in the radio personality under general options. Ensure radio IDs and talkgroup IDs are uploaded to the site.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
Radio 1	9980001	TG 64001 P25	64001	1
Radio 2	9980002	TG 64002 P25	64002	1
Radio 3	9980003	TG 64003 P25	64003	1

Execution:

1. At the UAS, select 'Regroup' tab and 'Regroup Profile'.
2. Click 'Add' to add profile detail; name Group 'Regroup1', and Description 'Regroup1 Test'.
   - > Define regroup profile; select Agency 998 and 'TG64003'.
   - > Select 'OK' and save changes to the UAS.
3. Click 'End User Group' and click 'Add'. Name Group 'Regroup1' and Description 'Regroup1 test'.
   - > Select Agency 998 from 'Select a Scope' drop down box.
   - > Add 'Radio 1' and 'Radio 2' to the 'Selected' windows.
   - > Select 'OK' to close 'End User Group Detail'.
   - > Click 'Save' button to download the new regroup.
4. Click 'Define Regroup' and click 'Add' to name the regroup 'Regroup1' and description 'Regroup1 test'.
   - > Change 'Profile Name' to 'Regroup1' and change 'End User Group Id' to 'Regroup1'.
   - > Click 'OK' and save to click 'Save' the changes to the UAS.
5. Click 'Manage Regroup' check the box for 'Regroup1' and select the button for 'Regroup'.
   - > Click 'Save' to start regroup.
   - > Verify that Radio 1 and Radio 2 are forced to 'Talkgroup 64003'.
6. At 'Radio 1' and 'Radio 2', attempt to change talkgroups away from 'Talkgroup 64003'
   - > Verify that both radios are forced to remain on 'Talkgroup 64003'.
7. PTT 'Radio 1' on 'Talkgroup 64003'.
   - > Verify that 'Radio 3' hears audio on 'Talkgroup 64003' and can respond.
8. Clear the dynamic regroup from the UAS client.
   - > Verify 'Radio 1' and 'Radio 2' are no longer forced to 'Talkgroup 64003' (i.e., they can select other predefined talkgroups).

TEST RESULTS				
Tester:				
Date:				
Result:	☐	Pass	☐	Fail

UNIT DEREGISTRATION

Purpose: Demonstrate that a radio will automatically deregister when the radio is turned off.

Expected Results: Test will show the radio that is off and will not create traffic load demand.

Setup: Radio 1 is the only radio on 'Talkgroup A' for this test. All other radios should be on different talkgroups. UAS>System Properties>Protocol Timer>Radio Re-Registration Timer for P25 trunked sites must be lowered to a minimum value to test this feature. It is typically setup for 360 minutes. Set the timer for two minutes and note the "calculated" value of "VNIC Remove Demand Timer". The VNIC Remove Demand Timer value is the "wait time" to see the radio be "deregistered" by the system after losing connectivity. Restart the VNIC following the change. Be sure to set the timer back to 360 minutes following the test.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
Radio 1	9980001	TG 64001 P25	64001	1
Console	9989101	TG 64001 P25	64001	1

Execution:

1. On a client computer, open Windows Internet Explorer and browse to https://s0u1rnm.vida.local/nmc and log in with an Active Directory account. Choose 'System Map' and select 'Launch Application' button. Open 'Realtime' tab and click 'Mobiles.'

   > Verify Radio 1 LID is shown registered on the site.

2. PTT console on Talkgroup 64001 and verify it communicates on the system to Radio 1.

   > Return call from Radio 1 to the console on Talkgroup 64001.

3. Turn off Radio 1 and wait for expiration of the radio timeout period.
4. Refresh RNM mobiles screen periodically and verify Radio 1 is deregistered after VNIC *Remove Demand Timer* has passed.
5. PTT console on Talkgroup 64001, after the expiration of the timeout.

   > Verify no channel is assigned to site, since no demand exists at the sites.

TEST RESULTS				
Tester:				
Date:				
Result:	☐	Pass	☐	Fail

UAS Site Adjacency Configuration

Purpose: Demonstrate the capability to configure site adjacencies in the UAS.

Expected Results: Site adjacencies will be successfully configured and modified.

Setup: UAS installed and functioning on System network.

Basic test is to follow the manual and SRN instructions to configure site adjacencies using the new graphical interface.

Execution:

1. In the UAS go to System > System Properties > Site adjacency.
2. Select a site on the left side to configure for adjacency information.
3. Use the left hand side to add adjacencies for the site.
   - Confirm the adjacent sites are removed from the non-adjacent site list and display correctly on the right side.
4. Use the right hand side to remove a site adjacency.
   - Confirm the removed adjacency disappears on the right side and is displayed as a non-adjacent site on the left side.

TEST RESULTS				
Tester:				
Date:				
Result:	☐	Pass	☐	Fail

UNIT ENABLE/DISABLE FROM THE UAS

Purpose: Demonstrate the ability to disable a lost/stolen radio from the UAS.

Expected Results: Test will disable and re-enable a designated radio.

Setup: Ensure radios can communicate together on same trunk group. Verify all sites are connected to the NSC and are online.

Note: If a radio is encrypted, unit disable will automatically delete the encryption key from the radio, as it is disabled. To restore unit functionality for an encrypted radio, the radio must have the encryption key re-installed.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID
Radio 1	9980001	TG 64001 P25	64001
Radio 2	9980002	TG 64001 P25	64001
Radio 4	9980004	TG 64001 P25	64001

Execution:

1. In the UAS Select Talkgroup 64001 on Radios 1, 2, and 4.
   - > Verify that the radios can communicate.
2. From the UAS:
   - > Click Radio 4 Enable/Disable.
   - > Under the Unit Enable/Disable tab, enter the ID of Radio 4 to be modified.
   - > Select the disable button and check the status.
   - > Attempt to PTT Radio 4 and verify that it will not communicate with the other encrypted radios.
   - > PTT Radio 1 and verify that Radio 4 cannot receive the call.
3. Enable the ID of Radio 4.
   - > Verify that the Enable/Disable screen indicates that the current state of the radio is enabled.
   - > Confirm that the radios can communicate in unencrypted mode.
4. Switch off Radio 4 and disable it from the Enable/Disable screen.
   - > Switch on the radio and verify that, on logging into the site, it becomes disabled.
   - > Verify that the state settings change to disabled and that the radios cannot communicate.
5. Enable Radio 4.
   - > Verify that radios can communicate in unencrypted mode.

TEST RESULTS				
Tester:				
Date:				
Result:	☐	Pass	☐	Fail

CREATE A RESTRICTED USER ACCOUNT IN THE UAS

Purpose: Show that a user can be created in the UAS that has restricted access.

Expected Results: New user will only have access to the agencies tab and 998 agency.

Setup: User will need system level access to a UAS to define a new administration class that has limited access privileges and create a new user with that class.

Execution:

1. Browse to the UAS at the address of https://s0u1uas.vida.local:8443/nas.
2. Log in to the UAS system administrator level account.
3. Select the 'System' tab and 'Admin User.'
4. Click 'Add' to add the new user.
   - > In the 'Admin User' text field type 'LimitedUser.'
   - > In the 'Admin Class' field select 'Agency998.'
   - > In the 'Description' text field type 'Limited User for ATP.'
   - > Type a password into both 'Password' text fields.
   - > Select 'Ok.'
5. Select the 'Save' button to save the results.
6. Log out and log back in as the 'LimitedUser.'
   - > Verify the new user only has access to the ‘Agencies’ tab and agency 998.
7. Log out of the UAS.
8. Log in with the default account and delete the 'LimitedUser.'

TEST RESULTS				
Tester:				
Date:				
Result:	☐	Pass	☐	Fail

UAS SITE ACCESS CONTROL FOR INVALID USER ID

Purpose: Demonstrate access control for subscriber units with invalid radio IDs and high availability of the Regional System Manager (RSM).

Expected Results: Radio will be denied access to the system with an invalid subscriber ID. Once the radio is added to the system in the UAS database, the primary RSM will download the database that includes it to the sites and allow the radio access. When the primary RSM is turned off and the radio is deleted from the UAS database, the secondary RSM will download the database that deletes the radio from the system. Once the radio is deleted from the system, the radio will again be denied access.

Required Materials: Three radios, a programming cable, and computer with RPM2 installed.

Setup: Use the table below to set up the new radio in the UAS.

VOICE END USER	INPUT	SUBSCRIBER UNIT	INPUT
User ID	010:998:9150	Description	Radio9150
Name	Rad9150	Electronic Serial No.	0109989150
Description	Radio9150	RSI	0000000109989150
Personality	Pers1	Protocol Mask	P25
User Privilege	998_10_default	Status	Enabled Unit
Message Trunked Icall	TRUE	Sub Type	Harris XL-200P
Enable P25 AES OTAR	TRUE	Assigned End User	010:998:9150
Manually Keyed	FALSE	Algorithm Support	AES
Preferred Vocoder	P25 Half Rate		
Transc Allowed Flag	TRUE		

Execution:

1. Log into a site traffic controller, issue a “show udb 9989150.”
   > Verify radio is not present in the traffic controller database.
2. Program Radio 1 with an ID 9989150.
3. Attempt to PTT Radio 9150.
   > Verify access to the site is denied and audio is not heard on Radio 2.
   > Verify the system is still functional by PTT Radio 2 and verify the audio is heard on Radio 3.
4. Use the supplied table to enter Radio 0109989150 into the UAS database.
   > Select Agency/”agency name”/Voice End User. Click ‘Add Entry’ and then on the ‘End User’ Detail screen input the user ID, password (“p25user”), name, description, etc. of the user. Click OK and download.
   > Verify user ID has been added to the list of users.

> Select agency/"agency name"/subscriber unit and enter appropriate user ID, IP address, and ESN for the user created in the Create a Restricted User Account in the UAS section.

> Click OK and download.

5. Log into a site traffic controller, issue a "show udb 0109989150."

> Verify the radio is now present in the traffic controller database.

6. Key Radio 1 (9150).

> Verify access to the site is permitted and audio is heard on radio.

7. Restart Radio 1 (9150) and PTT the radio.

> Verify access to the site is permitted and audio is heard on Radio 2.

8. Delete 0109989150 from the UAS database.
9. Key Radio 1 (9150)

> Verify access to the site is not permitted and audio is not heard.

TEST RESULTS				
Tester:				
Date:				
Result:	☐	Pass	☐	Fail

CREATE A SUBSCRIBER UNIT REPORT FROM THE UAS

Purpose: Demonstrate the capability to create a report of subscriber units in the UAS database.

Expected Results: Test will create a subscriber unit report.

Setup: Agency level access to UAS or a UAS client.

Execution:

1. Browse to the UAS using Internet Explorer and the address of '**https://s0u1uas.vida.local:8443/nas**'

1. Log into the UAS as an agency-level administrator.
2. Select System/Report/Voice End User.
3. Type '0210' into the 'User ID' and select apply.

   > Verify that the UAS displays the user info for user '0210'

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

RADIO INACTIVE DEREGISTRATION

Purpose: Confirms the site will send a radio detach command when its configured registration timer expires.

Expected Results: Radio reregisters on the site in response to the radio detach command.

Setup: Program site with a radio registration age timer [UAS > System > System Properties > Protocol timer > Radio re-registration timer] set to five minutes. Radios 1 and 2 programmed for operation on the site.

Execution:

1. Power up site
2. Power up one radio
   - > Confirm the radio registers on the site
   - > Log into RNM>Realtime>Mobile>Track User.
3. After two minutes, power up the second radio
   - > Confirm the radio registers on the site.
4. Wait three minutes
   - > Confirm the first radio registers on the site again.
5. Wait two minutes
   - > Confirm the second radio registers on the site.
6. Reprogram the site for the default registration timer setting.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

Network Management

REAL-TIME SITE MONITORING (RNM)

Purpose: Demonstrate the capability to monitor real-time call activity from the RNM.

Expected Results: This test will show active call traffic on specific talkgroups and caller IDs.

Setup: Administrator access to the RNM.

Radio 1, Radio 2, and Console A operating on a site and NSC under test, both programmed with Group A.

Execution:

1. On a client computer, open the Windows Internet Explorer and browse to https://s0u1rnm.vida.local/nmc and log into the RNM.
   - > Choose the 'System Map' and select the 'Launch Application' button.
   - > Open the 'Real-time' tab and click 'Site Activity'.
   - > Select the site and expand.
2. Check the box next to the channels and select it to add the channels to the target list. Select the 'OK' button to launch the application.
3. Place a group call from Radio 1 to Radio 2 on the site.
   - > Verify the event viewer displays the talkgroup ID and caller ID.
   - > Verify the state changes from free to talk.
   - > Verify the trunk group alias displays the group number.
4. Place an emergency call from Radio 1 to Radio 2 on the site.
   - > Verify the event viewer displays the emergency indication.
   - > Verify the event viewer displays the talkgroup ID and caller ID.
5. Place an individual call from Radio 1 to Radio 2 on the site.
   - > Verify the event viewer displays an individual call on the channel.
   - > Verify the VNIC-assigned talkgroup ID changes with each transmission.
6. For P25 Phase 2: Verify the P25 Phase 2 RF traffic channels are sub-divided into two bearers (2-slot TDMA) when all Radios on the talkgroup are Phase 2 capable.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

REGIONAL NETWORK MANGER (RNM) MONITOR SYSTEM ALERTS

Purpose: Demonstrate the capability to monitor system alerts from the RNM.

Expected Results: This test will show system level equipment icons.

Setup: Administrator access to the RNM.

Execution:

1. On a client computer, open the Windows Internet Explorer and browse to https://s0u1rnm.vida.local/nmc and log into the RNM.
2. Choose the system map and select the 'Launch Application' button. Select the 'Network' tab and expand the tree in the left-hand panel until you can see a site in the right-hand panel.
   - > Verify the infrastructure is presented.
   - > Select an object and right click to select properties to view information related to the object.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

RF SYSTEM ALARMS INDICATIONS ARE REPORTED (RNM)

Purpose: Demonstrate the capability to monitor system faults and alarms at the RNM.

Expected Results: Site equipment will send alarms to the RNM.

Setup: Need access to the site under test and the regional RNM. The alarm will need to be generated by equipment being physically powered-down or reset. Note the time of the alarm condition for later tests. On the 'RNM Domain' screen, verify all map icons are either green or blue. On the fault browser screen, delete any prior alarms.

Execution:

1. On a client computer, open the Windows Internet Explorer and browse to https://s0u1rnm.vida.local/nmc and log in with an Active Directory account.
   - > Choose the system map and select the 'Launch Application' button.
   - > Select the 'Network' tab and expand the tree in the left-hand panel until a site is in the right-hand panel.
2. Generate an alarm on a device (see chart) by powering down or otherwise disabling the device.
   - > Verify that the RNM Network Viewer indicates a site alarm for the affected device.
   - > Review alarm details by doing a right mouse click on an 'Alarm Object'. Select the desired menu option.
   - > Verify alarm is listed in the 'Fault Browser'.
3. Turn the device back ON.
   - > Verify that the device alarm clears and displays green.
4. Repeat Steps 2 - 3 for all equipment listed in the below chart.
5. Substitute https://s0u2rnm.vida.local/nmc and repeat test Steps 1 - 4 for the second RNM.
6. Record the results below for each site.

Note: This form can be modified to reflect actual as-built alarms

SITE #		SITE NAME	

ALARM #	NAME	RESULTS (PASS/FAIL)	REMARKS
1	Traffic Controller		Press the reset button on the TC and watch for the alarm
2	Router		Remove cable from Gi0/0 (interface to SAS)
3	Switch		Remove a cable from a PLAN port
4	PA		Disable one of the site PAs

TEST RESULTS

Tester:		
Date:		
Result:	☐ Pass	☐ Fail

NETWORK SENTRY SITE ALARM INDICATIONS ARE REPORTED (RNM)

FIELD TEST ONLY

Purpose: Demonstrate the capability to monitor site faults and alarms at the RNM.

Expected Results: Site level equipment will indicate faults and alarms at the RNM. During factory testing the alarm will be simulated by changing the active state polarity. During field acceptance testing the jumper alarm contacts will be opened or closed to simulate an alarm. An actual alarm could be monitored if the contacts have been connected.

Setup: This test verifies that the site and shelter alarms are connected to the new system and alarm names are programmed to show the alarm types and locations. Site specific digital alarm inputs connected to the alarm management system (Network Sentry) alarm unit.

Execution:

1. On a client computer, open the Windows Internet Explorer and browse to https://s0u1rnm.vida.local/nmc and log in with the Active Directory account.
2. Choose the system map and select the 'Launch Application' button.
3. Select the 'Network' tab and expand the tree in the left-hand panel until you can see a site in the right-hand panel.
4. Select a physical site to test alarm inputs.
5. Create a condition that will either simulate an alarm (jumper alarm contacts) or the actual event to trigger each alarm
   > Verify that the alarm is detected and displayed in the RNM Network Viewer and is listed in the 'Fault Browser.'
6. Clear the alarm condition.
   > Observe that the alarm indication has cleared in both the 'Network Viewer' and the 'Fault Browser.'
7. Repeat for each alarm and for each site in the system.
8. Record the results below for each site.

   Note: This form can be modified to reflect actual as-built alarms.

SITE #		SITE NAME	

ALARM #	NAME	RESULTS (PASS/FAIL)	REMARKS
1			
2			
3			
4			

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

ENTERPRISE NETWORK MANAGEMENT DISPLAY VERIFICATION (ENM)

Purpose: Demonstrate ENM monitoring capabilities.

Expected Results: Monitor various components of the LMR system.

Setup: The ENM product must be configured in Active Directory, in the "VIDA ENM Administrators" group. The user must log into the ENM with an administrator account.

Execution:

1. Open Internet Explorer and browse to https://s0u0enm.vida.local.
2. On the left side of the screen select the "Maps" heading and the "Maps Dashboard" sub-heading. From here, you can select the type of map you would like to view.
3. Verify that geographical maps display system and NSC information as configured.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

ENTERPRISE NETWORK MANAGER ALARM AND ALERT TEST (ENM)

Purpose: Demonstrate the capability to monitor system faults and alarms at the ENM.

Expected Results: ENM will detect in system status by displaying the appropriate alarm.

Setup: Need access to the system under test and the ENM. The alarm will need to be generated by equipment being powered-down or reset. The ENM product must be configured in Active Directory in the "VIDA ENM Administrators" group. The user must log into ENM with an administrator account.

Execution:

1. On a client computer, open Windows Internet Explorer and browse to https://s0u0enm.vida.local. Log in with the Active Directory account.
2. On the left side of the screen select "Maps" heading and "Maps Dashboard" sub-heading. Then select "System" map. At the "System" map, select the icon for the NSC that you will be working on.
3. Generate an alarm on a device (see chart below) by powering down or otherwise disabling the device.
4. The machine will take a few minutes to shut down.
   > Verify after a few minutes that the host will be highlighted red, and the icon in the "Status" column will turn red.
5. Turn the device back on.
   > Verify after a few minutes the icon in the "Status" column will turn green. (It may take some time for the red highlight to clear).
6. Repeat Steps 1 - 5 for all equipment listed in the below chart.
   Note: This form can be modified to reflect actual as-built alarms.

Tester:			Results:	Date:
Alarm #	**Name**	**Description**	**Pass/Fail**	**Remarks**
		NSC1		
1	NSS	Network Switching Service		
2	ISSI	Inter Sub-System Interface		
3	ADSA	Active Directory Server (A, B, C)		
4	RCA/SCA	Root Certificate Authority/Subordinate Certificate Authority		
5	VCC (vCenter)	VCenter Computer		
6	VREP	Virtual Replication Server		
7	UAS	Unified Administration System		

Tester:			Results:	Date:
Alarm #	**Name**	**Description**	**Pass/Fail**	**Remarks**
8	RSM/PRO	Regional Site Manager		
9	LAP (BeOn)	LMR Access Point		
10	RNM	Regional Network Manager		
11	VPS	Vida Presence Server		
12	TXT	TextLink Server		
13	EDTA	eData Server		
14	KMF	Key Management Facility		
15	EPO	ePolicy Orchestrator		
16	SUMS	Security Update Management Service		
17	BAK	Backup Server (Unitrends)		
18	DFC	Defense Center Server		
19	NIDS	Network Intrusion Detection		
20	SMT	System Management Terminal		
21	Console- Dispatch (CON)	Console		
22	VMT	Virtual Management Terminal		
23	XCD	Transcoder		

Tester:			Results:	Date:
Alarm #	**Name**	**Description**	**Pass/Fail**	**Remarks**
NSC2				
1	NSS	Network Switching Service		
2	ISSI	Inter Sub-System Interface		
3	ADSA	Active Directory Server (A, B, C)		
4	SCA	Subordinate Certificate Authority		
5	PRO	Regional Site Manager		
6	LAP (BeOn)	LMR Access Point		
7	RNM	Regional Network Manager		
8	VPS	Vida Presence Server		

9	EDTA	eData Server		
10	BAK	Backup Server (Unitrends)		
11	DFC	Defense Center Server		
12	NIDS	Network Intrusion Detection		
13	VMT	Virtual Management Terminal		
14	XCD	Transcoder		

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

ENTERPRISE NETWORK MANAGER MOM FUNCTIONALITY TEST (ENM)

Purpose: Demonstrate the capability to monitor manager of managers (MoM) system alerts from the RNM to the ENM.

Expected Results: This test will show that when the s0u1rnm is turned off the ENM will show faults.

Setup: Administrator access to the ENM. The ENM product must be configured in Active Directory in the "VIDA ENM Administrators" group. The user must log into the ENM with an administrator account.

Execution:

1. On a client computer, open the Windows Internet Explorer and browse to https://s0u0enm.vida.local and log in with the Active Directory account.
2. To see the active devices, click on the check box icon at the upper right-hand side of the screen.
3. Go to the red 'Host Down' icon that is next to the check box icon.
4. Shutdown s0u1rnm
5. The machine will take a few minutes to shut down.
   > After a few minutes, the host will show up in the 'Host Down' page.
6. Select the 'Critical' icon and see that:
   > s0u1rnm is up and has an error.
7. Turn the s0u1rnm back on and:
   > Make sure the error cleared.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

Activity Warehouse

SITE ACTIVITY USING THE ACTIVITY WAREHOUSE

Purpose: Demonstrate the capability to create various agency level system usage reports.

Expected Results: Test will create an agency level user report.

Setup: Ensure radio traffic has occurred across the network recently. If necessary or desired, place some calls with a known radio ID on multisite talkgroups prior to running the test for reference during the test.

Execution:

1. Log into the SMT PC as a system level administrator.
2. Open Internet Explorer and browse to 'https://s0u1pro.vida.local/reports' and log in with active directory credentials.
3. Select 'Activity Reports' → Call Activity
4. Enter the time period for the report (Example: 2-hour window before this test).
5. Enter additional report information required.
6. Click on "View Report"

   > Check to make sure that there is call activity.

   NOTE: These reports can be up to two hours behind.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

BeOn Features

Purpose: Demonstrate the BeOn features.

Expected Results: Following tests will demonstrate that BeOn works as designed.

Setup: Tests will show that the BeOn system allows a smartphone to communicate with the radio system.

TRANSMIT GRANT TONE

Purpose: Demonstrate the grant tone on BeOn.

Expected Results: When the smartphone PTTs on the BeOn app, it will play a grant tone.

Setup: Grant tone (Ready to Talk tone) enabled in smartphone radio personality.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID
BeOn_202	9980202	TG 64151 P25	64151
BeOn_203	9980203	TG 64151 P25	64151
BeOn_204	9980204	TG 64151 P25	64151

Execution:

1. Press PTT button on smartphone with valid group selected.

   > Verify grant tone is heard at smartphone when working channel access is granted.

   Note: If the call is queued, the grant tone will be delayed until the call is assigned a working channel.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

GROUP CALL

Purpose: Confirms the scan function which allows a smartphone to hear audio on selected talkgroups other than the current talkgroup.

Expected Results: Selected talkgroup call audio is heard.

Setup: Set Smartphones 1, 2, and 3 to (Group A) per test group structure. Make sure Scan is turned OFF.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID
BeOn_202	9980202	TG 64151 P25	64151
BeOn_203	9980203	TG 64151 P25	64151
BeOn_204	9980204	TG 64151 P25	64151

Execution:

1. PTT on BeOn_202 and talk.
   - > The transmit (TX) indicators should turn on at BeOn_202.
   - > Audio should be heard in BeOn_203 and BeOn_204.
   - > The ID of BeOn_202 should be seen at BeOn_203 and BeOn_204.
2. Set BeOn_204 to TG 64152 P25. PTT on BeOn_202 and talk.
   - > The transmit (TX) indicators should turn on at BeOn_202.
   - > Audio should be heard in BeOn_203 only.
   - > The ID of BeOn_202 should be seen at BeOn_203 only.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

INDIVIDUAL (PRIVATE) CALL

Purpose: Confirms individual calls can be initiated using BeOn enabled smartphones.

Expected Results: Individual calls are confirmed.

Setup:

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID
BeOn_202	9980202	TG 64151 P25	64151
BeOn_203	9980203	TG 64151 P25	64151
BeOn_204	9980204	TG 64151 P25	64151

Execution:

1. Using the BeOn_202, select the pre-stored ID of BeOn_203 or enter the BeOn_203 ID directly from the keypad, and PTT Smartphone 1.
   - > Verify that BeOn_203 receives the call and displays the ID of Smartphone 1.
   - > Verify that BeOn_204 remains idle.
2. Release the PTT on BeOn_202 and immediately PTT on BeOn_203.
   - > Verify that BeOn_202 receives the call and displays the ID of BeOn_203.
   - > Verify BeOn_204 remains idle.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

GROUP SCAN

Purpose: Confirms the scan function which allows a smartphone to hear audio on selected talkgroups other than the current talkgroup.

Expected Results: Selected talkgroup call audio is heard.

Setup: BeOn_202 set up with TG13151 P25 and TG13152 P25 in the scan list, TG13151 P25 selected, and group scan initially disabled.

Description	Radio LID	TG Description	TG ID
BeOn_202	9980202	TG 13151 P25	13151
BeOn_203	9980203	TG 13151 P25	13151

Execution:

1. Place a call from BeOn_203 on TG13151 P25.
   - Verify the call is received and audio is heard on BeOn_202.
2. Place a call from BeOn_203 on TG13152 P25.
   - Verify the call is not received by BeOn_202.
3. Enable group scan on BeOn_202.
4. Place another call from BeOn_203 on TG13152 P25.
   - Verify that the call is now received and audio is heard on BeOn_202.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

EMERGENCY GROUP CALL

Purpose: Confirms an emergency can be declared, recognized, and cleared by a smartphone.

Expected Results: The emergency is declared, recognized, and cleared.

Setup:

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID
BeOn_202	9980202	TG 64151 P25	64151
BeOn_203	9980203	TG 64152 P25	64152
BeOn_204	9980204	TG 64153 P25	64153

Execution:

1. Press the emergency call button on BeOn_204 and then PTT BeOn_204.
   - > Verify that BeOn_204 indicates the “TX EMER” declaration and that it reverts to the home group.
   - > Verify that BeOn_202 and BeOn_203 indicate a “RX EMER” and hear audio on the emergency home group.
2. Clear the emergency with the supervisor smartphone (BeOn_202).
   - > Verify the emergency clears in the smartphones.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

Patch with BeOn (SR10A.2 or later)

Purpose: Confirm console patch feature creates shared communication between multiple selected talk groups between radios and smartphone.

Expected Results: Demonstrate patched talk groups can communicate.

Setup: Console 1 programmed with TGs: TG 13151 P25, TG 13152 P25, TG 13153 P25, and TG 64154 P25.

Description	Radio LID	TG Description	TG ID	Site
BeOn_202	9980202	TG 13351 P25	13351	1
BeOn_203	9980203	TG 13352 P25	13352	1
P25T Radio 1	9980001	TG 13353 P25	13353	1
P25T Radio 2	9980002	TG 13354 P25	13354	1

Execution:

1. Create a patch on PATCH 1 with all four TGs above.
2. Place a call from the newly created patch.
   - Verify the call is heard on the two BeOn Smartphones and on the two P25T Radios.
3. Place a call from BeOn_202.
   - Verify the call is heard on BeOn_202, on both P25T Radios 1 and 2, and on the console.
4. Deactivate the patch.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

Simulselect with BeOn (SR10A.2 or later)

Purpose: Confirm operation of the console Simulselect feature, which allows multiple talk groups to be selected for communication simultaneously between radios and smartphone.

Expected Results: Console can select multiple talk groups and communication is allowed.

Setup: Console 1 programmed with TGs: TG 13151 P25, TG 13152 P25, TG 13153 P25, and TG 64154 P25.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
BeOn_202	9980202	TG 13351 P25	13351	1
BeOn_203	9980203	TG 13352 P25	13352	1
P25T Radio 1	9980001	TG 13353 P25	13353	1
P25T Radio 2	9980002	TG 13354 P25	13354	1

Execution:

1. On the console, create Simulselect group on the 4 test group modules.
2. Place a call from the console on the Simulselect group.
   - Verify the call is heard on the two BeOn Smartphones and on the two P25T Radios.
3. Place a call from each smartphone and radio.
   - Verify that only the console hears the calls.
4. Deactivate the Simulselect group.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

GROUP EMERGENCY AND EMERGENCY ALERT WITH BEON

Purpose: Confirm console receives a group emergency and an emergency alarm (unit alert) declared by a BeOn smartphone.

Expected Results: BeOn smartphone can declare an emergency alert.

Setup: BeOn Smartphones 1 and 2 have "Emergency Alarm" enabled in the personalities.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
BeOn_202	9980202	TG 64352 P25	64351	1
BeOn_203	9980203	TG 64352 P25	64352	1
P25T Radio 1	9980001	TG 64352 P25	64353	1
P25T Radio 2	9980002	TG 64353 P25	64354	1

Execution:

1. On Smartphone BeOn_202 declare an emergency on Talkgroup 64152 and PTT to talk on the emergency group.
   - > Verify BeOn_202 Smartphone indicates the "TX EMER" declaration.
   - > Verify BeOn_203 Smartphone and P25T Radio 1 indicates "RX EMER" and can hear the emergency group call.
   - > Verify P25T Radio 2 does not display the emergency.
2. On Symphony Console's Sidebar Panel, go to the Emergency Panel.
   - > Verify emergency listed shows Talkgroup 64152, in a mini module, with a red background.
   - > Verify Declarer ID, BeOn_202, is listed, with an "ACK" button and a number "1" for the number of group emergencies declared. [Listed below talkgroup mini module.]
   - > Verify below declarer ID, single unit icon and declarer ID is listed with an "ACK" button and a number '1', for number of unit alerts declared.
3. Clear group emergency from BeOn_202 Smartphone.
   - > Verify Symphony Console no longer displays group emergency.
   - > Verify group emergency is no longer seen on BeOn_203 Smartphone and P25T Radio 1.
4. PTT on Radio 1, to do a group call.
   - > Verify an emergency group call goes to the BeOn Smartphones 202 and 203, and the console.
   - > This occurs, since the emergency alert is still active on Talkgroup 64152.
5. On Symphony 'Emergency Sidebar Panel,' clear emergency alert tone by selecting second "ACK" button next to unit icon and declarer ID. Also, clear group emergency alert tone on Talkgroup 64152, by selecting first "ACK" button next to declarer ID.
   - > Verify emergency tones have been silenced.

6. On 'Emergency Sidebar Panel,' clear group emergency by selecting first "Clear" button next to Declarer ID. Also, clear Unit Alert by selecting second "Clear" button next to Unit icon and Declarer ID.

   > Verify emergency on Talkgroup 64152 has been cleared from the console, Smartphones, and Radio 1.

7. PTT on BeOn_202 Smartphone to do a group call.

   > Verify a group call without an emergency is seen and heard at the console, at BeOn_203 Smartphone, and P25T Radio 1.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

Trunked Logging Recorder

GROUP CALL

Purpose: Confirms group call audio is captured, recorded, and accessible on the logging recorder

Expected Results: Calls are captured, recorded, and accessible.

Setup:

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID
Radio 1	9980001	TG 64051 P25	64051
Radio 2	9980002	TG 64051 P25	64051
Radio 3	9980003	TG 64051 P25	64051

Execution:

1. PTT Radio 1 and talk.
   > Audio should be heard on Radio 2. Note the start time of the call and the approximate duration.
2. Retrieve the call from the logging recorder.
   > Verify the caller, callee, start time, and duration.
   > The caller should be the LID for Radio 1 and the callee should be the GID for 64051. Verification should include the user ID (LID), group ID (GID), and its alias as defined by the UAS.
   > Verify that the call is identified as a group call.
3. Playback the audio.
   > Confirm that the playback audio is all recorded and intelligible.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

EMERGENCY GROUP CALL

Purpose: Confirms emergency group call audio is captured, recorded, and accessible on the logging recorder

Expected Results: Emergency calls are captured, recorded, and accessible.

Setup:

RADIO DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID
Radio 1	9980001	TG 64051 P25	64051
Radio 2	9980002	TG 64051 P25	64051
Radio 3	9980003	TG 64051 P25	64051

Execution:

1. Press the emergency call button on Radio 2. Talk during the hot mic transmit time.
2. Clear the emergency with the Radio 1.
3. Retrieve the call from the logging recorder.
   - > Verify the caller.
   - > Verify the callee.
   - > Verify the start time.
   - > Verify the duration.
   - > The caller should be the LID for Radio 2, and the callee should be the GID for the home group.
   - > Verification should include the user ID (LID), group ID (GID), and its alias as defined by the UAS.
   - > Verify that the call is identified as an emergency.
   - > Playback the audio and confirm that it is all recorded and intelligible.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

Patch with BeOn (SR10A.2 or later)

Purpose: Confirm console patch feature creates shared communication between multiple selected talk groups between radios and smartphone.

Expected Results: Demonstrate patched talk groups can communicate.

Setup: Console 1 programmed with TGs: TG 13151 P25, TG 13152 P25, TG 13153 P25, and TG 64154 P25.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
BeOn_202	9980202	TG 13351 P25	13351	1
BeOn_203	9980203	TG 13352 P25	13352	1
P25T Radio 1	9980001	TG 13353 P25	13353	1
P25T Radio 2	9980002	TG 13354 P25	13354	1

Execution:

1. Create a patch on PATCH 1 with all four TGs above.
2. Place a call from the newly created patch.
   - Verify the call is heard on the two BeOn Smartphones and on the two P25T Radios.
3. Place a call from BeOn_202.
   - Verify the call is heard on BeOn_202, on both P25T Radios 1 and 2, and on the console.
4. Deactivate the patch.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

Simulselect with BeOn (SR10A.2 or later)

Purpose: Confirm operation of the console Simulselect feature, which allows multiple talk groups to be selected for communication simultaneously between radios and smartphone.

Expected Results: Console can select multiple talk groups and communication is allowed.

Setup: Console 1 programmed with TGs: TG 13151 P25, TG 13152 P25, TG 13153 P25, and TG 64154 P25.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
BeOn_202	9980202	TG 13351 P25	13351	1
BeOn_203	9980203	TG 13352 P25	13352	1
P25T Radio 1	9980001	TG 13353 P25	13353	1
P25T Radio 2	9980002	TG 13354 P25	13354	1

Execution:

1. On the console, create Simulselect group on the 4 test group modules.
2. Place a call from the console on the Simulselect group.
   - Verify the call is heard on the two BeOn Smartphones and on the two P25T Radios.
3. Place a call from each smartphone and radio.
   - Verify that only the console hears the calls.
4. Deactivate the Simulselect group.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

Group Emergency and Emergency Alert with BeOn (SR10A.2 or later)

Purpose: Confirm console receives a group emergency and an emergency alarm (unit alert) declared by a BeOn smartphone.

Expected Results: BeOn Smartphone can declare an Emergency Alert.

Setup: BeOn Smartphones 1 & 2 have "Emergency Alarm" enabled in the personalities.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
BeOn_202	9980202	TG 13352 P25	13352	1
BeOn_203	9980203	TG 13352 P25	13352	1
P25T Radio 1	9980001	TG 13352 P25	13352	1
P25T Radio 2	9980002	TG 13353 P25	13353	1

Execution:

1. On smartphone BeOn_202 declare an emergency on TG 13152 and PTT to talk on the emergency group.
   - Verify BeOn_202 smartphone indicates the "TX EMER" declaration.
   - Verify BeOn_203 smartphone and P25T Radio 1 indicates "RX EMER" and can hear the emergency group call.
   - Verify P25T Radio 2 does not display the emergency.
2. On Symphony Console's Sidebar Panel, go to the Emergency Panel.
   - Verify emergency listed shows TG 13152, in a mini module, with a red background.
   - Verify Declarer ID, BeOn_202, is listed, with an "ACK" button and a number "1" for the number of group emergencies declared. [Listed below TG mini module.]
   - Verify below Declarer ID, single unit icon and Declarer ID is listed with an "ACK" button and a number '1', for number of Unit Alerts declared.
3. Clear group emergency from BeON_202 smartphone.
   - Verify Symphony Console no longer displays group emergency.
   - Verify group emergency is no longer seen on BeOn_203 smartphone and P25T Radio 1.
4. PTT on Radio 1, to do a group call.
   - Verify an emergency group call goes to the BeOn smartphones 202 and 203, & console.
   - This occurs, since the Emergency Alert is still active on TG 13152.
5. On Symphony Emergency Sidebar Panel, clear Emergency Alert Tone by selecting second "ACK" button next to Unit Icon and Declarer ID. Also clear Group Emergency Alert tone on TG 13152, by selecting first "ACK" button next to Declarer ID.
   - Verify emergency tones have been silenced.

6. On Emergency Sidebar Panel, clear group emergency by selecting first “Clear” button next to Declarer ID. Also clear Unit Alert by selecting second “Clear” button next to Unit icon and Declarer ID.
   - Verify emergency on TG 13152 has been cleared from console, smartphones & Radio 1.
7. PTT on BeOn_202 Smartphone to do a Group Call.
   - Verify a group call without an emergency is seen and heard at console, at BeOn_203 Smartphone and P25T Radio 1.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

TDMA Message Trunking with BeOn (SR10A.2 or later)

Purpose: Demonstrate system, for TDMA Phase 2 group calls, operates as Standard Message Trunking for Group Calls.

Expected Results: System will assign same working channel to a Message Trunked (MT) call, if next call happens within MT hang time. During hang time, transmitting radio will remain on Traffic (Working) Channel for Phase 2 Group Calls.

Setup: TDMA Enabled Radios 1, 2, and 3 should be only radios on the system. Each call needs to happen within 3 seconds of each other for this test to work. TG 13353 is a TDMA (Phase 2) MT Group Monitor System channel assignment in RSM Site Activity Real-time Viewer.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
BeOn_202	9980202	TG 13353 P25	13353	1
BeOn_203	9980203	TG 13353 P25	13353	1
Radio 1	9980001	TG 13353 P25	13353	1

Execution:

1. Log into RNM and start RSM Site Activity application in the real-time viewer. Observe all channels on Site 1 for each of the steps below.
2. PTT BeOn_202 Smartphone and talk.
   - Transmit (TX) indicators (red light) should turn on at BeOn_202 Smartphone.
   - On RNM, observe number of channel assigned and channel slot assigned.
   - Verify audio from BeOn_202 Smartphone is heard at BeOn_203 Smartphone & Radio 1.
3. Un-PTT BeOn_202 Smartphone.
   - Verify BeOn_202 Smartphone's LED Receive (RX) indicator turns green, to indicate BeOn_202 Smartphone remains on Traffic (Working) channel, during the Hang Time. (This is Standard Message Trunking for TDMA.)
4. PTT BeOn_203 Smartphone, within the 3 second hang time, and talk.
   - Transmit (TX) indicators (red light) should turn on at BeOn_203 Smartphone.
   - Verify same channel / slot is assigned, as in step 2.
   - Verify audio from BeOn_203 Smartphone is heard at BeOn 202 Smartphone & Radio 1.
5. Un-PTT BeOn_203 Smartphone.
   - Verify BeOn_203 Smartphone's LED light turns green, to indicate Receive (Rx). Indicates BeOn_203 Smartphone remains on Traffic (Working) channel, during Hang Time.
6. PTT Radio 1, within 3 second hang time, and talk.
   - Transmit (TX) indicators (red light) should turn on at Radio 1.
   - Verify same channel / slot is assigned in steps 2 & 4.

- Verify audio from Radio 1 is heard at BeOn_202 and BeOn_203 Smartphones.

7. Un-PTT Radio 1
   - Verify Radio 1's LED light turns green, to indicate Receive (Rx). Indicates Radio 3 remains on Traffic (Working) channel, during Hang Time.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

P25 ISSI GATEWAY

ISSI Group Calls (SR10A.2 or later)

Purpose: Confirm a Group Call can occur from a Home Radio to a Foreign ISSI Radio.

Expected Results: Demonstrate ISSI Group Call goes from a Home Radio to a Foreign Radio.

Setup: Home System A is connected to Foreign System B using P25 ISSI wireline interface.

NOTE: Radios 2 and 4 are used to verify receive audio on originating system/call

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SYSTEM
P25T Home Radio 1	9980001	TG 13051 P25	13051	A
P25T Home Radio 2	9980002	TG 13051 P25	13051	A
P25T Foreign Radio 3	9980003	TG 13051 P25	13051	B
P25T Foreign Radio 4	9980004	TG 13051 P25	13051	B

Execution:

1. PTT Home Radio 1, on System A, and verify it communicates with Home Radio 2 on Home System A and Foreign Radios 3 and 4, on System B. Verify that audio is received on Home Radio 2 and Foreign Radios 3 & 4. Verify that the Caller ID of Radio 1 is displayed on Radios 2, 3 and 4.
2. PTT Foreign Radio 3 and verify it communicates with Home Radios 1 and 2, on Home System A, and Foreign Radio 4, on Foreign System B. Verify that audio is received on Radios 1, 2 and 4. Verify that the Caller ID of Radio 3 is displayed on Radios 1, 2 and 4.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

ISSI System Roaming (SR10A.2 or later)

Purpose: Confirm Roamed ISSI Radios can communicate with Group Calls across the ISSI.

Expected Results: Demonstrate Roamed ISSI Radios communicate with group calls to the Home and Foreign Radios over the ISSI.

Setup: Home System A is connected to Foreign System B using P25 ISSI wireline interface.

NOTE: Radios 2 and 4 are used to verify receive audio on originating system/call

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SYSTEM
P25T Home Radio 1	9980001	TG 13051 P25	13051	A
P25T Home Radio 2	9980002	TG 13051 P25	13051	A
P25T Foreign Radio 3	9980003	TG 13051 P25	13051	B
P25T Foreign Radio 4	9980004	TG 13051 P25	13051	B

Execution:

1. Log Home Radio 1 into Foreign System B.
2. Log Foreign Radio 3 into Home System A.
3. PTT Home Radio 1 and verify it communicates with Foreign Radio 3 on Home System A, and Foreign Radio 4 on Foreign System B. Verify that audio is received on Radios 3 and 4. Verify that the Caller ID of Radio 1 is displayed on Radios 3 & 4.
4. PTT Foreign Radio 3 and verify it communicates with Home Radio 1 on Foreign System B and Home Radio 2 on Home System A. Verify that audio is received on Radios 1 and 2. Verify that the Caller ID of Radio 3 is displayed on Radios 1 and 2.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

ISSI Encrypted Calls (SR10A.2 or later)

Purpose: Confirm ISSI Encrypted Group Calls work.

Expected Results: Demonstrate ISSI Encrypted Group Calls work between the Home System and the Foreign System.

Setup: Home System A is connected to Foreign System B using P25 ISSI wireline interface. TG 13051 is an ISSI Encrypted Talkgroup. Make sure Radio 1 & 3 have been set up for encryption and radio 2 has not.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SYSTEM
P25T Home Radio 1	9980001	TG 13051 P25	13051	A
P25T Home Radio 2	9980002	TG 13051 P25	13051	A
P25T Foreign Radio 3	9980003	TG 13051 P25	13051	B

Execution:

1. PTT Home Radio 1 on Home System A and verify it communicates with Foreign Radio 3 on Foreign System B. Verify Home Radio 2 cannot hear the call.
2. PTT Foreign Radio 3 and verify it communicates with Home Radio 1 on Home System A and Home Radio 2 could not hear the call.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

ISSI Emergency Call (SR10A.2 or later)

Purpose: Confirm ISSI Group Emergency declared on Home System A is received and heard on Foreign System B

Expected Results: Demonstrate Foreign Radio 3 on Foreign System B receives and hears ISSI Group Emergency call from Home Radio 1 on Home System A.

Setup: Home System A is connected to Foreign System B using P25 ISSI wireline interface. On all 3 radio personalities the 'Emer Alarm' is not enabled.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SYSTEM
P25T Home Radio 1	9980001	TG 13051 P25	13051	A
P25T Home Radio 2	9980002	TG 13051 P25	13051	A
P25T Foreign Radio 3	9980003	TG 13051 P25	13051	B

Execution:

1. Declare an Emergency on Home Radio 1 on Home System A.
   - Verify Home Radio 2 on Home System A receives the emergency.
   - Verify Foreign Radio 3 on Foreign System B receives the emergency.
   - Verify Home Radio 2 and Foreign Radio 3 hear the emergency group call audio.
   - Verify the Caller ID of Home Radio 1 is displayed on Home Radio 2 and Foreign Radio 3.
2. PTT Foreign Radio 3 and verify it communicates with Home Radio 1 and 2 on Home System A.
   - Verify ISSI Emergency Group Call Audio is received on Home Radios 1 and 2.
   - Verify the Caller ID of Foreign Radio 3 is displayed on Home Radios 1 and 2.
3. Clear the emergency on Home Radio 1.
   - Verify emergency is cleared on Home Radio 2 on Home System A and Foreign Radio 3 on Foreign System B.
4. Repeat the previous steps with Foreign Radio 3 on Foreign System B declaring the Emergency.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

ISSI Fault Monitoring (SR10A.2 or later)

Purpose: Confirm an alarm indicates when the ISSI machine loses power.

Expected Results: Demonstrate an alarm is given when the ISSI loses power.

Setup: System (A) is connected to System (B) using the P25 ISSI wireline interface.

Execution:

1. On a client computer, open the windows Internet Explorer and browse to https://s0u1rnm.vida.local/nmc and log in with an Active Directory account.
2. Choose the system map and select the 'Launch Application' button.
3. Select the 'Network' tab and expand the tree in the left panel until you can see a site in the right panel.
4. Power down the ISSI virtual machine.
   - Verify that the RNM indicates an alarm for the affected device.
5. Turn the ISSI virtual machine back ON.
   - Verify that the device alarm clears and displays green.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

ISSI Real Time Monitoring (SR10A.2 or later)

Purpose: Confirm ISSI Group Calls are shown on the RNM Real-Time Viewer.

Expected Results: Demonstrate ISSI Group Calls on the RNM Real-Time Viewer.

Setup: System A is connected to System B using the P25 ISSI wireline interface. Administrator access to the RNM

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SYSTEM
P25T Home Radio 1	9980001	TG 13051 P25	13051	A
P25T Foreign Radio 2	9980002	TG 13051 P25	13051	B

Execution:

1. On a client computer, open the windows Internet Explorer and browse to https://s0u1rnm.vida.local/nmc and log in with an Active Directory account.
2. Choose system map and select 'Launch Application' button.
3. Open Realtime tab and Click Site Calls.
4. Select the site and expand.
5. Check the box next to the channels and select to add the channels to the target list. Select the 'ok' button to launch the application.
6. Place a group call from Home Radio 1 to Foreign Radio 3 on an ISSI Talk Group.
7. Verify the event viewer displays talkgroup ID and calling party ID.
8. Verify state changes from Free to Talk.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

ISSI Group Emergency and Unit Alert with Symphony (SR10A.2 or later)

Purpose: Confirm ISSI Foreign Radio receives group emergency and emergency alarm (Unit Alert) declared by an ISSI Home radio. Confirm Home Symphony Console can reset and clear emergency unit alert and cancel group emergency.

Expected Results: Demonstrate Group Emergency and Unit Alert operate across ISSI interface.

Setup: Home System A is connected to Foreign System B via ISSI.TG 13051 P25 is an ISSI Interop TG Radios 1 & 2 have Emergency Alarm enabled in personality. Console: Symphony.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SYSTEM
P25T Home Radio 1	9980001	TG 13051 P25	13051	A
P25T Foreign Radio 2	9980002	TG 13051 P25	13051	B

Execution:

1. Select TDMA TG 13051 on Home Symphony Console. On Home Radio 1, declare an ISSI Emergency on TG13051. PTT Radio 1 to talk to dispatcher.
   - Verify Foreign Radio 2 on Foreign System B receives emergency, and hears emergency group call.
2. On Home Symphony's TG 13051 Module:
   - Verify TG13051 Module has a stripped red background.
   - Verify TG Smart Button flashes an "emergency icon", which alternates with TG icon.
   - Verify Declarer ID is shown in Red on TG Module.
   - Verify emergency alarm tone and radio emergency group call audio is heard on console.
3. On Home Symphony's Sidebar Panel, go to Emergency Panel:
   - Verify emergency listed shows TG13051, in a mini module, with a red background.
   - Verify Declarer ID is listed, with an "ACK" button and a number '1', for number of group emergencies declared, [listed below TG Mini Module].
   - Verify below Declarer ID, single unit icon and Declarer ID is listed, with an "ACK" button and a number '1', for number of Unit Alerts declared.
4. To clear ISSI Group Emergency alarm tone on Symphony Emergency Sidebar Panel, select top "ACK" button next to Declarer ID.
   - Verify group emergency alarm tone is silenced on console.
   - Verify ISSI Group Emergency is still displayed on talk group module and emergency sidebar panel.
   - Verify Unit Alert "ACK" is still displayed below group emergency.
5. On console, select and transmit on TG13051.
   - Verify Radio 1 and 2 both receive ISSI Emergency call.

6. Clear ISSI Group Emergency on Home Radio 1.
   - Verify Home console TG Module no longer indicates an ISSI Group Emergency.
   - Verify group emergency is no longer seen on Home Radio 1 & Foreign Radio 2.
7. PTT on Home Radio 1, to do a group call:
   - Verify an emergency group call goes to Symphony on TG13051 Module, and to Radio 2.
   - Verify emergency is also seen in Emergency Sidebar Panel.
   - (This occurs, since Emergency Unit Alert is still active on TG13051.)
8. On Symphony Emergency Sidebar Panel, clear Unit Alert Tone by selecting second “ACK” button next to Unit Icon and Declarer ID. Also clear Group Emergency Alarm tone on TG13051, by selecting first “ACK” button next to Declarer ID.
   - Verify all emergency tones have been silenced.
9. On Emergency Sidebar Panel, “Clear” group emergency by selecting first “Clear” button next to Declarer ID. Also Clear Unit Alert by selecting second “Clear” button next to Unit Icon and Declarer ID.
   - Verify ISSI Emergency on TG13051 has been cleared from Home Symphony Console, Home Radio 1, and Foreign Radio 2.
10. PTT on Home Radio 1 on TG 13051, to do a Group Call.
    - Verify a group call without an emergency is seen and heard at the console and Foreign Radio 2.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

P25 ISSI Feature – Site Adjacencies (SR10A.3 or later)

Purpose: Demonstrate capability to configure ISSI Site Adjacencies in UAS. ISSI Adjacencies show the relationship between ISSI Foreign Sites and P25 Home Sites.

Expected Results: ISSI Site Adjacencies will be successfully viewed and configured.

Setup: UAS: Foreign ISSI Gateway defined. MastrV Site Personalities: Enable "Inter RF Subsystem Interface (ISSI) Interoperability. Home System A: Home Sites 1 and 2. Foreign System B: Foreign Sites 3 and 4.

Execution:

1. In UAS, System Tab, System Properties, Site Adjacency; to view a Site Adjacency, select single row from Foreign Site Table and click "Show Adjacency" button on "System" tab, or click "Show Adjacency" button and select desired P25 or Foreign Site.
   - Verify that P25 Site Adjacency or Foreign Site Adjacency can be viewed. Selected Site will be displayed in "center" of Site Adjacency diagram with all of its adjacencies, if any, hanging off the center node in a hub-and-spoke fashion.
2. When in Adjacency UI, the drop-down Site list can be used to select what Site has its agencies displayed.
3. To configure ISSI Site Adjacencies, a unique foreign RFSS should be defined in Home System A, for each foreign site from Foreign System B, before it can be added as adjacent sites to the home local sites.
   - Create a new RFSS for Foreign Site 3 in Home System A. In UAS, System Tab, ISSI Gateway, Foreign ISSI Gateway screen, click "Add". Provide name, description, foreign system WACN, System ID (Region ID of foreign system), P25 RFSS ID (Site ID of foreign site that needs to be added as an adjacent site), Ext IP address (foreign system ISSI's external IP address), and ISSI Type.
4. A Foreign Site should be defined. In UAS, go to Foreign Site 3 (System Tab, ISSI Gateway, Foreign Site, click "Add". Enter the ID (P25 Site ID), name, description, Foreign ISSI Gateway ID (choose RFSS created in Step 3).
   - Foreign Site is successfully configured in UAS and can now be added as an Adjacent Site to any of the Home System A's Local Sites 1 or 2.
5. With Foreign RFSS and Foreign Site defined, Foreign Site 3 can be added as an adjacent site to either Home Site 1 or 2.
   - In UAS, System Tab, System Properties, Site Adjacency, Select Local Site 1, to which the foreign site created in Step 4, will be added as an adjacent site.
   - Scroll thru list of available sites, Foreign Site 3 created in Step 4, should be available at the bottom list. Select Foreign Site 3 and click "Add Adjacency".
   - New foreign adjacency is shown.
6. To confirm adjacent table is properly provisioned to the site after adding the foreign site adjacency, run "show at" command at the site CC.

- Resulting table should match the UAS configuration

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

VIDA INTER-OPERABILITY GATEWAY TEST

Local Interoperability

Purpose: The purpose of this test is to verify correct functionality of the Interoperability Gateway.

Expected Results: Verify that the Interoperability Gateway connects via 4-wire audio connections in its Universal Access Cards(UAC) cards to interoperability radio units (mobile or desktop). The Gateway also connects to a router and the Network Switching Center (NSC) to provide call functionality across the network.

Setup:

Execution:

1. Select Inter-op group 1 on the radio.
2. Initiate a call from the radio to group 1
   - Verify that audio is heard on inter-op group 1 radio.
3. Initiate a call from the inter-op group 1 radio to group 1
   - Verify that audio is heard on the radio.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

High Availability NSS Switchover

HIGH AVAILABILITY WIDE AREA ROUTER FAILURE

Purpose: Demonstrate capabilities of the system to work after a WAR failure.

Expected Results: System components that are set-up with high availability will continue to work after a WAR failure.

Setup: These tests are setup to be run twice, once on each router. After completing Step 4 restart the WAR router if not already running. Wait 20 minutes and rerun the tests for the second router. These tests will simulate a WAR failure by disconnecting it from the Wide Area Network (WAN), so the WAR to WAN connection will need to be known.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
Radio 1	9980001	TG 64001 P25	64001	1
Radio 2	9980002	TG 64001 P25	64001	1
Radio 3	9980003	TG 64002 P25	64002	1
Radio 4	9980004	TG 64002 P25	64002	2

Execution:

1. Use Radio 1 to initiate a call
   > Verify that the call is heard on the Radio 2. Keep the call active during fail-over.
2. Use Radio 3 to initiate a call
   > Verify that the call is heard on Radio 4. Keep the call active during fail-over.
3. Log in to s0u1nss and s0u2nss; change your user to the Root User and enter the password.
4. Type ‘HArunning’ into both NSSs, one will report that it is the ‘Stand By’ and one will report that it is the ‘Primary’. Note the name of the primary NSS and the primary WAR.

DESCRIPTION	TEST RUN 1	TEST RUN 2
Primary NSS Name		
Primary WAR Name		
Primary RNM Name		
Primary RSM Name		
Time of Server Reboot		

5. Log into the WAR that is associated with the ‘Primary’ NSS. “Reload” the WAR router.
   > The call from Radio 3 to Radio 4 will be dropped.
   > The call from Radio 1 to Radio 2 will continue and the console will lose connectivity to the VNIC.
   > Verify that after a short delay, the backup server NSS2 automatically takes over as the primary server.

6. Wait 20 minutes for the two NSS servers to synchronize and replicate their databases.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

UNIT 1 NSS SWITCHOVER

Purpose: Confirm when the primary NSS losses power, it will fail over to the second NSS. The secondary NSS will take over the function of the primary NSS and restart multi-site (console) call traffic.

Expected Results: Test will simulate NSS failure of the active NSS and show the redundant NSS will restart call handing functionality. The calls between the radios (1 and 2) on the same site will operate normally during the failover, the call between radios (3 and 4) on different sites will drop for about 40 seconds. During the failover, the console will lose connectivity to the system for about 40 seconds.

Setup: To start this test, the VNIC needs to be on s0u1nss; if it is not, start with Unit 2 NSS Switchover Test and perform this test after that test. Open a terminal screen. For single site simulcast system only, ignore Radios 1 and 2.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
Radio 1	9980001	TG 64001 P25	64001	1
Radio 2	9980002	TG 64001 P25	64001	1
Radio 3	9980003	TG 64002 P25	64002	1
Radio 4	9980004	TG 64002 P25	64002	2
Console	9989101	TG 64001 P25	64001	
Console	9989101	TG 64002 P25	64002	

Execution:

1. Log into both NSS's.
2. Open a terminal window and login as a 'Super User'.
3. Type 'HArunning' in to both terminal windows. The server that displays 'Running as Primary' is the primary.
4. Start calls with Radio 1 and Radio 3, listen to the calls with Radio 2, Radio 4, and the console.
5. Create an NSS failure, on the primary Network Switching Server (NSS), by initiating a "HArestart" command in the NSS window.
   - > Primary NSS gives an alert message and goes down.
   - > The call from Radio 1 to Radio 2 will continue and the console will lose connectivity to the VNIC. The call from Radio 3 to Radio 4 will be dropped.
   - > Verify that after a short delay, the backup server NSS2 automatically takes over as the primary server.
6. On the RNM, verify:
   - > NSS1, MDIS, and VNIC icons turn red.
   - > NSS2, MDIS, and VNIC icons turn green.
   - > RNM reports NSS1, MDIS, and VNIC failure messages.
   - > Verify the call between Radio 1 and Radio 2 continues to be heard on Radio 2, then drop the test call.

- After failover, verify that multi-site group and individual radio calls can be made between Radio 3 and Radio 4.
- Verify NSS in Step 5 comes back into standby operation.
- Verify NSS1 Icon turns blue on RNM.

7. Wait 20 minutes for the two NSS servers to synchronize and replicate their databases.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

UNIT 2 NSS SWITCHOVER

Purpose: Confirm when the secondary NSS loses power, it will fail over to the primary NSS. The primary NSS with take over the function of the secondary NSS and restart multi-site call (console) traffic.

Expected Results: Test will simulate NSS failure and show the redundant NSS will restart call handing functionality. The calls between the radios (1 and 2) on the same site will operate normally during the failover, the call between radios (3 and 4) on different sites will drop for about 40 seconds. During the failover, the console will lose connectivity to the system for about 40 seconds.

Setup: To start this test, the VNIC needs to be on s0u2nss; if it is not, start with Unit1 NSS switchover test and perform this test after that test. Open a terminal screen. For single site simulcast system only, ignore Radios 1 and 2.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
Radio 1	9980001	TG 64001 P25	64001	1
Radio 2	9980002	TG 64001 P25	64001	1
Radio 3	9980003	TG 64002 P25	64002	1
Radio 4	9980004	TG 64002 P25	64002	2
Console	9989101	TG 64001 P25	64001	
Console	9989101	TG 64002 P25	64002	

Execution:

1. Log into both NSSs.
2. Open a terminal window and login as a ‘Super User’.
3. Type ‘HArunning’ in to both terminal windows. The server that displays ‘Running as Primary’ is the primary.
4. Start calls with Radio 1 and Radio 3, listen to the calls with Radio 2, Radio 4, and the console.
5. Create an NSS failure, on the primary NSS, by initiating a “HArestart” command in the NSS window.
   - > Primary NSS gives an alert message and goes down.
   - > The call from Radio 1 to Radio 2 will continue and the console will lose connectivity to the VNIC. The call from Radio 3 to Radio 4 will be dropped.
   - > Verify that after a short delay, the backup server NSS2 automatically takes over as the primary server.
6. On RNM, verify:
   - > NSS1, MDIS, and VNIC icons turn red.
   - > NSS2, MDIS, and VNIC icons turn green.
   - > RNM reports NSS1, MDIS, and VNIC failure messages.
   - > Verify call between Radio 1 and Radio 2 continues to be heard on Radio 2, then drop the test call.

- After failover, verify that multi-site group and individual radio calls can be made between Radio 3 and Radio 4.
- Verify NSS in Step 5 comes back into standby operation.
- Verify NSS1 Icon turns blue on RNM.

7. Wait 20 minutes for the two NSS servers to synchronize and replicate their databases.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

High Availability Recovery Tests

Purpose: Demonstrate how the system recovers from hardware failures.

NSC-A HARDWARE FAILURE

Purpose: This test will demonstrate the amount of built in redundancy in each of the NSC locations. Each of the hardware appliances at the primary NSC will be removed from the network. Tests will verify that when each appliance fails services will recover to the back-up system. After test is complete, the system will require ~20 min to resync.

Expected Results:

- Removing the Internet firewall (IFW) will affect BeOn traffic for 2-5 sec
- Remove the WAR router (2-5 sec interruption of console to VNIC and site to site traffic)
- Remove RAR (2-5 sec interruption of console to VNIC and site to site traffic)
- Disconnect VAS (2-5 sec interruption of console to VNIC and site to site traffic, BeOn traffic Interruption ~60 sec) – VMs migrate to recovery NSC location

Setup: To start this test the VNIC needs to be on s0u1NSS NSC Room 1A.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
Radio 1	9980001	TG 64001 P25	64001	1
Radio 2	9980002	TG 64001 P25	64001	1
Console	9989101	TG 64001 P25	64001	
BeOn_202	9980202	TG 64001 P25	64001	
Radio 3	9980003	TG 64001 P25	64001	2

Execution:

1. Log into each of the NSS servers s0u1nss & s0u2nss.
2. Open a terminal window and type ‘sudo su – ‘and type in the password to get root level access.
3. Type ‘HArunning’, the server that displays ‘Running as Primary’ is the primary.
4. Start calls with Radio 1, listen to the calls with Radio 2, Radio 3, BeOn_202, and the console.
5. Restart the call described in Step 4
   - BeOn Traffic may have a 2-5 sec.
   - The call from Radio 1 to Radio 2 will not be interrupted.
   - The call from Radio 1 to Radio 3 and the console may have a 2-5 sec. interruption.
   - Log into the AUS to confirm server is available.
   - Log into the RNM to monitor system alarms.
6. Restart the call described in Step 4.
7. Remove the s0u1RARa router by removing the power from the router.

- BeOn traffic may have <60 sec. interruption.
- The call from Radio 1 to Radio 2 will not be interrupted.
- The call from Radio 1 to Radio 3 and the console may have a 5-30 sec. interruption.
- Log into the AUS to confirm server is available.
- Log into the RNM to monitor system alarms.

8. If VNIC Moves wait ~20 for re-sync to complete
   - On the RNM, verify that the;
   - S0u1NSS and VNIC icons turn red.
   - S0u2NSS and VNIC icons turn green.
   - RNM reports S0u1NSS, and VNIC failure messages.
   - Verify that S0u1NSS at Site 1 comes back into standby operation (~30 min).
   - Verify that the S0u1NSS Icon turns blue on RNM.
9. Monitor Vcenter for VM migration.
10. Restart the call described in Step 4.
11. Remove the s0u1VASa Server by removing OnBoard-GE1 from the VAS server that connects to s0u1RARb.
    - Verify that after a short delay, the Backup server NSS automatically takes over as the primary server.
    - BeOn Traffic will have a 3-5 sec. interruption.
    - The call from Radio 1 to Radio 2 will not be interrupted.
    - The call from Radio 1 to Radio 3 and the console will have a <10 sec. interruption.
    - Log into the AUS to confirm Server is available.
    - Log into the RNM to monitor system alarms.
    - Keep IFW, WAR, & RAR powers off.
12. Wait 30 minutes for the two NSS servers to synchronize and replicate their databases.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

NSC-C HARDWARE FAILURE (SR10A.4 OR LATER)

Purpose: This test will demonstrate the amount of built in redundancy in each of the NSC locations. Each of the HW appliances at the primary NSC will be removed from the network. Tests will verify that when each appliance fails services will recover to the back-up system.

After test is complete the system will require ~20 min to resync.

Expected Results:

1. Removing the IFW will affect BeOn traffic for 2-5 Sec
2. Remove the WAR router (2-5 sec interruption of Console to VINC & site to site traffic)
3. Remove RAR (2-5 sec interruption of Console to VINC & site to site traffic)
4. Disconnect VAS (2-5 sec interruption of Console to VINC & site to site traffic, BeOn traffic Interruption ~60 sec) – VMs migrate to recovery NSC location

Setup: To start this test the VNIC needs to be on s0u2NSS and all HW at NSC Room 1A should be disconnected or powered off.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
Radio 1	9980001	TG 13001 P25	13001	1
Radio 2	9980002	TG 13001 P25	13001	1
Console	9989101	TG 13001 P25	13001	
BeOn_202	9980202	TG 13001 P25	13001	
Radio 3	9980003	TG 13001 P25	13001	2

Execution

1. Log into each of the NSS servers s0u1nss & s0u2nss
2. Open a terminal window and type ‘sudo su – ‘and type in the password to get root level access
3. Type ‘HArunning’, the server that displays ‘Running as Primary’ is the primary.
4. Start calls with Radio 1, listen to the calls with Radios 2, Radio 3, BeOn_202, and Console.
5. Create power failure on Primary IFW (s0u2IFWb) by removing the power from the router.
   - BeOn Traffic may have a 2-5 Sec interruption.
   - The call from radio 1 to Radios 2, Radio 3, and Console will not be interrupted.
   - Log into the AUS to confirm Server is available
   - Log into the RNM to monitor system alarms
6. Restart the call described in Step #4
7. Remove the s0u2WARb router by removing the power from the router
   - BeOn Traffic may have a 2-5 Sec interruption.
   - The call from radio 1 to Radios 2 will not be interrupted

- The call from radio 1 to Radio 3, and Console may have a 2-5 Sec interruption.
- Log into the AUS to confirm Server is available
- Log into the RNM to monitor system alarms

8. Restart the call described in Step #4
9. Remove the s0u2RARb router by removing the power from the router (NIC may move to Site 2)
   - BeOn Traffic may have <60 Sec interruption.
   - The call from radio 1 to Radios 2 will not be interrupted
   - The call from radio 1 to Radio 3, and Console may have a 5-30 Sec interruption.
   - Log into the AUS to confirm Server is available
   - Log into the RNM to monitor system alarms
10. If VNIC Moves wait ~20 for re-sync to
11. On the RNM, verify that the;
    - S0u2NSS and VNIC icons turn red.
    - S0u1NSS and VNIC icons turn green.
    - RNM reports S0u2NSS, and VNIC failure messages.
    - Verify that S0u2NSS at Site 1 comes back into standby operation (~30 min).
    - Verify that the S0u2NSS Icon turns blue on RNM
12. Monitor Vcenter for VM migration
13. Restart the call described in Step #4
14. Remove the s0u1VASa Server by removing OnBoard-GE1 from the VAS server that connects to s0u2RARa
    - Verify that after a short delay, the Backup server NSS automatically takes over as the primary server.
    - BeOn Traffic will have a 3-5 Sec interruption.
    - The call from radio 1 to Radios 2 will not be interrupted
    - The call from radio 1 to Radio 3, and Console will have a <10 Sec interruption.
    - Log into the AUS to confirm Server is available
    - Log into the RNM to monitor system alarms
15. Keep IFW, WAR, & RAR powered off.

Wait 30 minutes for the two NSS servers to synchronize and replicate their databases.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

NSC-B HARDWARE FAILURE (SR10A.4 OR LATER)

Purpose: This test will demonstrate the amount of built in redundancy in each of the NSC locations. Each of the HW appliances at the primary NSC will be removed from the network. Tests will verify that when each appliance fails services will recover to the back-up system.

After test is complete the system will require ~20 min to resync.

Expected Results:

1. Removing the IFW will affect BeOn traffic for ~60 Sec
2. Remove the WAR router (2-5 sec interruption of Console to VINC & site to site traffic)
3. Remove RAR (2-5 sec interruption of Console to VINC & site to site traffic)
4. Disconnect VAS (2-5 sec interruption of Console to VINC & site to site traffic, BeOn traffic Interruption ~60 sec) – VMs migrate to recovery NSC location

Setup: To start this test the VNIC needs to be on s0u1NSS and all HW at NSC Room 1A, NSC Room 2A should be disconnected or powered off.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
Radio 1	9980001	TG 13001 P25	13001	1
Radio 2	9980002	TG 13001 P25	13001	1
Console	9989101	TG 13001 P25	13001	
BeOn_202	9980202	TG 13001 P25	13001	
Radio 3	9980003	TG 13001 P25	13001	2

Execution

1. Log into each of the NSS servers s0u1nss & s0u2nss
2. Open a terminal window and type ‘sudo su – ‘and type in the password to get root level access
3. Type ‘HArunning’, the server that displays ‘Running as Primary’ is the primary.
4. Start calls with Radio 1, listen to the calls with Radios 2, Radio 3, BeOn_202, and Console.
5. Create power failure on Primary IFW (s0u1IFWb) by removing the power from the router.
   - BeOn Traffic will have ~60 Sec interruption.
   - The call from radio 1 to Radios 2, Radio 3, and Console will not be interrupted.
   - Log into the AUS to confirm Server is available
   - Log into the RNM to monitor system alarms
6. Restart the call described in Step # 4.
7. Remove the s0u1WARb router by removing the power from the router
   - BeOn Traffic will not be interrupted
   - The call from radio 1 to Radios 2 will not be interrupted

- The call from radio 1 to Radio 3, and Console will have a 2-5 Sec interruption.
- Log into the AUS to confirm Server is available
- Log into the RNM to monitor system alarms

8. Restart the call described in Step #4
9. Remove the s0u1RARb router by removing the power from the router
   - BeOn Traffic will not be interrupted
   - The call from radio 1 to Radios 2 will not be interrupted
   - The call from radio 1 to Radio 3, and Console will have a 2-5 Sec interruption.
   - Log into the AUS to confirm Server is available
   - Log into the RNM to monitor system alarms
10. Monitor Vcenter for VM migration
11. Restart the call described in Step #4
12. Remove the s0u1VASb Server by removing OnBoard-GE1 & OnBoard-GE2 from the VAS server
    - Verify that after a short delay, the Backup server NSS automatically takes over as the primary server.
    - BeOn Traffic will have a <10 Sec interruption.
    - The call from radio 1 to Radios 2 will not be interrupted
    - The call from radio 1 to Radio 3, and Console will have a <25 Sec interruption.
    - Log into the AUS to confirm Server is available
    - Log into the RNM to monitor system alarms
13. On the RNM, verify that the;
    - S0u1NSS and VNIC icons turn red.
    - S0u2NSS and VNIC icons turn green.
    - RNM reports S0u1NSS, and VNIC failure messages.
    - Verify that S0u1NSS at Site 1 comes back into standby operation (~30 min).
    - Verify that the S0u1NSS Icon turns blue on RNM.
14. Keep IFW, WAR, & RAR powers off.

Wait 20 minutes for the two NSS servers to synchronize and replicate their databases.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

NSC-D HARDWARE FAILURE (SR10A.4 OR LATER)

Purpose: This test will demonstrate the amount of built in redundancy in each of the NSC locations. Each of the HW appliances at the primary NSC will be removed from the network. Tests will verify that when each appliance fails services will recover to the back-up system.

After test is complete the system will require ~20 min to resync.

Expected Results:

1. Removing the IFW will affect BeOn traffic for 2-5 Sec
2. Remove the WAR router (2-5 sec interruption of Console to VINC & site to site traffic)
3. Remove RAR (2-5 sec interruption of Console to VINC & site to site traffic)
4. Disconnect VAS (2-5 sec interruption of Console to VINC & site to site traffic, BeOn traffic Interruption ~60 sec) – VMs migrate to recovery NSC location

Setup To start this test the VNIC needs to be on s0u2NSS (Room 2B) and all HW at NSC Room 1A, NSC Room 2A, and NSC Room 1B should be connected and powered on.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
Radio 1	9980001	TG 13001 P25	13001	1
Radio 2	9980002	TG 13001 P25	13001	1
Console	9989101	TG 13001 P25	13001	
BeOn_202	9980202	TG 13001 P25	13001	
Radio 3	9980003	TG 13001 P25	13001	2

Execution

1. Log into each of the NSS servers s0u1nss & s0u2nss
2. Open a terminal window and type ‘sudo su – ‘and type in the password to get root level access
3. Type ‘HArunning’, the server that displays ‘Running as Primary’ is the primary.
4. Start calls with Radio 1, listen to the calls with Radios 2, Radio 3, BeOn_202, and Console.
5. Create power failure on Primary IFW (s0u2IFWb) by removing the power from the router.
   - BeOn Traffic will have a 2-5 Sec interruption.
   - The call from radio 1 to Radios 2, Radio 3, and Console will not be interrupted.
   - Log into the AUS to confirm Server is available
   - Log into the RNM to monitor system alarms
6. Restart the call described in Step #4
7. Remove the s0u2WARb router by removing the power from the router
   - BeOn Traffic will not be interrupted
   - The call from radio 1 to Radios 2 will not be interrupted

- The call from radio 1 to Radio 3, and Console will have a 2-5 Sec interruption.
- Log into the RNM to monitor system alarms

8. Restart the call described in Step #4
9. Remove the s0u2RARb router by removing the power from the router
   - BeOn Traffic will not be interrupted
   - The call from radio 1 to Radios 2 will not be interruption
   - The call from radio 1 to Radio 3, and Console will have a 2-5 Sec interruption.
   - Log into the AUS to confirm Server is available
   - Log into the RNM to monitor system alarms
10. Monitor Vcenter for VM migration
11. Restart the call described in Step #4
12. Remove the s0u2VASb Server by removing OnBoard-GE1 & OnBoard-GE2 from the VAS server
    - Verify that after a short delay, the Backup server NSS automatically takes over as the primary server.
    - BeOn Traffic will have a <60 Sec interruption.
    - The call from radio 1 to Radios 2 will not be interrupted
    - The call from radio 1 to Radio 3, and Console will have a <25 Sec interruption.
    - Log into the AUS to confirm Server is available
    - Log into the RNM to monitor system alarms
13. On the RNM, verify that the;
    - S0u2NSS and VNIC icons turn red.
    - S0u1NSS and VNIC icons turn green.
    - RNM reports S0u2NSS, and VNIC failure messages.
    - Verify that S0u2NSS at Site 1 comes back into standby operation (~30 min).
    - Verify that the S0u2NSS Icon turns blue on RNM.
14. Keep IFW, WAR, & RAR powers off.

Wait 20 minutes for the two NSS servers to synchronize and replicate their databases.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

ROOM TO ROOM VM MIGRATION (SR10A.4 OR LATER)

Purpose: This test will demonstrate the system's ability to perform a planned migration of VMs from room to room at the same NSC location with little to no interruption to voice services.

Expected Results:

Moving VM's from Room A to Room B on NSC 1 will have little to no interruption to voice services.

Setup: To start this test the VNIC needs to be on s0u1NSS (Room A or B) and all HW at NSC Room 1A, NSC Room 2A, and NSC Room 1B should be connected and powered on.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
Radio 1	9980001	TG 13001 P25	13001	1
Radio 2	9980002	TG 13001 P25	13001	1
Console	9989101	TG 13001 P25	13001	
BeOn_202	9980202	TG 13001 P25	13001	
Radio 3	9980003	TG 13001 P25	13001	2

Execution

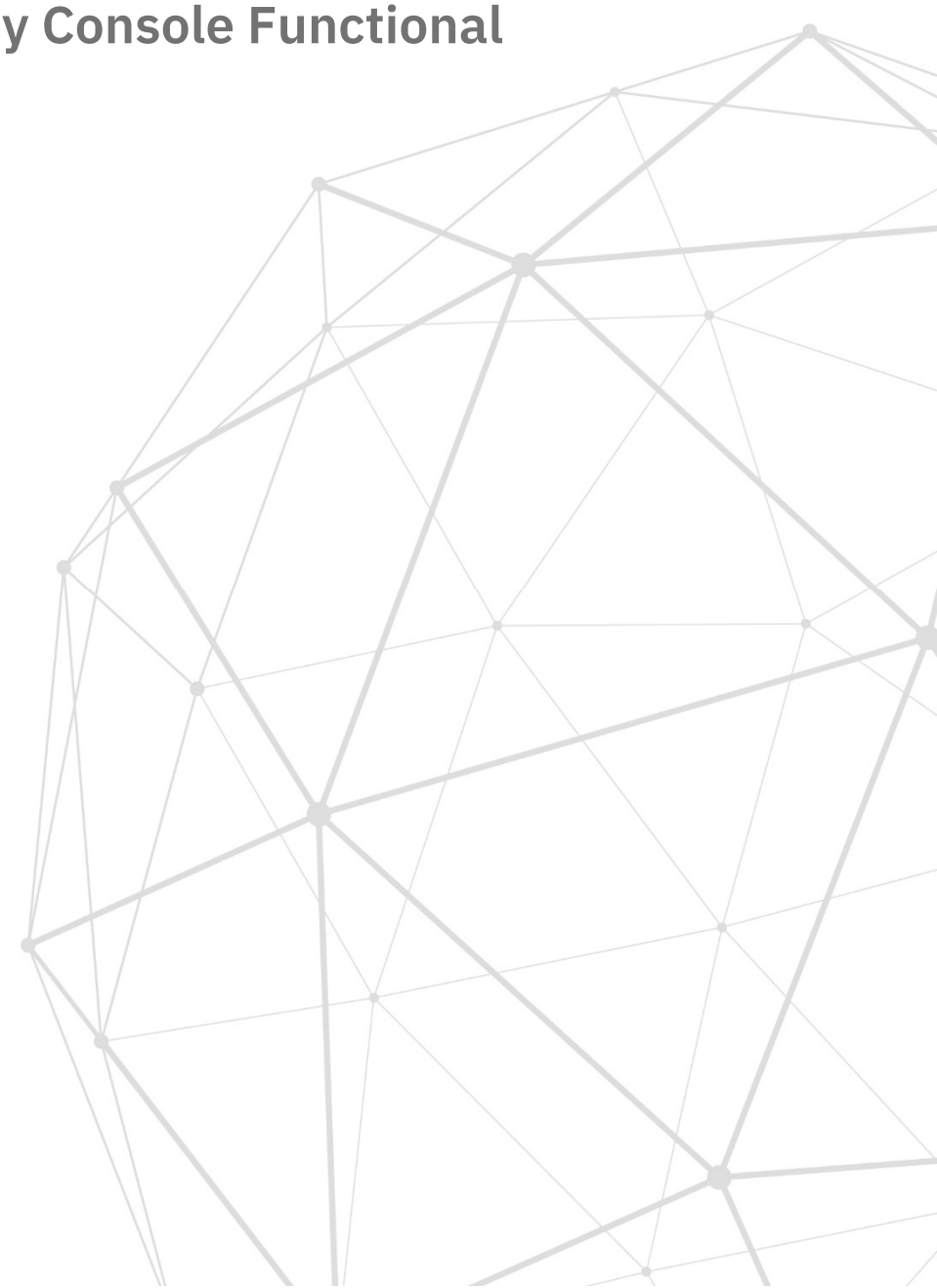
1. Log into each of the NSS servers s0u1nss and verify that it is Running as Primary
2. Open vSphere and select all of the VM's on NSC1 except for s0u1SAN
3. Right click on the selected servers and choose 'Migrate'
4. At pop up window click OK
   - Migration Type – Change Computer Resource Only – Select Next
   - Select the VAS you want to move the VMs to – Select Next
   - Select Next at the choose network
   - vMotion Priority – High Priority – Select Next
5. Start calls with Radio 1, listen to the calls with Radios 2, Radio 3, BeOn_202, and Console.
6. Select next in vSphere to start the migration
7. Record any voice outage times
   - BeOn Rx –
   - BeOn Tx –
   - Console –
   - The call from radio 1 to Radios 2 –

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

L3HARRIS™

FUNCTIONAL TEST PROCEDURES

SR10A.7 Symphony Console Functional Testing



Customer:
Dane County, Wisconsin

Prepared by:
S. Paramashivan

TABLE OF CONTENTS

About This Document

This document was specifically prepared for the customer shown below. Each section of this document is individually maintained in the L3Harris Document Control System.

Customer:	Dane County, Wisconsin
Prepared By:	S. Paramashivan

Document Usage

Many of the tests in this document will need to be run on multiple pieces of equipment. For tests that need to be run multiple times, log in the comment section of the result box the identifier of the equipment tested. Although specific tests are not included relating to electrical measurements or timing parameters of equipment, these tests and levels are conducted and recorded as part of L3Harris' standard production and/or installation practices. These parameters include but are not limited to:

- Transmit Frequency and Deviation
- Output and Reflected Power
- Receiver Sensitivity
- Receiver Multicoupler Gain (if applicable)
- Receiver Preamplifier Gain (if applicable)
- Combiner Loss (if applicable)
- Audio line out (if applicable)
- Audio line in (if applicable)

Subscriber Unit Usage

All tests for Subscriber (Terminal) Units in this document will be performed with L3Harris Subscriber Units unless the test setup identifies another Vendor's Subscriber Unit to be used.

FUNCTIONAL TEST ACCEPTANCE

This Functional Test Acceptance Procedure has been fully and successfully completed with all Action Items resolved.

Dane County, Wisconsin Representative	L3Harris Technologies Representative
Signature	Signature
Printed Name and Title	Printed Name and Title
Date	Date

Functional Testing Clarification

Equipment Inspection and Testing in addition to Staging Acceptance Testing is performed at the L3Harris Staging Facility. Staging tests as detailed in this matrix verify basic equipment functionality in addition to its functionality as part of an overall system. Equipment as received from L3Harris and Third-Party Manufacturing Suppliers is supplied with Manufacturer Test Results, as applicable. Test results Documentation will be that from the Staging Functional Acceptance Tests. Equipment tests will be performed in the field after installation, both as part of equipment commissioning and overall Final Functional Acceptance Testing. Test results documentation will be from the Final Functional Acceptance Tests.

Symphony Dispatch Feature Set

TRANSMITTING WITH A MICROPHONE (GROUP CALLS, I CALLS)

Purpose: Demonstrate Symphony operator can initiate communication with a Radio using Symphony select functions and foot pedal.

Expected Results: Confirms Symphony communication with Radio

Setup: Radio set to TG64001 P25 and console programmed with TG64001 P25

Execution:

1. Press INSTANT TX function (right mouse button) on module with test group.
   - > Verify call is heard on radio.
   - > Verify a ripple effect on 'TX' indicator is displayed.
   - > Verify a channel access tone is heard.
   - > Release the Instant TX key.
2. Right click on gear symbol for TG64002, and select 'Select' to make TG64002 the selected talk group.
   - > Verify module for TG64002 is highlighted, indicating it is selected talk group.
3. Make a call on TG64002 by pressing PTT foot pedal.
   - > Verify a channel access tone is heard.
   - > Verify halo around the 'TX' indicator is displayed.
   - > Verify call is heard on radio.
   - > Verify audio is heard at radio on talk group TG64002.
   - > Release foot pedal to end call.
4. Make a call on TG64002 by pressing headset button.
   - > Verify a channel access tone is heard.
   - > Verify halo around 'TX' indicator is displayed.
   - > Verify call is heard on radio.
   - > Verify audio is head at radio on talk group TG64002.
   - > Release headset button to end call.

5. Make a call on TG64002 by selecting it with a mouse.
   - > Verify a channel access tone is heard.
   - > Verify halo around ‘TX’ indicator is displayed.
   - > Verify call is heard on radio.
   - > Verify audio is head at radio on talk group TG64002.
   - > Release mouse button to end call.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

RECEIVING CALLS (UNIT ID DISPLAY, TALK GROUP ID DISPLAY, ALIASING)

Purpose: Confirm Symphony operator can receive communications from a Radio, using both talkgroup and individual calling.

Expected Results: Communications are initiated and received on appropriate speaker (select or unselect) and Radio's ID is displayed.

Setup: Symphony has talk groups 64001 and 64002, programmed with 64002 selected, and Radio set to TG64001 P25

Talk Group Call

Execution:

1. Key radio and verify
   - > That call is heard at unselect speaker.
   - > Calling radio ID is displayed on module for TG64001.
   - > A green light ID displayed indicating an incoming call on module TG64001.
2. Switch radios talk group to TG64002 and key radio.
   - > Verify call is heard at select speaker.
   - > Verify calling radio ID is displayed on TG64002 module.
   - > Verify a green light ID displayed indicating an incoming call on module TG64002.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

Individual Call (Unit – Unit)

Execution:

1. Right click on ‘L3Harris’ box on top left-hand side of screen.
2. Select ‘Open Directory’ this will open a pop up window for ‘Directory’.
3. Select ‘Users’ tab.
4. Select ‘Radio 1’ under “ALIAS’ column.
5. Press ‘Radio 1’ button right side to screen to place an individual call to ‘Radio 1’.
   - > Verify ripple effect on ‘TX’ indicator is displayed.
   - > Verify a ringing tone will be heard at console and radio.
   - > Verify radio displays ‘INDV’ and consoles ‘ID”.
6. Respond to console by PTTing radio.
   - > Verify call is heard on Symphony, and calling Radio’s ID and Call Indicator are displayed.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

EMERGENCY CALL AND EMERGENCY ALARM

Purpose: Confirms Symphony indicates an emergency declared by a Radio and can reset and clear emergency.

Expected Results: Symphony indicates and can clear emergency.

Setup: Test requires a test radio capable of generating and clearing an emergency (i.e. Supervisor Radio).

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID
Radio 1	9980001	TG 13001 P25	13001

Execution:

1. Select TG13002 in Symphony. Using test radio, declare an emergency on TG13001.
   - > Verify 'TG13001' module turns red,
   - > Verify ID/Name of test radio is displayed
   - > Verify emergency alert tone is heard on Symphony.
2. Select triangle with a '!' to access emergency menu.
   - > Verify acknowledge 'Ack' button is red and check box is red.
3. Using radio, transmit on talk group
   - > Verify call is received by Symphony.
4. With Symphony, transmit on group with emergency.
   - > Verify test radio receives call, and is still in emergency mode.
5. Acknowledge emergency by selecting 'Ack' button
   - > Verify button changes from 'Ack' to clear.
   - > Verify radio and Symphony are still in emergency mode.
6. Clear the emergency by selecting 'Clear X' button
   - > Verify Symphony clears emergency.
   - > Verify radio clears emergency.
7. Transmit on radio.
   - > Verify emergency is cleared and normal group calls have resumed.
8. Select TG13001 group selected on Symphony, declare an emergency on test group by pressing 'Emer Declare'.
   - > Verify Symphony and radio have same indications as steps 2 to 4.
9. Acknowledge by hitting 'Ack' in step 5.
10. Clear emergency with Symphony.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

ALERT TONES

Purpose: Confirm Symphony can initiate alert tones which can be heard at Radio.

Expected Results: Tones can be initiated and heard.

Setup: Symphony programmed with TG64002 and TG64001 selected.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID
Radio 1	9980001	TG 64001 P25	64001
Radio 2	9980002	TG 64002 P25	64002

Execution:

1. Make TG64001 P25 selected talk group.
2. Select tones tab on talk group module.
3. Select one of three ALERT TONE keys by selecting drop-down list next to orange button, using Symphony with a method other than the mouse.
4. Radio 1 will receive call.
5. Test all three alert tones to ensure all alert tones can be heard on radio.

   > Verify ALERT TONE is received by Radio 1, and is also heard on Symphony. (To hear tones on Symphony, press and hold foot pedal and listen for tone on SELECT speaker).

6. When ALERT TONE key is released.

   > Verify call on Radio 1 drops.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

CONSOLE PRE-EMPT

Purpose: Confirm Symphony can pre-empt an ongoing call between Radios.

Expected Results: Call started by the radio will be interrupted by the console.

Setup: Symphony programmed with TG: TG64001 P25

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID
Radio 1	9980001	TG 64001 P25	64001
Radio 2	9980002	TG 64001 P25	64001

Execution:

1. Key Radio 1 on TG64001 and hold call up. Verify that audio is heard at Radio 2 and Symphony.
2. Key Symphony on TG64001 and hold, while continuing to hold call up on Radio 1
   - > Verify console pre-empts.
   - > Verify transmit indicator is displayed along with pre-empted caller LID and CALL indicator.
   - > Verify second radio begins to hear Symphony audio and not first radio call.
   - > Verify pre-empted radio audio is still heard on pre-empting console.
3. Un-key first Radio.
   - > Verify pre-empted caller LID and CALL indicators are removed, and pre-empted radio audio is no longer heard on pre-empting Symphony.
4. Un-key Symphony.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

SIMULSELECT

Purpose: Confirms operation of Symphony Simulselect feature, which allows multiple talk groups to be selected for communication simultaneously.

Expected Results: Symphony can select multiple talk groups and communication is allowed.

Setup: Symphony programmed with TGs: TG64051 P25, TG64052 P25, TG64053 P25, and TG64054 P25.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID
Radio 1	9980001	TG 64051 P25	64051
Radio 2	9980002	TG 64052 P25	64052
Radio 3	9980003	TG 64053 P25	64053
Radio 4	9980004	TG 64054 P25	64054

Execution:

1. Create Simulselect group on 4 test group modules.
2. Place a call from Symphony on Simulselect group.
   > Verify call is heard at all four radios.
3. Place a call from each radio.
   > Verify only Symphony hears calls.
   > Verify only radios on similar talk groups here call.
4. Deactivate Simulselect group.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

PATCH

Purpose: Confirms Symphony patch feature creates shared communication between multiple selected talk groups.

Expected Results: Patched talk groups can communicate.

Setup: Console 1 programmed with TGs: TG64051 P25, TG64052 P25, TG64053 P25, and TG64054 P25.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID
Radio 1	9980001	TG 64051 P25	64051
Radio 2	9980002	TG 64052 P25	64052
Radio 3	9980003	TG 64053 P25	64053
Radio 4	9980004	TG 64054 P25	64054

Execution:

1. Create patch on PATCH 1 with all four groups above.
2. Place a call from newly created patch.
   > Verify call is heard on all radios.
3. Place a call from each radio.
   > Verify call is heard on Symphony and each radio.
4. Deactivate patch.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

CONSOLE TO CONSOLE CROSS-MUTE

Purpose: Confirm creation of a cross-mute of another console to quiet the muted consoles audio on the local console.

Expected Results: Cross-muted console's audio cannot be heard on local console.

Setup: Establish two Symphony consoles, (A and B) to test Cross Mute function. Both Symphony consoles must be on same NSC. Program and select a test group on both consoles.

Execution:

1. Place a call on console A on test group.
   > Verify console B can hear console A.
2. Open Symphony Configuration Utility for console B, in 'General' section, add ID for console A to 'Cross Mute' list.
3. Select 'Apply' to save changes.
4. Place a call on console A on test group.
   > Verify call can't be heard at console B.
5. Restore desired cross mute setup.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

CALL HISTORY

Purpose: Confirms a history of calls processed at the Symphony.

Expected Results: History is accessible and valid.

Setup: Test compares programmed module call activity to history scroll lists.

Utility page, dispatch menu will be selected. Select either “Select History” or “Unselect History”.

Execution:

1. Press ‘Scroll Up’ and ‘Scroll Down’ buttons to scroll through Unselect Call History list.
   > Compare these calls with known activity.
2. Press ‘Scroll Up’ and ‘Scroll Down’ buttons to scroll through Selected Call History list.
   > Compare these calls with known activity.
3. Press ‘Esc’ button to exit history scroll mode.
4. To monitor call history on a single group, use ‘module history’ button on ‘module modify’ menu.
5. Use ‘scroll up’ and ‘scroll down’ buttons to scroll through calls for picked module.
   > Compare these calls with known activity.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

MOTOROLA PATCH PHASE 2

Purpose: Confirms Symphony patch feature to create shared communication between multiple selected talk groups can operate in Motorola Mode, if so configured.

Expected Results: Patched talk groups can communicate; a radio declared emergency is associated with the group and not with the patch.

Setup: Symphony programmed with Phase 2 TGs: TG64051 P25, TG64052 P25, TG64053 P25, and TG64054 P25.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID
Radio 1	9980001	TG 64051 P25	64051
Radio 2	9980002	TG 64052 P25	64052
Radio 3	9980003	TG 64053 P25	64053
Radio 4	9980004	TG 64054 P25	64054

Execution:

1. Create patch on PATCH 1 with all four groups above
2. Place a call from newly created patch.
   > Confirm call is heard on all radios.
3. Place a call from each radio.
   > Confirm call is heard on Symphony and each radio.
4. Declare an emergency from one radio.
   > Confirm radio group is displayed in emergency on Symphony.
5. Place a call from radio that declared emergency.
   > Confirm call is a group call heard on Symphony and is not heard by radios on other groups in patch.
6. Deactivate patch.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

GROUP EMERGENCY AND UNIT ALERT WITH SYMPHONY

Purpose: Confirm Symphony receives a group emergency and an emergency unit alert declared by a radio. Confirm console can acknowledge and clear emergency alarm (unit alert) and acknowledge and clear group emergency.

Expected Results: Symphony Console can indicate emergency alarm (unit alert) and group emergency. Symphony can also clear unit alert & cancel group emergency.

Setup: Radios 1 & 2 have "Emergency Alarm" enabled in personalities.

DESCRIPTION	RADIO LID	TG DESCRIPTION	TG ID	SITE
Radio 1	9980001	TG 64152 P25	64152	1
Radio 2	9980002	TG 64152 P25	64152	2

Execution:

1. Select TDMA TG 64152 on the console. On Radio 1, declare an emergency on TG 64152. PTT Radio 1 to talk to the dispatcher.
   - > Verify Radio 2 on Site 2 receives emergency, and hears emergency group call.
2. On Symphony's TG 64152 Module:
   - > Verify TG 64152 Module has a stripped red background.
   - > Verify TG Smart Button flashes an "emergency icon", which alternates with TG icon.
   - > Verify Declarer ID is shown in Red on TG Module.
   - > Verify emergency alarm tone and radio emergency group call audio is heard on Symphony.
3. On Symphony's Sidebar Panel, go to the Emergency Panel:
   - > Verify emergency listed shows TG 64152, in a mini module, with a red background.
   - > Verify Declarer ID is listed, with an "ACK" button and a number '1', for number of group emergencies declared, [listed below TG Mini Module].
   - > Verify below Declarer ID, single unit icon and Declarer ID is listed, with an "ACK" button.
4. To clear group emergency alarm tone on Symphony Emergency Sidebar Panel, select top "ACK" button next to Declarer ID.
   - > Verify group emergency alarm tone is silenced on the console.
   - > Verify group emergency is still displayed on talk group module and emergency sidebar panel.
   - > Verify Unit Alert "ACK" is still displayed below group emergency.

5. On Symphony, select and transmit on TG 64152.
   > Verify Radio 1 and 2 both receive emergency call.
6. Clear group emergency on Radio 1.
   > Verify console TG Module no longer indicates a group emergency.
   > Verify the group emergency is no longer seen on Radio 1 and Radio 2.
7. PTT on Radio 1, to do a group call:
   > Verify an emergency group call goes to the Symphony on TG64152 Module, and to Radio 2.
   > Verify emergency is also seen in Emergency Sidebar Panel.
   > (This occurs, since Emergency Unit Alert is still active on TG 64152.)
8. On Symphony Emergency Sidebar Panel, clear Unit Alert Tone by selecting second “ACK” button next to Unit Icon and Declarer ID. Also, clear Group Emergency Alarm tone on TG 64152, by selecting first “ACK” button next to Declarer ID.
   > Verify all emergency tones have been silenced.
9. On Emergency Sidebar Panel, clear group emergency by selecting first “Clear” button next to Declarer ID. Also, clear Unit Alert by selecting second “Clear” button next to Unit Icon and Declarer ID.
   > Verify emergency on TG 64152 has been cleared from Symphony, Radio 1, and Radio 2.
10. PTT on Radio 1 on TG 64152, to do a Group Call.
    > Verify a group call without an emergency is seen and heard at Symphony and Radio 2.

TEST RESULTS		
Tester:		
Date:		
Result:	☐ Pass	☐ Fail

PRICING SUMMARY

The prices included in this proposal are valid for a contract to be executed by both parties by 12/31/2020. Software FX and Maintenance costs through 2022, as contained in Addendum 11, will not be altered with the execution of this System Upgrade. Purchase of additional equipment, and/or increase in scope, may impact maintenance prices in the future.

Item	Qty	List Price	Discount	Sale Price
VIDA Premier Core Upgrade - Hardware	1 Lot	$205,812.14		$144,068.50
SERVER, DELL R640, PREMIER	1	55,600.00	30%	$38,920.00
CABINET, NSS, 42 RU, 120V	1	6,450.00	30%	$4,515.00
POWER KIT, SR10A.4, LOC HA/UNITE/ESSEN, 110	1	195.00	30%	$136.50
CABLE KIT, SR10A.4, LOC HA/UNITE/ESSENT	1	195.00	30%	$136.50
Non-Ru Netclock, GPS Master Clock	1	5,950.00	30%	$4,165.00
Non-Ru Kit, GPS Antenna, Outdoor, For Netclock	1	1,025.00	30%	$717.50
Non-Ru Cable, GPS Ant Outdoor, 100ft/Netclock	1	795.00	30%	$556.50
Spare Non-Ru Netclock, GPS Master Clock	1	5,950.00	30%	$4,165.00
Spare Non-Ru Kit, GPS Antenna, Outdoor, For Netclock	1	1,025.00	30%	$717.50
Spare Non-Ru Cable, GPS Ant Outdoor, 100ft/Netclock	1	795.00	30%	$556.50
DRAWINGS, PREM/UNITE/CON ON PREM, SR10A.4	1	1.00	30%	$0.70
VIDA Security, NSC	1	1,095.57	30%	$766.90
KIT, CISCO 4331 ROUTER, NSC MTG	1	18.00	30%	$12.60
ROUTER, ISR4331 AX APP & SEC LIC	1	8,690.00	30%	$6,083.00
FIREWALL, ASA5506-X W/SEC+/ANYCON-25USR	1	2,826.00	30%	$1,978.20
KIT, RACKMNT, 5506	1	390.00	30%	$273.00
MODULE, NIM 4PORT LAYER2 GE	1	600.00	30%	$420.00
SWITCH, CATALYST 3650 24P IP	1	6,595.00	30%	$4,616.50
ROUTER, C881-K9, ADV IP SVC	1	1,735.00	30%	$1,214.50
ROUTER, ISR, C1111-4P, SEC	1	2,180.00	30%	$1,526.00
KIT, C1111 ROUTER SITE MTG	1	156.00	30%	$109.20
SERVER, DELL R640, PREMIER	1	55,600.00	30%	$38,920.00
CABINET, NSS, 42 RU, 120V	1	6,450.00	30%	$4,515.00
POWER KIT, SR10A.4, LOC HA/UNITE/ESSEN, 110	1	195.00	30%	$136.50
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KIT, RACKMNT, 5506	1	390.00	30%	$273.00
MODULE, NIM 4PORT LAYER2 GE	1	600.00	30%	$420.00
SWITCH, CATALYST 3650 24P IP	1	6,595.00	30%	$4,616.50
ROUTER, C881-K9, ADV IP SVC	1	1,735.00	30%	$1,214.50
ROUTER, ISR, C1111-4P, SEC	1	2,180.00	30%	$1,526.00
KIT, C1111 ROUTER SITE MTG	1	156.00	30%	$109.20
PC, SYSTEM MANAGEMENT TERMINAL	1	1,280.00	30%	$896.00

Item	Qty	List Price	Discount	Sale Price
VIDA Premier Core Upgrade - Software	1 Lot	$952,237.85		$33,521.50
SERVICE, SYBASE LICENSE	2	5,354.00	30%	$3,747.80
SOFTWARE, ISSI GATEWAY, VM	1	83,750.00	100%	$0.00
SOFTWARE, PREMIER CORE, VM	1	68,700.00	100%	$0.00
License, Quest Authentication, Server	13	5,915.00	30%	$4,140.50
LICENSE, QUEST AUTHENTICATION, USER, QTY 6	1	52.00	30%	$36.40
Software, Epolicy Orch VM	1	2,000.00	30%	$1,400.00
LICENSE, SUMS, ENDPOINT	69	2,415.00	30%	$1,690.50
LICENSE, SUMS, CORE	40	1,200.00	30%	$840.00
LICENSE, HOST SECURITY, AV, EPO, QTY 51-100	95	11,617.55	30%	$8,132.29
LICENSE, HA, LOCATION, NSC	1	50,000.00	100%	$0.00
LICENSE, P25 APPLICATION	1	20,000.00	100%	$0.00
License, Quad Mode Vocoder	1	35.00	30%	$24.50
LICENSE, SQL SERVER 2016 STD, BASE 4CORE	1	4,050.00	30%	$2,835.00
LICENSE, CONSOLE	50	50,000.00	100%	$0.00
LICENSE, CONSOLE TALKPATH	600	150,000.00	100%	$0.00
LICENSE, P25 SITE	11	110,000.00	100%	$0.00
LICENSE, P25 TIER 11-17 SITES	1	50,000.00	100%	$0.00
LICENSE, P25 SITE TALKPATH	20	20,000.00	100%	$0.00
LICENSE, NETWORK FIRST TALKPATH	68	34,000.00	100%	$0.00
LICENSE, TRANSCODER TALKPATH	8	20,000.00	100%	$0.00
LICENSE, VMWARE, VCENTER, FOUNDATION	1	2,900.00	30%	$2,030.00
LICENSE, VMWARE, VCENTER, FOUNDATION, 3YR	1	2,910.00	30%	$2,037.00
LICENSE, ISSI GATEWAY TALKPATH	10	25,000.00	100%	$0.00
LICENSE, ISSI EXTERNAL SYS CONN, PREMIER	2	100,000.00	100%	$0.00
SERVICE, SYBASE LICENSE	2	5,354.00	30%	$3,747.80
SOFTWARE, PREMIER CORE, VM	1	68,700.00	100%	$0.00
License, Quad Mode Vocoder	1	35.00	30%	$24.50
LICENSE, SQL SERVER 2016 STD, BASE 4CORE	1	4,050.00	30%	$2,835.00
FEATURE, NO AES ENCRYPTION	1	0.02	30%	$0.01
PACKAGE, BEON, FOUNDATION, +10 USERS	1	0.28	30%	$0.20
LICENSE, UPGRADE, FOUNDATION TO PREMIER	1	30,000.00	100%	$0.00
LICENSE, NSS, IP LOGGING RECORDER	2	4,200.00	100%	$0.00
LICENSE, NSS, IP LOGGING RECORDER TALKPATH	20	20,000.00	100%	$0.00
Unitrends Servers	1 Lot	$29,000.00		$20,300.00
SERVER,UNITRENDS RS8006	2	29,000.00	30%	$20,300.00
Windows Image for Symphony PC's/Dispatch Upgrade	40	$26,014.00	30%	$18,209.80
SW, SYMPHONY PC APP & WIN 10 IMAGE	40	8,000.00	30%	$5,600.00
ROUTER, ISR, C1111-4P, SEC	4	8,720.00	30%	$6,104.00
KIT, C1111 ROUTER SITE MTG	4	624.00	30%	$436.80
SWITCH, CISCO 2960 PLUS	6	8,190.00	30%	$5,733.00
KIT, MTG HDWR, CISCO 2960 MASTR III/V CAB	6	480.00	30%	$336.00
Engineering & Installation Services	1 Lot	$555,155.00	0%	$336,494.20
Program Management	1 Lot	$228,200.00	57%	$98,354.20
System Engineering	1 Lot	$50,940.00	0%	$50,940.00
Network Engineering	1 Lot	$187,200.00	0%	$187,200.00
Installation	1 Lot	$88,815.00	100%	$0.00
VIDA Premier Core Upgrade - Subtotal	1 Lot	$1,768,218.99		$552,593.99

Item	Qty	List Price	Discount	Sale Price
Additional Control Point (Hardware & Software)	1 Lot	$87,964.34	30%	$61,575.04
ASSY, CONTROLLER, SITEPRO, MME W/ CABLES DC	2	39,000.00	30%	$27,300.00
ROUTER, ISR4331-DC/K9, SEC	2	16,000.00	30%	$11,200.00
KIT, CISCO 4321 ROUTER MTG	2	220.00	30%	$154.00
POWER SUPPLY, DC, ISR4221, 1100	2	464.34	30%	$325.04
SWITCH, C3650-24TS-L, DC, LANBASE	6	31,080.00	30%	$21,756.00
MODULE, NIM 4PORT LAYER2 GE	2	1,200.00	30%	$840.00
Engineering & Installation Services	1 Lot	$6,000.00	0%	$6,000.00
System Engineering	1 Lot	$6,000.00	0%	$6,000.00
Discount Credit for Antenna Move		($10,256.00)		($10,256.00)
Additional Control Point - Subtotal	1 Lot	$83,708.34		$57,319.04
MPLS Upgrade	1 Lot	$206,478.80		$144,535.16
ROUTER, NOKIA, 7705, SAR-8, DC	10	120,000.00	30%	$84,000.00
MODULE, NOKIA, 8P GE SFP CARD	10	31,000.00	30%	$21,700.00
Switch, T1/E1 Alcatel, SAR 16 port	10	40,078.80	30%	$28,055.16
NOKIA - SFP GIGE BASE-T RJ45 COPPER	55	15,400.00	30%	$10,780.00
RF Site Upgrade	1 Lot	654,396.19		$365,747.33
MODULE, SFP GBIC	12	5,340.00	30%	$3,738.00
KIT, CISCO 3650 SWITCH MOUNTING, OPEN RACK	6	2,040.00	30%	$1,428.00
VS PROD GRP, CONFIGURED MODEL NUMBER	11	4,840.00	30%	$3,388.00
ASSEMBLY, NWS4, WIN10, UPGRADE	7	43,750.00	43%	$24,815.00
KIT, NET SENTRY, CNTL/DATA, DC PWR,WIN10	0	147,000.00	30%	$0.00
ROUTER, ISR4221-SEC/K9	9	30,780.00	30%	$21,546.00
KIT, CISCO 4221 ROUTER, SITE MTG	9	531.00	30%	$371.70
POWER SUPPLY, DC, ISR4221, 1100	7	1,625.19	30%	$1,137.63
SWITCH, C3650-24TS-L, DC, LANBASE	27	139,860.00	30%	$97,902.00
MODULE, SFP GBIC	54	24,030.00	30%	$16,821.00
KIT, CISCO 3650 SWITCH MOUNTING, OPEN RACK	27	9,180.00	30%	$6,426.00
MODULE, NIM 4PORT LAYER2 GE	9	5,400.00	30%	$3,780.00
Ru Net Clock - Oscillator, SecureSync, Rb, Master, DC	11	239,536.00	30%	$167,675.20
Ru Net Clock - Cable, DC Dstrbn, GPS SecureSync 24 in	11	484.00	30%	$338.80
Spare Ru Net Clock - Oscillator, SecureSync, Rb, Master, DC	1	21,776.00	30%	$15,243.20
Spare Ru Net Clock - Cable, DC Dstrbn, GPS SecureSync 24 in	1	44.00	30%	$30.80
LICENSE, WINDOWS 10 LTSC 2019, IOT ENT	4	780.00	30%	$546.00
Win 10, Image, NWS	4	800.00	30%	$560.00
DFSI Interface	10 talkpaths	$30,000.00	30%	$21,000.00
SOFTWARE, ENCOMPASS GW FOR DFSI	1	5,000.00	30%	$3,500.00
LICENSE, DFSI TALKPATH	10	25,000.00	30%	$17,500.00
Enterprise Network Manager - 3 Yr. Support	1 Lot	$17,300.00	30%	$12,110.00
LICENSE, ENM P-RTU, + 3 YR SUPP, BASE	250	14,000.00	30%	$9,800.00
LICENSE, ENM P-RTU, +3YR SUPP, GEO-HA	1	3,300.00	30%	$2,310.00
StatusAware Software for 100 Devices	1 Lot	$35,000.00	30%	$24,500.00
SOFTWARE, STATUSAWARE, 100 DEVICES	1	35,000.00	30%	$24,500.00
ISSI Redundancy (Engineering Labor)	1 Lot	$24,000.00	0%	$24,000.00
Service, L3Harris Senior Sys Engineering	1 Lot	$24,000.00	0%	$24,000.00

Item	Qty	List Price	Discount	Sale Price
Spare Parts (1 ea, of parts listed below)	1 Lot	$48,333.17	30%	$36,573.72
Site Spares - Control Point				
ROUTER,ISR4331-DC/K9,SEC	1	$8,000.00	30%	$5,600.00
KIT, CISCO 4331 ROUTER MTG	1	$110.00	30%	$77.00
MODULE,NIM 4PORT LAYER2 GE	1	$600.00	30%	$420.00
SWITCH,C3650-24TS-L,DC,LANBASE	1	$5,180.00	30%	$3,626.00
MODULE,SFP GBIC	2	$890.00	30%	$623.00
KIT,CISCO 3650 SWITCH MOUNTING,OPEN RACK	1	$340.00	30%	$238.00
Site Spares - Tx Site				
ROUTER,ISR4221-SEC/K9	1	$3,420.00	30%	$2,394.00
KIT, CISCO 4221 ROUTER, SITE MTG	1	$59.00	30%	$41.30
POWER SUPPLY,DC,ISR4221,1100	1	$232.17	30%	$162.52
MODULE,NIM 4PORT LAYER2 GE	1	$600.00	30%	$420.00
SWITCH,C3650-24TS-L,DC,LANBASE	1	$5,180.00	30%	$3,626.00
MODULE,SFP GBIC	2	$890.00	30%	$623.00
KIT,CISCO 3650 SWITCH MOUNTING,OPEN RACK	1	$340.00	30%	$238.00
Dispatch Spares				
ROUTER,ISR,C1111-4P,SEC	1	$2,180.00	30%	$1,526.00
KIT, C1111 ROUTER SITE MTG	1	$156.00	30%	$109.20
SWITCH,CISCO 2960 PLUS	1	$1,365.00	30%	$955.50
KIT,MTG HDWR,CISCO 2960 MASTR III/V CAB	1	$80.00	30%	$56.00
Core Spares				
ROUTER,ISR4331 AX APP &SEC LIC	1	$8,690.00	30%	$6,083.00
FIREWALL, ASA5506-X W/SEC+/ANYCON-25USR	1	$2,826.00	30%	$1,978.20
MODULE,NIM 4PORT LAYER2 GE	1	$600.00	30%	$420.00
SWITCH,CATALYST 3650 24P IP	1	$6,595.00	30%	$4,616.50
ROUTER,C881-K9,ADV IP SVC	1	$1,735.00	30%	$1,214.50
ROUTER,ISR,C1111-4P,SEC	1	$2,180.00	30%	$1,526.00
Required updates at local agencies. Includes router software and Symphony updates.				
Middleton	1 Lot	4,176.00		2,923.20
SW, SYMPHONY PC APP & WIN 10 IMAGE	1	200.00	30%	$140.00
WIN 10, 64BIT, LTSB	1	195.00	30%	$136.50
ROUTER, ISR, C1111-4P, SEC	1	2,180.00	30%	$1,526.00
KIT, C1111 ROUTER SITE MTG	1	156.00	30%	$109.20
SWITCH, CISCO 2960 PLUS	1	1,365.00	30%	$955.50
KIT, MTG HDWR, CISCO 2960 MASTR III/V CAB	1	80.00	30%	$56.00
Fitchburg	1 Lot	33,401.00		7,850.70
SW, SYMPHONY PC APP & WIN 10 IMAGE	6	1,200.00	30%	$840.00
WIN 10, 64BIT, LTSB	6	1,170.00	30%	$819.00
ASSEMBLY, NWS4, WIN10, UPGRADE	1	6,250.00	43%	$3,545.00
KIT, NET SENTRY, CNTL/DATA, DC PWR,WIN10	0	21,000.00	30%	$0.00
ROUTER, ISR, C1111-4P, SEC	1	2,180.00	30%	$1,526.00
KIT, C1111 ROUTER SITE MTG	1	156.00	30%	$109.20
SWITCH, CISCO 2960 PLUS	1	1,365.00	30%	$955.50
KIT, MTG HDWR, CISCO 2960 MASTR III/V CAB	1	80.00	30%	$56.00
Sun Prairie	1 Lot	25,381.00		17,766.70
SW, SYMPHONY PC APP & WIN 10 IMAGE	3	600.00	30%	$420.00
KIT, NET SENTRY, CNTL/DATA, DC PWR,WIN10	1	21,000.00	30%	$14,700.00
ROUTER, ISR, C1111-4P, SEC	1	2,180.00	30%	$1,526.00
KIT, C1111 ROUTER SITE MTG	1	156.00	30%	$109.20
SWITCH, CISCO 2960 PLUS	1	1,365.00	30%	$955.50
KIT, MTG HDWR, CISCO 2960 MASTR III/V CAB	1	80.00	30%	$56.00
Total Sale Price		$2,882,060.32		$1,266,919.84

Licenses for additional ENM points can be purchased at the price of $39.20 per point

Payment Milestones

The Provider shall invoice, and the County shall pay net 30 days, the System Upgrade Price in accordance with the invoice milestone payment schedule listed below. The invoice milestones payments listed herein shall supersede all milestone payments in the Agreement.

The following is the proposed payment schedule:

		Scheduled due date	
- Project Start Date (1/4/2021)	10%	1/31/21	$126,691.98
- CDR completed and Customer Accepted	25%	3/31/21	$316,729.96
- Completion of Factory Staging	0%	not applicable to upgrade	
- Shipment of Equipment	20%	5/28/21	$253,383.97
- Installation of Equipment Complete	10%	8/31/21	$126,691.98
- FATP completed and Customer Accepted	15%	8/30/21	$190,037.98
- Final System Acceptance	20%	12/31/21	$253,383.97
			$1,266,919.84