

Department of Veterans Affairs

Real Time Location System (RTLS)




Requirements Specification Document





November 2014

Version 3.2

Revision History

Date	Revision	Description	Author
November 2014	3.2	<p>Updated Revision History, row 3.0, with updates from the VA review.</p> <p>Made the following updates to Section 8 and the Appendix NDR requirements.</p> <p>Removed Duplicates: NOC-090, NOC-100, NOC-110, NOC-120; NOS-010, NOS-030, NOS-040, NOS-070, NOS-080, NOS-090, NOS-110, NOS-122</p> <p>Moved NST-041 and NST-042 to Section 8.2 Contractual Requirements.</p> <p>Updated wording of NST-043.</p> <p>Updated wording of NIR-010.</p> <p>In Appendix: Renumbered NFT-010 through NFT-130 (in the NDR Future Requirements) to NFT-140 through NFT-260.</p> <p>Removed NSR-010 (duplicate of NIB-040).</p> <p>Separated NIR-090 into 2 requirements: NIR-090 and NIR-091.</p> <p>Added the following to Section 8.2 Contractual Requirements: NPD-010,020,030,040,050,060,070,080,090,100,110,111,112,113,114,115,116,117,118,119,120,130,140,150,160,170,171,172. NDD-010,020,021,030,040,050. NSD-050,060,061,062,063,064,065,066.</p> <p>Moved NED-021, 022, 023 from NDR System Design and Enterprise Data Architecture to 8.2 Contractual Requirements.</p> <p>Moved NED-070 and NED-080 from 8.3 Solution Guidance to 8.2 Contractual Requirements.</p> <p>Added to Appendix: NDP-080, 081, 082, 083; NUM-010, 011, 012; NUT-170.</p> <p>Updated wording of NSN-020.</p> <p>Removed NOS-010</p> <p>Removed NGR-040 duplicate of NSW-032.</p>	
October 2014	3.1	Technical edit	
October 2014	3.0	<p>Updates to the NDR Increment 1 section after elaboration meetings with the VA on 10/23.</p> <p>Under new section the following requirements have been moved to Contractual Requirements: NSW-010, NSW-020, NSW-031, NSW-032, NSW-050, NPP-010, NGR-040, NEF-020, NEF-030, NDH-010, NGR-020, NGR-050, NSD-010, NBI-020, NED-040, NED-041, NSA-010, NSA-020, NHD-010, NSD-030, NSD-040, NED-010, NED-090, NDP-010, NDP-020, NDP-040, NDP-050, NDP-060, NDP-070, NFT-020, NFT-030, NFT-050, NFT-060, NFT-080, NFT-090, NFT-100, NFT-110, NFT-120, NFT-130, NOC-010, NOC-030, NOC-040, NOC-050, NOC-060, NOC-070, NOC-080, NOC-090, NOC-100, NOC-110, NOC-120, NOS-010, NOS-030, NOS-040, NOS-070, NOS-080, NOS-090, NOS-110, NOS-122</p> <p>The following requirements have been moved to the Solution Guidance Section: NEF-010, NEF-040, NEF-050, NRY-030, NRY-040, NIR-060, NIR-061, NRY-020, NIR-030, NIR-050, NIR-110, NSC-050, NHD-020, NID-030, NID-070, NSD-020, NED-060, NED-070, NED-080, NFT-011, NOS-060</p>	

Date	Revision	Description	Author
		<p>Sections removed due to requirement moves to new sections: 8.4 NDR Design Constraints 8.5 NDR General Requirements</p> <p>Requirement Changes: NSW-040 Removed combined with NSW-030 Removed NGR-030 Removed NRY-060 Duplicate of NRY-104 Removed NSA-030 separated into the following requirements. NSA-031, NSA-032, NSA-033, NSA-034, NSA-035, NSA-036 Removed NAR-010 separated into the following requirements., NAR-013, NAR-014, NAR-015, NAR-016 NAR-020 and NAR-030 renumbered to NAR-011 and NAR-012, respectively Removed NID-120 separated into the following requirements. NID-121, NID-122, NID-123, NID-124 Removed NED-020 Separated into the following requirements. NED-021, NED-022, NED-023 Removed NOS-120 Separated into the following requirements. NOS-121, NOS-122 Removed NST-040 Separated into the following requirements. NST-041, NST-042 Removed NOS-020 replaced with NOC-010 Removed NFT-070 separated into the following requirements. NFT-071, NFT-072, NFT-073, NFT-074, NFT-074, NFT-075 Removed NOC-020 Removed NOS-100 Duplicate of NOS-110 Split NED-040 to NED-040 and NED-041 Split NIR-040 to NIR-060 and NIR-061 Removed NGR-010 Removed NRY-050 Removed NRY-100 separated into the following requirements. NRY-101 through NRY-107 Removed NIR-020 NFT-010 Renumbered and reworded to NFT-011 Removed NIR-100 separated into the following requirements. NIR-101, NIR-102, NIR-103 Removed NSC-010 separated into the following requirements. NSC-011, NSC-012, NSC-013 Removed NSC-020 separated into the following requirements. NSC-021, NSC-022, NSC-023 Removed NSC-040 Removed NID-010 Removed NID-020 Removed NID-080 Removed NDI-010 Split NDP-020 to NDP-020 and NDP-021 Removed NDP-030 Duplicate of NDP-021 NBI-030 moved to Appendix A NED-050 moved to Appendix A</p>	
August 2014	2.1	Updates to selected requirements per agreement with the VA (e.g., removing references to Common Data Model). Technical Edit.	
July 2014	2.0	<p>Adding the NDR requirements from the PWS current TO and Future requirements. Removed the following old NDR future requirements to support the future task order future requirements</p> <p>Requirements to be obsolete:DRS-020, DRS-070, DRS-080, DRS-090, DRS-100, NDB 010, NDB-020, NDB-020, NDB-030, NDB-040, NDB-050, NDB-060, NDB-070, NDB-080, NDB-090,</p>	

Date	Revision	Description	Author
		NDB-110, NDB-120, NDB-130, NDB-131, NDB-132, NDB-140, NDB-150, NDB-160, NDB-170, NDB-180, NDB-190, NDB-200, NDB-210, NDB-220, NDB-230, NDB-240, NDB-250, NDB-260, NDB-270, NDB-280, NDB-290, NDB-300, NDB-310, RBF-1--, RF-110, QUL-020, QUL-030, QUL-060, QUL-140, QUL-230, QUL-240, QUL-250, QUL-260, QUL-270, QUL-280, QUL-290, QUL-300, QUL-310, QUL-320, QUL-330, RPT-010, RPT-020, RPT-030, RPT-040, RPT-050, RPT-060, RPT-070, RPT-080, RPT-090, RPT-100, RPT-110, RPT-120, RPT-130, RPT-140, RPT-150, RPT-160, RPT-170, RPT-171, RPT-180, RPT-190, RPT-200, RPT-210, RPT-220, RPT-230, RPT-240	
November 2013	1.6	Technical edit.	
November 2013	1.5	Changed requirement number SRP-100.1 to SRP-100 and SRP-100.2 to SRP-105.	
October 2013	1.5	Technical edit.	
October 2013	1.4	Added verbiage referencing the VA Franchise Fund National Data Center, changed the descriptions of two figures and added a figure showing the architecture of a national deployment.	
June 2013	1.3	The following requirement was changed: SPS-250, Maturity Model Stage 2. Deleted the RTLS Project Management Office Director's comment regarding Phase 1 or 2 placement of this requirement. The following requirements were rewritten by the RTLS Project Management Office Director: TMP-051, TMP-150, TRP-10, TRP-20.	
May 2013	1.2	Updated Asset Tracking, Cath Lab, and SPW requirements based on additional information received from partners and from the VA: Changes include: deletion, rewrites, and move to appendix. Deleted Requirements Asset Tracking Deleted Requirements: ALR-231, ARP-090, ARP-160, ARP-170, ARP-190, ARP-201. Cath Lab Deleted Requirements: CAT-160, CAT-210, CAT-220, CAT-230, CAT-240, SFI-050, SPS Deleted Requirements: SPS-230, SPS-250, SPS-310, SRP-140, Requirement Rewrites: Asset Tracking Rewrites: ARP-010, ARP-202, QUL-050, AST-430. Cath Lab Rewrites: CAT-30, CAT-90, CAT-100, CAT-190; CAT-250, CAT-260, CAT-270, CAT-300, CAT-301, CAT-350, CAT-360, CAT-390, CAT-420, CAT-440, CAT-450, CRP-70, CRP-80, CRP-100, CRP-140, SFI-070, SPS Rewrites: SPS-010, SPS-030, SPS-110, SPS-120, SPS-130, SPS-150, SPS-160, SPS-170, SPS-190, SPS-200, SPS-210, SPS-280, SPS-290, SPS-300, SPS-320, SPS-330, SPS-370, SPS-380, SPS-400, SPS-410, SPS-420, SPS-450, SPS-460, SRP-020, SRP-030, SRP-060, SRP-080, SRP-100 (split into 2), SRP-120, SRP-130, SRP-150. Temp/Humidity Rewrites: TMP-010, TMP-020, TMP-030, TMP-040, TMP-050, TMP-060, TMP-070, TMP-100, TMP-110, TMP-130, TMP-131, TMP-140, TRP-010, TRP-020, TRP-040, Requirements moved to Appendix:	

Date	Revision	Description	Author
		<p>Asset Tracking Move to Appendix: AST-131, AST-140, AST-540, AST-550, ARP-060, ARP-080. AST-560, AST-570 (AST560 and 570 were rewritten in the appendix.).</p> <p>Cath Lab Move to Appendix: CRP-90, CRP-130</p> <p>SPS Requirements moved/added to appendix: SPS-220. SRP-010 (split into 2), SRP-050. SRP-100 (split into 2), SRP-130, SPS-165. SPS-165, SPS-195, SPS-230. SPS-250. SPS-260, SPS-270, SPS-430, SPS-390, SRP-070. SRP-080, SRP-100 (split into 2).</p> <p>The following requirements were added back into this document as maturity model stage 3 requirements. They were previously deleted; however, ongoing discussion about printing on passive tags continue. TAG-020, AST-010, AST-030, AST-040, AST-050.</p> <p>The following requirements were added to Cath Lab: CAT-480, CAT-490</p> <p>The following requirements were added to Temp/Humidity: TMP-042, TMP-051, TMP-052, TMP-120, TMP-121, TMP-150, TRP-070, TRP-080</p> <p>The following requirements were added to the maturity model section of the appendix: TMP-030.1, TRP-060, TMP-121.1, TRP-010.1, TRP-020.1, TRP-040.1, TMP-100.1</p> <p>Note 1: Concurrence from each of the workgroup leads was received.</p> <p>Note 2: The appendix requirements are requirements that have not yet been vetted and on-going discussions continue.</p>	
April 2013	1.X	<p>Updates based on VA feedback for baseline version.</p> <p>Created Appendix A for NDR and future requirements.</p>	

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1 Introduction

1.1 Purpose

This document specifies the requirements for the Real Time Location System (RTLS) which consists of the physical hardware (tags, readers, local facility display devices), and the infrastructure for maintaining the RTLS system up through the enterprise level National Data Repository.

This document is based on the Product Development ProPath Template for requirements. This document's organization and content reflect VA guidelines.

1.2 Scope

The scope of this document is to cover the software requirements for an RTLS system that is to be deployed within VA Medical Centers (VAMC) and other facilities nationally. The National Data Repository (NDR) is a national component serving the purpose of aggregating the data from the RTLS instances and providing national reporting and insights into the data collected. Technology is anticipated to evolve, and as it evolves it is anticipated that the requirements specification will also evolve, accounting for new tag technologies, new input/output devices, new interfaces, and new applications for the RTLS technology.

Throughout the remainder of the document, the term RTLS refers to an instantiation of RTLS, including the RTLS tags and system components, at the facility and/or VISN levels, as well as integration of the RTLS back-end solution hardware and software nationally at a VA Franchise Fund National Data Center (NDC). The NDR shall refer to the National Data Repository of which there will be one instance nationally.

The following gives an overview of the context in which RTLS will be deployed.

1.2.1 Veterans Health Administration (VHA)

The VHA is comprised of 21 Veterans Integrated Service Networks (VISNs) that are each responsible for managing health care activities within their geographic area that can include six to ten medical facilities and a number of supporting outpatient facilities. Details can be found at:

[REDACTED]

VA Medical Centers (VAMCs) within a VISN work together to provide efficient, accessible health care to Veterans in their areas. With 152 VAMCs nationwide, VHA manages one of the largest health care systems in the United States.

In addition to the 21 VISNs aligned under VHA, there are also seven Consolidated Mail Outpatient Pharmacy (CMOP) facilities located at Leavenworth, KS; Tucson, AZ; Chelmsford, MA; Dallas, TX; Murfreesboro, TN; Hines, IL; and Charleston, SC which process total nationwide workloads exceeding 110 million prescriptions annually.

VHA medical facilities are responsible for tracking all property. VHA currently employs asset tracking tools that incorporate bar coding technology with unique inventory locator numbers assigned to individual assets as they are deployed at VHA sites. Data about these assets, including equipment maintenance records, are managed by an automated system called AEMS/MERS (Automated Engineering Management System/Medical Equipment Reporting System), which is a module of VA's VistA Hospital

Information System. While these tools allow for identification of the assets and associated data maintenance, locating the assets in the facility is accomplished manually. Inventory management in medical facilities often demands special tracking, for example, devices requiring sterilization for reuse and specimens that must be stored under specific climate conditions. Care delivery and process flows can also be improved upon through the use of real-time location data and back-end analytics that track the location and movement of hospital staff and patients.

Individual VHA facilities have already independently deployed instances of different RTLS systems. The following table and Figure 1 show the current deployment and system type. These deployments have been termed Legacy and Technology Demonstration RTLS systems.

Location	RTLS Vendor	Capability/Type of Data
Loma Linda, CA	AeroScout	Asset Tracking and Instruments (not tied together)
Minneapolis, MN	GE, Censis	Asset Tracking and Instruments (not tied together)
Indianapolis, IN	Ekahau system (Wi-Fi/IR)	Asset Tracking
Houston, TX	Sonitor, (Ultra Sound)	Operating Room Flow
St. Louis, MO	Versus	Clinic Flow
Columbus, OH	Versus	Patient Tracking
San Juan, Puerto Rico	AeroScout	Asset Tracking

Technology Demonstration Area	VA Facilities	RTLS Vendor						
		Prime / Integrator / Other	Active Solution	Passive Solution	ITS Solution	Cath Lab Solution	Hand Hygiene	Patient Elopement
VISN 10	Chillicothe VAMC	Team Vet-Fed (Vet-Fed, ICS, Shipcom, CSC)	Ekahau	Motorola Jamison	Censitrac	N/A	N/A	Ekahau
	Cincinnati VAMC					Solstice		Non-RTLS
	Cleveland VAMC					Solstice		Ekahau
	Columbus VAMC					N/A		N/A
	Dayton VAMC					Solstice		Non-RTLS
	Parma VAMC					Uses Cleveland VAMC		N/A
	Ft. Thomas CBOC		Awarepoint		Uses Cincinnati VAMC	N/A		N/A
VISN 11	Ann Arbor VAMC	HP Enterprise Services The Experts Intelligent InSites CSA FSA	Skytron	Feig Zebra ATID	Censitrac	WaveMark	N/A	N/A
	Battle Creek VAMC		AeroScout			N/A		
	Danville VAMC		Skytron			WaveMark		
	Detroit VAMC		Centrak			N/A		
	Saginaw VAMC		RF Code			WaveMark		
	Indianapolis VAMC		Ekahau			N/A		
	Northern Indiana HCS (Fort Wayne and Marion)		Sonitor			N/A		
CMOPS	Charleton CMOP	Jen-esis ICS Shipcom	Ekahau	Motorola Jamison	N/A	N/A	Ekahau	N/A

Figure 1 RTLS Technology Demonstrations

1.3 Acronyms and Definitions

Acronym	Meaning
AEMS-MERS	Automated Engineering Management System-Medical Equipment Reporting System
API	Application Programming Interface
BI	Business Intelligence
BRD	Business Requirements Document
CART-CL	Cardiovascular Assessment, Reporting, and Tracking System for Cath Labs
CMOP	Consolidated Mail Outpatient Pharmacy
CO	Contracting Officer
COTS	Commercial Off-the-Shelf System
CPRS	Computerized Patient Record System
DRP	Disaster Recovery Plan
ED	Emergency Department
EP	Electrophysiology
FDCC	Federal Desktop Core Configuration

Acronym	Meaning
GIP	Generic Inventory Package
GUI	Graphical User Interface
HLD	High Level Disinfectant
ICD	Interface Control Document
IFU	Instructions for Use
ISO	Information Security Officers/International Organization for Standardization
M (MUMPS)	Massachusetts General Hospital Utility Multi-Programming System
NCA	National Cemetery Administration
NDC	National Data Center
NDR	National Data Repository
On-Demand Item	On-Demand (rarely or inconsistently used) Items that must be on hand in case of an emergency or due to a seasonal need. On-demand items can exist only in Primary and Secondary Inventory Points
PIMS	Patient Information Management System
PMAS	Program Management Accountability System
RME	Reusable Medical Equipment
RFI	Request For Information
RSD	Requirements Specification Document
RTLS	Real Time Location System
SDD	System Design Document
SPD	Sterile Processing & Distribution
SPS	Sterile Processing Service (formerly SPD)
SSN	Social Security Number
TRR	Test Readiness Review
UDI	Unique Device Identifier
UI	User Interface
VAMC	VA Medical Center
VBA	Veterans Benefits Administration
VHA	Veterans Health Administration
VISN	Veterans Integrated Service Network
VistA	Veterans Health Information Systems and Technology Architecture

1.4 References

The following reference documents served as inputs to this Requirements Specification.

- FY11-13 Health Care Efficiency Initiative Operating Plan
- Real Time Location System (RTLS) Business Requirements Document (BRD)
- Real Time Location System (RTLS) National Performance Work Statement
- RTLS Workgroups Metrics Sheets (located on RTLS SharePoint)
- NSR20110208 109 RTLS-AM - Item Tagging.doc
- NSR20110208 110 RTLS-AM - Reporting.doc
- NSR20110208 111 RTLS-AM - System Administration.doc
- NSR20110208 116 RTLS-VBA - Asset Tracking.doc
- NSR20110208 117 RTLS-VBA - Inventory Process.doc
- NSR20110208 119 RTLS-CMOP-Track Inventory.doc
- NSR20110208 137 RTLS-Temperature Monitoring Setup.doc
- NSR20110208 138 RTLS-Temperature Monitoring Reporting.doc
- NSR20110208 139 RTLS-Temperature Monitoring Alarms and Alerts.doc
- NSR20110208 112 RTLS-VHA SPD-Critical.doc
- NSR20110208 113 RTLS-VHA SPD-Semi-Critical.doc
- NSR20110208 114 RTLS-VHA SPD-Non-Critical.doc

2 Overall Specifications

Convention used throughout this document.

- **RTLS** - When stated in a requirement, this requirement is specific to the RTLS Middleware, Database and related Hardware installed at the facility and/or VISN level, as well as the back-end solution hardware and software installed at a VA Franchise Fund NDC.
- **NDR** - When stated in a requirement, this requirement is specific to the National Data Repository.

2.1 Accessibility Specifications

All requirements of Section 508 of the Rehabilitation Act (29 U.S.C. 794d), as amended by the Workforce Investment Act of 1998 (P.L. 105-220), August 7, 1998 will be adhered to. VHA recognizes that these are Enterprise cross-cutting legal requirements for all developed Electronic & Information Technology. To ensure that these requirements are met, they are addressed through the Enterprise-level requirements maintained by VHA Health Information Technology, Software Engineering and Integration, Enterprise Requirements Management. Section 3 contains a complete list of standards that apply to the software components of RTLS.

Req. ID	Requirement
ACC-010	RTLS shall comply with section 508 requirements as covered at http://www.section508.gov .

2.2 Business Rules Specifications

The following are examples of business rules:

- AEMS-MERS is the system of record for asset tracking of non-expendable equipment.
- AEMS-MERS Inventory Date field for an item should be updated when an item is inventoried in addition to normal periodic updates.
- Warning, alert and alarm notifications will be based on business rules established by the personnel at the facility.
- GIP is the system of record for inventory management of expendable inventory.

Business rules, such as the ones above, are documented and dispersed throughout this document. The document does not contain a full list of business rules as business rules will vary between facilities.

2.3 Design Constraints Specifications

The following items represent mandated design decisions that have been made regarding the design and development of the RTLS system. The majority of these requirements revolve around the existing VA enterprise licenses for software, and the VA's desire to reduce licensing costs by utilizing these licenses for new initiatives, where possible.

With regard to supported web browsers, the expectation is that the RTLS system will be a web-based system with a large user base across the many VA facilities. Therefore, the software shall be able to run within the approved browsers used in the VA, without the need for custom plugins which would be difficult to manage on hundreds of thousands of computers.

Req. ID	Requirement
DCS-010	The RTLS shall utilize VA enterprise software.
DCS-020	The RTLS shall utilize VA enterprise software including but not limited to: <ol style="list-style-type: none"> 1. Windows Server 2008 2. SQL 2008 3. IBM BigFix 4. Microsoft SCCM 2007 (System Center Configuration Manager) 5. Guidance EnCase 6. McAfee ePO (e-Policy Orchestrator) 7. McAfee VirusScan Enterprise V8.7 & HIPS V7.0 (Host Intrusion Prevention System) 8. SecureWave Sanctuary
DCS-030	The RTLS User Interface shall be compatible with Microsoft Windows XP SP3 Client Operating systems and newer.
DCS-040	The RTLS User Interface shall be compatible with Internet Explorer 7 or greater.

Req. ID	Requirement
DCS-050	The RTLS browser and desktop configuration shall be in accordance with Federal Desktop Core Configuration (FDCC).
DCS-060	The RTLS browser and desktop configuration shall not require customization.
DCS-070	RTLS shall utilize Wi-Fi as its primary location and wireless communication technology, except where otherwise approved by VA.
DCS-080	RTLS shall source data from VA systems of record (such as VistA), when available.

2.4 Disaster Recovery Specifications

As an enterprise-wide system, RTLS is going to require multiple levels of disaster recovery, dependent on the final architecture and placement of the various infrastructure components. At a minimum, the system will have two levels of disaster recovery. The VISN-level and national level RTLS is considered mission critical, and will require a short (12 hour) time window for disaster recovery. The NDR components are not considered mission critical and will have a longer time window for disaster recovery. For infrastructure placed within the VA Franchise Fund NDC, the Contractor shall assist the center with the development of the Continuity of Operations Plan and the Disaster Recovery Plan.

Req. ID	Requirement
DRS-010	In disaster recovery situations, RTLS shall be restored to full operation within 12 hours.
DRS-030	The RTLS shall be designed to facilitate database backups within a corporate data center environment.
DRS-040	The RTLS shall be designed to be reloaded from a backup image and placed back into service.
DRS-050	The RTLS shall be designed to minimize the risk of data loss.
DRS-060	The RTLS shall be designed to support periodic archiving of data.

2.5 Documentation Specifications

The following new end-user documents shall be created:

- **RTLS Enterprise Data Architecture Specification** – Documentation regarding the common data model used throughout the levels of the RTLS hierarchy, from local facility to the national level
- **RTLS Users Guide** – Descriptions and instructions of all User accessible functionality
- **RTLS System Administrators Guide** – Instructions on system installation, configuration, data synchronization, and system maintenance, security, as well as any other functionality that the System Administrator has specialized access to
- **RTLS ICD** – ICD specifying how RTLS and NDR communicate with VA and third party systems
- **RTLS APIs** – Documentation of APIs available to enable third party developers to access the RTLS and NDR data

2.6 Functional Specifications

RTLS involves an enterprise-wide deployment of functionality relevant from the local facility level, all the way up to the national level. The system overview in Figure 2 (following) gives a highlight of the functionality involved with RTLS, which will be covered in this document.

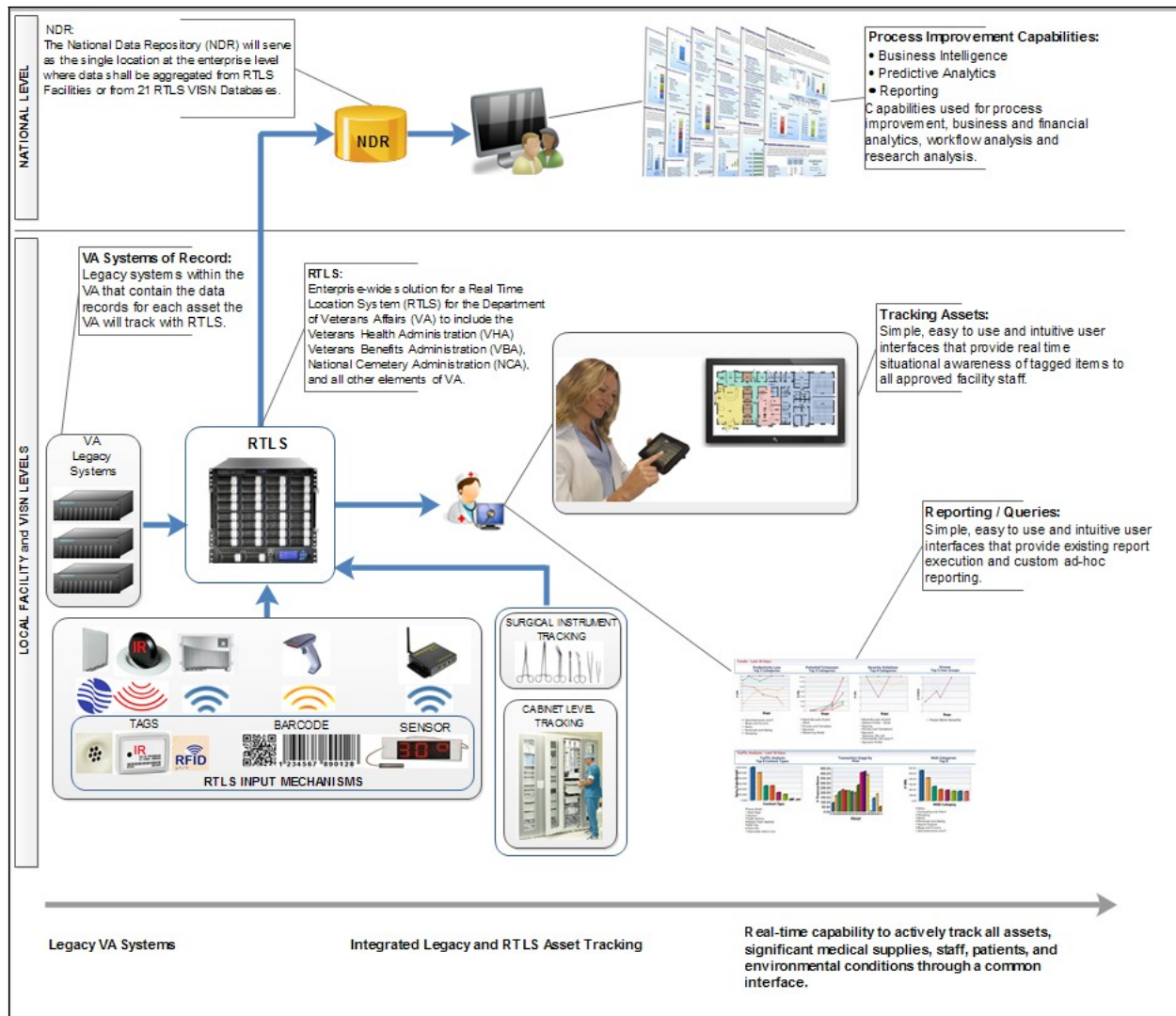


Figure 2 RTLS Conceptual Overview

The functional specifications section has been divided into multiple sections covering the wide span of software requirements related to RTLS. For hardware requirements, refer to the RTLS System Design Document (SDD).

2.6.1 Tag Related Software Requirements

RFID Tags are the primary tool for implementing the RTLS concept. The VA is interested in mainly two varieties:

Passive Tags	Passive RFID tags have no internal power supply. The minute electrical current induced in the antenna by the incoming radio frequency signal provides power for the complementary metal-oxide-semiconductor (CMOS) integrated circuit in the tag to power up and transmit a response (nominally, the tag UID).
Active Tags	Active RFID tags have their own internal power source, usually a small battery, which is used to power the integrated circuits and to broadcast the response signal to the reader.

The VA desires all tags to be standard COTS products and not require any vendor- or manufacturer-unique software, hardware, or firmware. All active tags are expected to handle both 802.11 as well as the supplemental technology required to reach greater sub-room level accuracies.

This section documents software-related requirements for these types of tags. Physical hardware requirements can be found in the RTLS SDD.

Req. ID	Requirement
TAG-030	The RTLS shall ensure tag fields comply with the RTLS common data model.
TAG-040	The RTLS shall ensure tag ID's are globally unique throughout the VA.
TAG-050	The RTLS shall provide the capability to print 1D and 2D barcodes onto passive tags.
TAG-060	The RTLS shall encode the tag ID as part of the printed 1D and 2D barcode.
TAG-070	The RTLS shall provide the capability to read the data encoded on 1D and 2D barcodes.
TAG-080	The RTLS shall be capable of identifying previously issued tag IDs.
TAG-100	The RTLS shall provide the capability to program active tags.
TAG-110	The RTLS shall provide the capability to program active tags that contain on-tag alert buttons over the air.
TAG-120	The RTLS shall provide the capability to program active tags that contain sensors over the air.
TAG-130	The RTLS shall provide the capability to program active tags with audible and visual alarm capabilities over the air.
TAG-140	The RTLS shall provide the capability to program active tags with status indicator lights over the air.
TAG-150	For active tags with status indicator lights, RTLS shall provide the capability to enable/disable the status indicator lights over the air.
TAG-160	The RTLS shall provide the capability to adjust active tags beacon rates

Req. ID	Requirement
	over the air.
TAG-170	Active tags shall provide adjustable beacon rates.
TAG-180	The RTLS shall provide the capability to create business rules for tagged items.
TAG-190	The RTLS shall provide active tag business rules capabilities to include: <ul style="list-style-type: none"> • Monitoring an active tag's movement • Adjusting an active tag's status • Adjusting an active tag's beacon rate over the air based on status • Adjusting the audible alarm status of a tag with alarm capabilities • Adjusting sensor thresholds for tags with status indicator lights
TAG-200	The RTLS shall provide the capability to monitor battery life status messages from active tags.
TAG-201	The RTLS shall provide the capability to query active tags for their battery status.
TAG-210	The RTLS UI shall provide battery status for active tags.
TAG-220	The RTLS UI shall provide a report listing active tags that have reached a low threshold level, or have not been heard from since alerting for a low battery.
TAG-230	If an item comes with a manufacturer-installed passive tag, the solution shall track this tag in the same manner as tags provided by the RTLS solution.

2.6.2 Zonal Positioning Requirements

RTLS Zonal Positioning refers to a web-based, real-time, tracking application that tracks and displays the location (by zone) of all tagged items within the designated areas in each facility and their movements within the designated areas. Terms used to define areas are defined in the following table:

Discrimination Levels	Description
Campus	Multiple Buildings on an area of land belonging to a facility.
Building	Free-standing structure.
Floor	Entire level in a building.
Zone	Defined area on a floor: multiple spaces.
Room	Smaller unit on a floor / zone. Has defined entrance / exit point. (3 meters)
Individual Workspace/SubRoom	Designated area within a room or zone. Bed or Bay area. (1 meter)
Cabinet	Storage device for supplies.

Discrimination Levels	Description
Shelf	Area within a cabinet or room in the vertical plane.
Bin	Smaller defined area within a cabinet or shelf.

Req. ID	Requirement
ZPS-010	The RTLS shall provide the capability of providing tag location, using a location coordinate system.
ZPS-020	The RTLS UI shall accurately display items on a floor plan within the spatial resolution of the RTLS system in that location.
ZPS-030	The RTLS shall provide the capability to define zonal discrimination levels as per the Discrimination Levels defined above.
ZPS-040	The RTLS shall have the capability to define an unlimited number of zones and allow assets to be tracked at varying levels of specificity.
ZPS-050	The RTLS shall be capable of discriminating between indoor and outdoor locations.
ZPS-060	The RTLS shall provide the capability to manage the discrimination between designated location quadrants in the facility (floor, zone, room, etc.).
ZPS-070	Floor-to-floor discrimination is required in all zones except stairwells and elevators.
ZPS-080	The RTLS shall provide the capability to detect, record, and display when a tag enters and exits a location.
ZPS-090	The RTLS shall provide the capability to designate geospatial areas for geo-fencing.

2.6.3 RTLS Database

At the VISN level or VA Franchise Fund NDC, depending on the selected deployment model, the database incorporates information on all tagged items within its jurisdiction. Some of this information may be imported from other VA information systems through system interfaces, manually entered by facility personnel, or inputted by devices (e.g. handheld scanners). The RTLS database(s) serve as a repository for all information associated with the RTLS to include tag information (IDs and item data), interfaces, and system data. Specific data required for each application will be covered in the application- specific section.

A separate NDR data warehouse shall serve as the single location at the enterprise level where aggregated RTLS facility level data will exist for reporting, analytics, business intelligence, and many forms of data mining.

To obtain the data from all of the RTLS databases, the RTLS solution shall provide a means of communication via the VA WAN, such that each facility-level, VISN-level, or national level RTLS database can connect to the NDR and transfer information to populate the NDR data warehouse.

The following sections describe the functionalities involved with each of these capabilities.

Req. ID	Requirement
RDB-010	The RTLS shall store all data within a relational database.
RDB-020	The RTLS database shall utilize a common data model across all RTLS database instances.
RDB-030	The RTLS Database and Data Store shall conform to best practices for transactional models.
RDB-040	The RTLS Database and Data Store shall be designed so that future added data types and fields can be added without software changes and modifying existing data.
RDB-050	Updates to the RTLS Database shall be real time.
RDB-060	The RTLS Database and Data Store shall encompass RTLS application data needs.
RDB-070	The RTLS Database and Data Store shall be flexible to cover application needs.
RDB-080	The RTLS Database and Data Store shall encompass the data from the legacy RTLS system at Minneapolis.
RDB-090	The RTLS Data Model shall encompass the data from the Technology Demonstration sites - VISN's 10 and 11.
RDB-100	The RTLS Data Store shall store at least 18 months of historical location and status updates for all tagged items. History is preserved for disabled or deleted tagged items.
RDB-101	History shall be preserved for disabled or deleted tagged items in the RTLS Data Store.
RDB-110	The RTLS database shall support the ability to dynamically add references to data records stored in database systems external to the RTLS system.
RDB-120	The RTLS database shall maintain information on the sources of data associated with a tag.
RDB-130	The RTLS System database shall retain a minimum of 18 months of data history for tagged items.
RDB-140	Data retention shall adhere to the Veterans Health Administration Records Control Schedule (http://www.va.gov/vhapublications/rcs10/rcs10-1.pdf).
RDB-150	The RTLS database shall store at least 2 images —a photographic image and icon associated with the image that is used in the map display for each tagged item.
RDB-160	A caption shall be stored for each image of the tagged item in the RTLS database.
RDB-170	The RTLS system shall provide the capability to see which tagged items

Req. ID	Requirement
	have been in which locations together.
RDB-180	The RTLS database shall have fields to distinguish VA-owned versus rented tagged items.
RDB-190	The RTLS database shall provide standard export functionality that allows the entire database or a subset, to be exported into a standard non-proprietary format that can be consumed by other database tools.
RDB-200	The RTLS shall provide database visualization and modeler functionality.
RDB-210	The RTLS Database Modeler Tool shall be restricted to System Administrators and select users.
RDB-220	The RTLS Database Modeler Tool shall provide the capability to visually inspect the RTLS Data Model.
RDB-230	The RTLS Database Modeler Tool shall provide the capability to drill down and navigate from the Data Model into the actual data.
RDB-240	<p>The RTLS Database Modeler Tool shall provide VA with the capability to modify the Data Model.</p> <p>NOTE: In general, editing the Data Model directly can cause the system not to function. Edits to the model should be handled through software releases, change control processes, or leveraging the APIs to create additional custom attributes. It is the understanding that this content is about changing the data model. This pertains to RDB-240 through RDB-280.</p>
RDB-250	<p>The RTLS Database Modeler Tool shall warn the user when changes to the model would have negative effects on the existing data.</p> <p>See NOTE within RDB-240.</p>
RDB-260	<p>The RTLS Database Modeler Tool shall provide the capability to commit or cancel changes made.</p> <p>See NOTE within RDB-240.</p>
RDB-270	<p>The RTLS Database Modeler Tool shall change the RTLS Data Model based on committed changes.</p> <p>See NOTE within RDB-240.</p>
RDB-280	<p>The RTLS Database Modeler Tool shall change the RTLS Database based on committed changes.</p> <p>See NOTE within RDB-240.</p>
RDB-290	Data shall be required to be maintained and accessible for a period of not less than three (3) calendar years at a minimum. Known records retention schedules shall supersede the minimum requirement.
RDB-300	Report templates shall have the ability to be saved as un-editable.

2.6.4 Role-Based Functionality

Req. ID	Requirement
RBF-010	The RTLS system shall provide user access based on security role access permissions defined and assigned to users based on staff type and Active Directory Security Group assignment.
RBF-020	The RTLS System shall allow VA Application Security to create, edit, and delete RTLS user based permissions for specific job/functional roles.
RBF-030	The RTLS System shall give the VA Application Security the ability to create, edit and delete RTLS user permissions to view, create, update, and delete specific RTLS Application settings.
RBF-040	The RTLS shall provide System Administrator tools.
RBF-050	The RTLS System Administrator Tool shall provide the capability to inspect and maintain the database.
RBF-070	The RTLS Connector Configuration Tool shall provide the capability to configure new connections to RTLS.
RBF-080	The VA network administration shall have the capability to manage user account using VA Active Directory to provide authentication and authorization to RTLS applications.
RBF-090	The RTLS System Administrator Tool shall provide RTLS reporting functionalities, to include: <ul style="list-style-type: none">• users logging in• time of user access• type of content that is accessed• database resource utilization• report generation time statistics
RBF-091	The RTLS rule-based system shall provide the VA capability to control user viewing and reporting access to the individual application/use case, report level, and facility level, by class of user.

2.6.5 Business Rules and Workflow

In order for RTLS to effectively assist VA management in the planning and oversight of assets, patients, and staff, RTLS must provide a suite of business rule functionality that can assess workflow functions among the various RTLS applications. Workflow management capabilities include, but are not limited to, activity, process and tag monitoring, reporting, analysis, and tracking. The goal of the VA is to use RTLS to improve workflow through analysis of the data provided by the RTLS.

The following table describes requirements for RTLS support of VA business rules and workflows.

Req. ID	Requirement
BRW-010	The RTLS shall provide a business rules engine.
BRW-020	The RTLS shall provide an interface for the creation, changing, and deleting of business rules that apply to RTLS tags.

Req. ID	Requirement
BRW-030	The RTLS business rules definition UI shall require no more than one (1) hour of training.
BRW-040	The RTLS Business Rules Engine shall provide the capability to create business rules.
BRW-050	The RTLS Business Rules Engine shall provide the capability to update business rules.
BRW-060	The RTLS Business Rules Engine shall provide the capability to delete business rules.
BRW-070	The RTLS Business Rules Engine shall allow only authorized users to view business rules.
BRW-080	The RTLS Business Rules Engine shall allow only authorized users to edit business rules.
BRW-090	The RTLS Business Rules Engine shall provide the capability to export by copy a user-selected set of business rules at the VISN level.
BRW-100	The RTLS Business Rules Engine shall provide the capability to import by copy a user-selected set of business rules at the VISN level.
BRW-110	The RTLS Business Rules Engine shall provide the capability to create business rules for tagged items.
BRW-120	The RTLS Business Rules Engine shall provide the capability to create business rules for tagged item categories.
BRW-130	The RTLS Business Rules Engine shall provide the capability to create business rules based on location.
BRW-140	The RTLS Business Rules Engine shall provide the capability to create business rules based on movement of tagged items.
BRW-150	The RTLS Business Rules Engine shall provide the capability to create business rules to trigger alarms.
BRW-160	The RTLS Business Rules Engine shall provide the capability to create business rules to trigger alerts.
BRW-170	The RTLS Business Rules Engine shall provide the capability to create business rules to trigger messages to external systems.
BRW-180	The RTLS Business Rules Engine shall provide the capability to create business rules to monitor inventory levels.
BRW-190	The RTLS Business Rules Engine shall provide the capability to create business rules to create associations between tags.
BRW-200	The RTLS Business Rules Engine shall provide the capability to create business rules to break associations between tags.
BRW-210	The RTLS Business Rules Engine shall provide the capability to create business rules to monitor proximity between tags.

Req. ID	Requirement
BRW-220	The RTLS Business Rules Engine shall provide the capability to create business rules to monitor the status of a tag.
BRW-230	The RTLS Business Rules Engine shall provide the capability to create business rules to update the status of a tag.
BRW-240	The RTLS Business Rules Engine shall provide the capability to create business rules for active tags.
BRW-250	The RTLS Business Rules Engine shall provide the capability to create business rules to update active tag settings.
BRW-260	The RTLS Business Rules Engine shall provide the capability to create business rules based on messages received from active tags.
BRW-270	The RTLS Business Rules Engine shall provide the capability to create business rules based on monitoring thresholds associated with items with active tags.
BRW-280	The RTLS Business Rules Engine shall provide the capability to manage complex scenarios and resulting actions by chaining rules through state management; a rule is capable of modifying the state of a tracked item and then another rule acts on that state.
BRW-290	The RTLS Business Rules Engine shall provide the capability to create business rules to move workflow to the next stage.
BRW-300	RTLS Business rules shall be configured for the production system.
BRW-310	<p>The RTLS Business Rules Engine shall execute actions based on rule triggers defined in previous requirements. The actions shall include:</p> <ul style="list-style-type: none"> • Send alerts • Send messages • Update tag status • Send external events including text for communication
BRW-320	The RTLS Business Rules Engine shall send alerts based on monitoring of events.
BRW-330	The RTLS Business Rules Engine shall send messages based on monitoring of events.
BRW-340	The RTLS Business Rules Engine shall update tag status based on monitoring of events.
BRW-350	The RTLS Business Rules Engine shall communicate with external systems based on triggered business rules.
BRW-360	The RTLS Business Rules Engine shall update the database based on triggered business rules.

2.6.6 RTLS Queries

RTLS provides three levels of reporting. The first level allows searching and filtering on real-time data, providing reports mainly in tabular format. The second level contains a number of canned reports that make use of real-time data and produce both tabular and graphical reports. The third level of reporting is within the RTLS Business Intelligence (BI) tool and features the most data manipulation functionality. The BI tool aggregates data once a day and produces reports in both tabular and graphical format. The following table contains requirements that are met through use of all three levels of RTLS reporting capability.

Req. ID	Requirement
QUL-010	The RTLS Query Tools shall provide a Query Design GUI that includes visual query-building capabilities.
QUL-040	The RTLS Query Tool shall provide the capability to perform ad hoc queries based on any data field within the data model.
QUL-050	The RTLS Query Tool shall provide multiple query options to include: <ul style="list-style-type: none">• current / past location of tagged item/device• item demographics• time in a location• relationship to other tagged items• item pictures• building, floor, and room location• device sterilization status• make• model• vendor• manufacturer• Spaulding classification• age of item
QUL-070	The RTLS Query Tool shall display result set data in a tabular format for analysis of RTLS data.
QUL-080	The RTLS Query Tool shall provide the option to display query results as a map-based representation of tag location data over time with variable speeds.
QUL-090	The RTLS Query Tool shall provide the option to query for all the assets of a specific organization or owner.
QUL-100	The RTLS Query Tool shall provide the capability to form complex queries by applying multiple criteria and filters.
QUL-110	The RTLS Query Tool shall provide the capability to save queries to the user's profile.
QUL-120	Saved queries shall be available to the user until deleted.
QUL-130	The RTLS Query Tool shall provide the capability to make saved queries visible to all users within the same group having access to that category of data.

Req. ID	Requirement
QUL-150	Queries that are made public are available to all users that have authorization to that reporting group.
QUL-160	The RTLS Query Tool shall provide the capability to export query results.
QUL-170	Exported query results shall be in a format compliant with Microsoft Office products and PDF formats.
QUL-180	When executing an on-demand query, the RTLS Query Tool shall provide a status indicator of query generation.
QUL-190	The RTLS Query Tool shall provide the option to cancel a query that is in process.
QUL-200	The RTLS Query Tool shall generate query results without impacting the RTLS UI functionalities.
QUL-210	The RTLS Query Tool shall allow hospital staff to query information about known defective or recalled medical devices.
QUL-220	The RTLS Query Tool shall allow hospital staff to query information about known lost or stolen inventory.

2.6.7 RTLS Reporting

A key component of the RTLS is the Reporting and Business Intelligence capability. The reporting functionality will provide insights into the business processes, workflows, and other relevant data at the local and national levels; such that trends can be identified and observed and actionable recommendations can be made to improve business processes and reduce waste.

Req. ID	Requirement
RRP-010	The RTLS shall provide a reporting tool that shall include a visual report designer with a drag and drop interface.
RRP-020	The RTLS Report Tools shall provide a UI for power users to generate report templates, queries, and reports.
RRP-030	The RTLS Report Tools shall provide the capability to generate ad hoc reports based on any data field from the data model that is visible in the RTLS UI.
RRP-040	The RTLS Report Tools shall provide the capability for users and groups with user defined access levels at each of the RTLS installed facilities to: <ul style="list-style-type: none"> • Generate • Modify report parameters • Save • Share
RRP-050	The RTLS Report Tools shall provide the option of displaying data in a tabular format.
RRP-060	The RTLS Report Tools shall provide the option of displaying a map-based representation of tag location data over time.

Req. ID	Requirement
RRP-070	<p>The RTLS Report Tools shall provide the option of generating graphical reports to include:</p> <ul style="list-style-type: none"> • time based charts • bar charts • line charts • digital dashboards
RRP-080	The RTLS Report Tools shall provide a report layout tool for designing data connections and report layout.
RRP-090	The RTLS Report Tools shall be available to users and groups with the appropriate access level.
RRP-100	The RTLS Report Tools shall provide the capability to limit access to certain features and categories of data based on user and group access level.
RRP-110	The RTLS Report Tools shall provide preconfigured reports.
RRP-120	Preconfigured reports shall be provided by category of data.
RRP-121	Preconfigured reports shall only be accessible by users and groups with a defined/configured access level.
RRP-130	The RTLS Report Tools shall provide the capability to export report results.
RRP-140	Exported report results shall be in a format compliant with Microsoft Office products and PDF formats.
RRP-150	The RTLS Report Tools shall provide the capability to schedule reports generation on a one time or periodic basis.
RRP-160	Scheduled reports shall be generated at the specified time and automatically delivered to a user or distribution list via e-mail that contains a link to the specified report output, or an encrypted email attachment.
RRP-170	Scheduled reports that occur during a system outage shall be continued after the RTLS is brought back on-line.
RRP-180	The RTLS Report Tools shall provide the capability to interface and display data from the Business Intelligence and Analytical functionality deployed with the RTLS.
RRP-190	The RTLS Report Tools shall provide the capability to display data on trends, forecasting, and other analyzed data from the RTLS Analytical functionality.
RRP-200	The RTLS Report Tools shall allow hospital staff to generate a report with tagged items, location, and duration.

2.6.8 Alerts and Alarms

RTLS provides the following notices; Alerts, Tasks, Messages, and Notifications. Unless otherwise specified as active or passive, the notices will apply to both active and passive tags.

Req. ID	Requirement
ALR-010	The RTLS shall provide the capability to configure business rules for alerts.
ALR-020	The RTLS alert notifications shall be customizable based on class or category of tagged item.
ALR-030	The RTLS alert notifications shall be individually configurable on a per-tag basis.
ALR-040	The RTLS rules and resulting alerts shall be managed by designated users.
ALR-050	The RTLS Alert interface shall be created to alert users based on application business rules.
ALR-060	End User Training for the RTLS Alert capability shall be completed in a maximum of one (1) hour.
ALR-070	The RTLS shall be capable of designating one or more notification mechanisms for any given alert or alarm.
ALR-080	The RTLS shall be capable of sending alert messages to communication and hospital systems, such as physical security systems.
ALR-090	The RTLS alerts shall have the ability to communicate with the VA facility unified communication system.
ALR-100	The RTLS shall provide the capability to send alerts via the following mechanisms: <ul style="list-style-type: none">• email• SMS voice messages• SMS text messages• pager text messages• RTLS UI instant messaging
ALR-110	The RTLS shall provide the capability to configure and route alerts.
ALR-120	The RTLS shall be configurable to provide an alert when a geo-fence region is entered, exited, or if a tag dwells within the region for a specified period of time.
ALR-130	The RTLS shall be able to provide an alert if a tagged piece of equipment designated as a specific type is moved.
ALR-140	The RTLS shall have the ability to provide alerts if tagged assets assigned to locations are removed from those approved locations.
ALR-150	The RTLS shall be configured to provide automatic area entrance and exit alerts for all tagged items in designated zones.

Req. ID	Requirement
ALR-160	The RTLS shall be capable of generating an alert when a given tag signal has not been received for greater than a specified period of time.
ALR-180	The RTLS shall provide a notification when a previously active tag that has gone outside of a detection area for a specified period of time reenters a zone and again becomes active.
ALR-190	The RTLS alerts shall provide adjustable delays to prevent false alerts.
ALR-200	The RTLS shall be capable of sending alerts if tamper-sensing tags are tampered with or removed from a device.
ALR-210	The RTLS shall provide the capability to associate a status with a tag, and to modify the status of a tag.
ALR-220	The RTLS shall provide the capability to configure business rules for alerts when tag status has changed.
ALR-232	The RTLS shall have the ability to trigger an alarm for an unauthorized removal of an asset from a facility.
ALR-233	The RTLS shall provide the capability to display alerts when a Cath Lab item is below par level, or is about to expire.
ALR-244	RTLS notifications shall be capable of registering a status of acknowledged or closed.

2.6.9 Application-Specific Requirements

2.6.9.1 Asset Tracking

VHA medical facilities are responsible for tracking all property. VHA desires that RTLS asset tracking tools replace the existing bar coding technology with RTLS as individual assets are deployed at VHA sites. Currently, data about these assets including equipment maintenance records are managed by an automated system called Automated Engineering Management System/Medical Equipment Reporting System (AEMS/MERS), which is a module of VA's VistA Hospital Information System. While these tools allow for identification of the assets and associated data maintenance, locating the assets in the facility is accomplished manually. Inventory management in medical facilities often demands special tracking, for example, devices requiring sterilization for reuse and specimens that must be stored under specific climate conditions.

RTLS may also aid in improving care delivery and process flows through the use of real-time data and back-end analytics that track the location and movement of hospital staff and patients. The following table identifies RTLS Asset Tracking requirements.

Req. ID	Requirement
AST-020	The RTLS Handheld Scanners shall provide the capability to scan both 1D and 2D barcodes.
AST-090	The RTLS Handheld scanner shall provide the capability to transfer data to the RTLS system wirelessly, where available.

Req. ID	Requirement
AST-100	The RTLS Handheld scanner shall provide the capability to sync information with a RTLS workstation when docked.
AST-110	The RTLS shall provide a mechanism to add items to the RTLS database by associating a passive tag's ID with an EE number prepended with the Vista Instance number.
AST-120	The RTLS shall provide the capability to retrieve item data from AEMS-MERS using an EE Number and a Station Number identifier.
AST-130	The RTLS database shall support transforming asset data from AEMS-MERS, at a minimum, on a daily basis. The RTLS system will treat the AEMS-MERS data as "master" records and update the asset fields in the RTLS database.
AST-160	The RTLS shall provide the capability to retrieve an Active tag's tag ID.
AST-170	The RTLS shall provide a mechanism to add items to the RTLS database by associating an active tag's ID with an EE number and Vista Instance number.
AST-180	The RTLS UI shall provide the capability to search for an item by any data field related to an asset record.
AST-190	The RTLS UI shall provide the capability to search for a Non-Expendable item by EE Number and Station Number.
AST-200	<p>The RTLS UI shall display individual item information including:</p> <ul style="list-style-type: none"> • Tag ID • Name • Fixed Asset Number • Type • Status • Model • Location • Assigned Location • Owner • Placed in Service • Manufacturer • Serial Number • Second Fixed Asset Number • Assigned Area • Service Status • Depreciation Date • Expiration • Value • Rental • Rental Company • Rental Expiration • Utilization
AST-240	The RTLS shall provide the capability to define Item Categories.

Req. ID	Requirement
AST-250	The RTLS shall provide the capability to assign default active tag settings for item categories and tag types.
AST-260	The RTLS shall provide designated users the capability to edit the item categories and associated defaults.
AST-270	Upon associating an active tag to an item, the RTLS system shall apply the defaults for that active tag based on the item category and the tag type.
AST-280	The RTLS UI shall provide the capability to edit the settings for an Active Tag.
AST-290	The RTLS UI shall warn the user when an invalid setting has been entered for an active tag.
AST-300	Upon committing changes to an active tag's settings, the RTLS system shall store the changes to the settings.
AST-310	Upon committing changes to an active tag's settings, the RTLS system shall transmit the changes to the active tag.
AST-320	For Asset Tracking, RTLS shall provide the capability to set business rules for individual items.
AST-330	The RTLS shall allow one or more business rules to be established for an item.
AST-340	The RTLS shall allow one or more events to be established for a business rule.
AST-350	The RTLS UI shall provide the capability to adjust business rules for an item.
AST-360	The RTLS shall provide the capability to establish business rules for the locations where an item is permitted.
AST-380	The RTLS shall provide four categories of events: -Alert – for immediate action; can escalate and mark as urgent -Notification – for action; no escalation -Task – for action; can be scheduled in advance and to recur -Message – for information
AST-390	The RTLS shall provide the capability to set the event delivery mechanism. Options include: - Email - Text Page - Event display on RTLS UI
AST-400	The RTLS shall provide the capability to set one or more individuals to receive the event.
AST-410	The RTLS shall provide the capability to set one or more groups to receive the event.

Req. ID	Requirement
AST-420	The RTLS handheld Scanner shall provide the capability to perform an inventory.
AST-430	The RTLS Handheld Scanner for passive RFID tagged assets downloads the expected inventory based on a location scan for the location which is to be inventoried. The inventory attributes include asset description, asset quantity and tag IDs.
AST-440	The RTLS Handheld Scanner shall provide the capability to read a location off of a barcode. (Barcodes typically affixed at entries to rooms and other areas).
AST-450	The RTLS Handheld Scanner shall provide the capability to manually enter its current location.
AST-460	For wirelessly enabled handheld scanners, the RTLS Handheld Scanner shall provide the capability to identify its current location.
AST-470	While performing an inventory of an area, the RTLS Handheld Scanner shall store the tag ID of items observed.
AST-480	While performing an inventory of an area, the RTLS Handheld Scanner shall keep a running tally of which items were observed and which items remain to be found.
AST-490	The RTLS Handheld Scanner shall provide the user the capability to indicate completion of scanning an area.
AST-500	The RTLS Handheld Scanner shall display to the user a list of items still missing with the following information for each item: - EE Number - Station Number - Serial Number - Model Number
AST-510	The RTLS Handheld Scanner shall display to the user a list of items found that are not in their assigned area, with the following information for each item: - EE Number - Station Number - Serial Number - Model Number
AST-520	The RTLS Handheld Scanner shall provide the capability of synching the inventory data with RTLS.
AST-530	RTLS shall update AEMS-MERS via the AEMS-MERS interface with inventory date and location for each item inventoried.
AST-580	The RTLS shall provide designated users the capability to adjust the periodicity of updates to AEMS-MERS.
AST-590	Periodicity of AEMS-MERS updates shall default to once every 24 hours.

Req. ID	Requirement
AST-600	When a periodic update is sent to AEMS-MERS, if the item's location has changed in the RTLS database since the previous AEMS-MERS update, RTLS shall send the Inventory Date and Location information to AEMS-MERS.
AST-610	When a periodic update is sent to AEMS-MERS, if the item's location has not changed in the RTLS database since the previous AEMS-MERS update, RTLS shall send only the Inventory Date to AEMS-MERS, and not the Location information.
AST-620	RTLS shall only update AEMS-MERS (Inventory Date and Location Information) for items that have a changed location recorded in the RTLS system since the last periodic update.
AST-640	The RTLS shall provide the Systems Administrator with the option to update AEMS-MERS on demand.
AST-650	The RTLS shall provide a mechanism for finding Active Tags that are enabled but not yet associated with items in the system.

The following are the Reporting requirements associated with the Asset Tracking Application.

Equipment Utilization Reports	
ARP-010	The RTLS Report Tools shall allow users the capability to run reports showing historical and current utility status of all equipment. (NOTE: Zones shall be set at a facility level RTLS with automated status settings.) Utilization Reports shall include queries for In Use equipment, equipment that is cleaned and available for use, equipment that has been soiled and requires cleaning, and equipment that is in a repair location.
Lost and Stolen Equipment Detection Reports	
ARP-020	The RTLS system shall provide ability to report tags that are not reporting on the active RTLS network.
ARP-030	The RTLS Report Tools shall allow users the capability to run reports that identify the location prior to loss of active tag reporting.
ARP-040	The RTLS Report Tools shall allow users the capability to run reports to identify frequency of locations prior to loss of active tag reporting.
Asset Management Reporting	
ARP-050	The RTLS Report Tools shall allow users the capability to run a report detailing inventory counts of any combination of equipment categories (e.g. infusion pumps, bariatric beds, suction units, Patient Controlled Analgesia (PCA) pumps, Barcode Medication Administration (BCMA) Carts, wheelchairs, portable imagining equipment, beds, defibrillators, etc.).
ARP-070	The RTLS software shall provide an option to report by Category Stock Number/Universal Medical Device Nomenclature System (UMDNS), Equipment Category, model, serial number, location.
ARP-120	The RTLS users shall be able to run a report that documents par levels for actively tagged assets in equipment supply rooms (e.g. infusion pumps).
ARP-140	The RTLS Report Tools shall allow users to generate reports identifying inventory expense.
ARP-190	The RTLS Report Tools shall allow user to generate reports on demand.
ARP-200	The RTLS Report Tools shall allow users to generate reports identifying all leased or rented equipment. Reports shall include equipment ID, equipment type, rental date, location, equipment age, and expiration date.
ARP-202	The RTLS Report Tools shall allow users to generate reports that identify device type, location (e.g., building, floor, room), and expected device expiration/retirement date.

2.6.9.2 Cardiac Catheterization

The VA desires RTLS to provide key inventory management and tracking services for the Cardiac Catheterization work flow. The following table contains Cardiac Catheterization-specific requirements based on current applications. The Cath Lab User Interface solution is the WaveMark XPOS (Point of Use Station).

Req. ID	Requirement
CAT-010	The RTLS shall provide RTLS Smart Cabinets capable of monitoring quantities of tagged items stored within the smart cabinet.
CAT-020	The RTLS shall monitor the usage of Cardiac Catheterization supplies and equipment necessary for patient procedures.
CAT-030	The RTLS shall provide real-time count of the number of each designated Cardiac Cath Lab item and its location, such as “on the shelf”, used in a procedure, or missing. See CAT 300.
CAT-040	The RTLS shall support par-level maintenance to ensure availability of Cardiac Catheterization supplies and equipment.
CAT-050	The RTLS shall interface with the VistA Generic Inventory Package (GIP).
CAT-060	The RTLS shall be able to retrieve item information on expendable items from GIP using the Item Master ID number.
CAT-070	The RTLS GIP interface shall transform data between the systems.
CAT-080	The RTLS shall provide a user interface for the Cath Lab staff to enter expendable item information during tagging process.
CAT-090	The RTLS shall utilize item data previously retrieved from GIP for the items tagged and registered into the RTLS system.
CAT-100	The RTLS shall provide the capability to scan the Cath Lab item barcodes, such as product UPN, expiration date, serial/lot number to automatically populate product information within RTLS for that item.
CAT-110	<p>The RTLS shall provide the capability to manually enter or barcode scan information for an expendable item to capture product identifying information, for example:</p> <ul style="list-style-type: none">a. Expiration dateb. Lot numberc. Serial numberd. Part numbere. Model namef. Model numberg. Manufacture dateh. Brand namei. Unique Device Identifier UDI including static and dynamic fieldsj. Food and Drug Administration (FDA) MedWatch Form 3500 data

Req. ID	Requirement
CAT-120	<p>For each item stored in the Cath Lab smart cabinet and linked to GIP, RTLS shall maintain product identifying information, for example:</p> <ul style="list-style-type: none"> a. Item Name b. Item description c. Unit of measure d. Unit of issue e. Manufacturer stock number f. Manufacturer product number g. Manufacturer name h. Expiration date i. Lot number j. Serial number k. Part number l. Model name m. Unique Device Identifier (UDI) n. FDA MedWatch form 3500 device identification data
CAT-130	The RTLS Smart Cabinet shall maintain a running inventory of Cath Lab items contained within it.
CAT-140	The RTLS Smart Cabinet shall increase the inventory counts within the RTLS database as new Cath Lab items are added to the Smart Cabinets and decrease the inventory counts as items are removed from the Smart Cabinets.
CAT-150	The RTLS shall provide the capability to interface with VistA for Cath Lab patient information.
CAT-170	The RTLS shall provide a UI for associating items removed from Cath Lab Smart Cabinets with patients and Cath Lab encounters.
CAT-190	The Cath Lab UI shall provide the capability to perform a patient search based on the scan of the patient wristband.
CAT-200	The Cath Lab UI shall query VistA's Patient File for patient information based on the search query entered.
CAT-250	<p>The RTLS shall maintain a record of:</p> <ul style="list-style-type: none"> • Patient identifier IEN (ICN) • Date & time of Cath Lab procedure • Facility identity (i.e., STATION_NUMBER) Cath/EP lab procedure room number
CAT-260	The RTLS shall record Cath Lab items, to be associated with a patient, as they are pulled from the RTLS smart cabinets and waved at the RTLS UI stations.
CAT-270	The RTLS UI Station shall display waved items pulled from the RTLS smart cabinet and associated with a patient.

Req. ID	Requirement
CAT-280	Unused items returned to the smart cabinet during an open encounter shall be disassociated with the encounter and removed from the RTLS display.
CAT-290	The RTLS UI shall provide the user the ability to select the disposition for each item used in encounter.
CAT-300	<p>The RTLS Cath Lab UI shall provide disposition values for tagged disposable items workflow, for example,</p> <ol style="list-style-type: none"> 1. Used Successfully (default at XPOS upon wave) 2. Used Unsuccessfully –Clinical Factors 3. Used Unsuccessfully – Product Defect 4. Not used –Defective Before Use 5. Not used – Wasted Before Use 6. Moved out of Dept. 7. Return to Rep 8. Return to Mfr 9. Lost or Stolen 10. Discarded – Expired 11. Discarded – Obsolete/Damaged 12. In Inventory (automated disposition) 13. Missing (automated disposition)
CAT-301	<p>The RTLS Cath Lab UI shall provide disposition values for implantable items workflow as in CAT-300.</p> <ol style="list-style-type: none"> 1. Used Successfully (default at XPOS upon wave) 2. Used Unsuccessfully –Clinical Factors 3. Used Unsuccessfully – Product Defect 4. Not used –Defective Before Use 5. Not used – Wasted Before Use 6. Moved out of Dept. 7. Return to Rep 8. Return to Mfr 9. Lost or Stolen 10. Discarded – Expired 11. Discarded – Obsolete/Damaged 12. In Inventory (automated disposition) 13. Missing (automated disposition)
CAT-310	The RTLS database shall store an association between the actual Cath Lab items used in the patient procedure and the patient after the final disposition of all Cath Lab items has been performed.
CAT-320	The RTLS shall be interfaced to CART-CL.
CAT-330	The RTLS-CART interface shall use SQL stored procedures or some other protocol to exchange information with CART-CL.
CAT-340	The RTLS shall transmit the Cath Lab item disposition information used in patient procedure and patient data to CART-CL after the final disposition process has been completed.

Req. ID	Requirement			
CAT-350	The RTLS shall provide Cath Lab interfaces to Hemodynamic recording systems. The following Hemodynamic recording systems are currently in use:			
		Hemodynamic System	Compatible Version(s)	Connection Type
		GE Mac-Lab/CardioLab	6.8 or newer	USB (HID)
		McKesson Horizon Cardiology	12.x or newer	RS232
		Merge – Camtronics PhysioLab	Most versions	RS232
		Merge – Heartsuite Hemo	7.x or newer	RS232
		Philips WITT CALYSTO	Most versions	USB (HID)
		Philips XPER	Most versions	USB (HID)
		Siemens Axiom Sensis XP	VC03F or newer	RS232
CAT-360	The RTLS shall interface to hemodynamic recording systems.			
CAT-370	The RTLS shall update the Hemodynamic monitoring system with Cath Lab items pulled for the procedure.			
CAT-380	The RTLS shall transmit Cath Lab item disposition information used in the patient procedure to the CART-CL systems upon final disposition of those items and hemodynamic monitoring systems upon use of the items.			
CAT-390	The RTLS Smart Cabinet inventory updates to GIP shall be dependent on a par-level stocking metric established by the VA facility for Cath Lab items stored in Smart Cabinets. Par levels are shared between GIP and RTLS (SFI-020).			
CAT-400	The RTLS shall provide the capability to set Cath Lab par level inventory levels for each item stored in the Smart Cabinet.			
CAT-410	The RTLS shall provide the capability to set the Cath Lab item low inventory threshold level for each item.			
CAT-420	The RTLS shall provide the capability for the facility to establish the Cath Lab inventory update interval to GIP.			
CAT-430	The RTLS shall provide the capability to set user(s) and user group(s) that shall receive alerts regarding low Cath Lab inventory item threshold levels.			
CAT-440	The RTLS Smart Cabinets shall perform periodic item inventory and RTLS shall notify GIP of its inventory status as per the inventory update interval (see CAT 420).			
CAT-450	The RTLS shall deduct items removed from the Smart Cabinet for a procedure from the inventory upon final disposition.			
CAT-460	The RTLS shall notify GIP of its inventory status for Cath Lab items that drop below par level at the next scheduled GIP update.			
CAT-470	If the par level for Cath Lab items drops below the item’s low inventory threshold, the RTLS shall issue an alert to the specified users.			
CAT-480	The RTLS shall log power failures as events in the system and upon power restoration update the inventory system with the current Smart Cabinet inventory count.			
CAT-490	The RTLS shall provide notification when cardiac Cath Lab items are expired.			

Req. ID	Requirement
Catheterization Lab Reports	
CRP-020	The RTLS Report Tools shall allow users the capability to run reports that indicate inventory levels for Cardiac Catheterization Labs and supply utilization.
CRP-040	<p>The RTLS Report Tools shall track disposable inventory used for Catheterization procedures (e.g. stents, catheters, pacemakers, balloons). Information shall include:</p> <ul style="list-style-type: none"> • Current available inventory by type, manufacturer and location • Inventory status reflecting if it is owned or consigned • Dollar value of current available inventory by type, location, category, and in total • Inventory used by location, patient, doctor • Inventory disposed of due to defects, returns, expirations or loss. • Inventory lost or stolen • Inventory with a recall notice associated with it
CRP-070	RTLS shall provide data to CART-CL that allows users to generate reports in CART-CL that identify patients associated with recall notices on medical inventory such as pacemakers, defibrillators and stents.
CRP-080	The RTLS shall provide data to CART-CL that allows users to generate reports in CART-CL that identify recalled items by patient identifier or product identifier.
CRP-100	The RTLS Report Tools shall allow users to generate reports that identify the nearest location of required inventory for a procedure, which is missing from the Cath Lab room.
CRP-110	<p>The RTLS Report shall allow users to generate reports that identify the location of the required inventory for a procedure.</p> <ol style="list-style-type: none"> Expiration date Manufacturer Lot number Serial number Part number Model name Brand name Unique Device Identifier UDI FDA MedWatch device identification data
CRP-120	The RTLS Report Tools shall allow users to generate reports that identify the location of EP and catheterization devices.

Req. ID	Requirement
CRP-140	<p>The RTLS Report Tools shall allow users to generate reports to include:</p> <ul style="list-style-type: none"> • Use date • Expiration date • Remaining inventory levels • Inventory order status • Inventory replenishment alerts • Patient identifiers associated to items used

2.6.9.3 Temperature Monitoring

RTLS will be utilized to ensure Temperature Monitoring is performed safely and consistently. The following table contains Temperature Monitoring-specific requirements based on current applications. In the following, “environmental sensors” refer to either temperature or humidity sensors.

Req. ID	Requirement
TMP-010	The RTLS UI shall provide the capability to display environmental sensor readings. Readings shall view Fahrenheit and Celsius units. Temp readings shall display and be accurate to tenths of degrees.
TMP-020	The RTLS UI shall provide the capability to associate an environmental sensor with an asset. For asset monitors, UI shall display EE#, type of asset (equipment category), asset location (including room and building), service/owner, current temp, temp status, humidity, and humidity status. UI shall provide capability for authorized users to edit data fields of individual assets.
TMP-030	The RTLS UI shall provide the capability to associate an environmental sensor with a location. For room/location monitors, UI shall display location (including room and building), current temp, temp status, humidity, humidity status, and equipment status.
TMP-040	The RTLS UI shall provide the capability to display environmental sensor settings for administrative users. Settings shall include temperature and humidity ranges, alarm thresholds, alert/notification settings (i.e. what types of alerts are sent to whom).
TMP-042	The RTLS UI shall provide capability to display and quickly differentiate between two temperature readings on the same asset (e.g. a household refrigerator/freezer unit).
TMP-050	The RTLS shall provide pre-configured business rules that can be applied to new tag types. Business rules shall include: temp/humidity ranges, alarm thresholds (temp and time), notifications, and escalation profiles.
TMP-051	The RTLS shall allow customization of the frequency of probe recordings.
TMP-052	The sensors can be calibrated and shall be NIST certified upon initial delivery. Appropriate documentation shall be provided to the facility.

Req. ID	Requirement
TMP-060	<p>The RTLS UI shall provide the capability to adjust environmental sensor business rules, to include:</p> <ul style="list-style-type: none"> a. Temperature thresholds/ranges b. Humidity thresholds/ranges c. Time thresholds for the ranges d. Warning/Alert/Alarm mechanism(s) (e-mail, pager, RTLS display) e. Individual(s) or group(s) to receive the warnings/alerts/alarms <p>The tag management system shall provide the capability to adjust:</p> <ul style="list-style-type: none"> • Monitoring Frequencies
TMP-070	Local users will have the ability to make their own business rules, but the national business rule standards will be uneditable.
TMP-080	The RTLS shall receive environmental sensor readings.
TMP-090	The RTLS shall apply business rules associated with temperature sensor readings.
TMP-100	The RTLS shall provide the capability to generate an event (warning, alert, or alarm) based on triggered business rules. RTLS shall provide capability to alert users via the following means: e-mail, text message to smart phones and within the RTLS Software.
TMP-110	The RTLS UI shall display environmental sensor status based on triggered business rules. Statuses shall include both environmental status (within range, out of range) and item status non-environmental (no sensor communication, low battery, probe failure, etc.).
TMP-120	For an environmental event, RTLS shall provide the capability to record the action taken to resolve the event. Data to be included are Date, Time, Log-in user and the corrective action.
TMP-121	When a failure happens to an entity the system shall have the capability to mark that entity as disabled so no further alerts will trigger while maintenance is performed. Corrective actions can be entered multiple times in the system until the corrective action is cleared.
TMP-130	The environmentally monitored entity in the RTLS UI will return to normal once the event has been resolved.
TMP-131	The RTLS UI shall provide the ability to require a manually entered corrective action note to close the environmental event.

Req. ID	Requirement
TMP-140	<p>The RTLS shall allow alarms and alerts to exist based on whether an action occurs.</p> <p>The variables to determine an alert or alarm shall include:</p> <ol style="list-style-type: none"> temperature out of range for configured minutes low battery battery failure probe failure <p>These alarm states shall trigger a change in status (per TMP 110) that are filterable on the dashboard.</p>
TMP-150	<p>The RTLS UI shall provide users the ability to record date, time and log-in user when they access the system and confirm their assets/locations of responsibility are being appropriately monitored.</p>
Temperature Tracking Reports	
TRP-010	<p>The RTLS Report Tools shall allow users to run reports to determine temperature fluctuations over selected time periods. Data from all assets and locations shall be stored indefinitely and reportable for the most recent 2 years.</p>
TRP-020	<p>The RTLS Report Tools shall allow users to run reports that show all adverse events for a device/location along with the associated corrective actions taken. Reports should allow users to run reports over a period of time for all other assets and location probes. Data from all assets and locations shall be stored indefinitely and reportable for the most recent 2 years.</p>
TRP-030	<p>The RTLS Report Tools shall allow users to run reports that include a daily reading of defined tags over a set period of time and displaying the following data elements:</p> <ol style="list-style-type: none"> Tag ID Device Name (which includes the Equipment Entry (EE) number) Location Temperature Reading Time of Reading
TRP-040	<p>The RTLS Report Tools shall allow users to run reports that include all alarms and alerts, by monitored item group, over a specified time period and displaying the following data elements:</p> <ul style="list-style-type: none"> • Device Name (includes EE number) • Location • Reason for Alert • Corrective Action • Time of Alert • Time Corrected • Responding Individual • Respondent's Comment (if any, same as corrective action)

Req. ID	Requirement
TRP-050	The RTLS Report Tools shall allow users to run reports that include a graphical display of all detected temperatures over a period of time for a select tag(s) including a display of any alerts that occurred.
TRP-070	The RTLS Report Tools shall report values relative to settings at the time of recording, not the settings at time of report query.
TRP-080	The RTLS Report Tools shall allow users to run a report that shows all dates and times they accessed the system and confirmed correct monitoring of their assets/locations. Part of TMP-150.

2.6.9.4 SPS

The VA desires that the RTLS solution enhance SPS business processes and support SPS staff responsible for tracking, cleaning and distributing medical equipment throughout the medical facility by automating the tracking of tasks, instruments, and supplies. The following table contains SPS-specific requirements based on current applications.

Req. ID	Requirement
SPS-010	ITS shall send an alert when the cleaning/sterile processing is not completed.
SPS-030	ITS shall scan the location, provide a time stamp and record the status of an SPS instrument or item at each key point in the SPS process, to include <ul style="list-style-type: none"> a. Decontamination b. Preparation c. Packaging d. Sterilization e. QA f. Storage
SPS-070	Authorized users shall have the ability to log into the RTLS-ITS and perform status updates of the SPS items as they move through the SPS workflow process.
SPS-075	Manual overrides of the workflow process shall be logged into RTLS-ITS for reporting purposes.
SPS-110	ITS shall provide the capability to update location of the tagged case cart when it is placed into the washer.
SPS-115	RTLS shall provide the capability to update location of the tagged case cart when it is placed into the washer.
SPS-120	ITS shall provide the facility-optional capability to update location status of the tagged case cart when the cleaned case cart is placed into storage.
SPS-125	RTLS shall provide the facility-optional capability to update location status of the tagged case cart when the cleaned case cart is placed into storage.

Req. ID	Requirement
SPS-130	ITS shall provide the capability to update a scanned item's location/status with a time stamp as it moves from beginning of Decontamination to Preparation.
SPS-150	ITS shall provide the capability to update an item's location/item status as "Out of Service" for damaged or non-functional electrochemically marked Reusable Medical Equipment (RME) (critical, semi-critical).
SPS-160	ITS shall provide the capability to save an item's location status and load.
SPS-170	ITS shall provide the capability to update an item's location when an item passes a Functional QA inspection.
SPS-190	ITS shall provide the capability to save the sterilizer cycle setting based on an item's Instructions for Use (IFU) via manual entry.
SPS-200	ITS shall have the capability to store and display an item's Standard Operating Procedure (SOP) at each step of the SPS process, to include decontamination, assembly and packaging, sterilization, and storage.
SPS-210	ITS shall perform an internal (via ITS-sterilizer interface) QA check for sterilization cycle compatibility and display an incompatible sterilization method message if the method is incompatible based on the pre-defined SOP data stored in the RTLS-ITS database for each SPS item.
SPS-280	ITS shall provide the capability to update an item's status when a user performs Sterilization Physical (i.e., visual, Biological Indicator (BI), integrator) QA check on sterilized load.
SPS-290	ITS shall provide the capability for a user to record the Sterilization Physical (visual) QA check result.
SPS-300	ITS shall provide the capability for the user to create an alert to send to additional designated personnel when a Sterilization Physical (visual) QA check fails.
SPS-320	ITS shall time stamp an item's location status when a user performs a Quarantine QA check.
SPS-330	ITS shall provide the capability for a user to record a pass/fail result for a Quarantine QA check.
SPS-340	ITS shall provide the capability for a user to initiate a full recall of the load and generate an incident report for recall when a Quarantine QA check fails.
SPS-360	ITS shall provide the capability to update an item's location status when a user sends an item to the Bio Med department.
SPS-365	RTLS shall provide the capability to update an item's location status when a user sends an item to the Bio Med department.
SPS-370	ITS shall provide the capability to update an item's location status to "Storage" when the item has completed the sterile processing.
SPS-375	ITS shall provide the capability to update a semi-critical item's location status to "Storage" when the semi-critical item has completed the HLD process.

Req. ID	Requirement
SPS-380	ITS shall provide the ability to track specific RME and/or instrument of implantable item(s) to a specific SPS staff member who processed the RME (critical, semi-critical) and/or instrument.
SPS-400	ITS shall track items with required cycle counts.
SPS-410	ITS shall generate an alert when the appropriate number or reprocessing cycles is close to occurring, or has been exceeded so that it may be removed from service.
SPS-420	ITS shall track the number of times an employee has performed a competency based task.
SPS-430	RTLS-ITS shall provide the ability for a supervisor/trainer to hand-enter an electronic validation code to endorse competency assessment.
SPS-450	ITS shall display time intervals indicating the length of time instruments sit waiting to be cleaned.
SPS-460	ITS shall generate alerts when the instruments have passed a user-programmable dwell time (shelf life) threshold.
Sterile Processing (SPS workflow) Reports	
SRP-020	<p>The ITS Report Tools shall allow users to generate reports detailing processing time from arrival of RME (critical and semi-critical) to the Decontamination area through completion of the sterilization cycle. Reports shall include:</p> <ul style="list-style-type: none"> • Equipment id • Equipment type • Arrival time at the sterilization location • Time at start of the sterile processing • Time at completion of the sterile processing • Id of staff member(s) performing the sterile processing
SRP-030	<p>The ITS Report Tools shall allow users to create reports identifying RME sterilized within specific sterilization parameters and RME (critical and semi-critical) sterilized outside specified sterilization parameters. The report shall include:</p> <ul style="list-style-type: none"> • the recommended parameters • actual parameters used • equipment ID • equipment type • equipment location • sterilization staff • sterilization status

Req. ID	Requirement
SRP-060	<p>The RTLS Report Tools shall allow users to generate reports, for inventory management and excess inventory management showing annual aged RME (critical and semi-critical) rates by:</p> <ul style="list-style-type: none"> • equipment id • equipment type • dollar value • location
SRP-080	<p>The ITS Report Tools shall allow users to generate reports identifying the utilization rate of RME (critical and semi-critical) moving through the sterile processing. Reports shall include:</p> <ul style="list-style-type: none"> • waiting to be sterilized • time in sterilization • time sterilized but waiting to be used
SRP-085	<p>The RTLS Report Tools shall allow users to generate reports identifying the utilization rate of RME (critical and semi-critical) moving through the sterile processing. Reports shall include:</p> <ul style="list-style-type: none"> • waiting to be sterilized • time in sterilization • time sterilized but waiting to be used
SRP-100	<p>The ITS Report Tools shall allow users to generate reports identifying VA-owned RME (critical and semi-critical) items. Reports shall include:</p> <ul style="list-style-type: none"> • Inventory ID • Purchase date • Location • Cost • Time in storage • Time in maintenance • Expiration date
SRP-105	<p>The RTLS Report Tools shall allow users to generate reports identifying VA-owned RME (critical and semi-critical) items. Reports shall include:</p> <ul style="list-style-type: none"> • Inventory ID • Purchase date • Location • Cost • Time in storage • Time in maintenance • Expiration date
SRP-120	<p>The ITS Report Tools shall allow users to generate reports identifying RME (critical and semi-critical) that is assigned to ward storage.</p> <p>Reports shall include:</p> <ul style="list-style-type: none"> • equipment ID • equipment type • ward, location • time in ward storage

Req. ID	Requirement
SRP-125	<p>The RTLS Report Tools shall allow users to generate reports identifying RME (critical and semi-critical) that is assigned to ward storage.</p> <p>Reports shall include:</p> <ul style="list-style-type: none"> • equipment ID • equipment type • ward, location • time in ward storage
SRP-130	<p>The ITS Report Tools shall allow users to generate reports identifying the amount of time RME (critical and semi-critical) is out of service due to repair/upgrade.</p> <p>Reports, shall include:</p> <ul style="list-style-type: none"> • equipment ID • equipment type • date delivered for repair • date returned from repair • repair location, repair vendor • repair history
SRP-135	<p>The RTLS Report Tools shall allow users to generate reports identifying the amount of time RME (critical and semi-critical) is out of service due to repair/upgrade.</p> <p>Reports, shall include:</p> <ul style="list-style-type: none"> • equipment ID • equipment type • date delivered for repair • date returned from repair • repair location, repair vendor
SRP-150	<p>The ITS Report Tool shall allow users to generate work history reports that provide scheduling and work data for supervisors or work leaders to allow equitable staffing assignments ensuring that staff can function in all roles within SPS operations.</p>

2.6.10 Graphical User Interface (GUI) Specifications

RTLS provides a browser-based user interface used to access the querying and reporting functionalities. Additional features can be accessed by System Administrators and other designated users for accessing maintenance and monitoring functionality.

2.6.11 General Display Requirements

Req. ID	Requirement
GUI-010	The RTLS UI shall be web-based.
GUI-030	The system shall display functions based on users Role and access levels.
GUI-040	The RTLS UI shall prevent users from viewing functionalities, features and data that they are not authorized to view based on their role.
GUI-050	The RTLS UI shall provide the capability to customize the user view with functionality such as lists, maps, dashboard views, location of items on screen, and favorite reports.
GUI-060	The RTLS UI shall store the User's preferred view and display that view upon login.
GUI-070	The RTLS UI shall log out users after a user-defined length of inactivity.
GUI-080	The inactivity period timeout shall be a value that is configurable per class of user, or system-wide by the System administrator.
GUI-090	Large, wall-mounted RTLS display monitors shall be HIPAA-compliant.

2.6.12 RTLS Display

2.6.12.1 Map Display

RTLS Map Display refers to the computer monitor image depiction of geographical or facility features for purposes of determining a physical location of an RTLS tag.

Req. ID	Requirement
MAP-010	The RTLS shall provide the ability to display tagged items on a map view at floor level.
MAP-020	The RTLS shall provide selectable and customizable viewing options for users.
MAP-030	The RTLS shall have a customizable user interface based upon class of user (standard, power, System Administrator).
MAP-040	The RTLS shall retain a user's last view, which includes personal preferences as associated with a user.
MAP-050	The RTLS initial display at the initiation of a new session shall be user-configurable.

Req. ID	Requirement
MAP-060	The RTLS shall offer a method for time-lapse location monitoring with a playback mode for equipment movement in report and graphical views.
MAP-070	The duration of RTLS location history shall be configurable by the VA based on the category of the tagged item.
MAP-080	The RTLS shall provide a graphical map display with search capabilities based on asset type or Identification (ID) number.
MAP-090	The RTLS user map views shall be based on access privileges associated with individual user profiles.

2.6.12.2 Alert Display

RTLS Alert Display refers to the computer monitor image depiction of the passive (user-initiated) reporting of system status, condition, or tag location.

Req. ID	Requirement (PWS 6.3.1.7)
ALD-010	The RTLS shall display warning alerts on the map or list view for a specified area in the location hierarchy.
ALD-020	The RTLS shall have the ability to display alerts by priority, normal or urgent, in chronological order from newest to oldest.
ALD-030	A user shall have the ability to sort the list view of alerts by status.

2.6.12.3 Help Functionality

RTLS will provide a help functionality as specified in the following table:

Req. ID	Requirement
HFD-010	The RTLS shall have a searchable help function accessible to all users.

2.7 Performance Specifications

The performance requirements for the facility based RTLS is a function of the facility.

With varied facility types and diverse facility specific requirements, the RTLS performance requirements are expected to be defined on a facility level. General latency requirements for user response times are outlined here.

Req. ID	Requirements
PERF-040	<p>The RTLS shall provide the following response times based on 1000 concurrent users:</p> <p>Under 3 seconds To navigate WebPages</p> <p>Under 5 seconds To retrieve query results</p> <p>Under 8 seconds To display maps and imagery</p> <p>Under 5 seconds Navigate screens within RTLS UI</p>

2.8 Quality Attributes Specifications

The primary quality attributes concerns that have been defined for the RTLS has been regarding the reusability of the databases for other future purposes. RTLS databases, at both the national and local level, are likely to be used for studies and reports that are outside the current scope of the RTLS functionality itself. In order to best meet those needs, and to support portability and reusability, the databases need to be open for access to third party users / developers that wish to mine the data for clinical studies and other purposes. The following requirements outline the needs from that perspective.

Req. ID	Requirement
QAS-010	The RTLS shall be designed in a modular fashion such that the analytical, querying, and reporting functionalities can be replaced without requiring changes to the other components or any changes to the data model and database.
QAS-021	The RTLS databases shall be accessible to third party applications.
QAS-022	The RTLS database shall grant read and/or write access to third party applications based on authorization.
QAS-030	The RTLS shall provide an ICD for access by authorized third party applications.
QAS-040	The RTLS shall provide APIs to facilitate the integration of the RTLS with other VA applications.
QAS-050	For data fields requiring translation, the RTLS shall ensure 100% accuracy of the translation per the defined mapping for that field.

2.9 Reliability Specifications

Req. ID	Requirement
REL-010	The RTLS shall maintain 99% uptime year-round.
REL-040	The RTLS shall require no more than 8 hours of maintenance per month. Servicing and maintenance is expected to occur on the weekends during periods of least usage.

2.10 Scope of Integration

The primary scope of integration for the RTLS System covers a wide variety of VA systems.

- VistA – VistA is a large suite of applications that include clinical, fiscal, quality management and administrative software. Interfaces to the VistA systems will use XML based messages.
 - AEMS-MERS
 - IFCAP/CAP
 - Scheduling
 - Patient
 - Employee
- CART-CL - Cardiovascular Assessment Reporting and Tracking (CART) is a software application for standardized report generation, national SQL data repository, and national quality improvement program for VA Catheterization labs. The Interface into the CART-CL systems will use SQL.
- Existing RTLS Systems (Sonitor, Versus, Ekahau, Aeroscout, etc.) - These systems are the existing legacy RTLS systems that are in place throughout the various facilities. The existing RTLS Systems can use a variety of messaging standards such as XML, HL7, JMS, or TCP-IP.
- CDW – The Corporate Data Warehouse will house the NDR. The NDR is a system that provides a sophisticated nationwide business intelligence, predictive analytics, and reporting purposes of all the VA RTLS systems. The data aggregation into the NDR from the VISN/CMOP level RTLS Common Data will be FTP.
- Hemodynamic Monitoring System - Hemodynamic monitoring systems that allow users (Nurses) the ability to monitor patient progress through real-time procedure notes charting continually keeping clinical records up-to date. The interface from the local facility RTLS System to the Hemodynamic Monitoring System will be HID.
- Other Future Systems such as Maximo – A variety of message formats and protocols can be supported for future integrations such as (s)FTP, XML, Http(s), etc.

The secondary scope of integration of the NDR is to aggregate data from all of these RTLS local systems into one aggregated view of the data, or a subset of the data, for national queries and data mining.

Currently, the actual physical architecture can take many forms. The following figures assume an infrastructure where there are local, VISN level and national assets involved in the RTLS system. The final configurations are design dependent and to be supplied by the vendor.

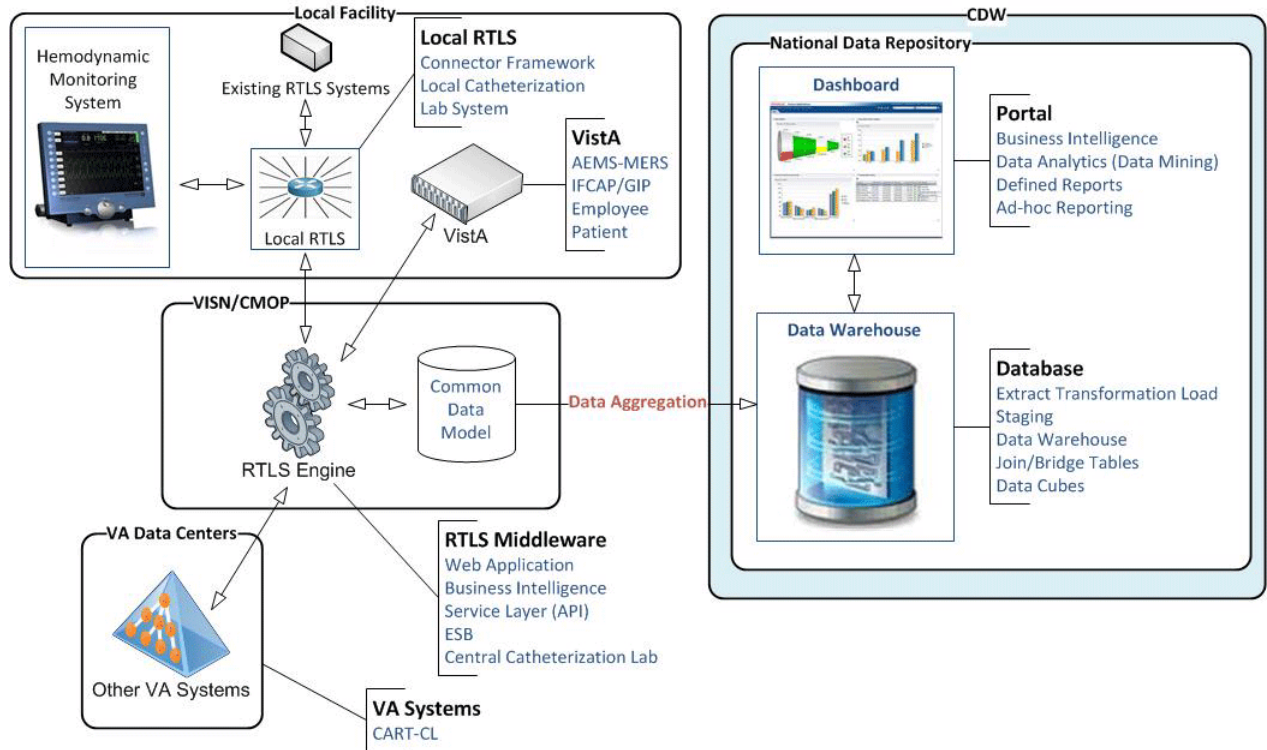


Figure 3 RTLS VISN Deployment Scope of Integration

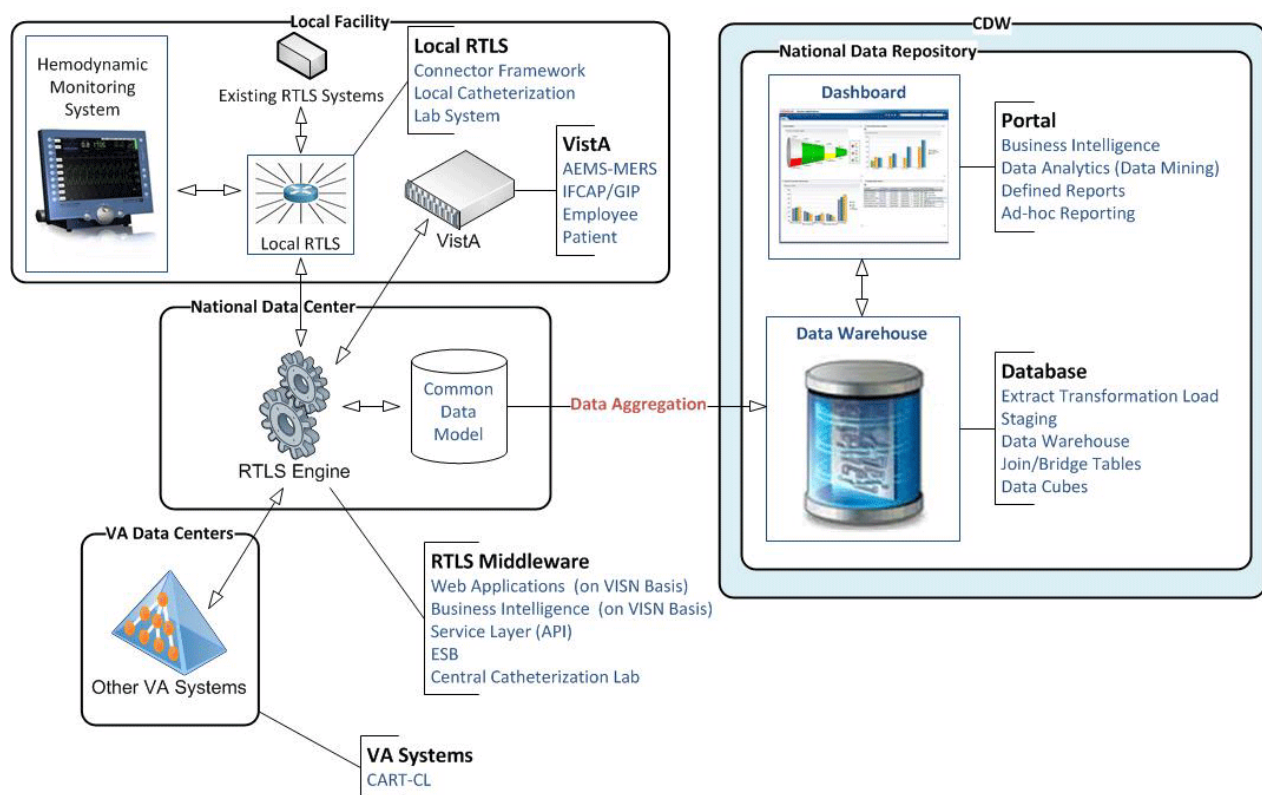


Figure 4 RTLS National Deployment Scope of Integration

2.11 Security Specifications

As a system that tracks equipment, personnel, and possibly patients in the future, RTLS requires access controls, data protection, and authorization so as to allow only authorized users access to the data.

Req. ID	Requirement
SEC-010	The RTLS shall utilize VA's Active Directory for user authentication.
SEC-020	The RTLS user authentication shall be provided through a Single Sign-On (SSO) with the existing VA Microsoft Active Directory servers so that the user will not have to provide a second/different Account/Password upon launching the RTLS application.
SEC-030	The RTLS shall provide a configuration GUI that links RTLS application functionality to the VA's Active Directory Domains/Organizational Units/Groups.
SEC-040	The RTLS shall provide the capability to assign user access to the client software using the VA's Active Directory service.
SEC-050	The RTLS shall provide hierarchical access to RTLS functionality for users through assigning role-based group privileges to the VA's Active Directory Domains/Organizational Units/Groups.

Req. ID	Requirement
SEC-060	The System Administrator and other designated users shall have the capability to grant access to RTLS and set user privileges.
SEC-070	The RTLS shall maintain an audit trail of who has accessed files and the time and date of when files were accessed, edited, or deleted.
SEC-080	The RTLS shall also detect and track attempts at unauthorized access to the system.
SEC-090	The RTLS shall have the capability of sending immediate alerts for certain security incidents as specified by the system administrator.
SEC-110	The RTLS shall use encrypted e-mail when distributing reports.
SEC-120	The RTLS Interface shall provide access controls for all connections. This authorization shall be configurable by the System Administrator.
SEC-130	Only authorized VA Systems shall be able to connect to the RTLS. This authorization shall be configurable by the System Administrator.
SEC-150	The RTLS Interface shall provide a secure mechanism for data transfer between the RTLS and all other systems.
SEC-160	The RTLS shall comply with all applicable VA security standards and best practices.

2.12 System Features

Refer to Section 2.1 of the SDD for a list of system features and their descriptions.

2.13 Usability Specifications

One of the primary user interfaces for the RTLS systems revolves around the capability to generate queries and reports, and for power users the ability to modify the business intelligence and predictive analytics portion of the RTLS. As such, the usability specifications revolve around the time required to train on the specifics of those interfaces.

Req. ID	Requirement
USA-010	The RTLS Querying/Reporting functionality shall require no more than 8 hours of user training.
USA-020	The RTLS Business Intelligence functionality shall require no more than 8 hours of user training.
USA-030	The RTLS Predictive Analytics functionality shall require no more than 16 hours of user training.

3 Applicable Standards

The following lists the standards that are applicable to the software components of RTLS.

1. Federal Information Processing Standard (FIPS) 140-2. FIPS can be found at <http://www.itl.nist.gov/fipspubs/>
2. 44 U.S.C. § 3541, “Federal Information Security Management Act (FISMA) of 2002”
3. Federal Information Processing Standard (FIPS) FIPS Pub 201, “Personal Identity Verification of Federal Employees and Contractors,” March 2006
4. Department of Veterans Affairs (VA) Directive 0710, “Personnel Suitability and Security Program,” June 4, 2010 ([REDACTED] in the Security Library)
5. 36 C.F.R. Part 1194 “Electronic and Information Technology Accessibility Standards,” July 1, 2003
6. VA Directive 6500, “Information Security Program,” August 4, 2006 ([REDACTED] in the Security Library)
7. VA Handbook 6500.6, “Contract Security,” March 12, 2010 [REDACTED] in the Security Library)
8. Technical Reference Model (TRM) (reference Contractor Library at [REDACTED] p
9. EPC Global Tag Data Translation v1.4
http://www.gs1.org/sites/default/files/docs/tdt/tdt_1_4-standard-20090610.pdf
10. EPC Global UHF Class 1 Gen 2 Standard v. 1.2.0
http://www.gs1.org/sites/default/files/docs/uhfclg2/uhfclg2_1_2_0-standard-20080511.pdf
11. EPC Global Low Level Reader Protocol Standard v1.0.1
http://www.gs1.org/sites/default/files/docs/llrp/llrp_1_0_1-standard-20070813.pdf
12. EPC Global Discovery Configuration & Initialization Standard v1.0
http://www.gs1.org/sites/default/files/docs/dci/dci_1_0-standard-20090610.pdf
13. EPC Global Reader Management Standard v1.0.1
http://www.gs1.org/sites/default/files/docs/rm/rm_1_0_1-standard-20070531.pdf
14. EPC Global EPC Information Services Standard v1.0.1
http://www.gs1.org/sites/default/files/docs/epcis/epcis_1_0_1-standard-20070921.pdf
15. EPC Global Application Level Events Standard v1.1.1
http://www.gs1.org/sites/default/files/docs/ale/ale_1_1_1-standard-core-20090313.pdf
16. http://www.gs1.org/sites/default/files/docs/ale/ale_1_1_1-standard-XMLandSOAPbindings-20090313.pdf
17. 44 U.S.C. § 3541, “Federal Information Security Management Act (FISMA) of 2002”
18. Federal Information Processing Standards (FIPS) Publication 140-2, “Security Requirements For Cryptographic Modules”
19. FIPS Pub 201, “Personal Identity Verification of Federal Employees and Contractors,” March 2006
20. Software Engineering Institute, Software Acquisition Capability Maturity Model (SA CMM) Level 2 procedures and processes
21. U.S.C. § 552a, as amended, “The Privacy Act of 1974”
22. VA Directive 6102, “Internet/Intranet Services,” July 15, 2008

23. OMB Circular A-130, "Management of Federal Information Resources," November 28, 2000
24. VA Handbook 6500, "Information Security Program," September 18, 2007
25. VA Handbook, 6500.5, Incorporating Security and Privacy in System Development Lifecycle.
26. VA Handbook 6550, "Pre-procurement Assessment for Medical Devices", [viewPublication.asp?Pub_ID=361&FType=2](#)
27. National Institute Standards and Technology (NIST) Special Publications
28. An Introductory Resource Guide for Implementing the Health Insurance Portability and Accountability Act (HIPAA) Security Rule, March 2005
29. VA Handbook 7002, Logistics Management Procedures, July 10, 2009
30. An Introductory Resource Guide for Implementing the Health Insurance Portability and Accountability Act (HIPAA) Security Rule, March 2005
31. Sections 504 and 508 of the Rehabilitation Act (29 U.S.C. § 794d), as amended by the Workforce Investment Act of 1998 (P.L. 105-220), August 7, 1998
32. Program Management Accountability System (PMAS) Guide V2.1, June 28, 2011
33. International Organization for Standardization (ISO) 9000 – Quality Management http://www.iso.org/iso/iso_catalogue/management_and_leadership_standards/quality_management.htm
34. International Organization for Standardization (ISO) 9001:2008 http://www.iso.org/iso/iso_catalogue/management_and_leadership_standards/quality_management/iso_9001_2008.htm
35. International Organization for Standardization (ISO) IWA 1:2005 - ISO 9000 Improved Guidelines for Health Sector http://www.iso.org/iso/iso_catalogue/management_and_leadership_standards/specific_applications/specific-applications_health.htm
36. International Organization for Standardization (ISO) 13485:2003 - Health Care and Medical Devices
37. http://www.iso.org/iso/iso_catalogue/management_and_leadership_standards/specific_applications/specific-applications_medical.htm
38. International Organization for Standardization (ISO) 13485:2003 Quality Management Systems for the Medical Device Industry http://www.iso.org/iso/iso_catalogue/management_and_leadership_standards/specific_applications/specific-applications_medical.htm

4 Interfaces

The VA maintains numerous databases which may interface with the RTLS System at the local, VISN, and/or national level. In some instances, databases may be deployed locally within some facilities, or be shared regionally among multiple facilities. For example, AEMS/MERS is typically deployed as separate databases at a facility level, however 2 VISNs deploy it at a VISN level. RTLS needs to provide a flexible system architecture that can accommodate numerous interfaces at potentially multiple levels in the architecture.

4.1 Hardware Interfaces

The RTLS system is composed of a number of hardware components including tags, tag readers, specialized displays and other hardware components. All of these items are to be supplied by the vendor as one enterprise RTLS system. As such, those hardware component's data sheets can be found in the SDD.

In addition, interfaces to facility-based hardware (such as public announcement systems, security systems, elevator controls, door controls, etc.) are all facility-dependent. As such, they are beyond the scope of this RSD and will be defined as required in specific task orders.

There are no other known hardware interfaces at this time.

4.2 Software Interfaces

While the hardware interfaces are heavily design dependent, the software interfaces within the VA facilities is a well-known quantity and are outlined in this section of the requirements.

Req. ID	Requirement
SFI-010	The RTLS shall provide a bi-directional interface for data exchange with AEMS-MERS.
SFI-020	The RTLS shall provide a bi-directional interface for data exchange with the Generic Inventory Package (GIP).
SFI-030	The RTLS shall provide a uni-directional interface for data exchange with CART.
SFI-040	The RTLS shall provide a bi-directional interface for data exchange with the VistA Patient File (a file within VistA Patient Information Management System [PIMS]).
SFI-060	The RTLS shall provide a bi-directional interface for exchange of employee data with VA employee data system.
SFI-070	The RTLS shall provide a uni-directional interface for data exchange with commercial hemodynamic systems used in cardiac catheterization labs.

5 Legal, Copyright, and Other Notices

Ownership of all RTLS data remains with VA and the Contractor shall allow VA to migrate any and all RTLS data to another contractor's system at the end of this contract, should VA so choose. There shall be no fees associated with the right to export/copy VA data from Contractor's database and there shall be no requirement for this function to be performed by Contractor's staff (i.e., VA staff may export the data, if VA so chooses). Upon request, the Contractor shall provide VA staff with instructions on how to export the data, at no additional cost to the Government.

6 Purchased Components

For RTLS, the intent is to procure a single national RTLS system that may contain niche RTLS systems that will be integrated to fully satisfy the varying needs of the different applications. In this instance, the requirements associated with the purchased components has to do with licensing.

Req. ID	Requirement
PUR-010	The RTLS shall provide the capability to assign user access to the client software, without any restrictions on the number of users granted access and the number of locations/machines that it can be accessed from (enterprise license).

7 User Class Characteristics

There are three primary classes of users that shall be using the RTLS.

Managers and others that will be utilizing the system to provide insight into business processes. These users will typically be running pre-generated reports or queries, and will not likely have a need to modify or customize their queries/reports after they are first generated.

The second class of user is the power user. The power user will have access to the underlying analytics functionality and will frequently be generating custom queries and business analysis rules. They are primarily interested in mining new insights from the data. As such, they will need to know how to generate the complex queries and implement the analysis rules. They may also be involved in connecting new data mining tools either directly to the database, or through the vendor-supplied API.

The System Administrator and other designated users shall have system administration rights to the system, and will primarily be concerned with maintaining the system and ensuring optimal performance from the system. They may also be involved in configuring connections to new systems in the future, as well as updating the RTLS Data Model.

8 NDR Increment 1

8.1 Documentation Specifications

- **RTLS Enterprise Data Architecture Specification** – Updates to the EDA to include the NDR architecture.
- **RTLS NDR ICD** – The ICD will specify how data from each of the RTLS source systems is extracted, transformed, and loaded into the NDR.
- **RTLS VISN SDD** – Update the VISN level software design document to include the design of the NDR.
- **RTLS National SDD** – Update the National level software design document to include the design of the NDR.
- **NDR Use Case Specification** – A set of scenarios that include common actors and the interaction between the NDR and the actor.
- **RTLS National RSD** – Update the RSD to include the NDR requirements.
- **NDR Master Test Plan** – Test plan for NDR Increment 1.
- **NDR Requirements Traceability Matrix** – The NDR Requirements Traceability Matrix provides a correlation between the NDR functional requirements and the test scripts.

8.2 Contractual Requirements

This section includes requirements that are high-level and provide contract-level direction. These requirements will typically be verified by inspection or analysis.

Req. ID	Requirement
NSW-010	The Contractor shall develop, install, configure, and test the NDR solution within the Corporate Data Warehouse (CDW).
NSW-020	The contractor shall develop an interface for connecting RTLS databases to the NDR and transferring information.
NSW-031	The NDR solution shall utilize existing CDW hardware.
NSW-032	The NDR solution shall utilize approved TRM software.
NSW-050	The NDR task order shall be proposed as a performance based Firm Fixed Price (FFP) contract.
NPD-010	The Contractor shall provide a single point of contact (Implementation Manager) to oversee the overall RTLS implementation for the NDR.
NPD-020	The Contractor Implementation Manager shall be responsible for: <ul style="list-style-type: none"> Effectively communicating the project progress to VA and Contractor team members. Ensuring proper documentation is delivered to VA. Coordinating, escalating, and resolving Contractor-related project issues. Representing the Contractor in status meetings and providing timely status reports.
NPD-030	The Contractor shall conduct a project kick-off meeting after Task Order (TO) award to introduce the Government team to the Contractor's overall operating plans and approach to the NDR TO.
NPD-040	At the kick-off meeting, the Contractor shall present a draft Contractor Project Management Plan (CPMP) for review with the government.
NPD-050	The Contractor shall update the CPMP based on the outcomes of the kick-off meeting.
NPD-060	The Kick-Off meeting shall be held via a virtual meeting.
NPD-070	The Contractor shall provide Kick-Off Meeting Briefing Materials and Kick-Off Meeting Minutes after the Kick-Off Meeting.
NPD-080	The Contractor shall produce a CPMP which includes the approach, timeline and tools to be used in execution of the contract.
NPD-090	The CPMP shall be updated and amended as outlined in the deliverables table under Section B of the NDR TO.
NPD-100	The Contractor shall update and maintain the COR-approved CPMP throughout the period of performance.

Req. ID	Requirement
NPD-110	The CPMP shall include a Work Breakdown Structure.
NPD-111	The CPMP shall include a Work Breakdown Structure Dictionary.
NPD-112	The CPMP shall include a comprehensive Project Schedule including milestones and deliverable dates for the deployment of the NDR.
NPD-113	The CPMP shall include a Risk Management Plan.
NPD-114	The CPMP shall include a Quality Management Plan.
NPD-115	The CPMP shall include a Communications Management Plan.
NPD-116	The CPMP shall include a Product Support Plan.
NPD-117	The CPMP shall include a Change Management Plan.
NPD-118	The CPMP shall include a Life-cycle Management Plan.
NPD-119	The CPMP shall include an End of Contract Transition Plan.
NPD-120	The CPMP shall include an RTLS Configuration Management Plan.
NPD-130	The Contractor shall provide an Integrated Master Schedule (IMS) in Microsoft Project format.
NPD-140	The IMS shall contain the activities necessary to complete the NDR as well as the interdependencies with other task orders.
NPD-150	The IMS shall be updated and amended as outlined in the deliverable schedule under Section B.
NPD-160	The Contractor shall conduct in-process review meetings on a biweekly basis utilizing the updated CPMP to update VA on Contractor project status, schedule, risks, risk mitigation, issues and issue resolution plans.
NPD-170	The Contractor shall submit a monthly progress report to include completed activities for the reporting period.
NPD-171	The Contractor shall submit a monthly progress report to include planned activities for the next reporting period.
NPD-172	The Contractor shall submit a monthly progress report to include tracking of current issues and risks.
NDD-010	The Contractor shall document NDR usage within a Use Case Specification document.
NDD-020	The Contractor shall update the RSD that was provided under the ESE TO.
NDD-021	The Contractor shall create the NDR RTM.
NDD-030	The Contractor shall update the RSD and RTM based on the use cases and the NDR requirements outlined in the NDR TO.
NDD-040	The Contractor shall update and maintain the COR-approved RSD and RTM throughout the period of performance.

Req. ID	Requirement
NDD-050	The Contractor shall deliver the requirements package consisting of Use Case Specifications, RSD updates, and RTM.
NPP-010	Efforts under the NDR task order shall be performed at the Contractor facilities.
NEF-020	The NDR solution shall be capable of running on and exporting information from the standard VA desktop.
NEF-030	The workstations shall be delivered as a signed .msi package and updates shall be delivered in signed .msp file formats for deployment using System Center Configuration Manager (SCCM), VA's current desktop application deployment tool.
NED-021	The Contractor shall evaluate existing data related to the RTLS Applications and document this in a CDW Sources Report to include: <ol style="list-style-type: none"> 1. Asset Tracking 2. Cath Lab 3. Sterilization Process Workflow 4. Temperature Monitoring
NED-022	The CDW Sources report shall include the data's application, domain, primary and foreign keys, server location, whether it is an authoritative source, and a contractor recommendation as to its value to RTLS.
NED-023	The contractor shall provide the CDW Sources Report at VA's direction whenever additional data is added to CDW related to the RTLS applications.
NDH-010	The Contractor shall design an NDR solution to include the software, hardware, and engineering services that can satisfy the functional requirements.
NGR-020	The NDR shall utilize Non-Developmental Items (NDI), COTS and Government-Off-the-Shelf (GOTS) products.
NGR-050	For interface design and development to the NDR, once the interface between the RTLS databases and the NDR is developed and accepted by the Government, the Government shall have unlimited reuse rights of that interface without incurring re-use or licensing fees associated with subsequent deployment of the interfaces.
NSD-010	The Contractor shall assess the data needs of the NDR, and develop a solution that optimizes bandwidth utilization and minimizes processing requirements on RTLS systems while ensuring the required data is available at the NDR in a timely fashion.
NBI-020	The Contractor shall determine whether Intelligent InSites can be used at a national level as an additional tool within the CDW for meeting the requirements of the NDR.
NED-040	The Contractor shall assess the feasibility of incorporating VISN 10 RTLS data into the NDR architecture.

Req. ID	Requirement
NED-041	The Contractor shall assess the feasibility of incorporating VISN 11 RTLS data into the NDR architecture.
NSA-010	The Contractor shall integrate the NDR with existing CDW software for system administration and maintenance.
NSA-020	For any portions of the NDR using non-CDW software, the Contractor shall provide system administrator roles and system administrator tools for managing the system.
NHD-010	The Contractor shall follow guidance from the Office of Information and Technology Continuity of Operations handbook 0320.1 dated July 22, 2009.
NSD-030	The Contractor shall define the end-to-end architecture (from facility level through enterprise level with the NDR) required to meet the NDR requirements.
NSD-040	The Contractor shall update and maintain the COR-approved SDD throughout the period of performance.
NSD-050	The Contractor shall document the system design.
NSD-060	The system design shall include system schematics, including system and subsystem performance-based descriptions, and key interfaces between them and bandwidth requirements required for data transport.
NSD-061	The system design document shall include bandwidth requirements to cover the initial NDR deployment, as well as address anticipated growth of data requirements over five years.
NSD-062	The system design shall define hardware and software specifications to include: size, weight and power (SWAP) requirements, performance requirements, systems and subsystem, interface requirements, and systems control requirements.
NSD-063	The system design shall include SWAP requirements for the current state and show scalability for future growth.
NSD-064	The system design shall specify the software being utilized to achieve the NDR requirements, and how it will be integrated to form a cohesive platform for business intelligence and analytics.
NSD-065	The system design shall apply software development processes of, or equivalent to, the stated Institute of Electrical and Electronics Engineers (IEEE) Standards, or the Software Engineering Institute (SEI) Capability Maturity Model (CMM), Level III or higher.
NSD-066	The system design shall comply with the risk management plan, identifying, assessing, and documenting risks associated with NDR development.
NED-010	The Contractor shall design the NDR data architecture such that all data being collected at the local RTLS instances can be sent to the NDR for analysis.

Req. ID	Requirement
NED-070	The Contractor shall update the Enterprise Data Architecture document that was developed under ESE TO with NDR specific data architecture updates.
NED-080	The Contractor shall comply with Section 5.2.2 of the ESE Task Order RTLS Enterprise Systems Engineering VA118A-12-D-0025 / VA118A-12-J-0125 (Modification P0001 dates 12/21/12) when updating the Enterprise Data Architecture.
NED-090	The Contractor shall update and maintain the COR-approved Enterprise Data Architecture document throughout the period of performance.
NDP-010	The Contractor shall ensure the requirements, design, and data architecture developed are followed for the development/deployment of the NDR.
NDP-020	The NDR development and test and initial production environments in the CDW shall use existing CDW servers. Additional hardware will be required as the NDR expands.
NDP-040	The Contractor shall work with CDW personnel on any required software installations and configurations.
NDP-050	The Contractor shall assist CDW personnel to add the NDR content to the CDW Continuity of Operations Plan (COOP)/Disaster Recovery Plan (DRP).
NDP-060	The Contractor shall comply with the requirements listed in section 5.1.2 of the Base RTLS IDIQ PWS VA118A-12-D-0025 (version 1.0 dated June 1, 2012) regarding COOP/ DRP.
NDP-070	The Contractor shall assist the CDW to establish the NDR enclave within the CDW.
NFT-020	The Contractor shall create a Pre-production User Functionality Test Plan for demonstration of the NDR functionality, connectivity and performance.
NFT-030	The Contractor shall ensure connectivity between the NDR and the selected facility-based RTLS databases.
NFT-050	The Contractor shall deliver initial software source code for the NDR to the COR.
NFT-060	The Contractor shall develop a set of Pre-production Outcome-Based Test Metrics for approval by the COR.
NFT-080	Upon approval of the Pre-production User-Functionality Test Plan, the Contractor shall execute the User Functionality Test with VA RTLS subject matter expert observation.
NFT-090	The Contractor shall collect user feedback and report all issues resulting from the UFT.

Req. ID	Requirement
NFT-100	At the completion of the user functionality test, the Contractor shall prepare a Pre-production User-Functionality Test Report.
NFT-110	The Pre-production User-Functionality Test Report shall include the outcome of the User Functionality Test to include queries, reports and analysis, assessment of issues encountered, lessons learned, actions needed and overall NDR performance during the test period.
NFT-120	The Contractor shall ensure all test results, as outlined in the Pre-production User-Functionality Test Plan, are successful prior to submitting the test report.
NFT-130	The Contractor shall prepare and deliver the IOC Entry Request in support of RTLS NDR readiness capability prior to the IOC Entry meeting.
NOC-010	The Contractor shall follow all ProPath and PMAS guidelines for Initial Operating Capability (IOC) and Full Operating Capability (FOC) (also known as VA National Release) of the NDR.
NOC-030	The Contractor shall support a ten (10) day error free IOC, unless COR provides written approval of a lesser time.
NOC-040	The Contractor shall resolve and track all defects, as well as address all issues and questions identified during the IOC evaluation.
NOC-050	For each defect identified, the Contractor shall log the defect, identify a resolution for the defect, and provide a Defect Resolution Plan.
NOC-060	The Defect Resolution Plan shall include a timeline for resolution, and document the impacts to the existing schedule, software code, and documentation.
NOC-070	Following COR approval of the plan, the Contractor shall execute the approved Defect Resolution Plan.
NOC-080	Until the COR approves that the defect has been resolved, the Contractor shall provide a status of the defect resolution at the weekly RTLS NDR Integrated Product Team (IPT) meeting.
NOC-090	At the completion of each defect correction, the Contractor shall make delivery of any updates to the Software Source Code, coordinate the installation of the software update into the test site production accounts, and deliver updated documentation.
NOC-100	After any defect correction in IOC, the updated Software Source Code shall remain in the production account for an additional five (5) days error free.
NOC-110	The Contractor shall deliver the updated Initial Operating Entry Request and Exit Summary within five (5) days of the successful completion of IOC.

Req. ID	Requirement
NOC-120	The Contractor shall deliver IOC Artifacts to include the Lessons Learned Report, the National Deployment Addendum, the Software Release Request, and updated Software Source Code within ten (10) days of successful completion of IOC.
NOS-030	Any defects identified during the implementation phase shall be addressed in the same manner as defects found during the IOC evaluation.
NOS-040	The Contractor shall update the Enterprise Data Architecture based on any improvements or fixes made to the system for the duration of the project.
NOS-070	The Contractor shall provide operations and maintenance of the NDR system during the implementation phase.
NOS-080	Operations and maintenance shall include system administration, routine maintenance, database maintenance and updates, emergent maintenance, and end user support of the NDR system.
NOS-090	Contractor initiated system outages shall be scheduled two weeks in advance for maintenance and or system upgrades to minimize user disruption, and occur during non-working hours or weekends.
NOS-110	The Contractor shall configure the connections to each RTLS system deployed under the RTLS National IDIQ as it reaches a point in its deployment that it is ready to connect to the NDR.
NOS-122	During the development and implementation of the NDR the contractor shall monitor the performance of the NDR system and report anomalies to the COR when these anomalies are detected.
NST-041	The Contractor shall provide a standard operating procedure by which the contractor identifies and the government approves PHI/PII data elements in the NDR.
NST-042	The NDR shall provide a means to mark contractor identified and government approved PHI/PII data elements in the NDR.

8.3 Solution Guidance

This section identifies requirements that are high-level and provide general design and development guidance to the implementer. These requirements will typically be verified by inspection or analysis.

Req. ID	Requirement
NEF-010	The NDR solution shall support the latest Internet Protocol Version 6 (IPv6) based upon the directive issued by the Office of Management and Budget (OMB) on September 28, 2010 (http://www.cio.gov/documents/IPv6memofinal.pdf).
NEF-040	The NDR workstation software shall be signed through a VA trusted code signing authority such as Verizon/Cybertrust or Symantec/VeriSign.
NEF-050	The Contractor shall ensure and certify that their solution functions as expected when used from a standard VA computer, with non-admin, standard user rights that has been configured using the Federal Desktop Core Configuration (FDCC) and United States Government Configuration Baseline (USGCB) found at http://usgcb.nist.gov/ .
NRY-030	The NDR shall consist of a flexible solution necessary to design a data warehouse using both relational and dimensional data modeling techniques.
NRY-040	The NDR shall be designed to run reports within an appropriate time based on the complexity of the report.
NIR-060	Roles shall be assigned using the “least privileges” concept.
NIR-061	Roles shall range from full access down to view only.
NRY-020	The NDR shall conform to best practices in data warehousing and database design for business intelligence and data mining applications.
NIR-030	<p>The NDR shall support the following user groups:</p> <ol style="list-style-type: none"> 1. Standard Users – users of preconfigured reporting capabilities and simple menu-driven queries. 2. Power Users – users performing complex queries, utilizing business intelligence and predictive analytics capabilities. 3. System Administrator – NDR system maintainer. 4. Data Steward – user responsible for maintaining a data element in the metadata registry. The data steward holds a strong understanding of the VA organization, the RTLS business domain, and the interaction of business processes with data entities and elements.

Req. ID	Requirement
NIR-050	The access levels shall be configurable by VA through role-based group privileges.
NIR-110	The system shall detect and track unsuccessful attempts to access the system.
NSC-050	The Contractor shall ensure all tools associated with the NDR are scalable to support the capacity growth associated with the RTLS national deployment.
NHD-020	The Contractor shall define additional hardware that is required and provide justification for the necessity the additional hardware.
NID-030	The interfaces shall be designed to balance bandwidth utilization versus processing burden on the RTLS systems and the NDR.
NID-070	The synchronization of NDR data shall not affect NDR system performance.
NSD-020	The Contractor shall ensure continuity of operations and disaster recovery considerations are assessed within the design of the NDR.
NED-060	The Contractor shall design the logical and physical data architecture for the NDR.
NFT-011	The NDR test environment must be capable of fully simulating the NDR production environment.
NOS-060	The design of the NDR solution shall not prevent connecting to other (non-RTLS) VA systems.

8.4 NDR Data Warehouse

The repository stores data from RTLS data sources.

Req. ID	Requirement
NRY-010	The NDR solution shall be capable of storing information on all RTLS tagged items.
NRY-070	Modification of the NDR data model shall take no more than two hours to train. Modifications of the data model are defined in the EDA v 9.3, Section 3.4.4.
NRY-080	Applying a modification to the NDR Data Schema, by a System Administrator, shall take no more than an hour to complete.
NRY-090	The NDR shall include access to a VA TRM approved Database Modeler Tool capable of providing a visual representation of the NDR Data Schema.
NRY-101	The NDR Database Modeler Tool capability shall include restricting access to System Administrators and select users.
NRY-102	The NDR Database Modeler Tool capability shall provide a visual inspection of the RTLS Data Model.

Req. ID	Requirement
NRY-103	The NDR Database Modeler Tool shall provide the capability to drill down and navigate from the data model into the actual data.
NRY-104	The NDR Database Modeler Tool capability shall allow modification of the data schema.
NRY-105	The NDR Database Modeler Tool shall warn the user when changes to the schema would have negative effects on the existing data.
NRY-106	The NDR Database Modeler tool shall commit or cancel changes made.
NRY-107	The NDR Database Tool capability shall include being able to change the NDR data schema based on committed changes.
NRY-110	The NDR shall provide an open Application Program Interface (API) for access, such that third party tools can have access to the NDR database(s) with the appropriate authentication credentials.

8.5 NDR Security and User Groups

The NDR requires access controls, data protection, and authorization so as to allow only authorized user's access to the data. User based roles will go from least privileges to highest privileges to access the data.

Req. ID	Requirement
NST-010	Access to NDR shall follow all VA Security Access Standards.
NST-020	The NDR shall only be modifiable by system administrators.
NST-030	The NDR shall utilize VA's Active Directory for user authentication.
NST-043	The NDR shall restrict access to government approved PHI/PII data to authorized users of that data.
NIR-010	The NDR client interface shall utilize Internet Explorer Version 9 or greater.
NIR-040	The NDR shall provide hierarchical access for users.
NIR-070	The NDR shall prevent users from seeing functionalities, features and data that they are not authorized to see based on their role.
NIR-080	The NDR shall remember the user's preferred view and display that view upon login.
NIR-090	The NDR shall log users out after a defined length of inactivity.
NIR-091	The NDR shall be capable of having the inactivity period timeout value be set by the NDR Administrator.
NIR-101	The NDR shall provide the capability to maintain an audit trail of users' access of specific PHI and PII data and the time and date of when that data was accessed.
NIR-102	The NDR shall provide the capability to maintain an audit trail of administrators' access of specific PHI and PII data and the time and date of when that data was accessed, edited, or deleted.

Req. ID	Requirement
NIR-103	The NDR shall maintain access audit trails at the discretion of the VA.

8.6 NDR System Administration Specifications

The NDR will be installed in the VA Corporate Data Warehouse. Once the task order is completed the NDR will be transitioned to the VA. This section documents NDR administration requirements that must be in place for the transition to be completed.

Req. ID	Requirement
NSA-031	The system administration tools shall inspect and maintain the NDR databases.
NSA-032	The system administration tools shall update and maintain the data schemas associated with the NDR database(s).
NSA-033	The system administration tools shall configure data interfaces to legacy, early adaptor and new RTLS systems.
NSA-034	The system administration tools shall create and manage user accounts and access.
NSA-035	<p>The system administration tools shall provide NDR system administrator specific reporting functionalities to include:</p> <ul style="list-style-type: none"> a. Number of users logging in and when. b. Type of content that is accessed by table and column. c. Resource utilization for memory and disk storage. d. Time to complete by report. e. System management functionalities and reports providing information similar to: <ul style="list-style-type: none"> • The details on currently executing user transactions within an NDR database • Historical data about backup and restore actions performed on a NDR database • A history of all committed DDL statement executions with an NDR database • Index usage statistics
NSA-036	The system administration tools shall provide a dashboard depicting the status of the RTLS interfaces and the progress of the extracts.

8.7 NDR Scalability, Capacity, Availability, Reliability, and Hardware Design

The NDR Design will take into account the number of users and future RTLS implementations to be added to the NDR. NDR Maintenance or down time will not hinder the use of the NDR data during business hours.

Req. ID	Requirement
NSC-011	The NDR shall be capable of supporting a minimum of 100 concurrent users.
NSC-012	The NDR shall be able to scale up to at least 500 concurrent users.
NSC-013	The NDR shall be able to support an unlimited number of registered users (no per-user license).
NSC-021	The NDR shall be capable of aggregating all transactional data being produced from the local RTLS instances.
NSC-022	The NDR shall provide the ability to tailor future data aggregation, such that only a subset of the data, and summary data, can be aggregated from the RTLS systems.
NSC-023	The NDR shall provide the capability to archive and purge data.
NSC-030	The NDR solution shall document in the system design document how the solution is scalable to process data from 21 VISNs and 7 CMOPs.
NAR-011	The NDR system shall be available 99% of the time between 7AM and 10PM, Monday through Friday Eastern Standard Time (EST).
NAR-012	The NDR system shall be available before 7AM and after 10PM, Monday through Friday EST and weekends with 95% availability.
NAR-013	The NDR system shall require no more than 4 hours of Contractor scheduled maintenance per month.
NAR-014	The NDR system shall provide the capability to warn the system administrator when a system shutdown is initiated during report generation.
NAR-015	The NDR system shall provide the ability to recover from loss of power to the server(s) without requiring manual intervention.
NAR-016	The NDR system shall provide the capability to restart report generation when the system is brought back online.

8.8 NDR Reporting

This section refers to the reporting tools to be used by the NDR.

Req. ID	Requirement
NBI-010	The NDR solution shall utilize the existing CDW Microsoft SharePoint server to host an NDR user interface.

8.9 NDR RTLS Interface Design

An interface will be designed, developed, and documented for each RTLS source system. The requirements for these interfaces are documented in this section.

Req. ID	Requirement
NID-040	The NDR design shall conform to the CDW interface standards.
NID-050	The NDR design requires periodic synchronization of data; the periodic basis shall be able to be set by the System Administrator.
NID-060	The periodic synchronization of data shall default to be on a 24 hour period, and occur outside of normal operating hours (7AM -10PM, Monday through Friday EST).
NID-090	The design of the NDR shall specify details about timing, connection duration, synchronization methods, and performance of the data exchange.
NID-100	The NDR solution shall provide interfaces from each RTLS component that can be reused.
NID-110	The interfaces shall be configurable such that, as new RTLS systems based on the ESE Task Order (Performance Work Statement Modification P00010 dated 1 May 2014) and v 9.3 of the EDA are deployed, the System Administrator shall be able to configure the connection between the NDR and these new systems, without requiring code modification.
NID-121	The NDR solution shall be designed such that the interfaces provide authentication mechanism between NDR and the RTLS systems.
NID-122	The NDR solution shall be designed such that the interfaces provide an audit of all connection activity to include timestamps, connection attempts, connection success/failure, quantity of data transferred and connection duration.
NID-123	The NDR solution shall be designed such that the interfaces provide mechanisms for assuring data integrity and synchronization of required data from the distant RTLS systems.
NID-124	The NDR solution shall be designed such that the interfaces store the origination of the source data with each RTLS data entry.

8.10 NDR System Design and Enterprise Data Architecture

The NDR solution is a customized solution. The design of this solution and the associated data stores will be created by the contractor. This section lists the requirements that must be met in the design and documentation of that solution.

Req. ID	Requirement
NED-030	The NDR shall be capable of retrieving data from the CDW data sources identified in the CDW Sources Report.

8.11 NDR Increment 1 Development Phase

The NDR will be deployed in the CDW and eventually be maintained by CDW personnel. The contractor will work closely with CDW personnel during Increment 1 to ensure that the NDR is smoothly integrated into the CDW. To perform a successful integration, the contractor must meet requirements that have been defined for this purpose, and those requirements are listed in the following table.

Req. ID	Requirement
NDP-021	The NDR development and test and initial production environments shall not exceed 5TB of storage.

8.12 NDR Pre-Production User Functional Test

UFT will incorporate testing of the data to include connectivity to the RTLS sources, SQL simple query, and the structure of the data model.

Req. ID	Requirement
NFT-040	The system shall exchange data in accordance with the RTLS-NDR ICD.
NFT-071	The Pre-production Outcome-Based Test Metrics shall include technical viability including system reliability, availability of needed functionalities, data integrity, and system quality.
NFT-072	The Pre-production Outcome-Based Test Metrics shall include integration with VA business processes.
NFT-073	The Pre-production Outcome-Based Test Metrics shall include the baseline EDA v9.3. The NDR solution shall use an agile process to make changes to the EDA and gain VA acceptance of those changes.
NFT-074	The Pre-production Outcome-Based Test Metrics shall demonstrate the capability to modify the NDR Data schema.
NFT-075	The Pre-production Outcome-Based Test Metrics shall demonstrate the performance of the system and its ability to scale for future VISN and CMOP deployments.

8.13 NDR Operational Support

The contractor is responsible for support of the NDR during the period of performance of the task order until it is transitioned to the VA. The requirements that define this support and the activities associated with this support are defined in this section.

Req. ID	Requirement
NOS-050	The Contractor shall ensure the Enterprise Data Architecture is provided as reference material that is easily accessible within the NDR.
NOS-121	The Contractor shall provide the ability to monitor the performance of the NDR system, to include network utilization, user loads, storage capacity, and other performance metrics typical of a data warehouse system.

9 Approval Signatures

Signed:

Date:



Director, RTLS Project Management Office
Healthcare Technology Management Office (10NA9)
RTLS Integrated Project Team (IPT) Co-Chair

Signed:

Date:



Chief Healthcare IT Strategist
Office of the Associate Deputy Assistant Secretary
Enterprise Systems Engineering
RTLS Integrated Project Team (IPT) Co-Chair

Signed:

Date:



Product Development (PD)
RTLS Integrated Project Team (IPT) Co-Chair

A. Appendix

Information in the following tables represents future application and requirements in support of subsequent levels in the RTLS solution as development continues on the RTLS project.

These requirements have not yet been vetted, and on-going discussions continue.

Note: The previous “Future NDR Requirements” (currently showing in gray text) will be made obsolete. The Optional Tasks requirements will become future PWS requirements.

Future NDR Requirements

Software Design Requirement

Req. ID	Requirement
NGR-060	For the design and development of the optional reports/workflows/models under this task order, the Contractor shall collaborate with VA to produce multiple rapid prototypes and to perform user testing with VA Subject Matter Experts and the COR to ensure the screens and report designs developed meet the needs of VA.
NGR-070	All training materials developed under this task order shall become the property of the Government and the Government shall have unlimited distribution rights for all training materials without incurring additional fees.

NDR Updated Contractor Project Management Plan

Req. ID	Requirement
NDP-080	The Contractor shall update the CPMP with a Helpdesk Support Approach.
NDP-081	The Contractor shall update the CPMP with a Training Development Plan.
NDP-082	The Contractor shall update the CPMP with a Support Management Plan.
NDP-083	The Contractor shall update the CPMP with a Reporting Methodology for Gathering, Validating and Generating Reports.

NDR Repository Reporting

Req. ID	Requirement
NRV-120	Pre-defined reports shall return results within one minute.
NRV-130	Ad-Hoc reports shall return results within 10 minutes.
NRV-140	Scheduled reports shall return results within 10 hours.

Req. ID	Requirement
NRY-150	<p>NDR capability shall include:</p> <ol style="list-style-type: none"> 1. Ability to join to other tables within the CDW. 2. Maintain information on the sources of all data associated with an item. 3. Retain data history for tagged items and adhere to the Veterans Health Administration Records Control Schedule (RCS10). 4. Establish associations between tagged items. 5. Export functionality that allows the entire database, or subset, to be exported into a standard non-proprietary format that can be consumed by other database tools. 6. Contain a standard backup and restore mechanism with automatic scheduling. 7. Support database replication.

User Based Interface Control

Req. ID	Requirement
NIR-120	The user shall be able to access all NDR reports, queries, and data management from a single user interface.
NIR-130	Access to information and creation of custom workflows and reports shall be limited to users with appropriate access based on their group.
NIR-140	NDR shall present a tailored visualization based on users role and access levels granted to functionalities.
NIR-150	NDR shall provide the capability to customize the user interface based on user preferences regarding lists, maps, dashboard views, location of items on screen, favorite reports and other similar capabilities.

Business Intelligence Capabilities

Req. ID	Requirement
NBI-030	The Contractor shall emphasize ease of use and human factors principles in the design of all reporting tools.
NIB-040	SharePoint NDR users shall be able to create dynamic and interactive dashboards displaying the right information from sources like Excel, SQL Server Analysis Services, SharePoint lists, and Web page content
NIB-050	The Contractor shall design NDR reporting functionality.
NIB-060	NDR Reporting functionality shall allow users to generate reports for all data available within the NDR.
NIB-070	The mechanisms for displaying NDR report results shall be both tabular and graphical.

Req. ID	Requirement
NIB-080	<p>NDR Reporting capability shall include:</p> <ol style="list-style-type: none"> 1. Report generation based on defined access level by user group or category. 2. Ability to execute reports on demand. 3. Ability to access non-NDR data sets from within CDW into reports. 4. Schedulable report generation (one time or periodic frequencies). 5. Ability to define e-mail distribution lists for reports to be sent to. 6. Ability to select automated report delivery to a distribution list. 7. Ability to report a time of interaction between tags relative to each other (Example: Ability to run a report showing which tags were in the same location at the same time and for how long). 8. Graphical reports to include: time based charts, bar charts, line charts, digital dashboards, and map based displays. 9. Report layout tool for designing data connections and report layout. 10. Ability to export report results. Exported report results shall be in a format compliant with Microsoft Office products (Word/Excel) and PDF formats. 11. Prior to executing a query or report that may require a long processing time, provide a visual indication to the user of the approximate time to execute the query/report and option to cancel execution. 12. For query and report generation that may require a long processing time, provide a visual indication to the user of generation status and/or estimated time to complete. 13. Allow specified staff to generate aggregate reports of lost or stolen equipment by location, equipment type, and value, filtered by facility, VISN, region, and enterprise wide locations. 14. Allow specified staff to generate any of the Asset Tracking reports filtered by facility, VISN (region), and enterprise wide locations. 15. Allow specified staff to generate any of the Catheterization Lab reports filtered by facility, VISN (region), and enterprise wide locations. 16. Allow specified staff to generate any of the Temperature Monitoring reports filtered by facility, VISN (region), and enterprise wide locations. 17. Allow specified staff to generate any of the Sterile Processing Service (SPS) reports filtered by facility, VISN (region), and enterprise wide locations.
NIB-090	<p>The NDR solution shall provide users the ability to create and save ad-hoc report templates, as well as share ad-hoc report templates with other users.</p>

Req. ID	Requirement
NIB-100	<p>The NDR users shall have the ability to perform drill-down searching by multiple filters, to include:</p> <ol style="list-style-type: none"> 1.station number 2.campus-building 3.exterior area surrounding a building 4.floor 5.wings/section 6.room number 7.cubicle/bed 8.day 9.date and/or time range 10.staff job type 11.patient type 12.staff-patient relationship 13.equipment category 14.equipment ownership 15.item type (asset, supply, instrument, etc.) 16.Manufacturer, Vendor, Model Number, Item Number 17.Facility 18.VISN 19.Region 20.Item status
NIB-110	<p>The NDR shall include search capabilities with multiple options to include:</p> <ol style="list-style-type: none"> 1. current and past location 2. item characteristics 3. time in a location 4. relationship / interaction to other tagged items 5. recent alarms or alerts 6. expirations or recent maintenance (if available for item) 7. any other query permitted by the available data
NIB-120	The NDR shall provide the ability to store reports.
NIB-130	Stored reports shall be able to be rerun without re-querying the database.

NDR Reporting Capabilities

Req. ID	Requirement
NRC-010	The Contractor shall develop the NDR Reporting functionality as per section 5.2.3 Software Design Requirements, of the RTLS NDR PWS.

Req. ID	Requirement
NRC-020	<p>The Contractor shall develop the following reports and models prior to the User Functionality Test:</p> <ol style="list-style-type: none"> 1. Five preconfigured reports per application area (Asset Tracking, Cath Lab, Sterile Processing Workflow and Temperature Monitoring). 2. One BI workflow model. 3. One predictive analytics model. 4. One GIS based report

NDR Workflow Analysis

Req. ID	Requirement
NWA-010	<p>The NDR shall provide the following functionality for workflow analysis:</p> <ol style="list-style-type: none"> 1. Define workflows and workflow rules. 2. A graphical user interface that enables an end user to easily create, update and delete workflows. 3. Associate workflow rules with the NDR. 4. Run the workflows against the data within the NDR. 5. Produce queries for records that do not conform to the workflow rules. Data and reports shall be visible to the NDR query/reporting functionality. 6. Allow end user to publish new or updated workflows for use by other users. 7. Execute workflow analysis and reporting at recurring times or on demand. 8. No aspect of running the Business Intelligence tool(s) shall in any way impact the other aspect of the NDR.
NWA-020	<p>The Contractor shall consider ease of use in the selection of the workflow analysis tool(s), so the user can become proficient with using the business intelligence tool(s) with eight hours or less of instructor led training.</p>

NDR Predictive Analytics Tools

Req. ID	Requirement
NPA-010	<p>The Contractor shall utilize the CDW's SAS tool suite that is available within VA Informatics and Computing Infrastructure (VINCI) computing environment to provide predictive analytics and predictive modeling capabilities.</p>

Req. ID	Requirement
NPA-020	<p>The predictive analytical tool shall have the following capabilities:</p> <ol style="list-style-type: none"> 1. An intuitive/easy to use interface with which to build data sets for modeling. 2. Save mining "Sets" (data plus formulas run) as individual files. 3. Auto schedule or auto run a pre-defined set of inquiries on a recurring basis. 4. No aspect of running the predictive analytics system shall in any way impact the business intelligence tools or any other aspect of the NDR. 5. Design, build and implementation of any business rule based on any data element or combination of data elements from the Data Model. 6. Workflows and workflow rules shall be comprised of business rules sequenced ordering of events, timelines, thresholds, and other business process data that typically comprises a workflow. 7. NDR Predictive Analytics Tool shall provide the capability to execute workflow analysis in real-time, periodically, or on-demand. <ol style="list-style-type: none"> a. "Real time" means that data is checked as it is received. b. "Periodically" means on a regular, pre-scheduled interval. c. "On-demand" means one time analysis executed by the user directly. 8. Generate summary data on workflows which can serve as input to the RTLS Reporting capabilities
NPA-030	The Contractor shall demonstrate the ability to limit access to data by creating rules within SAS that are specific to both users and/or user groups.
NPA-040	The Contractor shall demonstrate the ability to extract datasets from the NDR for supplying research groups using SAS desktop applications with NDR data for a specified time period.
NPA-050	The Contractor shall demonstrate mapping to an external asset inventory data source within the CDW, to provide additional details for the analytical data and how it ties into actual VAMC records.
NPA-060	The Contractor shall consider ease of use in the selection of the predictive analytics tool(s), so the user can become proficient with using the predictive analytics tool(s) with 16 hours or less of instructor-led training.

NDR Enterprise Data Architecture

Req. ID	Requirement
NED-050	The Contractor shall analyze the reports being requested in Attachment A – NDR reports.
NED-100	The Contractor shall work with VA subject matter experts and research analysts to determine what queries are most likely to be run frequently and how to configure the NDR database(s) to optimize the reporting of this data as well as provide data structures suitable for general querying.

NDR Geographical Information Systems (GIS)

Req. ID	Requirement
NGS-010	The Contractor shall design the NDR to incorporate ArcGIS (v10) for additional data visualization capability.
NGS-020	The Contractor shall integrate ArcGIS with the NDR such that any NDR data can be visualized using ArcGIS.
NGS-030	In addition, the Contractor shall integrate the GIS capability with a focus on ease of use for the end user and flexibility in creating useful map visualizations.
NGS-040	The Contractor shall implement the GIS capability so the user can become proficient with eight hours or less of instructor led training.

NDR Initial Training Development

Req. ID	Requirement
NTD-010	The Contractor shall provide training and training materials in accordance with the Section 5.9.2 of the Base RTLS IDIQ PWS.
NTD-020	The Contractor shall provide a Training Plan to include training approach, curriculums and training schedule.
NTD-030	The Contractor shall provide training and Training Course Materials for NDR Standard Users, Power Users and Systems Administrators of the NDR.
NTD-040	The training shall include both an overview of the NDR and detailed training on how to manage and operate the NDR.
NTD-050	The Contractor shall develop digital training materials, online computer based training, and video teleconferencing based training material.
NTD-060	The Contractor shall train up to 15 NDR users (to include Standard & Power User and System Administrator) provided by the COR no more than 15 days prior to the User Functionality Test.
NTD-070	The Contractor shall provide NDR Standard User Training Course Materials that contain sufficient detail such that a standard user can become proficient with the data aggregation capability, queries and reports with eight hours of training.
NTD-080	The Contractor shall provide NDR Power User Training Course Materials that contain sufficient detail such that a power user can become proficient with the business intelligence and predictive analytics portions of the NDR with 24 hours of training.
NTD-090	The Contractor shall ensure VA NDR standard and power users are fully trained and capable of utilizing the NDR System.

Req. ID	Requirement
NTD-100	The Contractor shall provide NDR System Administrator Training Course Materials.
NTD-110	The Contractor shall ensure VA NDR System administrators are fully trained and capable of maintaining, including updating, configuring or modifying the NDR System to meet future VA demand.
NTD-120	The Contractor shall demonstrate this capability by having VA NDR System administrator perform these functions during the training session.
NTD-130	The Contractor shall deliver a training package that includes Standard, Power, and System Administrator training course materials.
NTD-140	The Contractor shall review the training material with the VA COR prior to the conduct of the User Functionality Test and incorporate feedback into the initial training materials.

NDR Pre-Production User Functionality Testing (Increment 2)

Req. ID	Requirement
NFT-140	The Contractor shall build upon the NDR test bed developed in Increment 1.
NFT-150	Prior to the User Functionality Test, the Contractor shall ensure the NDR test bed has been configured with reporting capabilities to include Business Intelligence tools, Predictive Analytics tools, and GIS capability.
NFT-160	The Contractor shall create a Pre-production User Functionality Test Plan for demonstration of the NDR reporting functionality and performance.
NFT-170	The Contractor shall ensure the business intelligence tools and predictive analysis tools are accessible over the web and properly configured to access the data in the NDR.
NFT-180	The Contractor shall deliver initial software source code for the NDR.
NFT-190	The Contractor shall develop a set of Pre-production Outcome-Based Test Metrics for approval by the COR.
NFT-200	Upon approval of the COR, the test metrics will be used by VA for functionality testing.

Req. ID	Requirement
NFT-210	<p>The Pre-production Outcome-Based Test Metrics shall include the following domains:</p> <ol style="list-style-type: none"> 1. Technical viability including system reliability, availability of needed functionalities and system quality. 2. Integration with VA business processes. 3. Business intelligence, predictive analytics, and GIS capabilities. 4. Compare test, queries and reports against selected RTLS database reports to ascertain data integrity. 5. Test the conformance of the NDR to the RTLS Data Model and standards. 6. Demonstrate the capability to adjust the NDR Data Model. 7. Demonstrate the performance of the system and its ability to scale for future VISN and CMOP deployments.
NFT-220	Upon approval of the Pre-production User-Functionality Test Plan, the Contractor shall execute the User Functionality Test with VA RTLS subject matter expert observation.
NFT-230	The Contractor shall collect user feedback and report all issues. At the completion of the user functionality test, the Contractor shall prepare a Pre-production User-Functionality Test Report.
NFT-240	The Pre-production User-Functionality Test Report shall include the outcome of the User Functionality Test to include queries, reports and analysis, assessment of issues encountered, lessons learned, actions needed and overall NDR performance during the test period.
NFT-250	The Contractor shall ensure all test metrics are met, as outlined in the Pre-production User-Functionality Test Plan, prior to submitting the test report.
NFT-260	The Contractor shall prepare and deliver the IOC Entry Request in support of RTLS NDR readiness capability prior to the IOC Entry meeting.

NDR Initial Operating Capacity (IOC)

Req. ID	Requirement
NOC-130	The Contractor shall perform IOC for the NDR reporting capabilities, as per section 5.4.1.

NDR Operational Support

Req. ID	Requirement
NOS-160	The Contractor shall provide the same operational support activities as per section 5.4.2.
NOS-170	The Contractor shall also monitor performance of the NDR reporting to include user interface latencies, and latency of report generation.

Req. ID	Requirement
NOS-180	The Contractor shall provide help desk support for the NDR as part of the help desk services outlined in section 5.10.1 of the Base RTLS IDIQ PWS.
NOS-190	The Contractor shall ensure that Final Software Source Code delivery and documentation includes all defect resolutions before final contract completion.

NDR User Manuals

Req. ID	Requirement
NUM-010	The Contractor shall create and deliver NDR COTS Users Manuals for all NDR COTS products.
NUM-011	The Contractor shall create and deliver Supplemental User Manuals covering Querying, Reporting, Business Intelligence and Predictive Analytics aspects beyond what is covered in the COTS Users Manuals.
NUM-012	The Contractor shall create and deliver RTLS NDR Comprehensive System Administration Manual to include instructions for managing accounts, back-ups, inspecting the database, updating the data model and database, updating naming convention, configuring connections, and instructions on all functionality associated with system administration.

NDR User Training

Req. ID	Requirement
NUT-010	The Contractor shall update the training materials and computer based training based on any improvements or fixes made to the system for the duration of the project.
NUT-020	The Contractor shall ensure links to training materials and computer based training be available within the NDR.
NUT-030	The Contractor shall develop NDR Train-the-Trainer Course Materials documenting how to effectively train users on the NDR.
NUT-040	The Contractor shall provide a Train-the-Trainer Training Plan to include training approach, curriculums and training schedule.
NUT-050	The Contractor shall develop both digital and classroom based NDR Train-the-Trainer Course Materials.
NUT-060	The Contractor shall review the NDR Train-the-Trainer Course Material with VA COR and incorporate feedback into the NDR Train-the-Trainer Course Materials.
NUT-070	The NDR Train-the-Trainer Course Material shall be approved by VA prior to scheduling training sessions.

Req. ID	Requirement
NUT-080	The Contractor shall conduct three online training sessions to train standard and power users during the implementation phase.
NUT-090	Each online session shall handle 50 participants.
NUT-100	The Contractor shall ensure VA NDR standard and power users are fully trained and capable of utilizing the NDR System.
NUT-110	The Contractor shall ensure VA NDR System Administrators are fully trained and capable of maintaining, including updating, configuring or modifying the NDR System to meet future VA demand.
NUT-120	The Contractor shall demonstrate this capability by having VA NDR System Administrator perform these functions during the training session.
NUT-130	The Contractor shall conduct a Train-the-Trainer training session to train five VA participants.
NUT-140	The Train-the-Trainer training shall be conducted virtually, utilizing Microsoft Conferencing Live Meeting.
NUT-150	The Contractor shall work with the COR to schedule the dates for the online training events and provide updated the NDR Training Course Materials for Standard User, Power User, and System Administrator.
NUT-160	The Contractor shall deliver a Final Training Package consisting of the Train the Trainer Course Materials, and updated Standard, Power, And System Administrator Training Course Materials.
NUT-170	The Contractor shall conduct System Administrator training session with VA, to handle three participants.

NDR Transition Planning

Req. ID	Requirement
NTP-010	The Contractor shall develop a plan to transition NDR duties to Government staff at the end of the TO Period of Performance (PoP).
NTP-020	The Contractor shall submit a Transition Plan to include: <ol style="list-style-type: none"> 1. Maintenance of all Hardware and Software components of NDR. 2. Processes and procedures for all support scenarios. <ol style="list-style-type: none"> a. Change processes b. Maintenance processes
NTP-030	The Transition Plan for NDR shall be a volume within the CPMP.

NDR VISN 11 and VISN 10 Interface Testing

Req. ID	Requirement
NVI-010	The Contractor shall design the interface for exchange of data between the VISN 11 RTLS system and the NDR.

Req. ID	Requirement
NVI-020	The Contractor shall update the RSD, RTM and applicable sections of the SDD with the requirements and design for the VISN11 – NDR Interface.
NVI-030	The Contractor shall deliver the updated VISN 11 System Design Package (RSD, RTM, SDD).
NVI-040	The Contractor shall develop the interface between the NDR and the RTLS systems in VISN 11.
NVI-050	The Contractor shall develop the interface such that data from VISN 11 can be converted to the NDR's standard data model and be made available within the NDR.
NVI-060	The Contractor shall develop the interface to conform to the CDW interface standards.
NVI-070	The Contractor shall define the specifics of the data exchange to include timing, connection duration, synchronization methods, and performance.
NVI-080	The Contractor shall document the interface specifics for the VISN 11 interface in a NDR-VISN 11 RTLS ICD.
NVI-090	The Contractor shall conduct Interface Functionality Testing between VISN 11 RTLS to the NDR.
NVI-100	The Contractor shall use the NDR test bed environment or configuration indicated in section 5.3.4 to test the VISN11 Interface.
NVI-110	The Contractor shall connect the test bed to a replicated copy of the VISN 11 RTLS system.
NVI-120	The Contractor shall create a VISN 11 Pre-production Interface Test Plan for demonstration of the interface functionality, connectivity and performance.
NVI-130	The Contractor shall develop a set of VISN 11 Pre-production Outcome-Based Test Metrics for approval by the COR.
NVI-140	The Contractor shall test the interface to assure adherence to the NDR-VISN 11 RTLS ICD and the NDR data model.
NVI-150	The Contractor shall demonstrate the VISN 11 RTLS to NDR interface to VA.
NVI-160	The Contractor shall submit a VISN 11 Pre- production Interface Test Report indicating that all test metrics are met, as outlined in the VISN 11 Pre-production Interface Test Plan.
NVI-170	Upon successful completion of the Interface Functionality Test between VISN 11 RTLS and the NDR, the Contractor shall connect the NDR to the production VISN 11 RTLS system.
NVI-180	The Contractor shall support a 10 days error free test with the production system, unless COR provides written approval of a lesser time.

Req. ID	Requirement
NVI-190	The Contractor shall resolve and track all defects, as well as address all issues and questions identified during this time.
NVI-200	For each defect identified, the Contractor shall log the defect, identify a resolution for the defect, and provide a Defect Resolution Plan.
NVI-210	The Defect Resolution Plan shall include a timeline for resolution, and document the impacts to the existing schedule, software code, and documentation.
NVI-220	Until COR approves that the defect has been resolved, the Contractor shall provide a status of the defect resolution at the weekly IPT meeting.
NVI-230	At the completion of each defect correction, the Contractor shall make delivery of any updates to VISN 11 Interface Software Source Code, coordinate the installation of the software update into the VISN 11 production accounts, and deliver updates to any affected documentation (e.g.,: RSD,RTM,SDD,ICD).
NVI-240	After any defect correction, the updated VISN 11 Interface Software Source Code shall remain in the production account for an additional five days error free.
NVI-250	The Contractor shall design the interface for exchange of data between the VISN 10 RTLS system and the NDR.
NVI-260	The Contractor shall update the RSD, RTM and applicable sections of the SDD with the requirements and design for the VISN10 – NDR Interface.
NVI-270	The Contractor shall deliver the updated VISN 10 System Design Package (RSD, RTM, SDD).
NVI-280	The Contractor shall develop the interface between the NDR and the RTLS systems in VISN 10.
NVI-290	The Contractor shall develop the interface such that data from VISN 10 can be converted to the NDR's standard data model and made available within the NDR.
NVI-300	The Contractor shall develop the interface to conform to the CDW interface standards.
NVI-310	The Contractor shall define the specifics of the data exchange to include timing, connection duration, synchronization methods, and performance.
NVI-320	The Contractor shall document the interface specifics for the VISN 10 interface in a NDR-VISN 10 RTLS ICD.
NVI-330	The Contractor shall conduct Interface Functionality Testing between VISN 10 RTLS and the NDR.
NVI-340	The Contractor shall use the NDR test bed environment or configuration indicated in section 5.3.4 to test the VISN10 Interface.

Req. ID	Requirement
NVI-350	The Contractor shall connect the test bed to a replicated copy of the VISN 10 RTLS system.
NVI-360	The Contractor shall create a VISN 10 Pre-production Test Plan for demonstration of the interface functionality, connectivity and performance.
NVI-370	The Contractor shall develop a set of VISN 10 Pre-Production Outcome-Based Test Metrics for approval by the COR.
NVI-380	The Contractor shall test the interface to assure adherence to the NDR-VISN 10 RTLS ICD and the NDR data model.
NVI-390	The Contractor shall demonstrate the VISN 10 RTLS to NDR interface to VA.
NVI-400	The Contractor shall submit a VISN 10 Pre-production Interface Test Report indicating that all test metrics are met, as outlined in the VISN 10 Pre-production Interface Test Plan.
NVI-410	Upon successful completion of the Interface Functionality Test between VISN 10 RTLS and the NDR, the Contractor shall connect the NDR to the production VISN 10 RTLS system.
NVI-420	The Contractor shall support a 10 days error free test with the production system, unless COR provides written approval of a lesser time.
NVI-430	The Contractor shall resolve and track all defects, as well as address all issues and questions identified during this time.
NVI-440	For each defect identified, the Contractor shall log the defect, identify a resolution for the defect, and provide a Defect Resolution Plan.
NVI-450	The Defect Resolution Plan shall include a timeline for resolution, and document the impacts to the existing schedule, software code, and documentation.
NVI-460	Following COR approval of the plan, the Contractor shall execute the approved VISN 10 Defect Resolution Plan.
NVI-470	Until COR approves that the defect has been resolved, the Contractor shall provide a status of the defect resolution at the weekly IPT meeting.
NVI-480	At the completion of each defect correction, the Contractor shall make delivery of any updates to VISN 10 Interface Software Source Code, coordinate the installation of the software update into the VISN 10 production accounts, and deliver updates to any affected documentation (e.g.,: RSD, RTM, SDD, ICD).
NVI-490	After any defect correction, the updated VISN 10 Interface Software Source Code shall remain in the production account for an additional five days error free.

NDR Develop Pre-Configured Reports

Req. ID	Requirement
NCR- 010	The Contractor shall provide 50 NDR Pre-configured Report Templates based on the RTLS Use Cases listed in the RTLS IDIQ PWS and on the reports outlined in Attachment A.
NCR-020	The Contractor shall coordinate with VA in determining the reports to be implemented.
NCR-030	The Contractor shall review the NDR Pre-configured Report Templates with the COR.
NCR-040	Upon agreement from the COR, the Contractor shall implement the NDR Pre-configured Report Templates within the NDR.

NDR Develop Business Intelligence Workflow Models

Req. ID	Requirement
NWM-010	The Contractor shall provide an initial set of Business Intelligence Workflow Models to the COR and RTLS subject matter experts based on the Application Use Cases defined in the Base RTLS IDIQ PWS.
NWM-020	The Contractor shall coordinate with VA in determining the workflows to be implemented.
NWM-030	The Contractor shall update the RSD, RTM, SDD, and EDA based on their analysis.
NWM-040	The Contractor shall deliver these updates as a Workflow Models Design Package.
NWM-050	Upon approval of the COR, Contractor shall provide a final Business Intelligence Workflow Models demonstrating a set of preconfigured workflows within the NDR.

NDR Develop Predictive Analytics Models

Req. ID	Requirement
NPM-010	The Contractor shall define an initial set of models based on the Use Cases defined in the RTLS IDIQ PWS.
NPM-020	The Contractor shall work with VA on defining a set of Pre-configured Predictive Analytic Models based on the Use Cases and the available data.
NPM-030	The Contractor shall update the RSD, RTM, SDD, and EDA based on their analysis.
NPM-040	The Contractor shall deliver these updates as a Predictive Analytics Models Design Package.

Req. ID	Requirement
NPM-050	The Contractor shall provide a final set of Pre-configured Predictive Analytic Models.

ArcGIS NDR Reports

Req. ID	Requirement
NAG-010	The Contractor shall develop five ArcGIS NDR Reports.
NAG-020	The ArcGIS NDR Reports shall be defined based on the reports outlined in Attachment A and input from VA Subject Matter Experts.
NAG-030	The Contractor shall coordinate with VA in determining the ArcGIS NDR Reports to be implemented.
NAG-040	The Contractor shall review the ArcGIS NDR Report with the COR.
NAG-050	Upon agreement from the COR, the Contractor shall implement the ArcGIS NDR Report within the NDR.

NDR Server Procurement

Req. ID	Requirement
NSP-010	Based on the hardware requirements determined in the System Design Document and the CDW specifications below, the Contractor shall procure the required server hardware for the NDR.
NSP-020	The Contractor shall work with the CDW personnel to install the RTLS hardware.

NDR Storage Area Network (SAN) Procurement

Req. ID	Requirement
NSN-010	Based on the hardware requirements determined in the system design and the CDW specifications below, the Contractor shall procure the required SAN hardware for the NDR.
NSN-020	The Contractor shall work with the CDW personnel to install the RTLS hardware.

Obsolete NDR Future Requirements

Disaster Recovery Specifications

Req. ID	FUTURE NDR Requirements
DRS-020	In disaster recovery situations, the NDR shall be restored to full operation within 72 hours.
DRS-070	The NDR shall be designed to facilitate database backups within a corporate data center environment.
DRS-080	The NDR shall be designed to be reloaded from a backup image and placed back into service.
DRS-090	The NDR shall be designed to prevent the loss of data.
DRS-100	The NDR shall be designed to support periodic archiving of data.

RTLS Databases

Req. ID	FUTURE NDR Database Requirements
NDB-010	The NDR shall provide a database for aggregation of data from external systems. External systems are defined as RTLS, Technology Demonstration RTLS databases, Legacy RTLS databases, and other external systems.
NDB-020	The NDR database shall utilize the same data model as the facility or VISN level RTLS databases.

Req. ID	FUTURE NDR Database Requirements
NDB-030	The NDR shall provide an interface for external systems to exchange data with the NDR.
NDB-040	The NDR Interface shall provide the capability to extract data from external sources of information.
NDB-050	The NDR Interface shall transform extracted data into the NDR Database and Data Store such that no data relevant to the NDR Data Model is discarded.
NDB-060	The NDR shall store the source of external records stored in the database.
NDB-070	The NDR Interface shall transform data for storage into the NDR.
NDB-080	The NDR shall be designed to allow bulk loads of data at any time without impacting existing connections or users of the NDR system.
NDB-090	The NDR Interface shall be capable of processing data from external systems.
NDB-110	The NDR Interface shall check the integrity of all received data.
NDB-120	The NDR Interface shall discard data records that do not conform to the NDR Data Model.
NDB-130	<p>The NDR Interface shall log discarded data records with the following information:</p> <ul style="list-style-type: none"> Timestamp data sources data record error type indicating which field or fields caused the record to be discarded
NDB-131	The NDR shall provide an alert when data records have been discarded.
NDB-132	The NDR shall provide a display for reviewing data records that were discarded.
NDB-140	For communications with RTLS, the NDR Interface shall ensure the NDR has received data the RTLS generated since its last communication with the NDR.
NDB-150	The NDR Interface shall provide the capability to request missing data from an RTLS from its last communication.
	Data loaded into the NDR database shall become available in real time.
NDB-170	The NDR shall maintain an audit log of data transactions between an RTLS and the NDR.
NDB-180	<p>The data audit log shall include:</p> <ul style="list-style-type: none"> • timestamp data transfer was initiated • number of records transferred • timestamp data transfer was completed

Req. ID	FUTURE NDR Database Requirements
	<ul style="list-style-type: none"> completion status
NDB-190	The NDR shall provide the capability to produce a data audit log report for a user-specified time period showing the amount and type of data transferred between each RTLS and the NDR.
NDB-200	The NDR shall provide database visualization and modeler functionality.
NDB-210	The NDR Database Modeler Tool shall be restricted to System Administrators and select users.
NDB-220	The NDR Database Modeler Tool shall provide the capability to visually inspect the RTLS Data Model.
NDB-230	The NDR Database Modeler Tool shall provide the capability to drill down and navigate from the Data Model into the actual data.
NDB-240	The NDR Database Modeler Tool shall provide VA with the capability to modify the Data Model.
NDB-250	The NDR Database Modeler Tool shall warn the user when changes to the model would have negative effects on the existing data.
NDB-260	The NDR Database Modeler Tool shall provide the capability to commit or cancel changes made.
NDB-270	The NDR Database Modeler Tool shall change the RTLS Data Model based on committed changes.
NDB-280	The NDR Database Modeler Tool shall change the RTLS Database based on committed changes.
NDB-290	<p>The NDR Business Intelligence Tool shall have the following capabilities:</p> <ul style="list-style-type: none"> Define workflows and workflow rules A graphical user interface that enables an end-user to easily create, update, and delete workflows. Use of this interface shall require no more than one (1) hour of training for proficient use. Associate workflow rules with the NDR Run the workflows against the data within the NDR Produce queries for records that do not conform to the workflow rules. Data and reports shall be visible to the NDR query/reporting functionality Allow end user to publish new or updated workflows for use by other users Execute workflow analysis and reporting at recurring times or on demand
NDB-300	<p>The NDR Predictive Analytics tool shall have the following capabilities:</p> <ul style="list-style-type: none"> A simple interface with which to build data sets for modeling Save mining "Sets" (data plus formulas run) as individual files. Auto schedule or auto run a pre-defined set of inquiries on a

Req. ID	FUTURE NDR Database Requirements
	<p>recurring basis.</p> <ul style="list-style-type: none"> • No aspect of running the predictive analytics system will in any way impact the business intelligence tools or any other aspect of the RTLS • Design, build and implementation of any business rule based on any data element or combination of data elements from the Data Model
NDB-310	The Contractor shall develop the data interface between the VA RTLS databases and the NDR. The Contractor may use a data architecture other than one which transmits RTLS data from the RTLS servers to the NDR and stores a copy at the NDR.

Role Based Functionality

Req. ID	FUTURE NDR Requirements
RBF-100	The NDR shall provide users hierarchical access to NDR functionality.
RBF-110	The NDR shall provide System Administrator tools.

RTLS Queries

Req. ID	FUTURE NDR Query Requirements
QUL-020	The NDR shall include a Query Design GUI that combines both visual query building and direct SQL text editing.
QUL-030	The NDR Query Tool shall provide the capability to query the external data source.
QUL-060	The NDR Query Tool shall provide multiple query options to include: <ul style="list-style-type: none"> • item current / past location • item demographics • time in a location • relationship to other tagged items
QUL-140	The NDR Query Tool shall provide the capability to make saved queries visible to all users within the same group having access to that category of data.
QUL-230	The NDR Query Tool shall display result set data in a tabular format for analysis of NDR data.
QUL-240	The NDR Query Tool shall provide the option to display query results as a map-based representation of tag location data over time.
QUL-250	The NDR Query Tool shall provide the option to query for all the assets of a specific organization or owner.
QUL-260	The NDR Query Tool shall provide the capability to form complex queries by applying multiple criteria and filters.
QUL-270	The NDR Query Tool shall provide the capability to save queries to the user's profile.
QUL-280	The NDR Query Tool shall provide the capability to export query results.
QUL-290	The NDR Query Tool shall generate query results without impacting the RTLS UI functionalities.
QUL-300	The NDR Query Tool shall allow hospital staff to query information about known defective or recalled medical devices.
QUL-310	The NDR Query Tool shall allow hospital staff to query information about known lost or stolen inventory.
QUL-320	When executing an on-demand query, the NDR Query Tool shall provide a status indicator of query generation and estimated time to complete.
QUL-330	The NDR Query Tool shall provide the capability to perform ad hoc queries based on any data field within the data model.

NDR Reporting Requirements

FUTURE NDR Reporting Requirements	
RPT-010	The NDR Report Tools shall allow specified staff to generate aggregate reports of equipment by location, equipment type, equipment status, and value, filtered by facility, VISN, region, and enterprise wide locations.
RPT-020	The NDR Report Tools shall allow specified staff to generate any of the Asset Tracking reports filtered by facility, VISN (region), and enterprise-wide locations.
RPT-030	The NDR Report Tools shall allow specified staff to generate any of the Catheterization Lab reports filtered by facility, VISN (region), and enterprise-wide locations.
RPT-040	The NDR Report Tools shall allow specified staff to generate any of the Temperature Monitoring reports filtered by facility, VISN (region), and enterprise-wide locations.
RPT-050	The NDR Report Tools shall allow specified staff to generate any of the SPS reports filtered by facility, VISN (region), and enterprise-wide locations.
RPT-060	The NDR shall provide a user-friendly reporting tool containing a visual report designer with a drag-and-drop interface.
RPT-070	The NDR Report Tools shall provide an advanced User Interface for Power Users capable of generating report templates, complex queries, and reports.
RPT-080	The NDR Report Tools shall provide the capability to generate ad hoc reports based on any data field within the data model.
RPT-090	<p>The NDR Report Tools shall provide the capability for users and groups with user defined access levels at each of the RTLS installed facilities to:</p> <ul style="list-style-type: none"> Generate Modify report parameters Save Share
RPT-100	The NDR Report Tools shall provide the option of displaying data in a tabular format.
RPT-110	The NDR Report Tools shall provide the option of displaying a map-based representation of tag location data over time.
RPT-120	<p>The NDR Report Tools shall provide the option of generating graphical reports to include:</p> <ul style="list-style-type: none"> • time based charts • bar charts • line charts • digital dashboards

FUTURE NDR Reporting Requirements	
RPT-130	The NDR Report Tools shall provide a report layout tool for designing data connections and report layout.
RPT-140	The NDR Report Tools shall be available to users and groups with the appropriate access level.
RPT-150	The NDR Report Tools shall provide the capability to limit access to certain features and categories of data based on user and group access level.
RPT-160	The NDR Report Tools shall provide preconfigured reports.
RPT-170	Preconfigured reports shall be provided by category of data.
RPT-171	Preconfigured reports shall only be seen by user and groups with a user defined/configured access level.
RPT-180	The NDR Report Tools shall provide the capability to export report results.
RPT-190	The NDR Report Tools shall provide the capability to schedule reports generation on a one time or periodic basis.
RPT-200	The NDR Report Tools shall provide the capability to interface and display data from the Business Intelligence and Analytical functionality deployed with the RTLS.
RPT-210	The NDR Report Tools shall provide the capability to display data on trends, forecasting, and other analyzed data from the RTLS Analytical functionality.
RPT-220	Scheduled reports shall be generated at the specified time and automatically delivered to a user or distribution list via email that contains a link to the specified report output, or an encrypted email attachment.
RPT-230	Scheduled reports that were to be generated during a system outage shall be generated or continued as the NDR is brought back on-line.
RPT-240	The NDR Report Tools shall allow hospital staff to generate a report with tagged item, location, and duration.

Alerts and Alarms

FUTURE Application Alerts	
ALR-230	The RTLS shall be capable of sending an alert from a tagged patient when the patient falls.
ALR-240	The RTLS shall provide the capability to configure security/alert level for patients based on degree of risk.
ALR-250	The RTLS shall provide authorized VA staff with the capability to designate specific users' privileges to be able to activate / deactivate patient wander alerts for any tagged patient.
ALR-260	The RTLS sensors shall be installed in each identified zone to detect and report patient movement in and out of designated areas.

Asset Tracking

Maturity Model Requirements – Stage 2	
AST-131	The RTLS database shall provide the ability to track asset preventive maintenance schedule data received from the AEMS-MERS system for a specific tagged asset.
AST-140	If the item has a preventative maintenance schedule, RTLS shall store the Preventative maintenance information for that item.
AST-560	RTLS shall provide an indication for items that have open work orders.
AST-570	RTLS shall provide a visual indicator for items that are part of a hazard recall.
AST-540	RTLS shall periodically retrieve maintenance status via interface from AEMS-MERS for tagged items.
AST-550	The RTLS shall adjust the display of an item based on its maintenance status.
ARP-060	The RTLS users shall be able to run a report on equipment affected by a product recall or hazard alert.
ARP-080	The RTLS users shall be able to run a report that denotes equipment in need of preventative maintenance and corrective service (i.e., broken equipment or infusion pumps with outdated drug libraries).

Maturity Model Requirements – Stage 3	
TAG-020	The RTLS shall provide the capability to write information to each tag.
AST-010	The RTLS shall provide the capability to print on passive tags from the VistA interface.
AST-030	For Passive tags with a printable surface, RTLS shall provide the capability to print a barcode and additional human readable data onto the tag.
AST-040	For Passive tags with a printable surface, RTLS shall print in human readable form the following information.
AST-050	For Passive tags with a printable surface, RTLS shall be able to print a barcode onto the tag encoded with the following information: <ul style="list-style-type: none"> • EE Number • Station Number • VistA System Number

Relates to Surgery not Cath Lab

Maturity Model Requirements	
CRP-090	The RTLS Report Tools shall support medical procedure preparation by allowing users to generate reports that compare the operating room actual device, supply and instrument inventory to the operating procedure required device, supply and instrument inventory.

Temperature and Humidity

Maturity Model Requirements Stage 2	
TMP-030.1	The RTLS UI shall provide the capability to associate an environmental sensor with a location. For room/location monitors, UI shall display location (including room and building), current temp, temp status, humidity, humidity status, last sensor communication, and equipment status.
TRP-060	The RTLS Report Tools shall allow users to view an audit log of all changes made to probe settings and business rules.

Maturity Model Requirements Stage 3	
TMP-121.1	When a failure happens to an entity the system shall have the capability to mark that entity as disabled so no further alerts will trigger while maintenance is performed. Corrective actions can be entered multiple times in the system until the corrective action is cleared. Users shall have the ability to change the status of an asset/location to out of service for selected equipment types.
TRP-010	The RTLS Report Tools shall allow users to run reports to determine temperature fluctuations over selected time periods. Data from all other assets and locations shall be stored indefinitely and reportable for the most recent 2 years. Data from the Blood Bank Archive shall be reportable for 10 years.
TRP-020.1	The RTLS Report Tools shall allow users to run reports that show all adverse events for a device/location along with the associated corrective actions taken. Reports should allow users to run reports over a period of time for all other assets and location probes. Data from all other assets and locations shall be stored indefinitely and reportable for the most recent 2 years. Data from the Blood Bank Archive shall be reportable for 10 years.

Maturity Model Requirements Stage 3	
TRP-040.1	<p>The RTLS Report Tools shall allow users to run reports that include all alarms and alerts, by monitored item group, over a specified time period and displaying the following data elements:</p> <ul style="list-style-type: none"> • Device Name (includes EE number) • Location • Reason for Alert • Corrective Action • Time of Alert • Time Corrected • List of Recipients • Responding Individual <p>Respondent's Comment (if any, same as corrective action).</p>
TMP-100.1	<p>The RTLS shall provide the capability to generate an event (warning, alert, or alarm) based on triggered business rules. RTLS shall provide capability to alert users via the following means: desktop alerts, phone calls, e-mail, text message to smart phones and within the RTLS Software.</p>

SPS

Maturity Model Requirements Stage 2	
SPS-015	RTLS shall send an alert when the cleaning/sterile processing is not completed.
SPS-165	RTLS shall provide the capability to save an item's location status and expiration date label information.
SPS-195	ITS shall provide the capability to save the sterilizer cycle setting based on an item's Instructions for Use (IFU) via an ITS scan.
SPS-220	RTLS shall display an alert to the user and additional designated personnel for monitoring and reporting in the event of a failed QA check.
SPS-230	ITS shall notify the user if an item has not completed an internal QA check prior to loading the item into the sterilizer.
SPS-250	ITS shall provide the capability to save the sterile processing type.
SPS-260	RTLS-ITS shall send an alert when the sterilizer fails a mechanical self-test or a user-driven QA check.
SPS-270	ITS shall update an item's location status when a Sterilizer Mechanical self-test passes or equipment status when for example, a Bowie-Dick QA check passes.

Maturity Model Requirements Stage 2	
SRP-010.1	<p>The ITS Report Tools shall allow users to generate reports detailing processing time from retrieval of RME (critical and semi-critical) after use, to the RME's arrival at the Sterilization location. Reports shall include:</p> <ul style="list-style-type: none"> • average time • maximum time
SRP-010.2	<p>The RTLS Report Tools shall allow users to generate reports detailing processing time from retrieval of RME (critical and semi-critical) after use, to the RME's arrival at the Sterilization location. Reports shall include:</p> <ul style="list-style-type: none"> • average time • maximum time • minimum time for equipment to get to the sterilization room after use • average, max and min time by type of equipment
SRP-050	<p>The ITS Report Tools shall allow users to generate reports tracking the expiration dates for all emergency patient-care/low-use RME (critical and semi-critical) to identify a manually entered future date prior to the real expiration date that allows time for reprocessing of RME to assure readiness (in other words, that it has not expired) at time of emergent need, providing VA with the data needed to assure RME has overlap so it is available when needed. Reports shall include emergency equipment expected to expire and expired equipment.</p>
SRP-055	<p>The RTLS Report Tools shall allow users to generate reports tracking the expiration dates for all emergency patient-care/low-use RME (critical and semi-critical) to identify a manually entered future date prior to the real expiration date that allows time for reprocessing of RME to assure readiness (in other words, that it has not expired) at time of emergent need, providing VA with the data needed to assure RME has overlap so it is available when needed. Reports shall include emergency equipment expected to expire and expired equipment.</p>
SRP-130	<p>The RTLS-ITS Report Tools shall allow users to generate reports identifying the amount of time RME (critical and semi-critical) is out of service due to repair/upgrade.</p> <p>Reports shall include:</p> <ul style="list-style-type: none"> • equipment ID • equipment type • date delivered for repair • date returned from repair • repair location, repair vendor • total time to repair • repair history

Maturity Model Requirements Stage 2	
SRP-135	<p>The RTLS Report Tools shall allow users to generate reports identifying the amount of time RME (critical and semi-critical) is out of service due to repair/upgrade.</p> <p>Reports, shall include:</p> <ul style="list-style-type: none"> • equipment ID • equipment type • date delivered for repair • date returned from repair • repair location, repair vendor • total time to repair • repair history

Maturity Model Requirements Stage 3	
SPS-115.5	RTLS shall provide the capability to update location of the tagged case cart when it is placed into the washer and automatically track the user(s).
SPS-390	RTLS shall allow hospital staff to track the number of events where procedures were delayed due to lack of instruments available in the operating room. The report shall include operating room/procedure room, type of procedure, items missing, medical team, patient, time elapsed until procedure occurs.
SRP-070	<p>The RTLS Report Tools shall allow users to generate reports tracking the number of events where procedures were delayed due to lack of instruments available for use in the operating room.</p> <p>The report shall include:</p> <ul style="list-style-type: none"> • operating room/procedure room • type of procedure • items missing • medical team • patient • time elapsed until procedure occurs
SRP-080	<p>The ITS Report Tools shall allow users to generate reports identifying the utilization rate of RME (critical and semi-critical) moving through the sterile processing. Reports shall include:</p> <ul style="list-style-type: none"> • waiting to be sterilized • time in sterilization • time sterilized but waiting to be used • time in use

Maturity Model Requirements Stage 3	
SRP-085	<p>The RTLS Report Tools shall allow users to generate reports identifying the utilization rate of RME (critical and semi-critical) moving through the sterile processing. Reports shall include:</p> <ul style="list-style-type: none"> • waiting to be sterilized • time in sterilization • time sterilized but waiting to be used • time in use
SRP-100	<p>The ITS Report Tools shall allow users to generate reports identifying VA-owned RME (critical and semi-critical) items. Reports shall include:</p> <ul style="list-style-type: none"> • Inventory ID • Purchase date • Location • Cost • Time in storage • Time in use • Time in maintenance • Expiration date
SRP-105	<p>The RTLS Report Tools shall allow users to generate reports identifying VA-owned RME (critical and semi-critical) items. Reports shall include:</p> <ul style="list-style-type: none"> • Inventory ID • Purchase date • Location • Cost • Time in storage • Time in use • Time in maintenance • Expiration date

Application Related Reports (Future)

The initial RSD outlines 4 applications (see section 2.6.10). This section contains reporting requirements for other applications that have been defined, but were not part of the initial 4 requested applications. Reporting requirements for the 4 requested applications are in their individual sections in section 2.6.10.

FUTURE Clinical & Business Workflow Reports	
FUT-010	The RTLS Report Tools shall allow users the capability to run reports that highlight clinical and business workflows including, but not limited to, patient waiting times, patient/provider, patient/other patient, patient/patient times, and patient/staff interaction times, physical distance traveled by patients/providers/clinicians/nursing staff, Emergency Department (ED) workflow, mobile resource workflow, radiology workflow, and surgery workflow and throughput.
FUT-020	The RTLS Report Tools shall allow users the capability to run reports that highlight process in the Sterile Processing Service (SPS) department of the hospital. Reports should associate equipment with a dirty status and the process steps and time it takes to be reprocessed and returned to an available for patient use state.
FUTURE RTLS Nurse Call Integration Reports	
FUT-030	The RTLS Report Tools shall allow users the capability to run reports that shows times between when a nurse call is initiated and when the nurse enters the room and cancels the call.
FUTURE Patient Room/Bed Management Reports	
FUT-040	The RTLS Report Tools shall allow users the capability to run reports that show if patient rooms are empty/available/dirty and the relative percentage of rooms in each state.
FUTURE Contagious Disease Contact Tracking and Hand Sanitation Compliance Reports	
FUT-050	The RTLS Report Tools shall allow users the capability to run reports that show contact between patients and staff by means of room/bed-level proximity. This shall allow for better management and prevention of the spread of contagious diseases.
FUT-060	The RTLS Report Tools shall allow users the capability to run reports that show caregiver hand-hygiene compliance.
FUTURE Patient Elopement Reports	
FUT-070	The RTLS Report Tools shall allow users the capability to run reports that show events indicating frequency of patient elopement.
FUT-080	The RTLS Report Tools users shall be able run reports that identify the location prior to patient elopement.
FUT-090	The RTLS Report Tools shall allow users the capability to run reports to identify sites prior to most frequent and least frequent patient elopement.

FUT-100	The RTLS Report Tools shall allow hospital staff to generate reports identifying the number of eloped patients stopped because of the RTLS device outside their designated area but still in the safety of the building. Reports shall include at a minimum, patient id, location, staff, distance from designated area, root cause of elopement, total time of elopement.
FUT-110	The RTLS Report Tools shall allow hospital staff to generate reports identifying the number of eloped patients stopped because of the RTLS device outside their designated area, but still on the hospital grounds. Reports shall include, but not limited to patient id, location, staff, distance from designated are, root cause of elopement, total time of elopement, locations eloped patient entered (e.g. male patient in female patient room).
FUT-120	The RTLS Report Tools shall allow hospital staff to generate reports identifying the number of eloped patients making it outside the facility or its grounds. Reports shall include, but not limited to patient id, location staff, distance from designated are, root cause of elopement, total time of elopement.
FUT-130	The RTLS Report Tools shall allow hospital staff to generate reports identifying the number of eloped patients injured as a result of an elopement. Reports shall include but not limited to, patient id, location staff, distance from designated are, root cause of elopement, elopement injuries, and total time of elopement.
FUT-140	The RTLS Report Tools shall allow hospital staff to generate reports identifying the number of eloped patients dying as a result of an elopement. Reports shall include but not limited to, patient id, location, staff, distance from designated are, root cause of elopement, elopement cause of death, and total time of elopement.
FUT-150	The RTLS Report Tools shall allow hospital staff to generate reports identifying a Pareto analysis of the causes of elopements.
FUT-160	The RTLS Report Tools shall allow hospital staff to generate reports identifying the number of loitering patients near exits and elevators. Reports shall include at a minimum, patient id, location staff, distance from exit and total time of loitering.
FUT-170	The RTLS Report Tools shall allow hospital staff to generate reports identifying the number of patients entering unauthorized areas (e.g., patient A in B's room). Reports shall include at a minimum, patient (A) id, unauthorized location, location staff, injuries, and total time of unauthorized entry.
FUT-180	The RTLS Report Tools shall allow hospital staff to generate reports identifying the number of patients tampering with tags. Reports shall include at a minimum, patient id, location staff, injuries, and total time between alert and resolution.
FUT-190	The RTLS Report Tools shall allow hospital staff to generate reports identifying the number of patients with elopement tags. Reports shall include at a minimum, patient id, assigned room, and total time of under care.

FUT-200	The RTLS Report Tools shall allow hospital staff to generate reports identifying the battery level/health of elopement tag. Reports shall include at a minimum, patient id, battery level, # of battery changes, %up time (# reports to system/# reports expected), total # of patients that have worn the tag, total time tag deployed, total time deployed to patient.
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NDR Predictive Analytics (future)

The NDR will support VA management by providing a comprehensive Predictive Analytics capability. The Predictive Analytics capability will be accessed through a user GUI. The Tool will have access to all RTLS data holdings and will be configurable to generate reports, alarms, and alerts when user-defined conditions are met. The Tool will function in accordance with user-specified workflows.

Req. ID	FUTURE NDR Requirements
ANA-010	The NDR shall provide business process predictive analytics capabilities.
ANA-020	The NDR Predictive Analytics Tool shall provide the capability to define workflows and workflow rules.
ANA-030	Workflows and workflow rules shall be comprised of business rules, sequenced ordering of events, timelines, thresholds, and other business process data that typically comprises a workflow.
ANA-040	The NDR Predictive Analytics Tool shall provide the capability to design, build and implement any workflow/business rule based on any data element or combination of data elements from the RTLS data model.
ANA-050	The NDR Predictive Analytics Tool shall provide an interface for creation of workflows and workflow rules, such that the majority of users can become proficient with the tool in 16 hours or less of instructor led training.
ANA-060	The NDR Predictive Analytics Tool shall provide a simple interface with which to build data sets for modeling.
ANA-070	The NDR Predictive Analytics Tool shall provide the capability to save data sets plus formulas run as individual files.
ANA-080	The NDR Predictive Analytics Tool shall provide the capability to auto schedule or auto run a pre-defined set of inquiries on a recurring basis.
ANA-090	No aspect of running the predictive analytics system shall in any way impact the business intelligence tools or any other aspect of the RTLS system.
ANA-100	The NDR Predictive Analytics Tool shall provide the capability to trigger alerts when workflow rules have not been executed or thresholds have been breached.
ANA-110	The alerts shall be sent to the user or designated group for that workflow.

Req. ID	FUTURE NDR Requirements
ANA-120	<p>The NDR Predictive Analytics Tool shall provide the capability to execute workflow analysis in real-time, periodically, or on-demand.</p> <p>Notes:</p> <ul style="list-style-type: none"> • ‘Real time’ means that data is checked as it is received. • ‘Periodically’ means on a regular, pre-scheduled interval. • ‘On-demand’ means one time analysis executed by the user directly.
ANA-130	The NDR Predictive Analytics Tool shall provide the capability to generate summary data on workflows which can serve as input to the RTLS Reporting capabilities.

Map Display

Req. ID	FUTURE Patient Elopement Requirement
MAP-100	The RTLS shall display an indicator identifying the real-time location of any eloped patient on a floor plan or map graphic (providing patient is within area covered by RTLS).

Multi-Divisional Specifications

While the RTLS is being deployed enterprise-wide within VHA initially and possibly within NCA and VBA, the actual local-level implementation must adapt to the requirements of a given facility.

Req. ID	FUTURE NDR Requirements
MDS-010	The NDR shall support aggregation of RTLS data across the VA.
MDS-020	The NDR shall store for each RTLS data entry the location of the source data.
MDS-030	The NDR shall allow authorized users to filter data by source/physical location.
MDS-040	For VHA, the NDR shall allow authorized users to filter data by facility.
MDS-050	For VHA, the NDR shall allow authorized users to filter data by VISN.

Performance Specifications

The NDR's centralized, web-based nature and defined user base provides the ability to define the necessary performance requirements at this time. The following are the performance requirements that have been defined to date.

Req. ID	FUTURE NDR Requirements								
PERF-010	The NDR shall be capable of supporting a minimum of 1000 simultaneous users.								
PERF-020	<p>The NDR shall be capable of supporting the following transaction rates at a minimum:</p> <ul style="list-style-type: none">• Per Hour – 5,000• Per Day – 45,000• Per Month – 1,350,000 <p>Note: Numbers calculated based on 1,000 users simultaneously X 5 transactions per user X 9 hours per duty day X 30 days per month.</p>								
PERF-030	<p>The NDR shall provide the following response times based on 1000 concurrent users:</p> <table><tr><td>Under 3 seconds</td><td>To navigate WebPages</td></tr><tr><td>Under 5 seconds</td><td>To retrieve query results</td></tr><tr><td>Under 8 seconds</td><td>To display maps and imagery</td></tr><tr><td>Under 5 seconds</td><td>Navigate screens within RTLS UI</td></tr></table>	Under 3 seconds	To navigate WebPages	Under 5 seconds	To retrieve query results	Under 8 seconds	To display maps and imagery	Under 5 seconds	Navigate screens within RTLS UI
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Under 5 seconds	To retrieve query results								
Under 8 seconds	To display maps and imagery								
Under 5 seconds	Navigate screens within RTLS UI								

Reliability Specifications

	FUTURE NDR Requirements
REL-020	The NDR shall maintain 99% uptime during national business hours from 6:00AM EST – 10PM EST.
REL-030	The NDR shall maintain 95% uptime during non-business hours.
REL-050	The RTLS shall ensure 100% synchronization between RTLS and the NDR, such that any available data that the RTLS produces is received and stored at the NDR.

Usability Specifications

	FUTURE NDR Requirements
USA-040	The NDR Querying/Reporting functionality shall require no more than 8 hours of user training.
USA-050	The NDR Business Intelligence functionality shall require no more than 8 hours of user training.
USA-060	The NDR Predictive Analytics functionality shall require no more than 16 hours of user training.

Communications Interfaces

As an enterprise deployment, the RTLS system will interface with communications devices throughout the hierarchy, from the local Wi-Fi and LAN-based facility systems, through the VA WAN up to the centralized NDR. As with any enterprise deployment, there are numerous design tradeoffs. The vendor needs to consider network utilization tradeoffs in determining server locations. The system architecture needs to minimize bandwidth utilization while maximizing throughput of data. The data transfer rate shall take into account size, distance and time when operating across the VA nationwide network. Tradeoffs in database design, location, frequency of updates, time and frequency of queries can all impact system architecture decision. These are all left to design.

Req. ID	FUTURE NDR Requirements
COM-010	The NDR shall connect to RTLS systems through the VA WAN.
COM-020	The RTLS NDR Interface shall provide the capability for RTLS to connect and exchange data with the RTLS NDR.
COM-030	The NDR Interface shall provide an open interface for third parties to connect and exchange data with the NDR.
COM-040	The NDR Interface shall support a minimum of 200 simultaneous connections to RTLS and other systems.
COM-050	The NDR Interface shall accept connections as they are initiated by external systems.
COM-060	<p>The NDR Interface data exchange shall be designed to limit the amount of bandwidth and computer resource utilization required on both the originating server and the NDR.</p> <p>Note: It is left to design whether to establish permanent connections with RTLS/other systems, or to establish temporary connections for the exchange of data.</p>
COM-070	The NDR Interface shall provide an audit log for connections.
COM-080	The NDR Interface Audit Log shall record connection related information to include: timestamps, connection attempts, connection success/failure, quantity of data transferred and connection duration.
COM-090	The NDR shall manage the connection with each RTLS such that degradation in performance does not occur at either the RTLS or the NDR.

Purchased Components

	FUTURE NDR Requirement
PUR-020	The NDR shall provide the capability to assign user access to the client software, without any restrictions on the number of users granted access and the number of locations/machines that it can be accessed from (enterprise license).