Test Plan of

EAC 2005 VVSG Certification Testing For The Unisyn OVS 1.3

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1.0 INTRODUCTION

The purpose of this National Certification Test Plan (Test Plan) is to document the procedures that National Technical Systems (NTS) will follow to perform certification testing of the Unisyn Voting Solutions (Unisyn) OpenElect Voting System Release 1.3 (OVS 1.3) to the requirements set forth for voting systems in the U.S. Election Assistance Commission (EAC) 2005 Voluntary Voting System Guidelines (EAC 2005 VVSG). Prior to submitting the system for certification testing, Unisyn submitted an application to the EAC for certification of the OVS 1.3 voting system modification to the previously certified OVS 1.0 Voting System (Certification number: UNS10121966-OE), OVS 1.0.1 Voting System (Certification number: UNS10121966-OE-WI), OVS 1.1 Voting System (Certification number: UNS10121966-OE-1.1), and OVS 1.2 (Certification number: UNS10121966-OE-1.2) voting systems. This test plan follows Notice of Clarification 09-005: Development and Submission of Test Plans for Modifications to EAC Certified Systems and Notice of Clarification 13-02: Detailed Description of Changes for Modifications.

At test conclusion, the results of all testing performed as part of this test campaign will be submitted to the EAC in the form of a final report.

1.1 Established Baseline System

The baseline system for this modification is the OpenElect Release 1.2 voting system. Tables 1-1, 1-2, and 1-3 describe the certified equipment and firmware versions. For full details about the OpenElect Release 1.2 system, refer to the Unisyn Voting Solutions OpenElect Release 1.2 Modification's Final Test Report (Rev B) located on the EAC's website at http://www.eac.gov.

Table 1-1 OpenElect Release 1.2 Voting System Hardware Components

Component	Hardware Version	Software/Firmware Version
OVO – Precinct ballot scanner	Rev. E	1.2.0
OVO – Plastic Ballot box	N/A	N/A
OVO – Portable Ballot box	N/A	N/A
OVI 7" – Ballot Marking Device	Rev. G	1.2.0
OVI-VC (15") – Ballot Marking Device	Rev. B	1.2.0
OVCS – Ballot scanner	Canon DR-X10C	N/A

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1.0 INTRODUCTION (Continued)

1.1 Established Baseline System (Continued)

Table 1-2 OpenElect Release 1.2 Voting System Software Components

Component	Version
Adjudicator	1.2.0
Ballot Layout Manager (BLM)	1.2.0
Election Manager (EM)	1.2.0
Election Server (ES)	1.2.0
OpenElect Central Suite (OCS) Installer	1.2.0
Software Server (SS)	1.2.0
Tabulator Monitor	1.2.0
Tabulator Client (TC)	1.2.0
Tabulator Reports (TR)	1.2.0
OpenElect Voting Central Scan (OVCS) Application	1.2.0

Table 1-3 OpenElect Release 1.2 Voting System EMS Components

Equipment	Description	Serial Number
EMS PC 1	Dell Precision T3600	CP7GGX1
EMS PC 2	Dell OptiPlex 7010	2Y7BGX1
EMS LAPTOP	HP 2000 Notebook PC	2C32NR

1.2 Scope of Modification

The purpose of this modification is to address End of Life (EOL) hardware components, state test campaign updates, customer requested functionality, and operating system updates to the previously certified Open Elect 1.2 (Certification number: UNS10121966-OE-1.2) voting system.

The system changes submitted to the EAC in the Application for Certification (UNS1401) include functional and hardware modifications to the EMS, OVO, OVI, and OVCS. These modifications are presented in their entirety in Appendix B.

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1.0 INTRODUCTION (Continued)

1.3 Initial Assessment

After analyzing the scope of changes to the submitted EMS, OVO, and OVI software, NTS personnel determined that accuracy, system integration, and a limited Functional Configuration Audit will be required to verify that the voting system still meets the 2005 VVSG requirements. Limited in this instance refers to only functional changes that were made in this modification (new features, changes to functions, etc.) or functions that have not changed but may be impacted by the modification. All source code will be compared to the EAC certified OVS 1.2 version to determine the extent of the source code review required. Based on this examination, NTS personnel will perform software code review to ensure that all applicable VVSG requirements are met and changes to the software do not introduce any new functions or features outside of the modifications in Appendix B.

NTS determined that the hardware changes to the OVO, hardware revision 1.3 will require all hardware testing except electrical power disturbance, electrical fast transient, lightning surge, and product safety. OVO hardware revision 1.2 and OVI hardware revision 1.3 will not require any hardware testing based on the changes submitted. The details of this analysis can be found in section 2.1 and 4.4.1.

An initial assessment has been performed on the TDP submitted by Unisyn for OVS 1.3. The TDP is constructed with the OVS 1.2 certified TDP and the OVS 1.3 changes to the certified documents. The submitted TDP will be reviewed to ensure that all OVS 1.3 changes are properly documented and comply with the 2005 VVSG.

1.4 References

The documents listed below were used in the development of the Test Plan and are utilized to perform certification testing.

- Election Assistance Commission 2005 Voluntary Voting System Guidelines, Volume I, Version 1.0, "Voting System Performance Guidelines," and Volume II, Version 1.0, "National Certification Testing Guidelines," dated December 2005
- Election Assistance Commission Testing and Certification Program Manual, Version 1.0, expires July 2017
- Election Assistance Commission Voting System Test Laboratory Program Manual, Version 1.0, expires July 2017
- National Voluntary Laboratory Accreditation Program NIST Handbook 150, 2006 Edition, "NVLAP Procedures and General Requirements (NIST Handbook 150)," dated February 2006
- National Voluntary Laboratory Accreditation Program NIST Handbook 150-22, 2008 Edition, "Voting System Testing (NIST Handbook 150-22)," dated May 2008
- United States 107th Congress Help America Vote Act (HAVA) of 2002 (Public Law 107-252), dated October 2002

1.0 INTRODUCTION (Continued)

1.4 References (Continued)

- NTS Quality Assurance Program Manual, Revision 5
- ANSI/NCSL Z540-1, "Calibration Laboratories and Measuring and Test Equipment, General Requirements"
- ISO 10012-1, "Quality Assurance Requirements for Measuring Equipment"
- EAC Requests for Interpretation (listed on http://www.eac.gov)
- EAC Notices of Clarification (listed on http://www.eac.gov)
- EAC Quality Monitoring Program residing at: http://www.eac.gov/testing_and_certification/quality_monitoring_program.aspx
- Unisyn Voting Solutions OpenElect Ver. 1.0 VSTL Certification Test Report Rev. B (listed on http://www.eac.gov)
- Unisyn Voting Solutions OpenElect Ver. 1.0 Technical Data Package
- Unisyn Voting Solutions OpenElect Ver. 1.0.1 Modification VSTL Certification Test Report Rev. A (listed on http://www.eac.gov)
- Unisyn Voting Solutions OpenElect Ver. 1.0.1 Technical Data Package
- Unisyn Voting Solutions OpenElect Ver. 1.1 Modification VSTL Certification Test Report Rev. A (listed on http://www.eac.gov)
- Unisyn Voting Solutions OpenElect Ver. 1.1 Technical Data Package
- Unisyn Voting Solutions OpenElect Ver. 1.2 Modification VSTL Certification Test Report Rev. B (listed on http://www.eac.gov)
- Unisyn Voting Solutions OpenElect Ver. 1.2 Technical Data Package

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1.0 INTRODUCTION (Continued)

1.5 Terms and Abbreviations

Table 1-4 defines all terms and abbreviations applicable to the development of this Test Plan.

Table 1-4 Terms and Abbreviations

Term	Abbreviation	Definition
Americans with Disabilities Act of 1990 (Amended 2008)	ADA	ADA is a wide-ranging civil rights law that prohibits, under certain circumstances, discrimination based on disability.
Audio Tactile Interface	ATI	Electronic voter interface that does not require visual reading of a ballot. Audio is used to convey information to the voter and sensitive tactile controls allow the voter to convey information to the system.
Configuration Management	CM	---
Commercial Off the Shelf	COTS	Commercial, readily available hardware or software.
Direct Record Electronic	DRE	An electronic voting system that utilizes electronic components for the functions of ballot presentation, vote capture, vote recording, and tabulation which are logically and physically integrated into a single unit. A DRE produces a tabulation of the voting data stored in a removable memory component and in printed hardcopy.
United States Election Assistance Commission	EAC	Commission created per the Help America Vote Act of 2002, assigned the responsibility for setting voting system standards and providing for the voluntary testing and certification of voting systems.
Election Management System	EMS	An umbrella term for the software application used to define and report election projects
Equipment Under Test	EUT	---
Functional Configuration Audit	FCA	Exhaustive verification of every system function and combination of functions cited in the manufacturer's documentation.
Federal Communications Commission	FCC	---
Help America Vote Act	HAVA	Act created by United States Congress in 2002.
National Institute of Standards and Technology	NIST	Government organization created to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhances economic security and improves our quality of life.
National Technical Systems, Inc.	NTS	---
NTS Operating Procedure	OP	NTS Test Method or Test Procedure.
System Under Test	SUT	---
OpenElect Central Suite	OCS	Unisyn's Election Management System
OpenElect Voting Central Scanner	OVCS	High-speed central ballot scan tabulator.
OpenElect Voting Optical	OVO	Precinct-level optical scanner and tabulator
OpenElect Voting Interface	OVI	Precinct-level voting device that prints Voter Assisted ballots using a variety of input devices (touchscreen, ATI, Sip and Puff)
Physical Configuration Audit	PCA	Review by accredited test laboratory to compare voting system components submitted for certification testing to the manufacturer's technical documentation, and confirmation the documentation meets national certification requirements.
Quality Assurance	QA	---
System Under Test	SUT	Refers to the system as a whole (all components)

1.0 INTRODUCTION (Continued)

1.5 Terms and Abbreviations (Continued)

Table 1-4 Terms and Abbreviations (Continued)

Term	Abbreviation	Definition
Test Case Procedure Specifications	TCPS	NTS-developed document that specifies test items, input specifications, output specifications, environmental needs, special procedural requirements, inter-case dependencies, and all validated test cases that will be executed during the area under test.
Technical Data Package	TDP	Manufacturer documentation related to the voting system required to be submitted as a precondition of certification testing.
Underwriters Laboratories Inc.	UL	---
Uninterruptible Power Supply	UPS	---
Voluntary Voting System Guidelines	EAC 2005 VVSG	Published by the EAC, the third iteration of national level voting system standards.

1.6 Testing Responsibilities

Prior to the development of this test plan, NTS evaluated test results from the previous test campaigns performed by Wyle Laboratories: OVS 1.0, OVS 1.0.1, OVS 1.1, and OVS 1.2. The purpose of this evaluation was to determine the scope of testing required for system certification. Based on this evaluation, NTS determined that testing from previous test campaigns could be utilized to satisfy some requirements of this test campaign. Sections 2.1 and 4.4.1 contain additional details of this evaluation. All other core and non-core software and hardware certification testing shall be conducted under the guidance of qualified NTS personnel.

1.6.1 Project Schedule

This information is contained in a NTS-generated Microsoft Project schedule. This schedule is presented in Appendix A, “Unisyn Project Schedule.” The dates on the schedule are not firm dates but planned estimates presented for informational purposes.

1.6.2 Test Case Development

NTS will utilize the “NTS Baseline Test Cases” for the Functional and System Integration Tests. These will be augmented with specially designed test cases tailored to the Unisyn OVS 1.3 system.

1.6.3 Test Procedure Development and Validation

NTS will utilize the NTS Operating Procedures (OPs) during the duration of this test program.

1.6.4 Third-Party Tests

NTS will not utilize any 3rd party testing during performance of the OVS 1.3 test campaign.

1.0 INTRODUCTION (Continued)

1.7 Target of Evaluation Description

The following sections address the design methodology and product description of the OpenElect Release 1.3 Voting System, as taken from the Unisyn Voting Solutions technical documentation.

1.7.1 System Overview

The Unisyn OVS 1.3 System is a paper ballot voting system using touch screen and scan technology to scan and validate ballots, provide voter assisted ballots to accommodate voters with special needs, and tabulate results. The OVS consists of the OpenElect Central Suite (OCS), OpenElect Voting Optical (OVO), OpenElect Voting Interface (OVI), and Open Elect Voting Central Scan (OVCS).

Election Management System: OpenElect Central Suite (OCS)

The Unisyn OVS 1.3 EMS consists of eight components running as either a front-end/client application or as a back-end/server application. Below is a list and brief description of each.

- Ballot Layout Manager (BLM) - uses a database to create and store precinct and district information and an interface to create, check, translate, and produce the ballot styles needed by a jurisdiction for an election.

- Election Manager (EM) - converts the Unisyn election definition file to a Unisyn-specific XML format and prepares compressed, encrypted election files for output to CD-ROM.

- Election Server (ES) - loads the correct system time on the voting devices and uses the Election CD created by the EM to download new election data, via a closed and secure network, to OVS voting devices.

- Tabulator Client (TC) - retrieves vote files from Transport Media (TM) devices, stores them on its disk, and transfers the files to the Tabulator and notifies the Tabulator that a new file is present.

- Tabulator - receives and validates uploaded voting data and provides a status of uploaded files as well as handling Rank Choice Voting (RCV) functionality.

- Adjudicator - accesses ballot images and data from the OVCS and TC PCs to allow jurisdiction personnel to evaluate and change questionable or erroneous marks on ballot in accordance to the voter's perceived intent.

- Tabulator Reports (TR) - accesses data from the Tabulator database to generate the necessary reports.

- Software Server (SS) - updates and validates voting device client software.

1.0 INTRODUCTION (Continued)

1.7 Target of Evaluation Description (Continued)

1.7.1 System Overview (Continued)

Precinct Ballot Tabulator: OpenElect Voting Optical (OVO)

The OVO device is a precinct-level, optical scan, ballot counter (tabulator) designed to perform the following major functions**:**

- Ballot scanning
- Tabulation
- Second chance voting

The Unisyn OpenElect Voting Optical (OVO) is a full-page, dual-sided optical scan ballot system which scans and validates voter ballots and provides a summary of all ballots cast. The election is loaded from the OVS Election Server over a secure local network or via a USB thumb drive. On Election Day, an OVO at each polling location scans and validates voters' ballots, and provides precinct tabulation and reporting. The OVO unit is also paired with the OVI for early voting to scan and tabulate early voting ballots. OVO units can also be used at election headquarters to read absentee, provisional, or recount ballots in smaller jurisdictions.

Figure 1-1
OVO on Plastic Ballot Box

Figure 1-2
OVO on Portable Ballot Box

1.0 INTRODUCTION (Continued)

1.7 Target of Evaluation Description (Continued)

1.7.1 System Overview (Continued)

Precinct Voting Device: OpenElect Voting Interface (OVI)

The OVI supports both ADA and Early Voting requirements. The OVI enables voters during early voting to cast regional ballots and voters with special needs to prepare their ballots independently and privately on Election Day. The OVI unit features a 7-inch or optional 15-inch full-color touch screen display that is easy to read, making voting simple and error free. The OVI will present each contest on the correct ballot to the voter in visual and (optionally) audio formats. The voter with limited vision navigates through the ballot using the audio ballot and the ADA keypad or touchscreen input to make their selections. The voter validates his or her selections by listening to the audio summary, printing the ballot, and inserting it into the OVO.

The OVI facilitates special needs voters through a variety of methods including wheelchair access, sip & puff, zoom-in ballot function, and audio assistance for the visually impaired. The OVI provides for write-in candidates when authorized by the jurisdiction. Voters input candidates' names via the ADA keypad, touchscreen or sip & puff device. Each OVI can support multiple languages for both visual and audio ballots, allowing the voter to choose their preferred language.

Figure 1-3 OVI with 7 Inch Screen

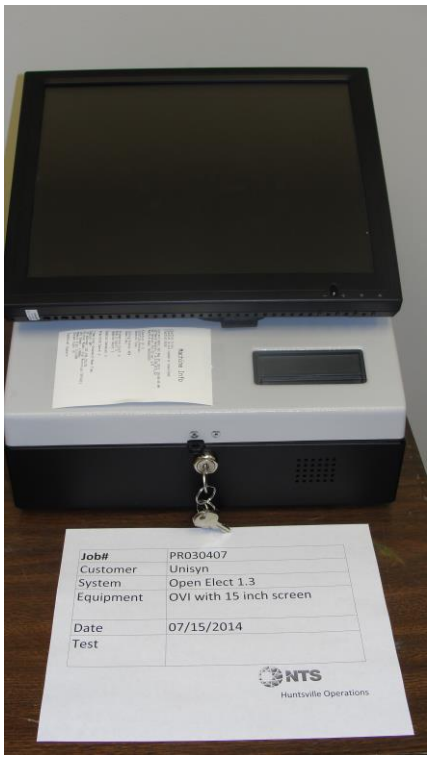

Figure 1-4 OVI with 15 Inch Screen

1.0 INTRODUCTION (Continued)

1.7 Target of Evaluation Description (Continued)

1.7.1 System Overview (Continued)

Central Tabulator: OpenElect Voting Central Scanner (OVCS)

The Unisyn OpenElect Voting Central Scanner (OVCS) resides at election headquarters designated to read absentee, provisional, or recount ballots in large jurisdictions, or read the entire election's ballots at a central count location in smaller jurisdictions. The OVCS also captures write-in data images and produces a write-in image report for manual processing upon request. The OVCS system consists of the following components:

- OVCS Workstation: a COTS computer used for ballot image and election rules processing and results transfer to the EMS.

- Canon DR-X10C Scanner: a COTS scanner used to provide ballot scanning and image transfers to the local OVCS Workstation.

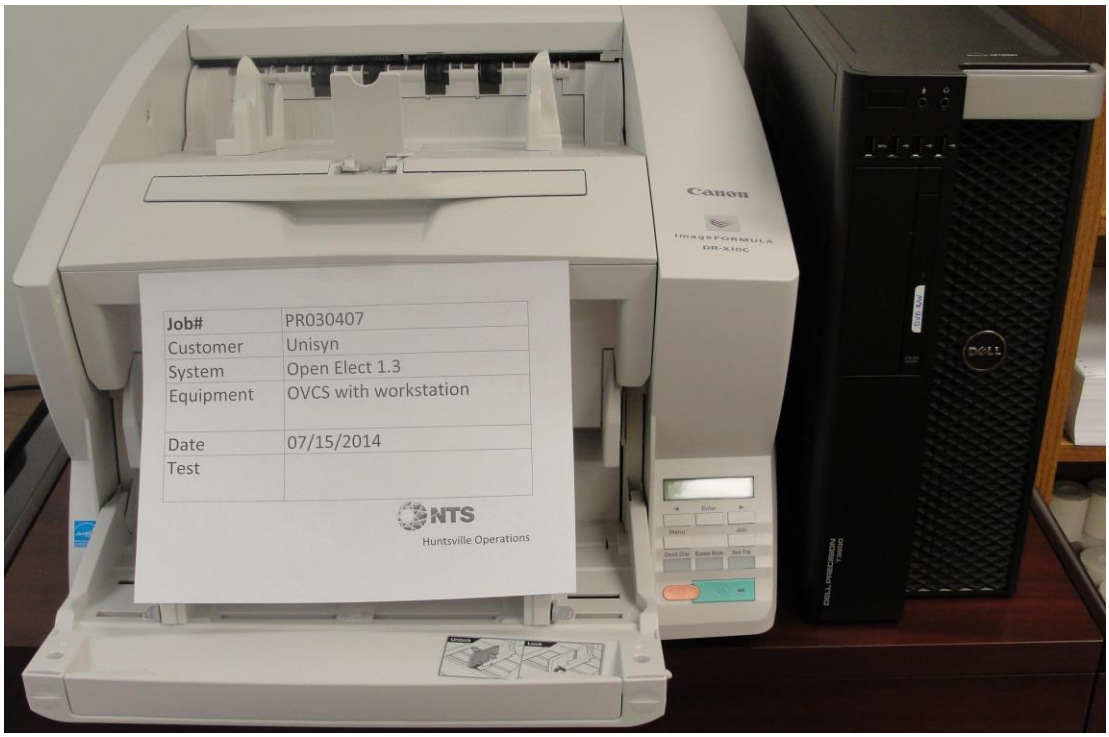

Figure 1-5
Canon DR-X10C Scanner and OVCS Workstation

1.0 INTRODUCTION (Continued)

1.7 Target of Evaluation Description (Continued)

1.7.2 System Operational Concept

The entire system diagram is presented in Figure 1-6.

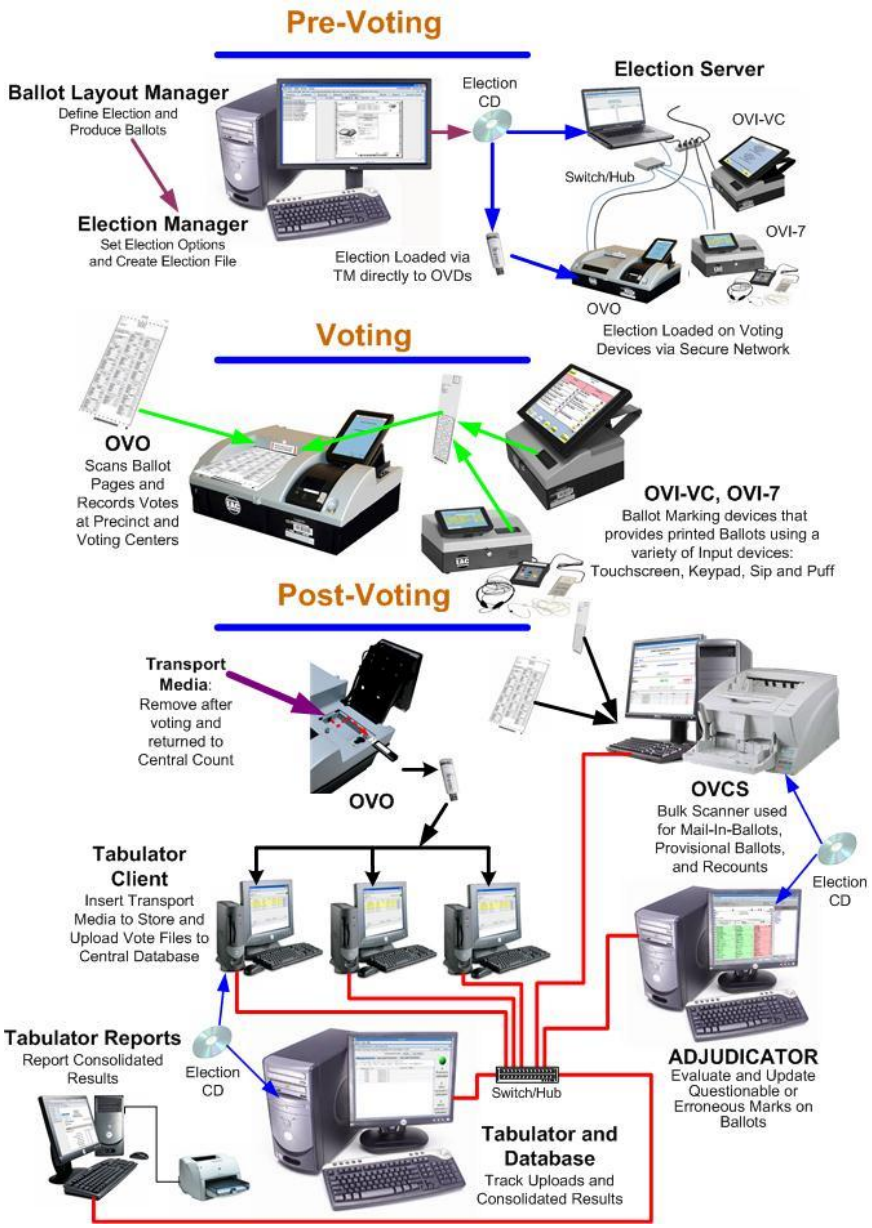

Figure 1-6
System Overview Diagram

2.0 PRE-CERTIFICATION TESTING AND ISSUES

NTS has conducted a pre-certification review, and findings indicate that all system changes are consistent with the change items documented in the EAC Application UNS-1401.

2.1 Evaluation of Prior VSTL Testing

NTS will reutilize all testing from the previously-certified systems submitted by Unisyn Voting Solutions. The testing of these systems was conducted by Wyle Laboratories in accordance with the EAC 2005 VVSG, and the EAC Certification Numbers are UNS10121966-OE, UNS10121966-OE-WI, UNS10121966-OE-1.1, and UNS10121966-OE-1.2.

Unisyn submitted the following test reports to NTS for reuse consideration. The reports and items requested for reuse are as follows:

- Wyle Test Report No. T56285.01-01 (National Certification Test Report for OVS 1.0)
    - Electrical Power Disturbance
    - Electromagnetic Radiation
    - Electrostatic Disruption
    - Electromagnetic Susceptibility
    - Electrical Fast Transient
    - Lightning Surge
    - Conducted RF Immunity
    - Magnetic Fields Immunity
    - Bench Handling
    - Vibration
    - High/Low Temperature
    - Humidity
    - Temperature/Power Variation
    - Product Safety Review, UL60950-1
    - Maintainability
    - Availability
    - Electrical Supply
    - Security Tests
    - Usability
    - Accessibility

- Wyle Test Report No. T58650.01-01 (National Certification Test Report for OVS 1.1)
    - Electromagnetic Radiation
    - Electrostatic Disruption
    - Electromagnetic Susceptibility
    - Conducted RF Immunity
    - Vibration
    - Security Tests
    - Usability
    - Accessibility

2.0 PRE-CERTIFICATION TESTING AND ISSUES (Continued)

2.1 Evaluation of Prior VSTL Testing (Continued)

- Wyle Test Report No. T70987.01-01 (National Certification Test Report for OVS 1.2)
  - Electromagnetic Radiation
  - Electrostatic Disruption
  - Electromagnetic Susceptibility
  - Conducted RF Immunity
  - Magnetic Fields Immunity
  - Availability
  - Security Tests
  - Usability
  - Accessibility

For details of the acceptance of the above items, refer to Section 4.4.1 of this test plan.

2.2 Known Field Issues

This system is a modification to previously certified systems. There were no systemic or significant issues traceable to any of the previously certified systems.

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3.0 MATERIALS REQUIRED FOR TESTING

The materials required for certification testing of the OVS 1.3 Voting System include software, hardware, test materials, and deliverable materials. These items were shipped directly to NTS by Unisyn Voting Solutions to enable the test campaign to occur.

3.1 Software

Table 3-1 lists the software the manufacturer must submit for testing. This section lists all software required for operation and testing of the voting system being certified. This includes the software used for testing accuracy and system integration as well as supporting software required for the test environment. All COTS software is listed in Appendix C.

Table 3-1 Software Utilized for Testing

Software Required For Testing	Software Version
Adjudicator	1.3.0
Ballot Layout Manager	1.3.0
Common (Library)	1.3.0
Election Manager	1.3.0
Election Server	1.3.0
OCS Installer	1.3.0
Regkey Builder	1.3.0
Software Server	1.3.0
Tabulator	1.3.0
Tabulator Client	1.3.0
Tabulator Reports	1.3.0
OVCS Application	1.3.0
OVI Firmware	1.3.0
OVO Firmware	1.3.0

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3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.1 Software (Continued)

Table 3-1 Software Utilized for Testing (Continued)

Software Required For Testing	Software Version
Scripter	1.3.0
Validator	1.3.0
Logger (Library)	1.3.0

3.2 Equipment

This subsection categorizes the equipment the manufacturer submitted for testing listed in Tables 3-2, 3-3, 3-4, 3-5, 3-6, and 3-7. Each test element is included in the list of equipment required for testing of that element, including system hardware, general purpose data processing and communications equipment, and any required test instrumentation.

Table 3-2 OVO Equipment

Equipment	Manufacturer	Model	Serial Number
OVO	Unisyn	OpenElect Voting Optical, Rev. A	UNI000018
OVO	Unisyn	OpenElect Voting Optical, Rev. A	UNI000024
OVO	Unisyn	OpenElect Voting Optical, Rev. E	UNI000029
OVO	Unisyn	OpenElect Voting Optical, Rev. E	UNI000036
OVO	Unisyn	OpenElect Voting Optical, Rev. E	UNI000039
OVO	Unisyn	OpenElect Voting Optical, Rev. E	UNI000049
OVO Ballot Box 1	Unisyn	Plastic Rolling	BB-58650-001
OVO Ballot Box 2	Unisyn	Plastic Rolling	UVSCOV001675 UVSBOT001685
OVO Ballot Box 3	Unisyn	Plastic Rolling	UVSCOV001738 UVSBOT001618
OVO Ballot Box 4	Unisyn	Portable (collapsible corrugated plastic)	CBB001 CBB002

Table 3-3 OVI Equipment

Equipment	Manufacturer	Model	Serial Number
OVI 7”	Unisyn	OpenElect Voting Interface, Rev. F	UNI150049
OVI 15”	Unisyn	OVI-VC, Rev. A	UNI202111
OVI 15”	Unisyn	OVI-VC, Rev. B	UNI203050

3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.2 Equipment (Continued)

Table 3-4 OVCS Equipment

Equipment	Manufacturer	Model	Serial Number
OVCS	Canon	ImageFORMULA DR-X10C	ED300631

Table 3-5 OCS COTS Equipment

Equipment	Manufacturer / Model	Hardware Specifications	Service Tag	COTS/ Non-COTS
PC 1	Dell Precision T3600	Processor: Intel Xeon E5-1620 3.6Ghz Memory: 4x 4GB 1600Mhz RAM Hard Drive Capacity: 500GB (Mirrored)	CP7GGX1	COTS
PC 2	Dell OptiPlex 7010	Processor: Intel Core i7-3770 3.4Ghz Memory: 4x 4GB 1600Mhz RAM Hard Drive Capacity: 500GB	2Y7BGX1	COTS
PC 3	Dell OptiPlex XE2	Processor: Intel Core i7-4770S 3.1Ghz Memory: 2x 8GB 1600Mhz RAM Hard Drive Capacity: 500GB	H407GZ1	COTS
Laptop 1	Dell Latitude E5540	Processor: Intel Core i7-4600U 2.1Ghz Memory: 2x 4GB 1600Mhz RAM Hard Drive Capacity: 500GB	CH78VZ1	COTS
Laptop 2	HP 2000 Notebook PC	Processor: AMD Dual-Core E1-1500 1.48GHz Memory: 1x 4GB DDR3 SDRAM Hard Drive Capacity: 320GB	2C32NR	COTS

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3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.2 Equipment (Continued)

Table 3-6 OVS 1.2 COTS Equipment

COTS Equipment	Make	Model	Serial Number
Headphones	Koss	KPH5	T70987-HP-001
Headphones	Koss	KPH5	T70987-HP-002
Headphones	Koss	KPH5	HP-T58650-002
Sip & Puff	Origin Instruments	AirVoter	00594
UPS	Minuteman	Entrust Series ETR1500	AE580906PA106
UPS	Minuteman	Entrust Series ETR1500	AE580906PA114
UPS	Minuteman	Entrust Series ETR1500	AE58090500284
UPS	Minuteman	Entrust Series ETR1500	AE58090500278
20 x Transport Media	STEC	Thumb Drive (UFD) 1GB Capacity	TM001-TM0020
2x Thumb Drives	PNY	USB 16 GB	PNY1, PNY2
Network Switch	Linksys	SR2024 Business Series 24-Port 10/100/1000 Gigabit Switch	REM30H600558 GGR1807 JJ
External DVD-RW Drive	Pioneer	DVR-X162Q	IDFW002121UC
External DVD-RW Drive	Samsung	SE-S084	R8816GAZA19986
ADA Voting Booth	American Made Election Equipment (AMEE)	Model 2000	T70987-VB01

Table 3-7 OVS 1.2 Build Equipment

Equipment and Operating System	Manufacturer	Version/Model	Serial Number	COTS /Non-COTS
Application Build Machine	Jetway	Processor: VIA Nano-BGA 1.5GHz Memory: 1GB Hard Drive Capacity: 320GB	T70987-SBB-001	COTS
OVO Linux OS Build Machine	Jetway	Processor: VIA Nano-BGA 1.5GHz Memory: 1GB Hard Drive Capacity: 320GB	T70987-SBB-002	COTS
OVI Linux OS Build Machine	Jetway	Processor: VIA Nano-BGA 1.5GHz Memory: 1GB Hard Drive Capacity: 320GB	T70987-SBB-003	COTS
Extra Hard Drives x 3	Western Digital	WD3200AAJA	N/A	COTS

3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.3 Test Tools/Materials

This subsection lists any and all test materials needed to perform voting system testing in Table 3-8. The scope of testing determines the quantity of a specific material required.

Table 3-8 Test Tools/Material

Test Tool/Material	Quantity
50 CD-R Spindle	as required
25 DVD-R Spindle	as required
Box of OVI Paper Rolls	as required
Box of OVO Paper Rolls	as required
Security zip ties	as required
Security seals	as required

3.4 Deliverable Materials

The materials listed in Table 3-9 are to be delivered as part of the OVS 1.3 voting system to the end users unless otherwise noted:

Table 3-9 Deliverable Materials

Deliverable Material	Version	Description
OCS	1.3	EMS software suite
OVO	1.3	Precinct ballot scanner
OVI	1.3	Accessible voting station
OVCS	1.3	Central Count scanner
Ballot Box	---	OVO ballot receptacle
Transport media	STEC 1 & 4 GB	USB Flash Drive
Minuteman UPS	ETR1500	UPS
Headphones (optional)	Koss KPH5	Stereo headphones
Sip and Puff (optional)	AirVoter	Binary input device
04-00444 OVS System Functionality	1.0	TDP Document
04-00446 System Overview	1.1	TDP Document
04-00459 System Maintenance Procedures	1.0	TDP Document
04-00454 Quality Assurance Plan	1.0	TDP Document

3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.4 Deliverable Materials (Continued)

Table 3-9 Deliverable Materials (Continued)

Deliverable Material	Version	Description
04-00494 OVS Acronyms	1.0	TDP Document
04-00428 Ballot Layout Manager User Guide	1.0	TDP Document
04-00427 Election Manager User Guide	1.0	TDP Document
04-00429 Election Server User Guide	1.0	TDP Document
04-00430 Software Server User Guide	1.0	TDP Document
04-00431 Tabulator Client User Guide	1.0	TDP Document
04-00432 Tabulator User Guide	1.0	TDP Document
04-00433 Tabulator Reports User Guide	1.0	TDP Document
04-00495 OVCS User Guide	1.0	TDP Document
04-00448 OVS Configuration Management Plan	1.0	TDP Document
04-00460 OVS System Operations Guide Warehouse Technician's Guide	1.0	TDP Document
04-00462 OVS System Operations Guide EDay Troubleshooters	1.0	TDP Document
04-00463 OVS System Operations Guide EDay Pollworkers	1.0	TDP Document
04-00464 Software Design and Specification	1.6	TDP Document
04-00503 OVS Paper Specification	1.0	TDP Document
04-00513 System HW Verification	1.1	TDP Document
04-00530 Adjudicator User Guide	1.0	TDP Document

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4.0 TEST SPECIFICATIONS

Modification testing of the OVS 1.3 will be performed on the configuration submitted in the EAC application UNS1401. NTS qualified personnel will ensure that all certification testing performed on the manufacturer's voting system follows NTS procedures for testing, and the specific test cases developed for this campaign meet the requirements of the EAC 2005 VVSG and EAC Testing and Certification Program Manual.

All Requests for Interpretation (RFIs) and Notices of Clarification (NOCs) applicable as of the date of this document shall apply to this test campaign unless otherwise noted.

4.1 Requirements (Strategy of Evaluation)

To evaluate the system test requirements, each section of the EAC 2005 VVSG will be analyzed to determine the applicable tests. The EAC 2005 VVSG requirements, along with the strategy for evaluation, are described below:

Section 2: Functional Requirements – The requirements in this section will be tested during the FCA and System Integration tests utilizing the "NTS Baseline Test Cases" along with test cases specially designed for the Unisyn OVS 1.3 per sections 4.4.3 and 4.4.4. The data input during these tests will be the predefined election definitions submitted as part of the test plan package.

Section 3: Usability and Accessibility – The requirements in this section will not be tested during this test campaign because no changes were included for the usability and accessibility portion of the voting system.

Section 4: Hardware Requirements – The requirements in this section will be tested and/or evaluated by trained NTS personnel per sections 4.4.2 and Table 6-1.

Section 5: Software Requirements – The requirements in this section will be tested during source code review, TDP review, and FCA. A combination of review and functional testing will be performed to ensure these requirements are met.

Section 6: Telecommunication – The requirements in this section will not be tested during this test campaign because no changes were included in this modification to the Standard Networking Configuration from the original Unisyn OVS, Version 1.0 EAC certified system.

Section 7: Security Requirements – Only the security requirements that pertain to the new operating system introduced in this modification will be tested.

Section 8: Quality Assurance (QA) Requirements – The requirements in this section will be tested throughout the test campaign via various methods. TDP review will be performed on the Unisyn QA documentation to determine compliance to EAC 2005 VVSG requirements and the requirements stated in the Unisyn QA Program document. All source code will be checked to ensure that proper QA documentation has been completed. All equipment received for initial testing and follow up testing will be checked against Unisyn documentation to ensure their QA process is being followed. NTS personnel will complete the requirements of EAC 2005 VVSG Vol. 2 Section 7, Quality Assurance Testing and Section 1.3.1.5, Focus of Vendor Documentation that requires NTS personnel to physically examine documents at Unisyn's location or conduct an external evaluation utilizing equipment, documents and support information provided by Unisyn during the test campaign.

4.0 TEST SPECIFICATIONS (Continued)

4.1 Requirements (Strategy of Evaluation) (Continued)

Section 9: Configuration Management (CM) Requirements – The requirements in this section shall be tested throughout the test campaign. The TDP review shall be performed on the Unisyn configuration management documentation to determine EAC 2005 VVSG compliance and to further determine whether Unisyn is following its documented CM requirements within the TDP. Any anomalies shall be formally reported to Unisyn and the EAC. NTS personnel will conduct an audit of the Unisyn CM Program at the Unisyn facility at the conclusion of the test campaign**.**

NTS personnel shall maintain a test log of the procedure(s) employed. This log identifies the system and equipment by model and serial number. In the event that the project engineer deems it necessary to deviate from NTS Test Cases or NTS Operating Procedures (OP) pertaining to the test environment, the equipment arrangement and method of operation, the specified test procedure, or the provision of test instrumentation and facilities the deviation shall be recorded in the test log. A discussion of the reasons for the deviation and the effect of the deviation on the validity of the test procedure shall also be completed by the Project Engineer and Program Manager.

NTS personnel utilize an internal bug tracking system in order to capture and track all issues and discrepancies found during the testing campaign. This allows for all issues and discrepancies to be monitored for reoccurrence, tracks the root cause analysis, and provides a resolution status. NTS personnel shall verify all items logged into the bug tracking system are resolved prior to the completion of testing and before any recommendation may be made for certification.

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4.0 TEST SPECIFICATIONS (Continued)

4.1 Requirements (Strategy of Evaluation) (Continued)

The specific NTS OPs to be used during testing include the following:

OP 1 Operations Status Checks

OP 2 Receipt Inspection

OP 3 Technical Data Package Review

OP 4 Test Plan Preparation *(This document)*

OP 5a-d Source Code Review

OP 7 & 7a Trusted Build

OP 7b & 7c Compliance Build

OP 8 Electrical Power Disturbance

OP 9 Electromagnetic Emissions

OP 10 Electrostatic Disruption

OP 11 Electromagnetic Susceptibility

OP 14 Conducted RF Immunity

OP 16 Bench Handling

OP 17 Vibration

OP 18 Low Temperature

OP 19 High Temperature

OP 20 Humidity

OP 21 Temperature Power Variation

OP 25 Physical Configuration Audit

OP 26 Functional Requirements

OP 27 Maintainability

OP 29 Electrical Supply

OP 30 System Integration Test

OP 34 Test Report

OP 41 Logic and Accuracy

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4.0 TEST SPECIFICATIONS (Continued)

4.2 Hardware Configuration and Design

The Unisyn OVS 1.3 voting system is a paper-based optical scan voting system. The OVS 1.3 voting system consists of four major components: the OCS, OVO precinct scanner, OVI precinct voting interface, and OVCS central count scanner. The OVS 1.3 is comprised of two proprietary pieces of hardware (OVO and OVI) and one piece of COTS hardware (OVCS). All OCS functions are handled by proprietary software running on COTS PC/laptops/servers. NTS has determined that these COTS PC/laptops/servers are not subject to hardware testing per the EAC 2005 VVSG. The provided PC/laptops/servers documented in Section 3, Materials Required for Testing, all contained CE, UL, and FCC labeling.

The hardware modifications submitted for this test campaign include the introduction of a new motherboard for use in OVO units to replace hardware which has reached End Of Life. NTS personnel performed an engineering analysis of the Unisyn documentation, as well as a visual inspection of the changes, and determined that the modifications to the previously certified hardware require testing to confirm that these changes do not affect the system's functional operation. No modifications to the OVO hardware involve power providing or conversion components. As such, it was determined that the only potential areas of impact are environmental and electromagnetic interference (EMI). See section 4.4.1 of this report for the assessment results.

Each unit will be loaded with the Operational Status Check election definition configured for early voting. This will allow all the data generated for the Pre-operational, Operational, and Post-operational test to be further analyzed.

4.3 Software System Functions

The Unisyn OVS 1.3 System software is written in the JAVA programming language. The system software is broken into three areas: EMS, Precinct tabulator/interface software acting as firmware, and central count application running on a COTS workstation.

The OVS 1.3 EMS (OCS) software consists of the eight components listed below:

- Ballot Layout Manager (BLM)
- Election Manager (EM)
- Election Server (ES)
- Tabulator Client (TC)
- Tabulator
- Adjudicator
- Tabulator Reports (TR)
- Software Server (SS)

4.0 TEST SPECIFICATIONS (Continued)

4.3 Software System Functions (Continued)

The OVS 1.3 contains two precinct devices and one central count device. The two precinct devices are the OVO and OVI. The OVS 1.3 has an independent workstation running proprietary software. The OVCS application provides the central tabulation function for the system.

4.4 Test Case Design

NTS uses the V-Model Life Cycle as defined by the Institute of Electrical and Electronics Engineers (IEEE). The IEEE definition of the V-Model Life Cycle uses two concepts "Verification" and "Validation." NTS' test approach is to incorporate the use of both "Verification" and "Validation". There are four basic levels of testing in the V-Model Life Cycle: Component, Integration, System, and Acceptance. NTS will be evaluating the Unisyn OVS 1.3 to all four levels.

4.4.1 Hardware Qualitative Examination Design

Unisyn submitted the results of previous testing in the form of the following test reports:

- Certification Testing of the Unisyn Voting Solutions, Inc. OpenElect Voting System Version 1.0, Wyle Test Report No. T56285-01

- Certification Testing of the Unisyn Voting Solutions, Inc. OpenElect Voting System Version 1.0.1, Wyle Test Report No. T58440.01-01

- Certification Testing of the Unisyn Voting Solutions, Inc. OpenElect Voting System Version 1.1, Wyle Test Report No. T58650.01-01

- Certification Testing of the Unisyn Voting Solutions, Inc. OpenElect Voting System Version 1.2, Wyle Test Report No. T70987.01-01

NTS personnel performed a hardware qualitative examination to 1) assess if the testing was performed under the guidelines of the EAC program, 2) assess if the tests were performed per the EAC 2005 VVSG, and 3) determine if the scope of the engineering changes were implemented since test performance. The results from this examination deemed that the hardware testing performed under the OVS 1.0, OVS 1.0.1, OVS 1.1, and OVS 1.2 campaigns were tested to the EAC 2005 VVSG and in accordance with the EAC Testing and Certification Program Manual. NTS recommends that reuse be approved for all test requirements in Tables 4-1 and 4-2 labeled as "Accept" underneath the component being tested.

NTS will verify all hardware during the PCA and those results will determine if the hardware is compliant with the previously tested versions. All testing that is deemed to require a "Re-Test" shall be performed by NTS personnel under this test campaign. The details of those tests are presented in Section 6.0.

4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.1 Hardware Qualitative Examination Design (Continued)

Table 4-1 OVO and OVI Test Examination Results

Test/EAC 2005 VVSG Section	Procedure/Description	OVS 1.3 Voting System Component	
		OVO	OVI
Electrical Power Disturbance/4.1.2.5	IEC 61000-4-11 (1994-06) power surges and dips	Accept	Accept
Electromagnetic Radiation/4.1.2.9	FCC Part 15 Class B for both radiated and conducted emissions	Re-Test	Accept
Electrostatic Disruption/4.1.2.8	IEC 61000-4-2 (1995-01) 15kV air discharge and 8kV contact discharge	Re-Test	Accept
Electromagnetic Susceptibility/4.1.2.10	IEC 61000-4-3 (2006) electromagnetic field of 10V/m modulated by a 1kHZ, 80% AM modulation at 80MHz to 1000MHz frequency	Re-Test	Accept
Conducted RF Immunity/4.1.2.11	IEC 61000-4-6 (1996-04) conducted radio frequency energy	Re-Test	Accept
Lightning Surge/4.1.2.7	IEC 61000-4-5 (1995-02)	Accept	Accept
Magnetic Fields Immunity/4.1.2.12	IEC 61000-4-8 (1993-06) AC magnetic fields of 30 A/m at 60Hz	Accept	Accept
Electrical Fast Transient/4.1.2.6	IEC 61000-4-4 (2004)	Accept	Accept
Bench Handling	MIL-STD-810D, Method 516.3 Procedure VI six 4” drops on each edge totaling 24 drops	Re-Test	Accept
Vibration/4.1.2.14	MIL-STD-810D, Method 514.3 physical shock and vibration during handling and transport	Re-Test	Accept
Low Temperature/4.1.2.14	MIL-STD-810D minimum temperature shall be -4 degrees F	Re-Test	Accept
High Temperature/4.1.2.14	MIL-STD-810D, Method 501.2 maximum temperature shall be 140 degrees F	Re-Test	Accept
Humidity Test/4.1.2.14	MIL-STD-810D, Method 501.2 ten 24 hour humidity cycles	Re-Test	Accept
Temperature/Power Variation/4.1.2.13	MIL-STD-810D, Method 502.2 and Method 501.2 163 hours at 50 degrees to 95 degrees	Re-Test	Accept
Usability/3.1	Measure of the effectiveness, efficiency, and satisfaction achieved by a specified set of users	Accept	Accept

4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.1 Hardware Qualitative Examination Design (Continued)

Table 4-1 OVO and OVI Test Examination Results (Continued)

Test/EAC 2005 VVSG Section	Procedure/Description	OVS 1.3 Voting System Component	
		OVO	OVI
Accessibility/3.2	Tests the voting system to ensure accessibility for individuals with disabilities to include, but not limited to visually impaired voters by providing the same access and participation opportunity.	Accept	Accept
Security/7	Tests the ability of the system to detect, prevent, log, and recover from a broad range of security risks identified.	Accept	Accept
Maintainability/4.3.4	Tests the ease in which preventative and corrective maintenance actions can be performed based on design, software, and documentation.	Re-Test	Accept
Availability/4.3.5	Tests the voting system to help ensure the probability that the equipment will be operational and accomplish set functions. This shall be calculated using the following formula at a 99% availability rate: Ai=(MTBF)/(MTBF+MTTR)	Accept	Accept
Electrical Supply/4.1.2.4	Meets voltage and power requirements of EAC 2005 VVSG Vol. 1 Section 4.1.2.4	Re-Test	Accept
Safety/4.3.8	UL 60950-1 product safety review	Accept	Accept

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4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.1 Hardware Qualitative Examination Design (Continued)

Table 4-2 OVCS Test Examination Results

Test/EAC 2005 VVSG Section	Procedure/Description	Configuration Tested	Status
Maintainability/4.3.4	Tests the ease in which preventative and corrective maintenance actions can be performed based on design, software, and documentation.	OVCS	Accept
Electrical Supply/4.1.2.4	Meets voltage and power requirements of EAC 2005 VVSG Vol. 1 Section 4.1.2.4	OVCS	Accept
Availability/4.3.5	Tests the voting system to help ensure the probability that the equipment will be operational and accomplish set functions. This shall be calculated using the following formula at a 99% availability rate: Ai=(MTBF)/(MTBF+MTTR)	OVCS	Accept

Support Equipment

NTS has determined that the COTS PC/Laptops and Servers are not subject to the hardware test requirements per the EAC 2005 VVSG per "2007-05 Decision on Testing Focus and Applicability." The provided PC/Laptops documented in Section 3, Materials Required for Testing, all contain CE, UL, and FCC labeling.

4.4.2 Hardware Environmental Test Case Design

The OVS 1.3 voting system hardware shall be tested by NTS' EMI, Dynamics, and Environmental test facilities for testing to the hardware requirements in accordance with NTS' A2LA certifications 845.01-.03. All EMI testing was performed, per the following NTS Test Guidelines Documents: EMI-001A, "NTS' Test Guidelines for Performing Electromagnetic Interference (EMI) Testing," and EMI-002A, "Test Procedure for Testing and Documentation of Radiated and Conducted Emissions Performed on Commercial Products." All hardware testing was per the guidelines of ANSI/NCSL Z540-1, "Calibration Laboratories and Measuring and Test Equipment, General Requirements," and ISO 10012-1, "Quality Assurance Requirements for Measuring Equipment", and the governing MIL-STD. All pre/post tests were conducted by qualified NTS personnel at the NTS Huntsville, AL, facility.

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4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.3 Software Module Test Case Design and Data

NTS personnel implements Component Level Testing during the FCA for each component and subcomponent exercising the functionality of each as designed and documented. NTS will utilize limited structural-based techniques (white-box testing) mainly in the area of Source Code Review, Compliance Builds, and Security Testing and Review. NTS will depend heavily on specification-based techniques (black-box testing) for the individual software components. The most common specification-based techniques applied to the Unisyn OVS 1.3 during software testing will be "equivalence partitioning" and "boundary value testing."

- "Equivalence partitioning" will be used to evaluate specific software functions and data entry points of the OVS 1.3 for valid and invalid data during the FCA. For software functions and data entry points, an entry will be made for a valid data requirement and at least one invalid data requirement to test for normal and abnormal conditions.

- "Boundary value testing" will be used to evaluate specific software functions and data entry points for minimums and maximums during the FCA. For software functions and data entry points, an entry will be made for all minimum and all maximum documented requirements to test for normal and abnormal conditions. This technique will be used for numeric ranges as well as non-numeric ranges.

NTS personnel will develop an expected result for each test. The PASS/FAIL criteria at the Component Level will be based on the expected result. If the System Under Test (SUT) meets the expected results, the test will be considered passed. If the SUT does not perform as expected, the test will be evaluated for tester errors, test procedure errors, or test equipment errors. If it is determined there was no tester error, the test will be repeated in an attempt to reproduce the results. If the results can be reproduced and the expected results are not met, the SUT will have failed the test. If the results cannot be reproduced, the manufacturer will be responsible for determining the root cause of the error. Upon correction of the failure a regression test will be performed. If the issue is found to be resolved, then the test will be considered passed, else the test will be considered failed until regression testing finds the issue resolved.

NTS personnel will document the error and track the error through resolution. NTS personnel will not move to the next level of testing until all documented errors are resolved to try and minimize errors that might occur farther along in the test campaign. Engineering analysis will be performed to determine what effect the resolution has on the component. A determination will be made whether regression testing will be sufficient or a complete re-test is necessary.

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4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.4 Software Functional Test Case Design and Data

The test approach to be used for the Unisyn OVS 1.3 will be a bottom-up approach where the lower-level components will be tested first and then used to facilitate the testing of higher-level components. The specification-based technique used by NTS personnel at the Integration Level is "Use Case." The actors that have been identified to use the Unisyn OVS 1.3 are:

- Election Administrator – The actor with responsibility of entering the election definition with translation and audio. This actor is also responsible for maintaining EMS users and the election database.

- Warehouse Technician-The actor responsible for loading the election definition onto the OVO and OVI units. This actor also runs diagnostic tests and maintains the units.

- Poll Worker-The actor at the precinct location to set up and close down the OVO and OVI units on election day.

- Voter-The actor who physically casts the ballot on election day.

- ADA Voter-The actor with special needs who has to vote unassisted on election day.

- Election Official-The actor who reports and audits the election result post-election day.

"Use Case" will be utilized during the FCA with a single pass through each component using only valid data. This pass will be considered the "Master Copy" of data to be passed between interfacing points of applications during integration level testing. If a component downstream in the test process needs data from previous processes, the "Master Copy" of data can be used or altered to accelerate the test process. Known tests that will utilize the "Master Copy" of data at the Integration Level are Security and Usability. Where applicable, NTS testers will introduce negative testing to ensure that submitted system either prevents the negative actions or handles the action in an appropriate manner.

If an error occurs between data interfaces or in the process flow, an engineering analysis will be performed to determine if the error is data, process, or tester error. The ACCEPT/REJECT criteria for integration level testing is whether the components and applications interface using the documented process for each actor. If there is an error interfacing between components, the error shall be documented and tracked through resolution. Engineering analysis shall be performed to determine what effect the resolution has on the component. A determination will be made whether regression testing will be sufficient or a complete re-test is necessary.

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4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.5 System Level Test Case Design

During system level testing, NTS personnel will test the ability of proprietary software, hardware, and peripherals in addition to the COTS software, hardware, and peripherals as a complete system in a configuration of the systems for intended use. The OVS 1.3 voting system is intended to support both large and small jurisdictions. NTS personnel's approach for the OVS 1.3 voting system will be to execute System Level Testing with a variety of elections that include various combinations of jurisdictions, parties, and ballot styles.

The ACCEPT/REJECT criteria for system level testing is whether the system can continue in testing. The two scenarios are: ACCEPT or REJECT. ACCEPT is either 1) no errors are found or 2) an error is encountered but the system continues to operate and engineering analysis determines that the root cause does not affect system testing. REJECT is when an error is encountered and the system is too unstable to continue or engineering analysis determines the root cause could affect further testing. If an error occurs during system level testing, the error shall be documented. If the OVS 1.3 voting system is able to recover and continue, the test will continue. If the error causes the system to become unstable, the test shall be halted. All errors documented during System Level Testing shall be tracked through resolution.

An engineering analysis shall be performed to determine what effect the resolution has on the system. A determination shall be made by NTS senior level engineers whether regression testing shall be sufficient or a complete re-test is necessary.

NTS personnel will implement acceptance level testing focusing on all the data collected during the entire test campaign along with performing the "Trusted Build" for the system. All data from hardware testing, software testing, functional testing, security testing, and reliability testing activities will be combined to ensure all functions supported by the OVS 1.3 voting system have been tested. The EAC 2005 VVSG requirements will be checked against the test data to ensure all applicable requirements are met. Items not supported by the OVS 1.3 voting system will be documented. Any issues documented during testing will be resolved or annotated in the test report.

NTS personnel will test every EAC 2005 VVSG requirement impacted by the OVS 1.3 voting System modification. NTS personnel will report all issues discovered during this test campaign to Unisyn and the EAC. If NTS determines there is not enough data to ensure a requirement was met, the test plan will be altered and further testing will be done. The EAC has the final decision as to whether the system meets all the requirements for an EAC-certified system. NTS will either recommend approval, if the system meets all applicable sections of the VVSG, or recommend disapproval if the system does not meet all applicable sections of the VVSG.

4.0 TEST SPECIFICATIONS (Continued)

4.5 TDP Evaluation

NTS qualified personnel will perform a comprehensive review of the Unisyn TDP to determine compliance to the EAC 2005 VVSG requirements and Unisyn specific requirements.

NTS qualified personnel utilize a TDP Review Matrix which lists every EAC 2005 VVSG requirement pertaining to TDP review. NTS qualified personnel will record the results of the review of each document to the applicable requirements listed in the TDP Review Matrix.

During the TDP review process, each document will be reviewed for completeness, clarity, correctness, and continuity. The review results will be formally reported to Unisyn. If a revised document is received, it will be re-reviewed as discussed in this section. The TDP will be continued to be reviewed during the entire testing process as these documents will be utilized to set up the systems, verify correct operational results, and numerous other tests. At the end of the TDP review process, a discrepancy report will be issued listing the non-compliant items on a document-by-document basis, if applicable. A listing of all documents contained in the OVS 1.3 voting system TDP is provided in Table 4-3.

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4.0 TEST SPECIFICATIONS (Continued)

4.5 TDP Evaluation (Continued)

Table 4-3 OVS 1.3 TDP Documents

OVS Release 1.3 Voting System TDP Documents	Version	Date	Document Number
System Overview	1.1	06/30/2014	04-00446
System Security Specification	1.0	08/10/2014	04-00447
Configuration Management Plan	1.0	06/11/2014	04-00448
Quality Assurance Plan	1.0	09/09/2013	04-00454
System Test and Verification Plan	1.0	08/08/2014	04-00453
Personnel Training and Deployment Requirements	1.0	09/09/2013	04-00445
Software and Design Specification	1.0	10/10/2011	04-00464
Final Quality Assurance Report	1.0	06/20/2013	04-00469
OVS Acronyms	1.0	08/10/2014	04-00494
System Functionality Description	1.0	3/28/2014	04-00444
System Maintenance Procedures	1.0	08/08/2014	04-00459
System Hardware Specification	1.0	7/27/2014	04-00458
Ballot Layout Manager User Guide	1.0	08/06/2014	04-00428
Election Manager User Guide	1.0	06/11/2014	04-00427
Election Server User Guide	1.0	08/08/2014	04-00429
Software Server User Guide	1.0	08/08/2014	04-00430
Tabulator Client User Guide	1.0	08/07/2014	04-00431
Tabulator User Guide	1.0	08/07/2014	04-00432
Tabulator Reports User Guide	1.0	08/07/2014	04-00433
OVCS User Guide	1.0	08/08/2014	04-00495
SOP: Election Day Poll worker's Guide	1.0	08/06/2014	04-00463
SOP: Election Day Troubleshooter's Guide OVO and OVI	1.0	08/10/2014	04-00462
System Operations Procedures: Warehouse Technician's Guide	1.0	08/08/2014	04-00460
Ballot Paper Specification	1.0	08/11/2014	04-00503
System HW Verification	1.1	10/22/2013	04-00513
Adjudicator User Guide	1.0	08/07/2014	04-00530

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4.0 TEST SPECIFICATIONS (Continued)

4.6 Source Code Review

The strategy for evaluating OVS 1.3 will be based on the source code of the previously identified modifications to the system. All code changes from OVS 1.2 will be reviewed to the EAC 2005 VVSG coding standards and the manufacturer supplied coding standards. Unisyn uses the "Code Conventions for the Java™ Programming Language Revised April 20, 1999" coding convention. The review will be conducted per the guidelines described in the following paragraphs.

As the source code is received, a SHA256 hash value will be created for each source code file. The source code team will then conduct automated source code review using Eclipse and Checkstyle because the source code is written entirely in JAVA. In addition to the automated source code review, NTS also performed a 10% manual review of the headers and quality of comments. This is done to verify compliance of EAC 2005 VVSG coding standards and manufacturer supplied coding standards. Each identified violation shall be recorded by making notes of the standards violation along with directory name, file name, and line number.

A technical report of all identified violations will be sent to Unisyn for resolution on a regular basis. All revised source code will be checked for corrections until the final issue is resolved. At the end of the Source Code review process, a discrepancy report will be issued listing all non-compliances, to the EAC and Unisyn. The results will be included in the final test report.

A "Compliance Build" shall be performed by NTS qualified personnel from the reviewed source code using the Compliance Build Procedure throughout the test campaign. This process follows the documented procedures of a "Trusted Build" in the EAC Testing and Certification Program Manual, Version 1.0, but differs from a Trusted Build with two exceptions: the image products will not be submitted to the EAC and no manufacturer representative shall be required to be present or on-site for these builds. The final step in the source code review shall be to create a Trusted Build from the reviewed source code. The Trusted Build will be performed by completing the following tasks in the order listed:

1. Clean the build machine of existing software
2. Retrieve the compliant source code
3. Construct the build environment
4. Create digital signatures of the build environment
5. Load the compliant source code into the build environment
6. Create a digital signature of the pre build environment
7. Create a disk image of the pre-build environment
8. Build executable code
9. Create a digital signature of executable code
10. Create a disk image of the post-build environment
11. Build installation media
12. Create a digital signature of the installation media
13. Install executable code onto the system and validate the software/firmware
14. Deliver source code with digital signature, disk image of pre-build environment with digital signatures, disk image of post-build environment with digital signatures, executable code with digital signatures, and installation media with signatures to the EAC Approved Repository.

4.0 TEST SPECIFICATIONS (Continued)

4.6 Source Code Review (Continued)

The "Trusted Build" for the Unisyn OVS 1.3 includes source code, data, and script files, in clear text form. The build also includes COTS software on commercially available media, COTS software downloaded by the VSTL, COTS software verified by SHA256 from the software supplier, and picture and sound files in binary format provided by Unisyn. The first step of the process is to clean the hard drives by writing data to every spot on the hard drive, so the drive is cleared of existing data. The appropriate operating system will then be loaded and the applications from the VSTL reviewed source files along with the VSTL verified COTS software will be built. The final step is installing the applications on the hardware.

4.7 QA and CM System Review

Both the Unisyn QA Plan and CM Plan will be reviewed. The review will be limited to only the changes within this modification to determine compliance with EAC 2005 VVSG Volume II Section 2, and Volume I Sections 8 and 9, EAC stated requirements, and with the requirements of the internal Unisyn documentation. Also, the Unisyn TDP documentation package will be reviewed to determine if the Unisyn QA Plan and the CM Plan are being followed. The results of the TDP review shall be entered on a spreadsheet as previously described in Section 4.5 of this test plan. The results of the TDP review, including the QA and CM compliance results of the Technical Data Package Review, will be included in the final test report.

5.0 TEST DATA

5.1 Test Data Recording

All equipment utilized for test data recording shall be identified in the test data package. For hardware environmental and operational testing, the equipment shall be listed on the Instrumentation Equipment Sheet for each test. The output test data shall be recorded in an appropriate manner as to allow for data analysis. For source code and TDP reviews, results shall be compiled in output reports and submitted to Unisyn for resolution. The resolution shall be returned to NTS for review and verification of compliance.

Additionally, all test results, including functional test data, will be recorded on the relevant NTS Operating Procedure and Test Cases. Results will also be recorded real-time in engineering log books. Incremental reports will be submitted to Unisyn and the EAC at the completion of major test areas to communicate progress and results as deemed necessary by the stakeholders.

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5.0 TEST DATA (Continued)

5.2 Test Data Criteria

NTS personnel will evaluate all test results against the Unisyn provided technical documentation for OVS 1.3 and the requirements set forth in the EAC 2005 VVSG. The acceptable range for system performance and the expected results for each test case shall be derived from the OVS 1.3 documentation. Per the EAC 2005 VVSG, these parameters shall encompass the test tolerances and samples to define the minimum number of combinations or alternatives of input and output conditions that can be exercised to constitute an acceptable test of the parameters involved. The parameters will also include events with criteria defining the maximum number of interrupts, halts, or other system breaks that may occur due to non-test conditions (excluding events from which recovery occurs automatically or where a relevant status message is displayed).

5.3 Test Data Reduction

Test data shall be processed and recorded in the relevant NTS Operating Procedures and Test Cases. Results will also be recorded real-time in engineering log books.

6.0 TEST PROCEDURE AND CONDITIONS

The following subsections describe test procedures and a statement of the criteria by which readiness and successful completion shall be indicated and measured.

6.1 Facility Requirements

All testing will be conducted at NTS Laboratories Huntsville, AL facility unless otherwise annotated. Environmental non-operating (storage) and operating hardware testing will be conducted utilizing an adequately sized environmental test chamber or dynamic vibration (shaker) system equipped with the required data gathering support equipment. All remaining operating hardware tests will be conducted at the appropriate test site with the required support equipment. All instrumentation, measuring, and test equipment used in the performance of this test program will be listed on the Instrumentation Equipment Sheet for each test and shall be calibrated in accordance with NTS Laboratories' Quality Assurance Program, which complies with the requirements of ANSI/NCSL Z540-1 and ISO 10012-1.

Standards used in performing all calibrations are traceable to the National Institute of Standards and Technology (NIST) by report number and date. When no national standards exist, the standards are traceable to international standards or the basis for calibration is otherwise documented.

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6.0 TEST PROCEDURE AND CONDITIONS (Continued)

6.1 Facility Requirements (Continued)

Unless otherwise specified herein, all remaining tests, including system level functional testing, shall be performed at standard ambient conditions:

- Temperature: 68 to 75 degrees Fahrenheit (± 4°F)
- Relative Humidity: 20 to 90%
- Atmospheric Pressure: Local Site Pressure

Unless otherwise specified herein, the following tolerances shall be used:

- Time ± 5%
- Temperature ± 3.6°F (2°C)
- Vibration Amplitude ± 10%
- Vibration Frequency ± 2%
- Random Vibration Acceleration
  20 to 500 Hertz ± 1.5 dB
  500 to 2000 Hertz ± 3.0 dB
- Random Overall grms ± 1.5 dB
- Acoustic Overall Sound Pressure Level +4/-2 dB

Deviations to the above tolerances may be submitted by the responsible test laboratory with sufficient engineering information to substantiate the deviation request, but only when best effort technique and system limitations indicate the need for a deviation.

6.2 Test Set-Up

All voting machine equipment (hardware and software), shall be received and documented utilizing NTS' Receiving Ticket (WL-218, Nov. 1985) and proper QA procedures. When voting system hardware is received, NTS personnel will notify NTS QA personnel. With NTS QA personnel present, each test article will be unpacked and inspected for obvious signs of degradation and/or damage that may have occurred during transit. Noticeable degradation and/or damage, if present, shall be recorded, photographed, and the Unisyn representative shall be notified. NTS QA personnel shall record the serial numbers and part numbers. Comparison shall be made between those numbers recorded and those listed on the shipper's manifest. Any discrepancies noted shall be brought to the attention of the Unisyn representative for resolution. All TDP and source code modules received will be inventoried and maintained by the NTS Project Engineer assigned to testing.

For test setup, the system will be configured as it would for normal field use. This includes connecting all supporting equipment and peripherals. NTS personnel will properly configure and initialize the system and verify that it is ready to be tested by following the procedures detailed in the OVS 1.3 voting system technical documentation. NTS personnel will develop an Operational Status Check to be performed prior to and immediately following each hardware test. NTS personnel will develop the system performance levels to be measured during operational tests.

6.0 TEST PROCEDURE AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

NTS personnel have developed eight election definitions that shall be used during this test campaign:

Operational Status Check

This election definition will exercise the operational status of the equipment during the operational tests and prior to and immediately following the non-operational hardware tests.

Accuracy

The accuracy test ensures that each component of the voting system can process 1,549,703 consecutive ballot positions correctly within the allowable target error rate. The accuracy test is designed to test the ability of the system to capture, record, store, consolidate, and report specific selections and absences of a selection. The required accuracy is measured as an error rate. This rate is the maximum number of errors allowed while processing a specified volume of data. For paper-based voting systems, the ballot positions on a paper ballot must be scanned to detect selections for individual candidates and contests and the conversion of those selections detected on the paper ballot converted into digital data.

General Election: GEN-01

The Gen-01 is a basic election held in four precincts, one of which is a split precinct, containing nineteen contests compiled into four ballot styles. Five of the contests are in all four ballot styles. The other fourteen contests are split between at least two of the precincts with a maximum of four different contests spread across the four precincts. This election was designed to functionally test the handling of multiple ballot styles, support for at least two languages, support for common voting variations, and audio support for at least two languages.

The parameters of this election are listed below:

- Closed Primary: No
- Open Primary: No
- Partisan offices: Yes
- Non-Partisan offices: Yes
- Write-in voting: Yes
- Primary presidential delegation nominations: No
- Ballot Rotation: Yes
- Straight Party voting: Yes
- Cross-party endorsement: No
- Split Precincts: Yes
- Vote for N of M: Yes
- Recall issues, with options: No

6.0 TEST PROCEDURE AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

General Election: GEN-01 (Continued)

- Cumulative voting: No
- Ranked order voting: No
- Provisional or challenged ballots: Yes
- Early Voting: No

In addition to the parameters listed above, the following will also be tested:

- Audio input in an alternative language for basic voting pattern using an ADA device
- Audio input for write-in voting using an ADA device
- Spanish language input for a basic voting pattern
- Input for write-in voting using Spanish language

General Election: GEN-02

The Gen-02 is a basic election held in three precincts. This election contains fifteen contests compiled into three ballot styles. Ten of the contests are in all three ballot styles with the other five split across the three precincts. This election was designed to functionally test the handling of multiple ballot styles, support for ballot rotation, support for two languages, support for complex voting variations, and audio support for multiple languages.

The parameters of this election are listed below:

- Closed Primary: No
- Open Primary: No
- Partisan offices: Yes
- Non-Partisan offices: Yes
- Write-in voting: Yes
- Primary presidential delegation nominations: No
- Ballot Rotation: Yes
- Straight Party voting: No
- Cross-party endorsement: No
- Split Precincts: No
- Vote for N of M: Yes

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

General Election: GEN-02 (Continued)

- Recall issues, with options: Yes
- Cumulative voting: No
- Ranked order voting: Yes
- Provisional or challenged ballots: No
- Early Voting: Yes

In addition to the parameters listed above, the following will also be tested:

- Early voting election with at least one unit in all precincts
- Voting options for over-voting
- Voting options for under-voting
- Spanish language ballots
- Audio ballots utilizing ADA capabilities

General Election: GEN-03

The Gen-03 is a basic election held in two precincts. This election contains eight contests compiled into two ballot styles. Four of the contests are in both ballot styles. The other four contests are split between the two precincts. This election was designed to functionally test the handling of multiple ballot styles, support for at least three languages including a character-based language, support for common voting variations, and audio support for at least three languages and an ADA binary input device.

The parameters of this election are listed below:

- Closed Primary: No
- Open Primary: No
- Partisan offices: Yes
- Non-Partisan offices: Yes
- Write-in voting: Yes
- Primary presidential delegation nominations: No
- Ballot Rotation: No
- Straight Party voting: No
- Cross-party endorsement: No

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

General Election: GEN-03 (Continued)

- Split Precincts: No
- Vote for N of M: Yes
- Recall issues, with options: No
- Cumulative voting: No
- Ranked order voting: No
- Provisional or challenged ballots: Yes
- Early Voting: No

In addition to the parameters listed above, the following will also be tested:

- Spanish language ballot with a basic voting pattern and write-in candidates
- Spanish audio input to simulate ADA device with write-in option
- Character based language with basic voting pattern
- Character based language utilizing an ADA option
- Binary input to support ADA option
- Binary input to support ADA audio device

Primary Election: PRIM-01

The Prim-01 is a closed primary election in two precincts (one precinct is a split), containing thirty contests compiled into five ballot styles. Each ballot style contains six contests. This election was designed to functionally test an closed primary with multiple ballot styles, support for two languages, and support for common voting variations.

The parameters of this election are listed below:

- Closed Primary: Yes
- Open Primary: No
- Partisan offices: Yes
- Non-Partisan offices: Yes
- Write-in voting: Yes
- Primary presidential delegation nominations: No
- Ballot Rotation: No
- Straight Party voting: No

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

Primary Election: PRIM-01 (Continued)

- Cross-party endorsement: No
- Split Precincts: Yes
- Vote for N of M: Yes
- Recall issues, with options: No
- Cumulative voting: No
- Ranked order voting: No
- Provisional or challenged ballots: Yes
- Early Voting: No

In addition to the parameters listed above, the following will also be tested:

- Alternative language utilized with a write-in option
- ADA audio device utilized with a write-in option

Primary Election: PRIM-02

The Prim-02 is a basic election held in two precincts. This election contains thirteen contests compiled into three ballot styles. One contest is in all three ballot styles and all other contests are independent. This election was designed to functionally test the handling of multiple ballot styles, support for primary presidential delegation nominations, support for two languages, support for complex voting variations, and audio support for multiple languages.

The parameters of this election are listed below:

- Closed Primary: No
- Open Primary: Yes
- Partisan offices: Yes
- Non-Partisan offices: Yes
- Write-in voting: Yes
- Primary presidential delegation nominations: No
- Ballot Rotation: No
- Straight Party voting: No
- Cross-party endorsement: Yes

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

Primary Election: PRIM-02 (Continued)

- Split Precincts: No
- Vote for N of M: Yes
- Recall issues, with options: No
- Cumulative voting: No
- Ranked order voting: No
- Provisional or challenged ballots: No
- Early Voting: No

In addition to the parameters listed above, this election will be an open primary election with one machine running for each precinct. Voting options for over-voting, under-voting and write-in voting will be exercised. Input in the Spanish language will be exercised. Casting of ballots using the ADA Audio capability will be exercised.

Primary Election: PRIM-03

The Prim-03 is a basic election held in two precincts. This election contains ten contests and is compiled into two ballot styles. Two of the contests are in both ballot styles. The other eight contests are split between the two party ballots. This election was designed to functionally test the handling of multiple ballot styles, support for at least three languages including an Ideographic based language, support for common voting variations, and audio support for at least three languages and an ADA binary input device.

The parameters of this election are listed below:

- Closed Primary: Yes
- Open Primary: No
- Partisan offices: Yes
- Non-Partisan offices: Yes
- Write-in voting: Yes
- Primary presidential delegation nominations: No
- Ballot Rotation: No
- Straight Party voting: No

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

Primary Election: PRIM-03 (Continued)

- Cross Party Endorsement: No
- Split Precincts: No
- Vote for N of M: Yes
- Recall issues, with options: No
- Cumulative voting: No
- Ranked order voting: No
- Provisional or challenged ballots: Yes
- Early Voting: No

In addition to the parameters listed above, the following will also be tested:

- Spanish ballot with basic voting pattern and write-in option
- Spanish language ballot using ADA audio device with write-n option
- Character based language ballot with basic voting pattern
- Character based language utilizing ADA device
- Binary input to support ADA option
- Binary input to support ADA audio device

6.3 Test Sequence

The components of the OVS 1.3 voting system will undergo testing to verify that the modification performs as described by Unisyn and meets the requirements of the 2005 VVSG. The following sections provide a list of each test and a brief description of each test. NTS personnel will utilize a combination of functional testing and TDP reviews to evaluate the system performance. (The tests are not in a specific sequence.)

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.1 Hardware Test Descriptions

Hardware tests are divided into two categories: Non-Operating and Operating. The Non-Operating tests are intended to simulate the storage and transport of equipment between the storage facility and the polling location. The Operating tests are intended to simulate conditions that the EUT may encounter during operation. Prior to and immediately following Non-Operating and Operating test, the EUT shall be subjected to an operational status check.

The Non-Operating tests include the following:

Low Temperature – This requirement addresses a range of tests for voting machines and precinct counters, as such devices are stored between elections and are transported between the storage facility and polling place, to meet specific minimum performance standards for low temperatures.

High Temperature – This test addresses a range of tests for voting machines and precinct counters, as such devices are stored between elections and are transported between the storage facility and polling place, to meet specific minimum performance standards for high temperature.

Humidity Test – This requirement addresses a range of tests for voting machines and precinct counters, as such devices are stored between elections and are transported between the storage facility and polling place, to meet specific minimum performance standards for humidity.

Vibration – This requirement addresses a range of tests for voting machines and precinct counters, as such devices are stored between elections and are transported between the storage facility and polling place, to meet specific minimum performance standards for vibration.

Bench Handling – The bench handling test simulates stresses faced during maintenance and repair of voting machines and ballot counters.

The Operating tests include the following:

Electromagnetic Radiation – This test verifies that radiated and conducted emissions from the voting system hardware do not exceed the allowable limits of Title 47CFR, Part 15, Class B. The test for electromagnetic radiation shall be conducted in compliance with the FCC Part 15 Class B requirements by testing per ANSI C63.4 (Volume II, Section 4.8.b).

Electrostatic Disruption – This test demonstrates the voting system's hardware to withstand electrostatic discharges during normal operation. This test is equivalent to the procedure of IEC 61000-4-2. The test for electrostatic disruption shall be conducted in compliance with the test specified in IEC 61000-4-2 (Volume II, Section 4.8.c).

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.1 Hardware Test Descriptions (Continued)

Electromagnetic Susceptibility – This test demonstrates the voting system's hardware to withstand radiated electromagnetic fields during normal operation. This test is equivalent to the procedure of IEC 61000-4-3. The test for electromagnetic susceptibility shall be conducted in compliance with the test specified in IEC 61000-4-3 (Volume II, Section 4.8.d.).

Conducted RF Immunity – This test demonstrates the voting system's hardware ability to withstand conducted RF energy on power and I/O lines during normal operation. This test is equivalent to the procedure of IEC 61000-4-6. The test for conducted RF immunity shall be conducted in compliance with the test specified in IEC 61000-4-6 (Volume II, Section 4.8.g).

Temperature Power Variation – The operational environmental test subjects the system hardware to varying temperatures and voltages, demonstrating hardware/data recording accuracy reliability Mean-Time-Between-Failure (MTBF) of 163 hours.

Maintainability – Maintainability represents the ease with which preventive and corrective maintenance actions can be performed based on the design characteristics of equipment and software and the processes the manufacturer and election officials have in place for preventing failures and for reacting to failures.

Electrical Supply – This requirement addresses the battery power source for providing electrical supply during a power failure.

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.1 Hardware Test Descriptions (Continued)

Table 6-1 OVS 1.3 Hardware Test Sequence

Test	Description	Procedure	Test Level	Specimen
Low Temperature	MIL-STD-810D minimum temperature shall be -4 degrees F	OP 18	Component	OVO
High Temperature	MIL-STD-810D, Method 501.2 maximum temperature shall be 140 degrees F	OP 19	Component	OVO
Humidity Test	MIL-STD-810D, Method 501.2 ten 24 hour humidity cycles	OP 20	Component	OVO
Vibration	MIL-STD-810D, Method 514.3 physical shock and vibration during handling and transport	OP 17	Component	OVO
Bench Handling	MIL-STD-810D, Method 516.3 Procedure VI six 4” drops on each edge totaling 24 drops	OP 16	Component	OVO
Electromagnetic Radiation	FCC Part 15 Class B for both radiated and conducted emissions	OP 9	Component	OVO
Electrostatic Disruption	IEC 61000-4-2 (1995-01) 15kV air discharge and 8kV contact discharge	OP 10	Component	OVO
Electromagnetic Susceptibility	IEC 61000-4-3 electromagnetic field of 10V/m modulated by a 1kHZ, 80% AM modulation at 80MHz to 1000MHz frequency	OP 11	Component	OVO
Conducted RF Immunity	IEC 61000-4-6 (1996-04) conducted radio frequency energy	OP 14	Component	OVO

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.1 Hardware Test Descriptions (Continued)

Table 6-1 OVS 1.3 Hardware Test Sequence (Continued)

Test	Description	Procedure	Test Level	Specimen
Temperature Power Variation	MIL-STD-810D, Method 502.2 and Method 501.2 163 hours at 50 degrees to 95 degrees	OP 21	Component	OVO
Maintainability	The ease with which preventive maintenance actions can be performed	OP 27	Component & Document	OVO & TDP Package
Electrical Supply	Meets voltage and power requirements of 2005 VVSG Vol. 1 Section 4.1.2.4	OP 29	Component	OVO

6.3.2 Software Test Descriptions

The software tests include the following:

Source Code Compliance Review – NTS qualified personnel will compare the source code to the manufacturer's software design documentation to ascertain how completely the software conforms to the manufacturer's specifications. Source code inspection shall also assess the extent to which the code adheres to the requirements in Section 5 of the EAC 2005 VVSG Volumes I and II.

Compliance Build of the System Software, Firmware, and Utilities – Before testing can begin, compliance builds of all the applications will be constructed by NTS personnel using the build environment, build documentation, and reviewed source code. This is to ensure the software being tested is constructed from the same source code that was reviewed.

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.2 Software Test Descriptions (Continued)

COTS Source Code Review – Unmodified, general purpose COTS non-voting software (e.g., operating systems, programming language compilers, database management systems, and web browsers) are not subject to the detailed examinations specified in this section; however, NTS personnel will examine such software to ensure that the specific version of software being used is identical to the design specification in order to confirm that the software has not been modified. NTS will verify by downloading the software directly from the manufacturer site, verifying against NRSL, or by being provided original OEM discs.

NTS qualified personnel may inspect the COTS generated software source code in preparation of test plans and to provide some minimal scanning or sampling to check for embedded code or unauthorized changes. For purposes of code analysis, the COTS units shall be treated as unexpanded macros.

The portions of COTS software that have been modified by the manufacturer in any manner are subject to review. Source code generated by a COTS package and embedded in software modules for compilation or interpretation will be provided in human readable form to NTS personnel to enable review.

Baseline of EMS Operating and Build Machine OS – NTS personnel will review the submitted NIST SCAP FDCC checklist for the EMS Operating System and Build Machine OS. The review will be performed for completeness, clarity, and consistency.

Security Source Code Review – The security source code review is a detailed review of the functionality of the source code that has been submitted. Both automated and manual reviews of the source code will be performed.

Trusted Build – The trusted build is a process of converting the reviewed source code into machine-readable binary instructions for a computer. This test will follow Section 5.6 of the EAC Testing and Certification Program manual.

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.2 Software Test Descriptions (Continued)

Table 6-2 OVS 1.3 Software Test Sequence

Test	Description	Procedure	Test Level	Specimen
Compliance Source Code Review	Source code review for compliance	NTSHVS14.2 OP 5a	Component	Source Code
Compliance Build	Using the build documents and source code to construct the EMS	NTSHVS14.3 OP 7b, OP 7c	Component	Source Code
Source Code COTS Review	Source code review to examine 3rd party products for modification and versions	NTSHVS14.2 OP 5d	Component	COTS Source Code
Baseline OS	RFI 2008-03 OS Configuration	NTSHVS14.3 OP 25	Component	NIST SCAP FDCC Checklist
Source Code Functional Review	Source code review for functionality and high level software design	NTSHVS14.2 OP 5b	Component & Integration	Source Code
Source Code Security Review (manual)	Source code review for specific security concerns augmented by an automated review	NTSHVS14.2 OP 5c OP 6a	Component & Integration	Source Code
Trusted Build	Creation and installation of the final system software	NTSHVS14.6 OP 7, OP 7a	Component	System software

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.3 System Testing

Physical Configuration Audit – The Physical Configuration Audit compares the voting system components submitted for qualification to the manufacturer's technical documentation, and shall include the following activities:

- Establish a configuration baseline of software and hardware to be tested and confirm whether manufacturer's documentation is sufficient for the user to install, validate, operate, and maintain the voting system
- Verify software conforms to the manufacturer's specifications, inspect all records of manufacturer's release control system, if changes have been made to the baseline version, verify manufacturer's engineering and test data are for the software version submitted for certification
- If the hardware is non-COTS, NTS will review drawings, specifications, technical data, and test data associated with system hardware to establish system hardware baseline associated with software baseline
- Review manufacturer's documents of user acceptance test procedures and data against system's functional specifications and resolve any discrepancy or inadequacy in manufacturer's plan or data prior to beginning system integration functional and performance tests
- Subsequent changes to baseline software configuration made during testing, as well as system hardware changes that may produce a change in software operation are subject to re-examination

Functional Configuration Audit – The functional configuration audit encompasses an examination of manufacturer's tests and the conduct of additional tests to verify that the system hardware and software perform all the functions described in the manufacturer's documentation submitted in the TDP. In addition to functioning according to the manufacturer's documentation, tests will be conducted to ensure all applicable EAC 2005 VVSG requirements are met. This testing is accomplished through a process called sequencing.

Sequencing is the act of navigating through the user interface to verify that the system performs as described by the manufacturer and does not violate any of the VVSG requirements. The path that the tester navigates follows the logical flow of accomplishing tasks required to conduct an election. For example, a task in conducting an election is to add a candidate. The tester will follow the flow of the user interface to add the candidate to a contest. If there are multiple ways to achieve this, then each method will be tested. This process will continue until all tasks for conducting an election are completed. Any paths, or combination of paths, that are determined to be at risk for failure that are outside of the normal flow of the interface will be tested on an individual basis.

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.3 System Testing (Continued)

TDP Review – The technical data package must be submitted as a precondition of national certification testing. These items are necessary to define the product and its method of operation, to provide technical and test data supporting the manufacturer's claims of the system's functional capabilities and performance levels, and to document instructions and procedures governing system operation and field maintenance. Any information relevant to the system evaluation shall be submitted to include source code, object code, and sample output report formats.

Accuracy – The accuracy test ensures that each component of the voting system can each process 1,549,703 consecutive ballot positions correctly within the allowable target error rate. The accuracy test is designed to test the ability of the system to "capture, record, store, consolidate, and report" specific selections and absences of a selection. The required accuracy is defined as an error rate. This rate is the maximum number of errors allowed while processing a specified volume of data. For paper-based voting systems, the ballot positions on a paper ballot must be scanned to detect selections for individual candidates and contests and the conversion of those selections detected on the paper ballot converted into digital data.

In an effort to achieve this and to verify the proper functionality of the units under test, the following methods will be used to test components of the voting system:

The accuracy requirements for the OVO will be met by the execution of the standard accuracy test.

- Stand-Alone Precinct Scanner – Tested by utilizing a combination of hand marked (70%) and pre-marked (30%) ballots to achieve accuracy rate greater than 1,549,703 correct ballot positions.

System Integration – System Level certification tests address the integrated operation of both hardware and software, along with any telecommunication capabilities. Compatibility of the voting system software components or subsystems with one another, and with other components of the voting system environment, shall be determined through functional tests integrating the voting system software with the remainder of the system.

Additionally, the system shall be configured exactly as it would for normal field use. This includes connecting all supporting equipment and peripherals including ballot boxes, voting booths (regular and accessible), and any physical security equipment such as locks and ties. NTS personnel will properly configure and test the system by following the procedures detailed in the OVS 1.3 voting system technical documentation.

Regression Testing – Regression Testing will be performed on all system components to verify all functional and firmware modifications made during the test campaign did not adversely affect the system and its operation.

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.3 System Testing (Continued)

NTS will verify the audit log records for error and exception activity to verify proper documentation and recovery action for all functional tests performed. A detailed listing of all audit log entries shall be provided by Unisyn in the TDP submitted. During testing, audit log entries will be compared to this list to ensure that all expected events are recorded. To ensure the system's ability to gracefully shutdown and recover from error conditions, negative test cases will be performed to introduce such error conditions. The error conditions introduced will be based on the system limits specified within the vendors TDP documentation.

Table 6-3 OVS 1.3 System Test Sequence

Test	Description	Procedure	Test Level	Specimen
Physical Configuration Audit	Audit hardware and software models and versions	NTSHVS14.3 OP 25	Component & System	System hardware and software
Functional Configuration Audit	Functional testing to the system documentation and EAC 2005 VVSG requirements	NTSHVS14.4 OP 26	Component & Integration	System
Technical Data Package (TDP) Review	Documentation review for compliance, correctness, and completeness	NTSHVS14.1 OP 3	Document	TDP package
Accuracy	Test of accuracy to ~1.6 million ballot positions per system component.	NTSHVS14.9 OP 41	System	System
System Integration	Test of all system hardware, software and peripherals.	OP 30	System	System

7.0 TEST OPERATIONS PROCEDURES

7.1 Proprietary Data

All proprietary data that is marked will be distributed only to those persons that the manufacturer or EAC identifies as needing the information to conduct qualification testing. The manufacturer is required to mark all proprietary documents as such. All organizations and individuals receiving proprietary documents will ensure those documents are not available to non-authorized persons.

APPENDIX A

PROJECT SCHEDULE

ID	Task Mode		Task Name	Duration	Start	Finish
1			**Test Plan**	**40 days**	**Mon 7/21/14**	**Mon 9/15/14**
2			Test Plan Creation	6 days	Mon 7/21/14	Mon 7/28/14
3			Test Plan Review by ILTS	2 days	Tue 7/29/14	Wed 7/30/14
4			Test Plan Submitted to EAC	0 days	Wed 7/30/14	Wed 7/30/14
5			EAC Test Plan Review	20 days	Thu 7/31/14	Wed 8/27/14
6			Test Plan Revision	2 days	Thu 8/28/14	Fri 8/29/14
7			Test plan Re-Submission	0 days	Fri 8/29/14	Fri 8/29/14
8			EAC Re-Review	10 days	Tue 9/2/14	Mon 9/15/14
9			**TDP Review**	**54 days**	**Wed 7/9/14**	**Tue 9/23/14**
10			**PCA**	2 days	Mon 7/14/14	Tue 7/15/14
11			**Source Code (initial for HW testing)**	**2 days**	**Mon 7/14/14**	**Tue 7/15/14**
12			Review Complete	1 day	Mon 7/14/14	Mon 7/14/14
13			Source Code Build	1 day	Tue 7/15/14	Tue 7/15/14
14			**System Setup**	**2 days**	**Wed 7/16/14**	**Thu 7/17/14**
15			**Hardware Testing EMI**	**8 days**	**Tue 9/2/14**	**Thu 9/11/14**
16			Electromagnetic Radiation	2 days	Tue 9/2/14	Wed 9/3/14
17			Electromagnetic Susceptibility	2 days	Thu 9/4/14	Fri 9/5/14
18			Electrostatic Disruption	1 day	Mon 9/8/14	Mon 9/8/14
19			Conducted RF Immunity	1 day	Fri 9/19/14	Fri 9/19/14
20			**Hardware Testing ENV**	**13 days**	**Fri 7/18/14**	**Tue 8/5/14**
21			Vibration	0.5 days	Fri 7/18/14	Fri 7/18/14
22			Bench Handling	0.5 days	Fri 7/18/14	Fri 7/18/14
23			Humidity	264 hrs	Fri 7/18/14	Tue 7/29/14
24			High Temperature	1 day	Wed 7/30/14	Wed 7/30/14
25			Low Temperature	1 day	Thu 7/31/14	Thu 7/31/14
26			**Temperature Power**	**80 hrs**	**Mon 9/15/14**	**Thu 9/18/14**
27			**Source Code Review - Functional Testing**	**3 days**	**Fri 9/12/14**	**Tue 9/16/14**
28			**Compliance Build - Functional Testing**	**1 day**	**Wed 9/17/14**	**Wed 9/17/14**
29			**FCA**	**8 days**	**Mon 9/22/14**	**Wed 10/1/14**
30			**Electrical Supply Test**	**1 day**	**Mon 9/22/14**	**Mon 9/22/14**
31			**Accuracy**	**4 days**	**Thu 10/2/14**	**Tue 10/7/14**
32			**Maintainability**	**1 day**	**Tue 9/23/14**	**Tue 9/23/14**
33			**System Intgration**	**5 days**	**Wed 10/8/14**	**Tue 10/14/14**

ID	Task Mode		Task Name	Duration	Start	Finish
34			**Trusted Build and EAC Package**	**1 day**	**Wed 10/15/14**	**Wed 10/15/14**
35			**Regression**	**1 day**	**Thu 10/16/14**	**Thu 10/16/14**
36			**Build and Tool Verification**	**2 days**	**Fri 10/17/14**	**Mon 10/20/14**
37			**Test Report**	**43 days**	**Fri 10/17/14**	**Thu 12/18/14**
38			Test Report Creation	7 days	Fri 10/17/14	Mon 10/27/14
39			Test Report to ILTS	2 days	Tue 10/28/14	Wed 10/29/14
40			Test Report Update	1 day	Thu 10/30/14	Thu 10/30/14
41			Report Submitted to EAC	0 days	Thu 10/30/14	Thu 10/30/14
42			EAC Review	20 days	Fri 10/31/14	Mon 12/1/14
43			Report Corrections	3 days	Tue 12/2/14	Thu 12/4/14
44			EAC Re-Review	10 days	Fri 12/5/14	Thu 12/18/14

APPENDIX B

CHANGE NOTES

Item Number	Module Affected	Modification
E-01	ALL	Cross Party Endorsement - All candidates to be assigned to more than one party affiliation. Straight ticket selection for any assigned party will select if all other conditions are met.
E-02	OCS, OVCS	Updated OS to CentOS 6.5 to support the new OCS hardware (Dell Latitude 5540 and Dell OptiPlex XE2)
E-03	BLM, OVO, OVCS. OVI	Increase number of digits in barcode for ballot style ID from 3 to 4. The 3 digit ballot style ID is no longer supported. This feature allows the system to support more ballot styles per election.
E-04	BLM, OVO, OVI, OVCS	Increase number of precinct ID digits from 4 to 5 on screen entry and in the barcode. The 4 digit precinct ID is no longer supported. This feature allows greater flexibility in precinct ID assignment.
E-05	EM	Add new options for OVI font size selection (large and small) and OVO show percentages on tally. This modification allows the user to set the options in EM.
E-06	OVI	Use EM option of Large or Small Font for the top of the OVI ballot (See E-05)
E-07	OVO	Use EM option 'Show percentages' to know if percentage values should be shown on the tally reports (See E-05)
E-08	TC, OVCS	Added the ability to hide/re-enable sessions
E-09	OVI	Changed the write-in character entry limit from 40 to 30 characters
E-10	OVI	Change Write-In Information format on Top of OVI Ballot to be designated by ** symbols to help with write-in extraction (via OCR) for the OVO write-in report.
E-11	OVO	Change Recount session to be contest specific.
E-12	OVO	Change Write-In Report to show Write-Ins extracted from OVI ballots.
E-13	OVO	After printing the Zero Count report for Pre-Init Precincts, a screen displays allowing the user to print an additional copy of the Zero Count report.
E-14	OVO	If election title is more than 3 lines, the title lines will be concatenated and wrapped as needed to display.
E-15	OVO	Add Party Designation for Primary Contests in Write In Report
E-16	OVO	During OVO close process, display screen requiring a Yes/No response from the user to print the Write-in Report.
E-17	OVO	Add OVO Write-in report defaulting to compressed images.

Item Number	Module Affected	Modification
E-18	BLM, OVO, OVCS	Add second barcode on the back side of two sided ballots. Added this feature to provide a validation that ballot style and page match.
E-19	BLM	Modified the "Keep Together" function which tries to keep all contests in a group in a single column to automatically move all contest in a group to the next column if necessary. This is a conditional column break, only moves to next column if necessary
E-20	BLM, OVI	Allow multiple contests headers per contest.
E-21	OVO	Change shape of the blade on the back side of the gate to enhance return of ballots
E-22	OVCS	A stop command has been introduced for the OVCS which allows the user to halt the scanning of ballots based upon any combination of invalid, no selection, write-in, overvote, and undervote ballots.
E-23	OVO,OVCS, EM, Tabulator, TR	Added the capability to count the number of blank ballots by a precinct and add the total to the tally. This count may be optionally printed on the OVO summary and/or printed on all reports that display the ballot count value.
E-24	TR	Added columns to the Statement of Votes Cast Report to show overvote/undervote counts by precinct and by contest.
E-25	OVI	On the OVI Summary Screen, if a contest is under voted, the background of the box containing the word "Undervote" is colored red to provide a color visual indicator of an undervote.
E-26	OVO/OVI	Software and election version information has been added to the machine info tape/screen as a standard part of the Open and Close tapes.
E-27	BLM	In a primary election, if a party specific ballot style is the functional equivalent of the Non-Partisan ballot style (All partisan contests are "NO CANDIDATES FILED" for ballot style), the ballot style should not be created/saved for the election and the party not included for that precinct when parties are selected on the OVI.
E-28	TR	An option has been added to allow data exported by CSV to be exported by Split instead of consolidating the data by "parent" ballot style.
HW-01	OVI	Introduced a new hinge to the OVI-VC which allows for adjustment of the viewing angle of the OVI-VC display.
HW-02	OVO	Introduced a new motherboard for use on OVO units to replace the current motherboard which has reached End of Life status.
HW-03	OVO	Introduced a new display for use on the OVO units to replace the current display which has reached End of Life Status.

APPENDIX C

COTS SOFTWARE TABLE

<u>The OVS 1.3 System includes the following COTS software which has been delivered by Unisyn:</u>
* NOTE: All hashes for COTS software were obtained from the COTS provider and then verified by NTS. All proprietary software developed by the manufacturer is built by NTS and the hashes are provided by NTS.

OCS and OVCS COTS Software Descriptions

Software Required For Testing	Software Version	Filename	Hash Value (MD5)
Java SE Development Kit	Development Kit 6 Update 2 for Linux	jdk-6u2-linux-i586.bin	6a488cb0a161a1c3a541a66e3b076f8e
Java SE Runtime Environment	Runtime Environment 6 Update 2	jre-6u2-linux-i586.bin	0d30636b5cd23e161da5eda9409f02d5
Java Cryptography Extension	Jurisdiction Policy Files 6	jce_policy-6.zip	b20f9d6ed14e55d73a5ed204bca01e7a
Apache Tomcat	6.0.13	apache-tomcat-6.0.13.tar.gz	50442a96332f0ec0cc1fba354f733ad6
PDI Scanner Driver and Libraries for OVCS	2.1.4	PS3_Canon_libraries_2014Jan06A.zip	6b28a3c6dccab539261ca96bd94dd1e5

COTS Operating System Software Descriptions

Software Required For Testing	Software Version	Filename	Hash Value (MD5)
Linux CentOS Distribution for OVS 1.3 (used for the OVO/OVI with old motherboard)	5.0	CentOS-5.0-i386-bin-1of6.iso CentOS-5.0-i386-bin-2of6.iso CentOS-5.0-i386-bin-3of6.iso CentOS-5.0-i386-bin-4of6.iso CentOS-5.0-i386-bin-5of6.iso CentOS-5.0-i386-bin-6of6.iso	f749d7e17fa01604b9956304efba2333; 963258ceafda5c5e6f79be86028b6b3d; a08ec9ccfdc89c24f3d6567219f90c42; b31c239009b780d1c89c311c192e43be; 0c3990be2271bf44c1495aa0003b5552; 9e6f91a5292f46b02777133765fc03fe
Linux CentOS Distribution (used for the OCS and OVCS)	5.7	CentOS-5.2-i386-bin-DVD.iso	c89db7f5294465d593e7b02c232e0e907 0111487
Linux CentOS Distribution (used for the OVO/OVI with new motherboard)	6.3	CentOS-6.3-i386-bin-DVD1.iso	0285160d8ba3cfc720ea55e98e464eac

OVO Third-Party Software (COTS) Descriptions

Software Required For Testing	Software Version	Filename	Hash Value (MD5)
Common Files			
Java SE Runtime Environment	Runtime Environment 6 Update 2	jre-6u2-linux-i586.bin	0d30636b5cd23e161da5eda9409f02d5
Java Cryptography Extension	Jurisdiction Policy Files 6	jce_policy-6.zip	b20f9d6ed14e55d73a5ed204bca01e7a
Apache Tomcat	6.0.13	apache-tomcat-6.0.13.tar.gz	50442a96332f0ec0cc1fba354f733ad6
PDI Scanner Driver and Libraries for OVO	6.3.32	PS3_Canon_libraries_2014Jan06A.zip	6b28a3c6dccab539261ca96bd94dd1e5
Citizen Printer for OVO	1.11.2.7	CSA_JPOS11127_setupEN.bin	d150d08693bf7dbe758adfdab94f655d
OpenCSV	2.3	opencsv-2.3-src-with-libs.tar.gz	d3423d8e3b0ae5c899cee32baa17a36f
Jetway J7F2			
openChrome Video Driver	0.2.900-7.el5	xf86-video-openchrome-0.2.900.tar.gz	3e36895eb4b4d61e21aa27d370f151c8
eGalax Touchscreen Driver	3.00.3719	eGalaxTouch-3.00.3719-32b-k26.tar.gz	51c835408093ccfc4055a9eab9537998
FVWM Desktop Window Manager	2.4.19	fvwm-2.4.19.tar.gz	a2fd2c07061303883d6bf89eb2b259ff
Jetway 2550			
Xenarc Touchscreen Driver	2.5.2107	eGTouch_v2.5.2107.L-x.tar.gz	cfb148b3997257ed0e4a8eb3fa6b3932
Linux Kernel	3.4.13	linux-3.4.13.tar.bz2	9c850d00c898ba792f29eb6a5973961c

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OVI Third-Party Software (COTS) Descriptions

Software Required For Testing	Software Version	Filename	Hash Value (MD5)
Common Files			
Java SE Development Kit	Development Kit 6 Update 2 for Linux	jdk-6u2-linux-i586.bin	6a488cb0a161a1c3a541a66e3b076f8e
Java SE Runtime Environment	Runtime Environment 6 Update 2	jre-6u2-linux-i586.bin	0d30636b5cd23e161da5eda9409f02d5
Java Cryptography Extension	Jurisdiction Policy Files 6	jce_policy-6.zip	b20f9d6ed14e55d73a5ed204bca01e7a
RXTX - Library and Jar	2.1-7r2	rxtx-2.1-7-bins-r2.zip	5f21ae633602a24fd3cdd096951476c2
Jetway J7F2			
openChrome Video Driver	0.2.900-7.el5	xf86-video-openchrome-0.2.900.tar.gz	3e36895eb4b4d61e21aa27d370f151c8
eGalax Touchscreen Driver	3.00.3719	eGalaxTouch-3.00.3719-32b-k26.tar.gz	51c835408093ccfc4055a9eab9537998
FVWM Desktop Window Manager	2.4.19	fvwm-2.4.19.tar.gz	a2fd2c07061303883d6bf89eb2b259ff
Jetway 2550			
Xenarc Touchscreen Driver	2.5.2107	eGTouch_v2.5.2107.L-x.tar.gz	cfb148b3997257ed0e4a8eb3fa6b3932
Linux Kernel	3.4.13	linux-3.4.13.tar.bz2	9c850d00c898ba792f29eb6a5973961c

Linux Build Machine Third-Party (COTS) Software Descriptions

Software Required For Testing	Software Version	Filename	Hash Value (MD5)
Java SE Development Kit	Development Kit 6 Update 2 for Linux	jdk-6u2-linux-i586.bin	6a488cb0a161a1c3a541a66e3b076f8e
Java 2 Enterprise Edition	1.3.01	j2sdkee-1_3_01-linux.tar.gz	224e9687c73ba48f1186e434368ec9b3
Java Cryptography Extension	Jurisdiction Policy Files 6	jce_policy-6.zip	b20f9d6ed14e55d73a5ed204bca01e7a
Apache Ant	1.7.0	apache-ant-1.7.0-bin.zip	ac30ce5b07b0018d65203fbc680968f5
Jasper Reports	2.0.5	jasperreports-2.0.5-project.zip	b80bd29e4f95f18bd15da65cfd45d1d2
SQL Connector	5.1.7	mysql-connnector-java-5.1.7.zip	f9a8008367f5b25bdec045c54100d5b0
Apache Axis	1.4	axis-bin-1_4.zip	9eda42bf82a274349f18c5affdd93608
Apache Commons Codec	1.3	commons-codec-current.zip	c30c769e07339390862907504ff4b300
Apache Commons Http	3.0	commons-httpclient-3.0.zip	42d96b0c7d627a2170fd57280476c8fe
Apache Commons File Upload	1.2	commons-fileupload-1.2-bin.zip	6fbe6112ebb87a9087da8ca1f8d8fd6a

Linux Build Machine Third-Party (COTS) Software Descriptions (Continued)

Software Required For Testing	Software Version	Filename	Hash Value (MD5)
Apache Commons IO	1.3.2	commons-io-1.3.2-bin.zip	ba31cc4a0d85842e4b0bfdf2472382ba
Apache Tag Library	1.1.2	jakarta-taglibs-standard-current.zip	f75c964f1b276b022c24a677ccc17d4d
PDF Help	4.92b23	pdfhelp.jar	f2542f332e5be4549a48f876d63ac915
Javazoom MP3	1.9.4	mp3spi1.9.4.zip	e259e7674d9b19e76f005cee2810e7f5
Citizen Printer for OVO	1.11.2.7	CSA_JPOS11127_setupEN.bin	d150d08693bf7dbe758adfdab94f655d
PDI Scanner Driver and Libraries for OVO and OVCS	2.1.4, 6.3.32	PS3_Canon_libraries_2014Jan06A.zip	6b28a3c6dccab539261ca96bd94dd1e5
RXTX - Library and Jar	2.1-7r2	rxtx-2.1-7-bins-r2.zip	5f21ae633602a24fd3cdd096951476c2
PDI Tool For Verification of Binary File	1.0	VisionX_11202008.EXE	af8905f015c7d7ff730b9f8b0811134b
Fonts for OCS	None	arial.zip; ARIALBD.zip; arialbi.zip; ariali.zip	c7f4d931da264bee5855cbf69630c81d; 589a0d88320f8a33dbcd4f2c1929ebce; b868660de8a00fe20f70970cca275038; 7968209fd0c62466a27fcde0f4104fec
Star 700II Printer	1.4.2_11-b06	starjavapos_linux_20070317.zip	172b1fcfecae654b00463be74efc7fbb

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