wyle laboratories
7800 Highway 20 West
Huntsville, Alabama 35806
Phone (256) 837-4411
Fax (256) 721-0144
www.wylelabs.com

Job No. T70987.01
Test Plan No. T70987.01-01 Rev B
August 8, 2013

CERTIFICATION TEST PLAN

Prepared for:

Manufacturer Name	Unisyn Voting Solutions, Inc.
Manufacturer System	OpenElect Voting System, Release 1.2
EAC Application No.	UNS1301
Manufacturer Address	2310 Cousteau Court, Vista, CA 92012

Stephen Han 8/8/13
Stephen Han, Test Plan Preparer

Frank Padilla 8/8/13
Frank Padilla, Voting Systems Manager

Robert Hardy 8/8/13
Robert D. Hardy, Department Manager

Raul Terceno 8/8/13
Raul Terceno, Q.A. Manager

COPYRIGHT BY WYLE. THE RIGHT TO REPRODUCE, COPY, EXHIBIT, OR OTHERWISE UTILIZE ANY OF THE MATERIAL CONTAINED HEREIN WITHOUT THE EXPRESS PRIOR PERMISSION OF WYLE IS PROHIBITED. THE ACCEPTANCE OF A PURCHASE ORDER IN CONNECTION WITH THE MATERIAL CONTAINED HEREIN SHALL BE EQUIVALENT TO EXPRESS PRIOR PERMISSION. WYLE SHALL HAVE NO LIABILITIY FOR DAMAGES OF ANY KIND TO PERSON OR PROPERTY, INCLUDING SPECIAL CONSEQUENTIAL DAMAGES, RESULTING FROM WYLE'S PROVIDING THE SERVICES COVERED BY THIS REPORT.

NVLAP LAB CODE 200771-0

U.S. Election Assistance Commission VSTL
EAC Lab Code 0704

wyle laboratories			**REPORT NO.** Test Plan T70987.01-01 Rev B
			DATE August 8, 2013
REV	DATE	PAGE OR PARAGRAPH AFFECTED	DESCRIPTION OF CHANGES
---	6-27-13	Entire Document	Original Release
A	7-18-13	Entire Document	Changes are highlighted
B	8-8-13	Entire Document	Highlights are removed

TABLE OF CONTENTS

1. INTRODUCTION 1

1.1 Scope 1
1.2 References 2
1.3 Terms and Abbreviations 3
1.4 Testing Responsibilities 4
1.4.1 Project Schedule 4
1.4.1.1 Owner Assignments 4
1.4.1.2 Test Case Development 4
1.4.1.3 Test Procedures and Validation 4
1.4.1.4 Third-Party Tests 4
1.4.1.5 EAC and Manufacturer Dependencies 4
1.5 Target of Evaluation Description 4
1.5.1 System Overview 5
1.5.2 Block Diagram 9
1.5.3 System Limits 10
1.5.4 Supported Languages 11
1.5.5 Supported Functionality 11
1.5.6 VVSG 12
1.5.7 Beyond VVSG 12

2.0 PRE-CERTIFICATION TESTING AND ISSUES 12

2.1 Evaluation of Prior VSTL Testing 12
2.2 Known Field Issues 13

3.0 MATERIALS REQUIRED FOR TESTING 13

3.1 Software 13
3.2 Equipment 17
3.3 Test Support Materials 20
3.4 Deliverable Materials 21

4.0 TEST SPECIFICATIONS 22

4.1 Requirements (Strategy of Evaluations) 24
4.1.1 Rationale for 'Not Applicable' Requirements 26
4.2 Hardware Configuration and Design 26
4.3 Software System Functions 27
4.4 Test Case Design 27
4.4.1 Hardware Qualitative Examination Design 28
4.4.2 Software Module Test Case Design and Data 30
4.4.3 Software Functional Test Case Design and Data 30
4.4.4 System-Level Test Case Design 31
4.5 Security Functions 32
4.6 TDP Evaluation 33
4.7 Source Code Review 34
4.8 QA and CM System Review 35

TABLE OF CONTENTS (Continued)

5.0 TEST DATA…… 35

5.1 Test Data Recording 35
5.2 Test Data Reduction 35

6.0 TEST PROCEDURE AND CONDITIONS 36

6.1 Facility Requirements 36
6.2 Test Set-Up 37
6.3 Test Sequence 44
6.3.1 Hardware Test Description 44
6.3.2 Software Test Description 45
6.3.3 System Testing 46

7.0 TEST OPERATIONS PROCEDURES 50

7.1 Proprietary Data 50

APPENDICES

APPENDIX A UNISYN PROJECT SCHEDULE……..A-1

1.0 INTRODUCTION

The purpose of this National Certification Test Plan (Test Plan) is to document the procedures that Wyle Laboratories, Inc., will follow to perform certification testing of the Unisyn Voting Solutions (Unisyn), OpenElect Voting System Release 1.2 (OVS 1.2), 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 1.2 to the requirements of the EAC 2005 VVSG.

1.1 Scope

The purpose of this modification is to introduce the upgrade from the OVS 1.1 to the OVS 1.2 system. The system modifications will include both hardware and software upgrades from the previously certified system.

1. OpenElect Central Suite (OCS) Election Management System (EMS) – Software upgrades
2. OpenElect Voting Optical (OVO) – Hardware and Software Upgrades
3. OpenElect Voting Interface (OVI) – Hardware and Software Upgrades
4. OpenElect Voting Central Scan (OVCS) – Software Upgrades

This update includes the addition of key items to base level functionality that improves the general usability of the system for both current and potential customers. These additions include improved flexibility of generating ballot PDFs, including adding of custom artwork to ballots, increasing the number of layout options for candidate data, and allowing both left or right hand side targets.

Additional functionality was added to improve efficiency for loading election data on the in-precinct units and removing the necessity of networking the OVI/OVO systems to the Election Loader. Additional functionality was added to allow customers to predefine precinct definitions to remove the need for header cards, and the addition of consolidated session that accept all ballot styles.

A comprehensive redesign of the OVI voter interface was performed with the purpose of addressing formatting and usability requests from current customers and the ADA community thereby addressing items such as layout, screen structure, application flow, magnification, and brightness.

Customer feedback was used to improve the look and usability of election night reports, as well as inputting manual adjustments. A CSV export was also added, providing a comma delimited representation of the election: by precinct, by candidate, and by vote type (absentee, election day etc.)

Additional interface changes were made and options added throughout to generally enhance the usability of the system. These changes were based on Election Day observations of system usage in the field or in response to state specific election code.

Various hardware changes were introduced to keep pace with both current and expected obsolescence of system components.

Preliminary EMI Quick Scans were performed on the OVO and OVI units for comparison to the baseline emissions noted during prior test campaigns. Based on the results of the quick scans, Wyle will re-test the OVO and OVI and accept some of the previous hardware tests as noted in tables 4-2 and 4-3.

The complete system shall be tested in a full system integration test to ensure all components interact properly in the current system configurations.

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

1.0 INTRODUCTION

1.2 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, effective date January 1, 2007
- Election Assistance Commission Voting System Test laboratory Program Manual, Version 1.0, effective date July 2008
- 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
- Wyle Laboratories' Test Guidelines Documents: EMI-001A, "Wyle Laboratories' 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"
- Wyle Laboratories' Quality Assurance Program Manual, Current Revision
- Wyle Laboratories Quality Assurance Manual, Current Revision
- 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 www.eac.gov)
- EAC Notices of Clarification (listed on www.eac.gov)
- EAC Quality Monitoring Program residing on:

  http://www.eac.gov/testing_and_certification/quality_monitoring_program.aspx

A listing of the OVS 1.2 System Technical Data Package (TDP) documents submitted for this certification test effort is listed in Section 4.6, TDP Evaluation table 4-4.

(The remainder of this page intentionally left blank)

1.0 INTRODUCTION (Continued)

1.3 Terms and Abbreviations

This subsection defines all terms and abbreviations applicable to the development of this Test Plan.

Table 1-1 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	Voter interface designed to not require visual reading of a ballot. It is available on the OVI.
Configuration Management	CM	---
Commercial Off the Shelf	COTS	Commercial, readily available hardware or software
Direct Record Electronic	DRE	---
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	The Election Management System equivalent for the OVS 1.2 System.
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.
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. A trusted build of the executable system is performed to ensure the certified release is built from tested components.
Quality Assurance	QA	---
System Under Test	SUT	---
Test Case Procedure Specifications	TCPS	Wyle-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.
Wyle Operating Procedure	WoP	Wyle Test Method or Test Procedure.

1.0 INTRODUCTION (Continued)

1.4 Testing Responsibilities

All core and non-core software and hardware certification testing will be conducted under the guidance of Wyle Laboratories, Inc., by personnel verified by Wyle to be qualified to perform the testing.

1.4.1 Project Schedule

This information is contained in a Wyle-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.

1.4.1.1 Owner Assignments

This information is contained in a Wyle generated Microsoft Project schedule. This schedule is presented in Appendix A "Unisyn Project Schedule."

1.4.1.2 Test Case Development

Wyle will utilize the "Wyle Baseline Test Cases" for the Functional Configuration Audit (FCA), Usability and System Integration Tests. These will be augmented with specially designed test cases tailored to the Unisyn OVS 1.2. Wyle has designed specific election definitions for the Operational Status Check and Accuracy Tests.

1.4.1.3 Test Procedure Development and Validation

Wyle will utilize the Wyle Operating Procedures (WoPs) during the duration of this test program. The validated WoPs have been previously submitted to the EAC for review.

1.4.1.4 Third-Party Testing

Wyle will not utilize any 3rd party testing during performance of the Unisyn OVS 1.2 System test campaign.

1.4.1.5 EAC and Manufacturer Dependencies

This information is contained in a Wyle generated Microsoft Project schedule. This schedule is presented in Appendix A "Unisyn Project Schedule."

1.5 Target of Evaluation Description

The following sections address the design methodology and product description of the OVS 1.2 System, as taken from the Unisyn technical documentation.

(The remainder of this page intentionally left blank)

1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.1 System Overview

The Unisyn OVS 1.2 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 1.2 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.

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 remainder of this page intentionally left blank)

1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.1 System Overview (Continued)

<u>Precinct Ballot Tabulator: OpenElect Voting Optical (OVO)</u>

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.

Photograph No. 1
OVO on Metal Ballot Box

Photograph No. 2
OVO on Plastic Ballot Box

(The remainder of this page intentionally left blank)

1.0 INTRODUCTION (Continued)

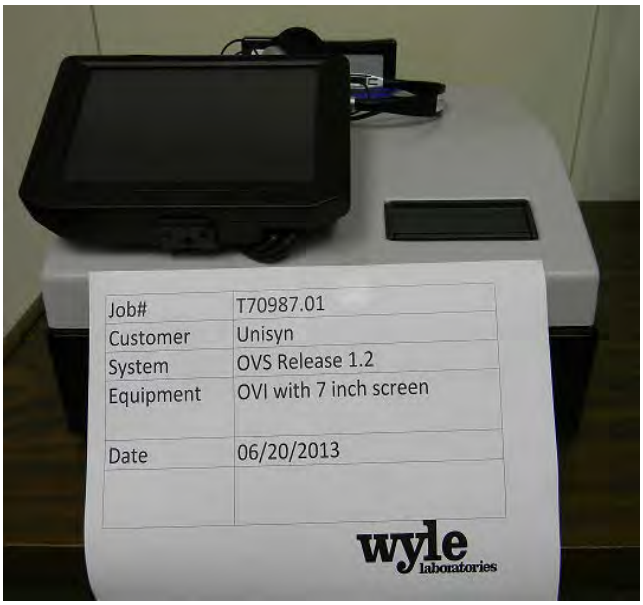
1.5 Target of Evaluation Description (Continued)

1.5.1 System Overview (Continued)

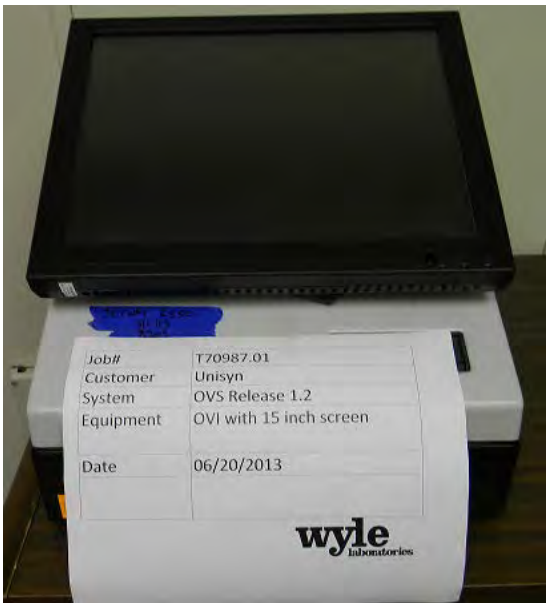
<u>Precinct Voting Device: OpenElect Voting Interface (OVI)</u>

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/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-n-puff, zoom-in ballot function and audio assistance for the visually impaired. The OVI provides for write-in candidates when authorized. 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.



Photograph No. 3
OVI with 7 Inch Screen



Photograph No. 4
OVI with 15 Inch Screen

(The remainder of this page intentionally left blank)

1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

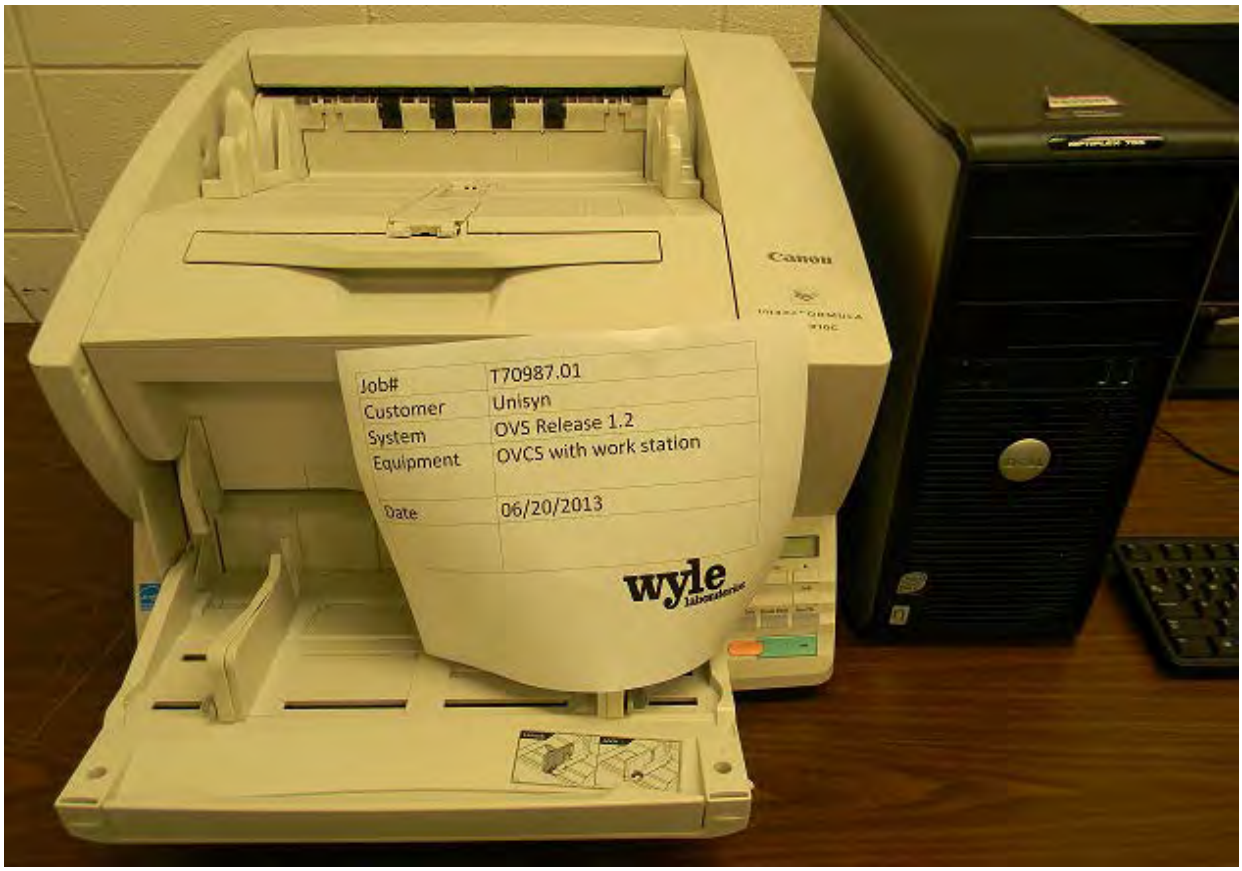
1.5.1 System Overview (Continued)

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.



Photograph No. 5
Canon DR-X10C Scanner and OVCS Workstation

1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.2 Block Diagram

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

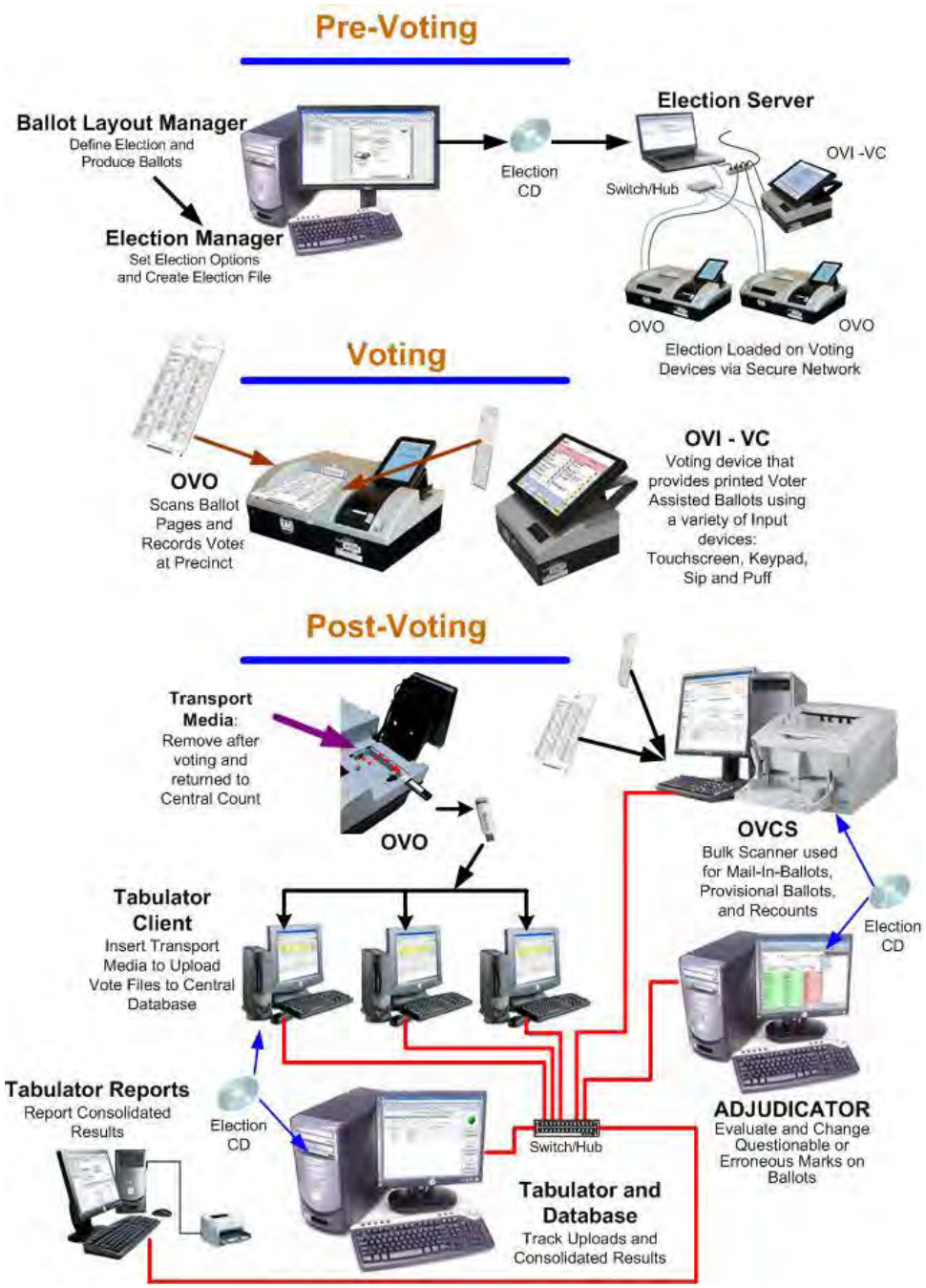


Figure 1-1 System Overview Diagram

1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.3 System Limits

The system limits that Unisyn has stated to be supported by the OVS 1.2 are compiled in the Tables 1-2 and 1-3.

Table 1-2 OVS 1.2 System Limits

Limit (Max # of)	Value
Elections	8
Precincts	2000
Splits per Precinct	9
Districts	400
Contest per District	20
Parties	24
Parties in Primary	12
Parties w/ Straight Ticket	12
District types	25
Languages	15
Ballot styles per Election	400
Contests per Election	150
Measures per Election	30
Instruction Blocks per Election	5
Headers per Election	50
Candidates per Contest	120
Vote for N of M	25
Ballots sheets per OVO	5000
Ballots processed (Ballot Box)	700
Units simultaneously loading	20
Precincts initialized per OVO	30
Precincts initialized per OVO in early voting	2000

Table 1-3 Unisyn OVS 1.2 Ballot Target Limits

Ballot Length	Maximum Positions (Row x Column)
11 inch	38 x 3
14 inch	50 x 3
17 inch	62 x 3
19 inch	70 x 3

(The remainder of this page intentionally left blank)

1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.4 Supported Languages

The following languages have been stated by Unisyn to be supported by the OVS 1.2:

- Armenian
- Cambodian
- Chinese (2 dialects supported)
  - Cantonese
  - Mandarin
- English
- Japanese
- Korean
- Russian
- Spanish
- Tagalog
- Vietnamese

Note: All stated languages will be verified to be supported; however, only English and Spanish ballots will be cast during functional testing. Wyle will test English, Spanish, and one character based language (Chinese) during System Integration Testing. Wyle will not be testing the accuracy of the translation of English to Spanish or English to Chinese.

1.5.5 Supported Functionality

The OVS 1.2 is designed to support the following voting variations:

- General Elections
- Closed primaries
- Open primaries
- Early Voting
- Primary presidential delegation nominations
- Partisan offices
- Non-partisan offices
- Write-in voting
- Straight ticket voting
- Presidential-only voting
- Ballot rotation
- Split precincts
- Multi-page ballots

1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.5 Supported Functionality (Continued)

- Multiple selection contests: vote for N of M
- Procedures for and tabulation of Provisional or challenged ballots
- Procedures for and tabulation of Absentee ballots
- Recount tabulation
- Ranked Choice Voting (RCV)
- Vote by Ballot Style

1.5.6 VVSG

The OVS 1.2 will be tested to all applicable EAC 2005 VVSG requirements.

1.5.7 Beyond VVSG

Based on the scope of this modification, no additional test results have been submitted for consideration as part of this test campaign.

2.0 PRE-CERTIFICATION TESTING AND ISSUES

Currently, no pre-certification testing has been completed. Per EAC Notice of Clarification (NOC) 09-001, Wyle views the Certification Test Plan as a living document. It will be updated with "As Run" testing and resubmitted to the EAC as major areas of testing have been completed.

Wyle has performed the first pass review for all source code submitted by Unisyn for OVS Release 1.2 voting system. The issues with compliance to the EAC 2005 VVSG were reported back to the manufacturer for resolution. Subsequent submissions will be reviewed by comparing the new submission against the last submission to ensure all documented issues are resolved before the source code review is completed.

An initial Technical Data Package (TDP) review was performed on the Unisyn OVS Release 1.2 voting system documents submitted as their TDP to determine compliance with the EAC 2005 VVSG and EAC requirements. Wyle found some documents were missing or included partial information, and the existing documentation contained information which was not consistent throughout the Unisyn TDP. The results were reported to Unisyn for resolution. Unisyn has subsequently revised and resubmitted the TDP. Wyle is performing a review of these documents and will submit the results to Unisyn as documented in Section 4.6 TDP Evaluation. Any incidences of non-certification issues (editing issues such as spelling or formatting) will be noted to Unisyn as informational comments for them to decide whether to address them.

2.1 Evaluation of Prior VSTL Testing

Wyle will reutilize all previous testing from the approved Wyle Laboratories previously performed testing to the EAC 2005 VVSG during the OVS 1.0, 1.0.1, and 1.1 approved certification testing (EAC CERTIFICATION NUMBERS – UNS10121966-OE, UNS10121966-OE-WI, and UNS10121966-OE-1.1). A breakdown of this information is provided in the Tables 4-2 and 4-3 located in Section 4.4.1.

2.0 PRE-CERTIFICATION TESTING AND ISSUES (Continued)

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.

3.0 MATERIALS REQUIRED FOR TESTING

The materials required for certification testing of the OVS 1.2 voting system include software, hardware, test materials, and deliverable materials to enable the test campaign to occur will be delivered by Unisyn to Wyle Laboratories.

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 security and system integration; as well as supporting software required for the test environment including compilers, assemblers, and database managers, etc. Both COTS and non-COTS software components are listed in this section.

Table 3-1 OCS Software Submitted for Testing

Software Required For Testing	Software Version
Proprietary Software	
Adjudicator	1.2.0
Ballot Layout Manager	1.2.0
Common (Library)	1.2.0
Election Manager	1.2.0
Election Server	1.2.0
OCS Installer	1.2.0
Regkey Builder	1.2.0
Software Server	1.2.0
Tabulator	1.2.0
Tabulator Client	1.2.0
Tabulator Reports	1.2.0
OVCS Application	1.2.0
OVI Firmware	1.2.0
OVO Firmware	1.2.0
Scripter	1.2.0
Validator	1.2.0
Logger (Library)	1.2.0

(The remainder of this page intentionally left blank)

3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.1 Software (Continued)

The OCS and OVCS software relies on the third party (COTS) software applications listed in Table 3-2.

Table 3-2 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	2.1.3	PS3_Canon_libraries_2013June19_B.zip	bcbd6ed14376bfa46e3f1b7f59f57221

Table 3-3 lists the COTS Operating Systems used in the Unisyn OVS Build Environments as well as the Operating Systems used for the Unisyn OCS and OVCS Applications.

Table 3-3 COTS Operating System Software Descriptions

Software Required For Testing	Software Version	Filename	Hash Value (MD5)
Linux CentOS Distribution for OVS 1.2 (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	**SHA-1:** c89db7f5294465d593e7b02c232e0e907 0111487
Linux CentOS Distribution (used for the OVO/OVI with new motherboard)	6.3	CentOS-6.3-i386-bin-DVD1.iso	0285160d8ba3cfc720ea55e98e464eac

(The remainder of this page intentionally left blank)

3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.1 Software (Continued)

The OVO includes the third-party (COTS) software listed in Table 3-4.

Table 3-4 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_2013June19_B.zip	bcbd6ed14376bfa46e3f1b7f59f57221
Citizen Printer for OVO	1.11.2.7	CSA_JPOS11127_setupEN.bin	d150d08693bf7dbe758adfdab94f655d
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

(The remainder of this page intentionally left blank)

3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.1 Software (Continued)

The OVI includes the third-party (COTS) software listed in Table 3-5.

Table 3-5 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

The Linux Build Machine includes the third-party (COTS) software listed in Table 3-6.

Table 3-6 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

3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.1 Software (Continued)

Table 3-6 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	2.1.3, 6.3.32	PS3_Canon_libraries_ 2013June19_B.zip	bcbd6ed14376bfa46e3f1b7f59f57221
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

3.2 Equipment

This subsection categorizes the equipment the manufacturer has submitted for testing. Each test element is included in the list of the equipment required for testing of that element, including system hardware, general purpose data processing and communications equipment, and any required test instrumentation.

Every effort is made to verify that the COTS equipment has not been modified for use. Wyle will perform research using the COTS equipment manufacturers' websites based on the serial and service tag numbers for each piece of equipment and will evaluate COTS hardware, system software and communications components for proven performance in commercial applications other than elections. For PCs, laptops, and servers, the service tag information is compared to the system information found on each machine. Physical external and internal examination is also performed to the best of Wyle Laboratories' abilities when the equipment is easily accessible without the possibility of damage. Hard drives, RAM memory, and other components are examined to verify that the components match the information found on the COTS equipment manufacturers' websites.

(The remainder of this page intentionally left blank)

3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.2 Equipment (Continued)

Table 3-7 OVO Equipment

Equipment	Manufacturer	Model	Serial Number
OVO	Unisyn	OpenElect Voting Optical, Rev. E	UNI000037
OVO	Unisyn	OpenElect Voting Optical, Rev. E	UNI000049
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	UNI000044
OVO Ballot Box	Unisyn	Plastic	BB-58650-001
OVO Ballot Box	Unisyn	Plastic	T70987-BB01
OVO Ballot Box	Unisyn	Metal	T56285-BB01
OVO Ballot Box	Unisyn	Metal	T70987-BB02

Table 3-8 OVI Equipment

Equipment	Manufacturer	Model	Serial Number
OVI 7”	Unisyn	OpenElect Voting Interface, Rev. G	UNI150010
OVI 7”	Unisyn	OpenElect Voting Interface, Rev. F	UNI150037
OVI 7”	Unisyn	OpenElect Voting Interface, Rev. F	UNI150049
OVI 15”	Unisyn	OVI-VC, Rev. A	UNI150012
OVI 15”	Unisyn	OVI-VC, Rev. B	UNI203030
OVI 15”	Unisyn	OVI-VC, Rev. B	UNI203050

Table 3-9 OVCS Equipment

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

(The remainder of this page intentionally left blank)

3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.2 Equipment (Continued)

Table 3-10 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	2Y8BGX1	COTS
PC 3	Dell Optiplex 755	Processor: Intel Core2Duo E7200 2.53Ghz Memory: 4x 1GB 800Mhz RAM Hard Drive Capacity:250GB (Mirrored)	G5HW3J1	COTS
Laptop 1	Dell Latitude e5530	Processor: Intel Core i7-3540m 3.0Ghz Memory: 2x 4GB 1600Mhz RAM Hard Drive Capacity: 500GB	6QRGKX1	COTS
Laptop 2	Dell XPS m1530	Processor: Intel Core2Duo T7500 2.2Ghz Memory: 1x 4GB 667Mhz RAM Hard Drive Capacity: 320GB	5V9DYF1	COTS

Table 3-11 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-T58650-001
Headphones	Koss	KPH5	HP-T58650-002
Sip & Puff	Origin Instruments	AirVoter	005954
UPS	Minuteman	Entrust Series ETR1500	AE580906PA106
UPS	Minuteman	Entrust Series ETR1500	AE580906PA114
UPS	Minuteman	Entrust Series ETR1500	TBD
UPS	Minuteman	Entrust Series ETR1500	TBD
20 x Transport Media	STEC	Thumb Drive (UFD) 1GB Capacity	TBD
3 x Thumb Drives	PNY	USB 16 GB	TBD
Network Switch	Linksys	SR2024 Business Series 24-Port 10/100/1000 Gigabit Switch	REM30H600558 GGR1807 JJ
Dot Matrix Printer	Okidata	Microline 186	TBD
External DVD-RW Drive	Pioneer	DVR-X162Q	IDFW002121UC
ADA Voting Booth	American Made Election Equipment (AMEE)	Model 2000	T70987-VB01

3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.2 Equipment (Continued)

Table 3-12 OVS 1.2 Build Equipment

Equipment and Operating System	Manufacturer	Version/Model	Serial Number	COTS /Non-COTS
OVO Linux OS Build Machine – TBD	Jetway	Processor: VIA Nano-BGA 1.5GHz Memory: 1GB Hard Drive Capacity: 320GB	TBD	COTS
OVI Linux OS Build Machine – TBD	Jetway	Processor: VIA Nano-BGA 1.5GHz Memory: 1GB Hard Drive Capacity: 320GB	TBD	COTS
Application Build Machine – TBD	Jetway	Processor: VIA Nano-BGA 1.5GHz Memory: 1GB Hard Drive Capacity: 320GB	TBD	COTS
Extra Hard Drives x 3	TBD	TBD	TBD	TBD

3.3 Test Support Materials

This subsection enumerates any and all test materials needed to perform voting system testing. The scope of testing determines the quantity of a specific material required.

Table 3-13 Test Support Materials

Test Material	Quantity	Make	Model
50 CD-R Spindle	1	Memorex	TBD
25 DVD-R Spindle	1	Memorex	TBD
Box of Dot matrix printer paper	1	N/A	Printer paper
Box of OVI Paper Rolls	1	N/A	OVI Printer Paper
Box of OVO Paper Rolls	3	N/A	OVO Printer Paper
Security zip ties	1 bag	TBD	TBD
Security seals	1 bag	TBD	TBD

(The remainder of this page intentionally left blank)

3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.4 Deliverable Materials

The materials listed in Table 3-14 are to be delivered as part of the OVS 1.2 voting system to the users:

Table 3-14 Deliverable Materials

Deliverable Material	Version	Description
OCS	1.2	EMS software suite
OVO	1.2	Precinct ballot scanner
OVI	1.2	Accessible voting station
OVCS	1.2	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	1.2	TDP Document
04-00459 System Maintenance Procedures	1.0	TDP Document
04-00454 Quality Assurance Plan	1.0	TDP Document
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	1.7	TDP Document
04-00503 OVS Paper Specification	1.0	TDP Document
04-00513 System HW Verification	1.0	TDP Document
04-00530 Adjudicator User Guide	1.0	TDP Document

(The remainder of this page intentionally left blank)

4.0 TEST SPECIFICATIONS

Modification testing of the OVS 1.2 is the configuration submitted in the EAC application UNS1301. Wyle Laboratories' qualified personnel will ensure that all certification testing performed on the manufacturer's voting system follows Wyle Laboratories' procedures for testing and the specific test cases to ensure the requirements of the EAC 2005 VVSG and EAC Testing and Certification Program Manual are met.

Below is a list of EAC Request for Interpretations (RFI) and Notice of Clarifications (NOC) that will be incorporated in the test campaign:

Request for Interpretations (RFI)

RFI 2013-02 EAC Decision on Audio Presentation Volume Levels

RFI 2013-01 EAC Decision on the Extensions Clause

RFI 2012-06 EAC Decision on Use of Public Telecommunications Networks and Data Transmission

RFI 2012-05 EAC Decision on Public Telecommunications and Cryptography

RFI 2012-04 EAC Decision on Software Setup Validation

RFI 2012-03 EAC Decision on Configuration of COTS Products

RFI 2012-02 EAC Decision on Transmission of Results (Official and Unofficial Results)

RFI 2012-01 EAC Decision on Ballot Handling – Multi-feed

RFI 2010-08 EAC Decision on Calling Sequence

RFI 2010-07 EAC Decision on Module Length

RFI 2010-06 EAC Decision on DRE Accessibility Requirements and Other Accessible Voting stations

RFI 2010-05 EAC Decision on Testing of Modifications to a Certified System

RFI 2010-04 EAC Decision on Functional Requirements with Respect to Security

RFI 2010-03 EAC Decision on Database Coding Conventions

RFI 2010-01 EAC Decision on Voltage Levels and ESD Test

RFI 2009-06 EAC Decision on Temperature and Power Variation

RFI 2009-05 EAC Decision on T-Coil Requirements

RFI 2009-04 EAC Decision on Audit Log Events

RFI 2009-03 EAC Decision on Battery Backup for Central Count Systems

RFI 2009-02 EAC Decision on Alternate Languages

RFI 2009-01 EAC Decision on VVPAT Accessibility New

RFI 2008-12 EAC Decision on Ballot Marking Device/Scope of Testing

RFI 2008-10 EAC Decision on Electrical Fast Transient

RFI 2008-09 EAC Decision on Safety Testing

RFI 2008-08 EAC Decision on Automatic Bar Code Readers

RFI 2008-07 EAC Decision on Zero Count to Start Election

RFI 2008-06 EAC Decision on Battery Backup for Central Count

RFI 2008-05 EAC Decision on Durability

4.0 TEST SPECIFICATIONS (Continued)

RFI 2008-04 EAC Decision on Supported Languages

RFI 2008-03 EAC Decision on OS Configuration

RFI 2008-02 EAC Decision on Battery Backup for Optical Scan Voting Machines

RFI 2008-01 EAC Decision on Temperature and Power Variation

RFI 2007-06 EAC Decision on Recording and Reporting Undervotes

RFI 2007-05 EAC Decision on Testing Focus and Applicability

RFI 2007-04 EAC Decision on Presentation of Alternative Language

RFI 2007-03 EAC Decision on Summative Usability Testing

RFI 2007-02 EAC Decision on Variable Names

RFI 2007-01 EAC Decision on Accessible Design

Notice of Clarifications (NOC)

NOC 2012-02 Clarification of System Identification Tool Functionality

NOC 2012-01 Clarification of COTS Product Equivalency for De Minimis Change

NOC 2011-01 Clarification of De Minimis Change Determination Requirements Related to Data

NOC 2009-005 Development and Submission of Test Plans for Modifications to EAC Certified Systems

NOC 2009-004 Development and Submission of Test Reports

NOC 2009-003 De Minimis Change Determination Requirement

NOC 2009-002 Laboratory Independence Requirement

NOC 2009-001 Requirements for Test Lab Development and Submission of Test Plans

NOC 2008-003 EAC Conformance Testing Requirements

NOC 2008-002 EAC Mark of Certification

NOC 2008-001 Validity of Prior Non-core Hardware Environmental and EMC Testing

NOC 2007-005 Voting System Test Laboratory Responsibilities in the Management and Oversight of Third Party Testing

NOC 2007-004 Voting System Manufacturing Facilities

NOC 2007-003 State Testing Done in Conjunction with Federal Testing within the EAC Program

NOC 2007-002 VSTL Work with Manufacturers Outside of Voting System Certification Engagements

NOC 2007-001 Timely Submission of Certification Application

(The remainder of this page intentionally left blank)

4.0 TEST SPECIFICATIONS (Continued)

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 Volume I sections, 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 test utilizing the "Wyle Baseline Test Cases" along with test cases specially designed for the Unisyn OVS 1.2 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 be tested during the Usability Test utilizing a combination of the "Wyle Baseline Test Cases" and the "Wyle Baseline Usability Test Cases." The data input during this test will be the predefined election definitions submitted as part of the Test Plan Package.
- **Section 4: Hardware Requirements** – The requirements in this section will be tested and/or evaluated by trained Wyle personnel per sections 4.4.2 and the table in section 6.
- **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** – A test of the telecommunication technologies utilized by the Unisyn OVS 1.2 will be tested for data accuracy and correctness by analyzing the packet level information being transmitted. The telecommunications testing is limited to the closed network used in the Unisyn OVS 1.2 voting system. Section 6.2.6 will be excluded since the OVS 1.2 does not support the use of public networks.
- **Section 7: Security Requirements** – The requirements in this section will be tested during source code review, FCA, System Integration, and Security Tests. The requirements for this section that pertain to security for the use of public telecommunications by the voting system will be excluded. The OVS 1.2 does not support the use of public networks.
- **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. Wyle Laboratories' 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 Wyle 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.
- **Section 9: Configuration Management (CM) Requirements** – The requirements in this section will be tested throughout the test campaign. TDP review will 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. During source code review, Wyle Laboratories' qualified personnel will verify that Unisyn is following EAC 2005 VVSG CM requirements as well as Unisyn CM requirements. Any anomalies will be formally reported to Unisyn and the EAC. All equipment received for testing will be checked against Unisyn documentation to ensure their CM process is being followed.

4.0 TEST SPECIFICATIONS (Continued)

4.1 Requirements (Strategy of Evaluation)

Wyle Laboratories' 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 Wyle Test Cases or Wyle Operating Procedures (WoPs) pertaining to the test environment, the equipment arrangement and method of operation, the specified test procedure, or the provision of test instrumentation and facilities, 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 provided and approved by the Project Engineer and Program Manager.)

Wyle Laboratories utilizes 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. Wyle Laboratories 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.

The designated WoPs for this program are listed below together with the identification and a brief description of the hardware and software to be tested and any special considerations that affect the test design and procedure.

The specific Wyle WoPs to be used during testing include the following:

- WoP 1 Operations Status Checks
- WoP 2 Receipt Inspection
- WoP 3 Technical Data Package Review
- WoP 4 Test Plan Preparation *(This document)*
- WoP 5a-d Source Code Review
- WoP 6a-d Security
- WoP 7 Trusted Build
- WoP 9 Electromagnetic Emissions
- WoP 10 Electrostatic Disruption
- WoP 24 1 – 1g Usability
- WoP 25 Physical Configuration Audit
- WoP 26 Functional Configuration Audit
- WoP 27 Maintainability
- Wop 28 Availability
- Wop 29 Electrical Supply
- WoP 30 System Integration Test
- WoP 31 Telecommunications
- WoP 34 Test Report
- WoP 36 Vote Recording Requirements
- WoP 41 Logic & Accuracy

(The remainder of this page intentionally left blank)

4.0 TEST SPECIFICATIONS (Continued)

4.1 Requirements (Strategy of Evaluation)

4.1.1 Rationale for 'Not Applicable' Requirements

The Unisyn OVS 1.2 is a paper-based precinct counting system that supports a closed network (does not support transmission over public networks). Therefore, all EAC 2005 VVSG requirements, with the exceptions listed below, will be evaluated as part of this test campaign.

- Volume I Section 6.2.6 (Telecommunication Requirements)
- Volume I Section 7.5.2 (Protection Against External Threats)
- Volume I Section 7.5.3 (Monitoring and Responding to External Threats)
- Volume I Section 7.5.4 (Shared Operating Environment) Only the OVO and OVI are excluded.
- Volume I Section 7.6 (Use of Public Communication Networks)
- Volume I Section 7.7 (Wireless Communications)
- Volume I Section 7.9 (Voter Verifiable Paper Audit Trail Requirements)

The rationale for not evaluating the OVS 1.2 to the requirements contained in the indicated sections of the EAC 2005 VVSG is described in Table 4-1.

Table 4-1 Not Applicable Requirements

EAC 2005 VVSG Volume I Section	Rationale for 'Not Applicable'
6.2.6, 7.5.2, and 7.5.3	These requirements are written for use of public networks. The Unisyn OVS 1.2 does not use public networks.
7.5.4	This section is intended for a shared operating environment on ballot recording and vote counting equipment. The OVO and OVI use dedicated operating environments and will be excluded from this requirement. The OCS and OVCS components do use a shared operating environment and will be tested to this VVSG requirement.
7.6	This section pertains to "Voting systems that transmit data over public telecommunications…" The Unisyn OVS 1.2 does not support transmission over public networks.
7.7	No wireless technology is present in the Unisyn OVS 1.2.
7.9	The Unisyn OVS 1.2 is a paper based system.

4.2 Hardware Configuration and Design

The Unisyn OVS 1.2 hardware will be tested by the Wyle Laboratories' EMI, Dynamics, and Environmental test departments for testing to the hardware requirements in accordance with Wyle Laboratories A2LA Certification 845.01-.03. All EMI testing will be performed, per the following Wyle Laboratories' Test Guidelines Documents: EMI-001A, "Wyle Laboratories' 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." These proprietary documents shall be submitted under separate cover for reference. All hardware testing will be performed 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 to which the test is required. All pre-voting and post-voting tests will be conducted by Wyle Laboratories' qualified personnel at Wyle Laboratories' Huntsville, AL facility.

4.0 TEST SPECIFICATIONS (Continued)

4.2 Hardware Configuration and Design (Continued)

The Unisyn OVS 1.2 voting system is a paper-based optical scan voting system. The OVS 1.2 voting system consists of four major components: the OCS, OVO precinct scanner, OVI precinct voting interface, and OVCS central count scanner. The OVS 1.2 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. Wyle 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.

Each unit will be loaded with the Operational Status Check Hardware 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, compiled and included in the Reliability and Availability Test results.

4.3 Software System Functions

The Unisyn OVS 1.2 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 1.2 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)

The OVS 1.2 contains two precinct devices. The software applications are OVO and OVI. The OVS 1.2 has an independent workstation running proprietary software. The OVCS application provides the central tabulation function for the system.

4.4 Test Case Design

Wyle Laboratories 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.” Wyle’s 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. Wyle will be evaluating the Unisyn OVS 1.2 to all four levels.

4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.1 Hardware Qualitative Examination Design

Preliminary EMI quick scans were performed on the OVO and OVI components to verify any effects caused by the changes to the unit. Based on the results of the quick scans, Wyle will re-test the OVO and OVI as noted in table 4-2. Also, during the engineering analysis phase, if Wyle engineers determine that the modification directly affects the system performance or major operating characteristics that are documented from prior testing, those modifications will require further testing. Wyle Laboratories previously performed testing to the EAC 2005 VVSG during the OVS 1.0, 1.0.1, and 1.1 approved certification testing (EAC CERTIFICATION NUMBERS – UNS10121966-OE, UNS10121966-OE-WI, and UNS10121966-OE-1.1). Wyle Laboratories will be utilizing the data obtained during that test effort to satisfy requirements for this modification test campaign.

The summary of acceptable testing is provided in Tables 4-2 and 4-3. The details of those tests are presented in Section 6.0.

Table 4-2 OVO and OVI Test Examination Results

Test/EAC 2005 VVSG Section	Procedure/Description	Configuration Tested	Status
Usability/3.1	Measure of the effectiveness, efficiency, and satisfaction achieved by a specified set of users	OVO/OVI	Accept
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.	OVO/OVI	Accept/ Re-test Audio Levels
Security/7	Tests the ability of the system to detect, prevent, log, and recover from a broad range of security risks identified.	OVO/OVI	Accept
Maintainability/4.3.4	Tests the ease in which preventative and corrective maintenance actions can be performed based on design, software, and documentation.	OVO/OVI	Re-Test
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)	OVO/OVI	Accept
Safety/4.3.8	UL 60950-1 product safety review	OVO/OVI	Accept
Electrical Supply/4.1.2.4	Meets voltage and power requirements of EAC 2005 VVSG Vol. 1 Section 4.1.2.4	OVO/OVI	Re-Test
Electromagnetic Radiation/4.1.2.9	FCC Part 15 Class B for both radiated and conducted emissions	OVO/OVI	Re-Test
Electromagnetic Susceptibility/4.1.2.10	IEC 61000-4-3 electromagnetic field of 10V/m modulated by a 1kHz, 80% AM modulation at 80MHz to 1000MHz frequency	OVO/OVI	Re-Test
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	OVO/OVI	Accept
High Temperature/4.1.2.14	MIL-STD-810D, Method 501.2 maximum temperature shall be 140 degrees F	OVO/OVI	Accept
Low Temperature/4.1.2.14	MIL-STD-810D minimum temperature shall be -4 degrees F	OVO/OVI	Accept

4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.1 Hardware Qualitative Examination Design (Continued)

Table 4-2 OVO and OVI Test Examination Results (Continued)

Test/EAC 2005 VVSG Section	Procedure/Description	Configuration Tested	Status
Bench Handling	MIL-STD-810D, Method 516.3 Procedure VI six 4" drops on each edge totaling 24 drops	OVO/OVI	Accept
Vibration/4.1.2.14	MIL-STD-810D, Method 514.3 physical shock and vibration during handling and transport	OVO/OVI	Accept
Humidity Test/4.1.2.14	MIL-STD-810D, Method 501.2 ten 24 hour humidity cycles	OVO/OVI	Accept
Electrical Power Disturbance/4.1.2.5	IEC 61000-4-11 (1994-06) power surges and dips	OVO/OVI	Accept
Electrical Fast Transient/4.1.2.6	IEC 61000-4-4 (1995-01)	OVO/OVI	Accept
Lightning Surge/4.1.2.7	IEC 61000-4-5 (1995-02)	OVO/OVI	Accept
Electrostatic Disruption/4.1.2.8	IEC 61000-4-2 (1995-01) 15kV air discharge and 8kV contact discharge	OVO/OVI	Re-Test
Conducted RF Immunity/4.1.2.11	IEC 61000-4-6 (1996-04) conducted radio frequency energy	OVO/OVI	Re-Test
Magnetic Fields Immunity/4.1.2.12	IEC 61000-4-8 (1993-06) AC magnetic fields of 30 A/m at 60Hz	OVO/OVI	Re-Test

Table 4-3 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

Wyle has determined that these 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.

(The remainder of this page intentionally left blank)

4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.2 Software Module Test Case Design and Data

Wyle Laboratories implements Component Level Testing during the FCA for each component and subcomponent, exercising the functionality of each as designed and documented. Wyle will utilize limited structural-based techniques (white-box testing) mainly in the area of Source Code Review, Compliance Builds, and Security Testing and Review. Wyle Laboratories 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 1.2 during the software testing portion of 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 1.2 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.

Wyle Laboratories will document an expected result for each test. The ACCEPT/REJECT criteria at the Component Level will be based on the expected result. If the System Under Test (SUT) performs as expected, the results will be accepted. If the SUT does not perform as expected, the test will be evaluated for tester error. 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 and VSTL will determine the root cause of the error. If the root cause has been corrected and the SUT performs as expected, then the results will be accepted. If the root cause cannot be determined, the problem has not been corrected, or the SUT still does not perform as expected, the SUT will have failed the test.

Wyle will document the error and track the error through resolution. Wyle 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.

4.4.3 Software Functional Test Case Design and Data

Wyle implements Integration Level Testing primarily focusing on the interface between components and applications.

(The remainder of this page intentionally left blank)

4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.3 Software Functional Test Case Design and Data (Continued)

The test approach to be used for the Unisyn OVS 1.2 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 Wyle Laboratories at the Integration Level is "Use Case." The actors that have been identified to use the Unisyn OVS 1.2 are the following:

- 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 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 results post-Election Day.

"Use Case" will be used 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, Telecommunication, and Usability. During test performance, 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 will be documented and tracked through to resolution. 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.

4.4.4 System-Level Test Case Design

Wyle Laboratories implements System Level testing focusing on a complete system including all proprietary software, proprietary hardware, proprietary peripherals, COTS software, COTS hardware, and COTS peripherals in a configuration of the system's intended use. The Unisyn OVS 1.2 is intended to support both large and small jurisdictions. Wyle Laboratories' approach for Unisyn OVS 1.2 will be to execute System Level Testing with a variety of elections that include various combinations of jurisdictions, parties, and ballot styles.

(The remainder of this page intentionally left blank)

4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.4 System-Level Test Case Design (Continued)

Wyle Laboratories will test the function of all hardware, software, and peripherals of the complete system during System Level Testing. 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) if no errors are found, or 2) if an error is encountered, but the system continues to operate and engineering analysis determines that the root cause does not affect testing. Reject if the system is too unstable to continue or engineering analysis determines the root cause could affect further testing.

Wyle implements 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 pre-testing, hardware testing, software testing, functional testing, security testing, telecommunication testing, usability testing, accessibility testing, and reliability testing activities will be combined to ensure all requirements that are supported by the Unisyn OVS 1.2 in the EAC 2005 VVSG have been tested. All requirements will be checked against the test data to ensure the EAC 2005 VVSG requirements are met. Items not supported by Unisyn OVS 1.2 will be documented. Any issues documented during testing will be resolved or annotated in the test report.

Wyle will test every EAC 2005 VVSG requirement supported by the Unisyn OVS 1.2 voting system. Wyle will report all issues discovered during this test campaign to Unisyn and the EAC. If Wyle 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. Wyle 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.

4.5 Security Functions

The purpose of the security testing will be to evaluate the effectiveness of the OVS 1.2 in detecting, preventing, logging, reporting, and recovering from any security risks identified by simulating attacks on the system. To accomplish this, Wyle Laboratories has developed internal operating procedures to evaluate the Unisyn OVS 1.2 to the security requirements set forth in the EAC 2005 VVSG.

These procedures have been specifically tailored to assess the Unisyn OVS 1.2 to the applicable requirements. Wyle Laboratories will verify the access controls and physical security measures documented in the Unisyn technical data package. A threat matrix will be developed to determine the risks and vulnerabilities. Wyle Laboratories will utilize a combination of functional testing and source code review to evaluate the OVS 1.2 Voting System.

The following areas are not applicable to the OVS 1.2 and are; therefore, not included in the scope of the security testing:

- Use of Public Networks
- Wireless Communication

Wyle will report all issues discovered during this test campaign to Unisyn and the EAC. A report containing all findings shall be issued to the EAC as an Appendix to the final test report.

4.0 TEST SPECIFICATIONS (Continued)

4.6 TDP Evaluation

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

Wyle qualified personnel utilize a TDP Review Matrix which lists every EAC 2005 VVSG requirement pertaining to TDP review. Wyle Laboratories-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, and correctness, and continuity between the TDP documents. The review results will be formally reported to Unisyn for resolution. 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, an Anomaly 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 Unisyn OVS 1.2 System TDP is provided in Table 4-4.

Table 4-4 OVS 1.2 TDP Documents

OVS Release 1.0 Voting System TDP Documents	Version	Date	Document Number
System Overview	1.2	07/17/13	04-00446
System Security Specification	1.0	04/21/13	04-00447
Configuration Management Plan	1.0	TBD	04-00448
Quality Assurance Plan	1.0	TBD	04-00454
System Test and Verification Plan	1.0	07/07/13	04-00453
Personnel Training and Deployment Requirements	1.0	TBD	04-00445
Software and Design Specification	1.7	07/08/13	04-00464
Final Quality Assurance Report	1.0	06/20/13	04-00469
OVS Acronyms	1.0	04/21/13	04-00494
System Functionality Description	1.0	04/21/13	04-00444
System Maintenance Procedures	1.0	07/08/13	04-00459
System Hardware Specification	1.0	04/21/13	04-00458
Ballot Layout Manager User Guide	1.0	04/21/13	04-00428
Election Manager User Guide	1.0	04/21/13	04-00427
Election Server User Guide	1.0	07/04/13	04-00429
Software Server User Guide	1.0	TBD	04-00430
Tabulator Client User Guide	1.0	04/21/13	04-00431
Tabulator User Guide	1.0	04/21/13	04-00432
Tabulator Reports User Guide	1.0	04/21/13	04-00433
OVCS User Guide	1.0	04/21/13	04-00495
SOP: Election Day Poll worker's Guide	1.0	04/21/13	04-00463
SOP: Election Day Troubleshooter's Guide OVO and OVI	1.0	07/04/13	04-00462
System Operations Procedures: Warehouse Technician's Guide	1.0	04/21/13	04-00460
Ballot Paper Specification	1.0	07/16/13	04-00503
System HW Verification	1.0	07/07/13	04-00513
Adjudicator User Guide	1.0	04/21/13	04-00530

4.0 TEST SPECIFICATIONS (Continued)

4.7 Source Code Review (Continued)

As part of the testing activities, the Unisyn OVS 1.2 source code 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 SHA1 hash value shall 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. This is done to identify any violation of EAC 2005 VVSG coding standards or 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 summary report of all identified standards violations will be sent to Unisyn for resolution. Unisyn will then correct all standards violations and re-submit the source code for re-review. All reports will be included in an anomaly report for source code and submitted to the EAC and included in the final test report.

A "Compliance Build" shall be performed by Wyle from the reviewed source code using the Compliance Build Procedure to build iterative builds 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, effective date January 1, 2007. A Compliance Build differs from a Trusted Build because of 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:

- Clean the build machine of existing software
- Retrieve the compliant source code
- Construct the build environment
- Create digital signatures of the build environment
- Load the compliant source code into the build environment
- Create a digital signature of the pre build environment
- Create a disk image of the pre-build environment
- Build executable code
- Create a digital signature of executable code
- Create a disk image of the post-build environment
- Build installation media
- Create a digital signature of the installation media
- Install executable code onto the system and validate the software/firmware
- 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.

(The remainder of this page intentionally left blank)

4.0 TEST SPECIFICATIONS (Continued)

4.7 Source Code Review (Continued)

The "Trusted Build" for the Unisyn OVS 1.2 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 SHA1 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 along with the VSTL verified COTS software will be built. The final step is installing the applications on the hardware.

4.8 QA and CM System Review

The Unisyn QA Plan and CM Plan will be reviewed to determine compliance with EAC 2005 VVSG Volume II Section 2, and Volume I Sections 8 and 9, with 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 will be entered on a spreadsheet as previously described in Section 4.6 TDP Evaluation. The results of the TDP review, including the QA and CM compliance results, will also 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 will be listed on the Instrumentation Equipment Sheet for each test. The output test data will be recorded in an appropriate manner as to allow for data analysis.

For source code and TDP reviews, results will be compiled in output reports and discrepancies submitted to Unisyn for resolution. Additionally, all test results, including functional test data, will be recorded on relevant Wyle Operating Procedures and Test Cases. Results will also be recorded real-time in engineering log books.

Wyle Laboratories, Inc. will evaluate all test results against the Unisyn provided technical documentation for the OVS 1.2 and the requirements set forth in the EAC 2005 VVSG. The OVS 1.2 shall be evaluated for its performance against the EAC 2005 VVSG. The acceptable range for system performance and the expected results for each test case shall be derived from the OVS 1.2 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 which criteria define 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).

5.2 Test Data Reduction

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

6.0 TEST PROCEDURES 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 Wyle Laboratories Huntsville, AL facility unless otherwise annotated. Hardware environmental non-operating (storage) and operating 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 Wyle 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.

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.

(The remainder of this page intentionally left blank)

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up

All voting machine equipment (hardware and software) shall be received and documented utilizing Wyle Laboratories' Receiving Ticket (WL-218, Nov'85) and proper QA procedures. When voting system hardware is received, Wyle Shipping and Receiving personnel will notify Wyle QA personnel. With Wyle 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, photographs shall be taken, and the Unisyn representative shall be notified.

Wyle Laboratories' 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. TDP items, including all manuals, and all source code modules received will be inventoried and maintained by the Wyle Laboratories' Project Engineer assigned to testing.

For hardware test setup, the system will be configured as would for normal field use. This includes connecting all supporting equipment and peripherals. Wyle Laboratories' 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 1.2 technical documentation.

Wyle Laboratories will develop an operational status test to be performed prior to and immediately following each hardware test. Wyle Laboratories will develop the system performance levels to be measured during operational tests.

Wyle Laboratories has developed eight election definitions to be used during this test campaign.

<u>Operational Status Check</u>

This election definition will exercise the operational status of the OVS 1.2 System, during the operational hardware tests, and prior to and immediately following the non-operational hardware tests.

<u>Accuracy</u>

This test will exercise all possible voting positions for the ballot.

(The remainder of this page intentionally left blank)

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

General Election: GEN-01

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

In addition to the parameters listed above, audio input in an alternative language will be exercised for a basic voting pattern using an ADA device. Audio input to demonstrate support for write-in voting will be exercised using an ADA device. Spanish language input will be exercised for a basic voting pattern using Spanish. Spanish language input will be exercised to demonstrate support for write-in voting using Spanish.

(The remainder of this page intentionally left blank)

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

General Election: GEN-02

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
- 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, this election will be an early voting election with at least one machine running all precincts. Voting options for Over-voting and Under-voting will be exercised. Spanish language voting will be exercised. Casting of ballots using the ADA Audio capability will be exercised.

(The remainder of this page intentionally left blank)

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

General Election: GEN-03

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
- 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, input in the Spanish language with a basic voting pattern and a write-in will be exercised. Audio input using the Spanish language to demonstrate support for write-in voting using an ADA device will be exercised. A character-based language input with a basic voting pattern will be exercised. A character-based language using an ADA device will be exercised to demonstrate support for ADA device. A binary input to show support for ADA binary input device will be exercised. A binary input using an ADA audio device will be exercised to show support for binary input and ADA audio device.

(The remainder of this page intentionally left blank)

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

Primary Election: PRIM-01

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 open 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
- 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, input in an alternative language will be exercised with write-in voting. Input using an ADA audio device with write-in voting will be exercised. These inputs were selected to exercise the write-in functionality in a primary election.

(The remainder of this page intentionally left blank)

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

Primary Election: PRIM-02

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
- 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.

(The remainder of this page intentionally left blank)

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

Primary Election: PRIM-03

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 parties 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
- 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, input in the Spanish language with a basic voting pattern and a write-in will be exercised. Audio input using the Spanish language to demonstrate support for write-in voting using an ADA device will be exercised. A character-based language input with a basic voting pattern will be exercised. A character-based language using an ADA device will be exercised to demonstrate support for ADA device. A binary input to show support for ADA binary input device will be exercised. A binary input using an ADA audio device will be exercised to show support for binary input and ADA audio device.

(The remainder of this page intentionally left blank)

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence

The components of the OVS 1.2 voting system will undergo all applicable tests to the EAC 2005 VVSG. The following sections provide a list of each test and a brief description of each test. Wyle Laboratories will utilize a combination of functional testing, source code review, and TDP reviews to evaluate the system performance. The list of tests is not in a specific sequence.

6.3.1 Hardware Test Description

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 Operating test, the EUT will be subjected to an operational status check.

The Operating tests include the following:

Electromagnetic Radiation (emissions) – 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).

Electromagnetic Susceptibility – This test demonstrates the ability of 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).

Magnetic Fields Immunity – This test demonstrates the voting system's hardware ability to withstand Magnetic Fields during normal operation. This test is equivalent to the procedure of IEC 61000-4-8. The test for AC magnetic fields RF immunity shall be conducted in compliance with the test specified in IEC 61000-4-8 (Volume II, Section 4.8.h).

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). This test will be performed on the OVO and OVI units. The purpose of this test is to ensure that the hardware modifications do not negatively impact the units for the current test campaign.

Electrical Supply – This requirement addresses the battery power source for providing electrical supply during a power failure. This test will be performed on the OVO and OVI units. The purpose of this test is to ensure that the hardware modifications do not negatively impact the units for the current test campaign.

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.2 Software Test Description

The software tests include the following:

Source Code Compliance Review – Wyle Laboratories 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. A listing of the TDP documents for Software Design and Specification can be found in Table 4-5 of this document. Source code inspection shall also assess the extent to which the code adheres to the requirements in Section 5 of Volumes I and II.

Compliance Build of the System Software, Firmware, and Utilities – Before testing can begin a compliance build of all the applications will be constructed by Wyle 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.

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

Portions of COTS software that have been modified by the manufacturer in any manner are subject to review. Unmodified COTS software is not subject to code examination. However, source code generated by a COTS package and embedded in software modules for compilation or interpretation will be provided in human readable form to Wyle Laboratories. Wyle Laboratories personnel may inspect COTS source code units to determine testing requirements or to verify the code is unmodified.

Wyle Laboratories 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. Otherwise, the COTS source code is not subject to the full code review and testing. For purposes of code analysis, the COTS units shall be treated as unexpanded macros, as per Volume II, Section 5.2 of the EAC 2005 VVSG.

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

Error Recovery Test – This will be tested to ensure that unit is capable of recovering from a non- catastrophic failure of a device, or from any error or malfunction that is within the operator’s ability to correct and restore the device gracefully from the failures. Testing will include powering units off while operating, disconnecting various cables and components to ensure operation once restored.

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.

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.2 Software Test Description (Continued)

Table 6-1 OVS 1.2 System Software Test Sequence

Test	Description	Procedure	Test Level	Specimen
Compliance Source Code Review	Source code review for compliance	WHVS07.2 WOP 5a	Component	OVS 1.2 Source Code Package
Compliance Build	Using the build documents and source code to construct the EMS	WHVS07.3 WOP 7b	Component	OVS 1.2
Source Code COTS Review	Source code review to examine 3rd party products for modification and versions	WHVS07.2 WOP 5d	Component	OVS 1.2 Source Code Package
Baseline OS	RFI 2008-03 OS Configuration	WHVS07.3 WOP 25	Component	OVS 1.2
Source Code Functional Review	Source code review for functionality and high level software design	WHVS07.2 WOP5b	Component & Integration	OVS 1.2 Source Code Package
Source Code Security Review (manual)	Source code review for specific security concerns	WHVS07.2 WOP5c WOP 6a	Component & Integration	OVS 1.2 Source Code Package

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; 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
- Review drawings, specifications, technical data, and test data associated with system hardware, if non-COTS, 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; 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

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.3 System Testing (Continued)

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 for the TDP. In addition to functioning according to the manufacturer's documentation, tests shall 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 task required to conduct an election or otherwise exercise a function. 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.

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.

Security Test – The security test is designed and performed to test the capabilities of the voting system against the requirements defined in Volume I Section 7. These procedures shall focus on the ability of the system to detect, prevent, log, and recover from a broad range of security risks identified. This test will also examine system capabilities and safeguards claimed by Unisyn in the TDP to properly mitigate these risks. The range of risks tested is determined by the design of the system and potential exposure to risk.

Telecommunication Test – The telecommunication test focuses on system hardware and software function and performance for the transmission of data that is used to operate the system and report election results. This test applies to the requirements for Volume I, Section 6 of the EAC 2005 VVSG.

Usability – The usability test is a measure of the effectiveness, efficiency, and satisfaction achieved by a specified set of users with a given product in the performance of specified tasks. This test applies to the requirements for Volume I, Section 3 of the EAC 2005 VVSG.

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.

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.3 System Testing (Continued)

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 each component 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.

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

- Stand-Alone Central Count 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.

The accuracy requirements for the OVI will be met by the execution of following accuracy test.

- Multiple OVIs will be used to achieve an accuracy rate greater than 1,549,703 correct ballot positions marked.
- The marked ballots will be also be scanned through the OVCS for accuracy.

<u>System Integration</u> – System Level certification test 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. Wyle Laboratories personnel will properly configure and test the system by following the procedures detailed in the OVS 1.2 Voting System technical documentation.

<u>Regression Testing</u>

Regression Testing will be performed on all applicable system components to verify all firmware and application software modifications are working as expected.

(The remainder of this page intentionally left blank)

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.3 System Testing (Continued)

Table 6-2 OVS 1.2 Testing Sequence

Test	Description	Procedure	Test Level	Specimen	Election Data	Re-Use from Previous VSTL Testing
Technical Data Package (TDP) Review	Documentation review for compliance, correctness, and completeness	WHVS07.1 WOP 3	Document	TDP package	---	No
Physical Configuration Audit	Audit hardware and software models and versions	WHVS07.3 WOP 25	Component & System	System hardware and software	---	No
Functional Configuration Audit	Functional testing to the system documentation and EAC 2005 VVSG requirements	WHVS07.4 WOP 26 WOP30a	Component & Integration	System	Gen-01 Prim-01	Yes/ Perform FCA on the changes
Telecommunication (EMS Network)	Test of telecommunication technology of the system for accuracy and correctness	WHVS07.6 WOP 31	Integration & System	System	Gen-01	No
Usability/ Accessibility	Testing to the system documentation and EAC 2005 VVSG requirements	WOP 24-2d	Integration	System	Gen-01 Prim-01	No
Volume, Stress, & Reliability Test	Test to investigate the system's response to larger amounts of data than it is expecting.	WOP 21 WOP 30	System	System	Volume and Stress Election	Yes
Security	Assess the system to the 2005 VVSG requirements and execute basic system security tests.	WHVS07.7 WOP 6 WOP 6a WOP 6b WOP 6c WOP 6d	Integration & System	System	Gen-01 Prim -01	No
Accuracy	Test of accuracy to ~1.6 million ballot positions per system component (OVO, OVI, and OVCS)	WHVS07.9 WOP 30 WOP 21	System	System	Accuracy Elections	No
System Integration Test	Test of all system hardware, software and peripherals.	WOP 30	System	System	Gen-01-03 Prim-01-03	No
Trusted Build	Creation and installation of the final system software	WHVS07.6 WOP 7 WOP 7a	Component	System software	OVS 1.2 Source Code Package	No

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.

(The remainder of this page intentionally left blank)

APPENDIX A

UNISYN PROJECT SCHEDULE

ID		Task Name	Duration	Start	Finish	Predecessors
1	✓	**EAC Application**	**1 day**	**Thu 5/23/13**	**Thu 5/23/13**	
2	✓	**EAC Kickoff Meeting (Conference Call)**	**1 day**	**Tue 6/11/13**	**Tue 6/11/13**	
3		**Technical Data Package Review**	**52 days**	**Thu 5/30/13**	**Tue 8/13/13**	
4	✓	Partial Document Submission	1 day	Thu 5/30/13	Thu 5/30/13	
5		Document Review for Test Plan Requirements	5 days	Fri 5/31/13	Thu 6/6/13	4
6		Full TDP SUBMISSION	1 day	Mon 7/1/13	Mon 7/1/13	1
7		TDP Review for VVSG Requirements	20 days	Tue 7/2/13	Wed 7/31/13	6
8		TDP Final Report to ILTS	2 days	Thu 8/1/13	Fri 8/2/13	7
9		Final Review of Report and Correct Documents	5 days	Mon 8/5/13	Fri 8/9/13	8
10		Final Report TDP Review	2 days	Mon 8/12/13	Tue 8/13/13	9
11		**Source Code Review**	**19 days**	**Fri 5/31/13**	**Wed 6/26/13**	
12	✓	Submission of Coding Standards	1 day	Fri 5/31/13	Fri 5/31/13	
13		Wyle Review of Software Documents Prepare Code Review Plan	5 days	Mon 6/3/13	Fri 6/7/13	12
14		**Source Code Review**	**18 days**	**Mon 6/3/13**	**Wed 6/26/13**	
15		Wyle Source Code Review	10 days	Mon 6/3/13	Fri 6/14/13	12
16		Unisyn Review code	4 days	Mon 6/17/13	Thu 6/20/13	15
17		Wyle re-review of Source Code	3 days	Fri 6/21/13	Tue 6/25/13	16
18		Wyle Report	1 day	Wed 6/26/13	Wed 6/26/13	17
19		**Test Plan**	**59 days**	**Tue 6/4/13**	**Tue 8/27/13**	
20		Draft Test Plan	15 days	Tue 6/4/13	Mon 6/24/13	
21		Draft Test Plan Reviewed by ILTS	2 days	Tue 6/25/13	Wed 6/26/13	20
22		Draft Test Plan Update	1 day	Thu 6/27/13	Thu 6/27/13	21
23		Test Plan to EAC	1 day	Fri 6/28/13	Fri 6/28/13	22
24		EAC Review	20 days	Mon 7/1/13	Tue 7/30/13	23
25		Review TR's Comments	4 days	Wed 7/31/13	Mon 8/5/13	24
26		Revise Test Plan	5 days	Tue 8/6/13	Mon 8/12/13	25

ID		Task Name	Duration	Start	Finish	Predecessors
27		Re Submit Test Plan to EAC	1 day	Tue 8/13/13	Tue 8/13/13	26
28		Test Plan Approved by EAC	10 days	Wed 8/14/13	Tue 8/27/13	27
29		**Physical Configuration Audit**	**7 days**	**Thu 6/27/13**	**Tue 7/9/13**	
30		**PCA SCAP Checklist (Baseline of OS)**	**7 days**	**Thu 6/27/13**	**Tue 7/9/13**	
31		Research FDCC for all OS and Server for System (work with EAC)	2 days	Thu 6/27/13	Fri 6/28/13	14
32		Submit Benchmark Checklist to Manufacturer	1 day	Mon 7/1/13	Mon 7/1/13	31
33		Manufacturer Review	2 days	Tue 7/2/13	Wed 7/3/13	32
34		Analysis Manufacturers Response	1 day	Mon 7/8/13	Mon 7/8/13	33
35		Report to Manufacturer Any Discrepancies	1 day	Tue 7/9/13	Tue 7/9/13	34
36		System Set up and Initial Software Loads	23 days	Fri 5/31/13	Tue 7/2/13	
37		**Network Setup**	**2 days**	**Fri 5/31/13**	**Mon 6/3/13**	
38		Initial Hardening and Network setup	2 days	Fri 5/31/13	Mon 6/3/13	4
39		**Build Review**	**1 day**	**Thu 6/27/13**	**Thu 6/27/13**	
40		**Source Build Review**	**1 day**	**Thu 6/27/13**	**Thu 6/27/13**	**14**
41		**Create Build Environments**	**3 days**	**Fri 6/28/13**	**Tue 7/2/13**	
42		**Compliance Builds**	**3 days**	**Fri 6/28/13**	**Tue 7/2/13**	**40**
43		**Hardware Tests**	**3 days**	**Wed 7/10/13**	**Fri 7/12/13**	
44		Quick Scan	2 days	Wed 7/10/13	Thu 7/11/13	
45		ESD	1 day	Fri 7/12/13	Fri 7/12/13	44
46		**FCA**	**27 days**	**Fri 6/28/13**	**Wed 8/7/13**	
47		**Pre FCA**	**15 days**	**Fri 6/28/13**	**Mon 7/22/13**	
48		Wyle develop and validate test cases	15 days	Fri 6/28/13	Mon 7/22/13	40
49		**FCA Execution**	**12 days**	**Tue 7/23/13**	**Wed 8/7/13**	
50		Excute Test Cases	10 days	Tue 7/23/13	Mon 8/5/13	48
51		**FCA Completion**	**2 days**	**Tue 8/6/13**	**Wed 8/7/13**	
52		Report FCA Test	2 days	Tue 8/6/13	Wed 8/7/13	50

ID	Task Name	Duration	Start	Finish	Predecessors
53	**System Level Performance Testing**	**6 days**	**Thu 8/8/13**	**Thu 8/15/13**	
54	**Accuracy Test**	**6 days**	**Thu 8/8/13**	**Thu 8/15/13**	
55	Execution of Accuracy Test	5 days	Thu 8/8/13	Wed 8/14/13	29,46
56	Completion of Accuracy Test	1 day	Thu 8/15/13	Thu 8/15/13	55
57	**Security Test**	**2 days**	**Thu 8/8/13**	**Fri 8/9/13**	
58	**Access Controls Review (WoP 6)**	**2 days**	**Thu 8/8/13**	**Fri 8/9/13**	
59	Completion of Access Control Review	2 days	Thu 8/8/13	Fri 8/9/13	46,29
60	**Security Assessment**	**2 days**	**Mon 8/12/13**	**Tue 8/13/13**	
61	Report Security Assessment	2 days	Mon 8/12/13	Tue 8/13/13	57
62	**System Integration Testing**	**13 days**	**Fri 8/16/13**	**Wed 9/4/13**	
63	**GEN 01 - Contests, Candidates, Alt Language, Split Precinct, and Audio Ballot**	**2 days**	**Fri 8/16/13**	**Mon 8/19/13**	
64	GEN 01 Setup	0.5 days	Fri 8/16/13	Fri 8/16/13	53
65	GEN 01 Execution	1 day	Fri 8/16/13	Mon 8/19/13	64
66	GEN 01 Complete	0.5 days	Mon 8/19/13	Mon 8/19/13	65
67	**GEN 02 - N of M, Recall, Early Voting, Alt Language and Audio Ballot**	**2 days**	**Tue 8/20/13**	**Wed 8/21/13**	
68	GEN 02 Setup	0.5 days	Tue 8/20/13	Tue 8/20/13	66
69	GEN 02 Execution	1 day	Tue 8/20/13	Wed 8/21/13	68
70	GEN 02 Complete	0.5 days	Wed 8/21/13	Wed 8/21/13	69
71	**GEN 03 - Ideographic Language, Audio Ballot, and ADA Devices**	**2 days**	**Thu 8/22/13**	**Fri 8/23/13**	
72	GEN 03 Setup	0.5 days	Thu 8/22/13	Thu 8/22/13	70
73	GEN 03 Execution	1 day	Thu 8/22/13	Fri 8/23/13	72
74	GEN 03 Complete	0.5 days	Fri 8/23/13	Fri 8/23/13	73
75	**PRIM 01 - Closed Primary, Split Precinct, Multiple Ballot Styles, and Audio Ballot**	**2 days**	**Mon 8/26/13**	**Tue 8/27/13**	
76	PRIM 01 Setup	0.5 days	Mon 8/26/13	Mon 8/26/13	74
77	PRIM 01 Execution	1 day	Mon 8/26/13	Tue 8/27/13	76
78	PRIM 01 Complete	0.5 days	Tue 8/27/13	Tue 8/27/13	77
79	**PRIM 02 - Open Primary, Multiple Ballot Styles, Slate Voting, Cross-party Endorsement, and Audio Ballot**	**2 days**	**Wed 8/28/13**	**Thu 8/29/13**	
80	PRIM 02 Setup	0.5 days	Wed 8/28/13	Wed 8/28/13	78
81	PRIM 02 Execution	1 day	Wed 8/28/13	Thu 8/29/13	80
82	PRIM 02 Complete	0.5 days	Thu 8/29/13	Thu 8/29/13	81
83	**PRIM 03 - Closed Primary, Ideographic Language, and ADA devices**	**2 days**	**Fri 8/30/13**	**Mon 9/2/13**	
84	PRIM 03 Setup	0.5 days	Fri 8/30/13	Fri 8/30/13	82
85	PRIM 03 Execution	1 day	Fri 8/30/13	Mon 9/2/13	84
86	PRIM 03 Complete	0.5 days	Mon 9/2/13	Mon 9/2/13	85
87	**Completion of System Integration Testing**	**1 day**	**Wed 9/4/13**	**Wed 9/4/13**	
88	Final Report System Integration Tests	1 day	Wed 9/4/13	Wed 9/4/13	86
89	**All Testing Activities Completed**	**2 days**	**Thu 9/5/13**	**Fri 9/6/13**	
90	Verification and compilation of all test data	2 days	Thu 9/5/13	Fri 9/6/13	3,29,46,53,62
91	**PCA Completion**	**2 days**	**Mon 9/9/13**	**Tue 9/10/13**	
92	Regression All Changes to PCA that Occurred during the Test Campaign	1 day	Mon 9/9/13	Mon 9/9/13	89
93	Final Report PCA	1 day	Tue 9/10/13	Tue 9/10/13	92
94	**Final Trusted Build**	**12 days**	**Wed 9/11/13**	**Thu 9/26/13**	
95	Verify Build Environment	1 day	Wed 9/11/13	Wed 9/11/13	91
96	Trusted Build	4 days	Thu 9/12/13	Tue 9/17/13	95
97	Install and Verify System Build	4 days	Wed 9/18/13	Mon 9/23/13	96
98	Final Trusted Build Complete	1 day	Tue 9/24/13	Tue 9/24/13	97
99	Delivery of Images to EAC Repository	2 days	Wed 9/25/13	Thu 9/26/13	98
100	**Post Testing Activities**	**34 days**	**Wed 9/11/13**	**Mon 10/28/13**	
101	**Certification Report**	**34 days**	**Wed 9/11/13**	**Mon 10/28/13**	
102	Initial Draft Report	10 days	Wed 9/11/13	Tue 9/24/13	91
103	Manufacturer Review	2 days	Wed 9/25/13	Thu 9/26/13	102
104	Final Test Report for Submission to EAC for Review	2 days	Fri 9/27/13	Mon 9/30/13	103
105	EAC Review	20 days	Tue 10/1/13	Mon 10/28/13	104