CERTIFICATION TEST PLAN

Prepared for:

Manufacturer Name	Dominion Voting Systems
Manufacturer System	Democracy Suite Version 4.0
EAC Application No.	**DVS1001**
Manufacturer Address	215 Spadina Avenue, Suite 200 Toronto, Ontario, Canada

REV	DATE	PAGE OR PARAGRAPH AFFECTED	DESCRIPTION OF CHANGES
---	4-19-11	Entire Document	Original Release
A	9-19-11	Entire Document	Complete Document Edit Based on EAC Comments
A	9-26-11	Section 1.0	Deleted second sentence due to redundancy.
A	9-26-11	Section 1.3.1.1	Corrected typo (changed "in" to "is").
A	9-26-11	Section 1.4.1	Removed "secure" from the second sentence of the second paragraph of the ICE description.
A	9-26-11	Section 1.4.1	Removed "safely" from the second sentence of the first paragraph of the ICP description.
A	9-26-11	Section 1.4.1	Added the following sentence to the second paragraph of the ICP description: There is no paper ballot or record produced when the ATI is utilized for voting.
A	9-26-11	Section 1.4.3	Provided definition for UPS and LAN and expanded description for EMS Express hardware configuration.
A	9-26-11	Section 1.4.7	Changed last sentence to read as follows: This testing is out of scope for this test campaign.
A	9-26-11	Section 2.0	Added Democracy Suite version 4.0 voting system to TDP description.
A	9-26-11	Section 2.2 and 2.2.1	Added reference to EAC RFI for summative usability reporting and corrected tense.
A	9-26-11	Section 3.2	Added "COTS equipment" to clarify manufacturer.
A	9-26-11	Section 4.1.2	Added "DRE" to second sentence of first paragraph.
A	9-26-11	Section 4.4.3	Second paragraph, second sentence, deleted "including entries for invalid data".

			DATE **March 23, 2012**
REV	DATE	PAGE OR PARAGRAPH AFFECTED	DESCRIPTION OF CHANGES
A	9-26-11	Section 4.4.5	Deleted second sentence of second paragraph.
A	9-26-11	Section 4.5	Deleted first sentence in first paragraph and moved to previous section.
A	9-26-11	Section 4.5	Change "…they deem as valid" to "…that violate the standard" in the third sentence of the last paragraph.
A	9-26-11	Section 4.6	Restructured first sentence of first paragraph.
B	10-25-11	Section 1.4.5	Removed Open primary and ranked Choice Voting from supported functionality.
B	10-25-11	Section 6.2	Removed description for PRIM-02.
B	10-25-11	Section 1.3.1.4	Reworded section to provide additional information.
B	10-25-11	Section 1.4.3	Removed "(New York State)" from Table 1-2 and 1-3 titles and corrected title for Table 1-5.
B	10-25-11	Section 1.4.3, Tables 1-3 and 1-5	Changed column titles.
B	10-25-11	Section 1.4.4	Added Note: All stated languages will be verified to be supported; however, only English and Spanish ballots will be cast during functional testing.
B	10-25-11	Section 2.1	Added the following to the first sentence: "…as a complete system…" and additional wording to clarify testing.
B	10-25-11	Section 2.2	Added additional information on reuse of previous testing.
B	10-25-11	Section 2.3 and 2.3.1	Combined section and deleted Section 2.3.1.

REV	DATE	PAGE OR PARAGRAPH AFFECTED	DESCRIPTION OF CHANGES
B	10-25-11	Section 4.1	Added "and/or evaluated" in Section 4 description.
B	10-25-11	Section 4.1.2	Reworded entire section to provide clarification on testing.
B	10-25-11	Section 4.2	Reworded entire section to provide clarification on testing.
B	10-25-11	Section 4.4.2	Deleted section and incorporated information into previous section.
B	10-25-11	Section 4.4.4	Reworded first paragraph.
B	10-25-11	Section 4.5	Deleted last sentence of first paragraph.
B	10-25-11	Section 4.8	Combined last two sentences and deleted reference to Appendix F.
B	10-25-11	Section 6.3.3	Provided additional information on Logic and Accuracy Test.
C	11-30-11	Section 2.1	Added additional information for re-use of prior VSTL testing.
C	11-30-11	Section 2.2	Added additional information for re-use of prior non-VSTL testing and usability testing.
C	11-30-11	Section 2.2.1	Deleted section and incorporated information into previous sections.
C	11-30-11	Section 4.1.2	Reworded section for clarification of not applicable requirements.
C	11-30-11	Section 4.2 and 4.4.1	Reworded paragraphs to provide clarification on components tested, previous state test effort, and third-party testing, and included Temperature Power test.
C	11-30-11	Section 6.2	Updated election descriptions.

			DATE March 23, 2012
REV	DATE	PAGE OR PARAGRAPH AFFECTED	DESCRIPTION OF CHANGES
C	11-30-11	Section 6.3.3	Reworded Volume/Stress/Reliability and Logic and Accuracy test descriptions.
C	11-30-11	Appendix A	Added Dominion Voting Systems Implementation Statement.
C	11-30-11	Appendix B	Added project schedule.
D	12-5-11	Sections 1.3.1, 1.3.1.1, 1.3.1.5	Changed project schedule reference to Appendix B.
D	12-5-11	Sections 1.4.6 and 4.1.1	Added VRT reference.
D	12-5-11	Section 4.2	Corrected typo from “severs” to “servers”.
D	12-5-11	Section 6.3.3	Changed formatting.
D	12-5-11	Section 6.3.3	Added paragraph on audit logs.
E	3-23-12	Entire Plan	Updated to “As Run” Test Plan for Final Report.

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APPENDICES

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 Dominion Voting Systems, Democracy Suite 4.0 System, 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, Dominion Voting Systems submitted an application to the EAC for certification of the Democracy Suite 4.0 System to the requirements of the EAC 2005 VVSG.

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.

1.1 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, Revision 4
- 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 Democracy Suite 4.0 System Technical Data Package (TDP) Documents submitted for this certification test effort is listed in Section 3.4: Deliverable Materials.

1.0 INTRODUCTION (CONTINUED)

1.2 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.
EMS Audio Studio	AS	EMS application used to record audio files.
Audio Tactile Interface	ATI	Voter interface designed to not require visual reading of a ballot.
Conformité Européenne (European Conformity)	CE	---
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.
EMS Election Event Designer	EED	EMS application used for election definition functionality.
Election Management System	EMS	The Election Management System equivalent for the Democracy Suite 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.
ImageCast Central	ICC	High-speed central ballot scan tabulator.
ImageCast Evolution	ICE	Precinct-level optical scanner, ballot marker, and tabulator with audio voting.
ImageCast Precinct	ICP	Precinct-level optical scanner and tabulator with audio voting capabilities.

1.0 INTRODUCTION (CONTINUED)

1.2 Terms and Abbreviations (continued)

Table 1-1 Terms and Abbreviations (continued)

Term	Abbreviation	Definition
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	---
EMS Results, Tally and Reporting	RTR	EMS application used to integrate election results and reporting.
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.

1.3 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.

1.3.1 Project Schedule

This information is contained in a Wyle-generated Microsoft Project schedule. This schedule is presented in Appendix B "Dominion Voting Systems Project Schedule". The dates on the schedule are not firm dates but planned estimates presented for informational purposes.

1.3.1.1 Owner Assignments

This information is contained in a Wyle generated Microsoft Project schedule. This schedule is presented in Appendix B "Dominion Voting Systems Project Schedule".

1.0 INTRODUCTION (CONTINUED)

1.3 Testing Responsibilities (continued)

1.3.1 Project Schedule (continued)

1.3.1.2 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 Dominion Voting Systems Democracy Suite 4.0. Wyle has designed specific election definitions for the Operational Status Check and the Accuracy Tests. The "Baseline" functional test cases, "Baseline" usability test cases, and the election definitions are being submitted as part of this test plan package.

Throughout the test campaign, Wyle will develop and submit to the EAC Test Case Procedure Specifications (TCPS) for major areas of testing. The TCPS documents, the test items, input specifications, output specifications, environmental needs, special procedural requirements, inter-case dependencies, and all validated test cases that will be executed for a given test.

1.3.1.3 Test Procedure Development and Validation

Wyle will utilize the Wyle Operating Procedures (WoPs) during the duration of this test program. These procedures are validated and are being submitted as part of the test plan package.

1.3.1.4 Third-Party Testing

Dominion Voting Systems also submitted five hardware test reports for the ICP unit. Wyle reviewed the reports and performed a comparison between the ICP version tested in the provided reports and the ICP version currently submitted for testing and concluded that a portion of the hardware testing for the ICP will be recommended for reuse to satisfy requirements for this testing campaign. Wyle determined that the ICP shall be subjected to the following hardware tests per the EAC 2005 VVSG: Electromagnetic Radiation, Electromagnetic Susceptibility, and all non-operational environmental testing. A listing of reports reviewed, and Wyle's evaluation of these reports is contained in Section 4.4.1 of this document.

Additionally, Wyle will be utilizing 3rd party testing to perform the product safety portion of the test campaign. Third party testing will be witnessed by Wyle personnel at MET Labs.

1.3.1.5 EAC and Manufacturer Dependencies

This information is contained in a Wyle generated Microsoft Project schedule. This schedule is presented in Appendix B "Dominion Voting Systems Project Schedule".

1.4 Target of Evaluation Description

The following sections address the design methodology and product description of the Democracy Suite 4.0 System, as taken from the Dominion Voting Systems technical documentation.

1.0 INTRODUCTION (CONTINUED)

1.4.1 Target of Evaluation Description (continued)

1.4.1 System Overview

The Dominion Voting Systems Democracy Suite 4.0 System is a paper-based optical scan voting system. The Democracy Suite 4.0 System consists of four major components: the Election Management System (EMS), ImageCast Evolution (ICE) precinct scanner and ballot marking device, ICP precinct scanner with audio ballot, and ImageCast Central (ICC) central count scanner.

Election Management System

The Dominion Voting Systems Democracy Suite 4.0 EMS consists of seven 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.

- Democracy Suite 4.0 EMS Election Event Designer client application - integrates election definition functionality and represents a main pre-voting phase end-user application.
- Democracy Suite 4.0 EMS Results Tally and Reporting client application - integrates election results acquisition, validation, tabulation, reporting and publishing capabilities and represents a main post-voting phase end-user application.
- Democracy Suite 4.0 EMS Audio Studio client application - represents an end-user helper application used to record audio files for a given election project. As such, it is utilized during the pre-voting phase of the election cycle.
- Democracy Suite 4.0 EMS Data Center Manager client application - represents a system level configuration application used in EMS back-end data center configuration.
- Democracy Suite 4.0 EMS Application Server server application - represents a server side application responsible for executing long running processes, such as rendering ballots, generating audio files and election files, etc.
- Democracy Suite 4.0 EMS Network Attached Storage (NAS) Server server application - represents a server side file repository for election project file based artifacts, such as ballots, audio files, reports, log files, election files, etc.
- Democracy Suite 4.0 EMS Database Server server application - represents a server side RDBMS repository of the election project database which holds all the election project data, including pre-voting and post-voting data.

Precinct Ballot Tabulator: ImageCast Evolution (ICE)

The ICE Ballot Counter device is a precinct-level, optical scan, ballot counter (tabulator) designed to perform six major functions**:**

- Ballot scanning
- Tabulation
- Ballot review
- Second chance voting
- Accessible voting
- Ballot marking

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.1 System Overview (continued)

The Dominion Democracy Suite ImageCast Evolution system employs a precinct-level optical scan ballot counter (tabulator) in conjunction with an external ballot box. This tabulator is designed to mark and/or scan paper ballots, interpret voting marks, communicate these interpretations back to the voter (either visually through the integrated LCD display or audibly via integrated headphones), and upon the voter's acceptance, deposit the ballots into the ballot box. The unit also features an Audio Tactile Interface (ATI) which permits voters who cannot negotiate a paper ballot to generate a synchronously human and machine-readable ballot from elector-input vote selections. In this sense, the ImageCast Evolution acts as a ballot marking device.

Photograph 1: ImageCast Evolution (ICE)

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.1 System Overview (continued)

Precinct Ballot Tabulator: ImageCast Precinct (ICP)

The ImageCast Precinct (ICP) Ballot Counter is a precinct-based optical scan ballot tabulator that is used in conjunction with ImageCast compatible ballot storage boxes. The system is designed to scan marked paper ballots, interpret voter marks on the paper ballot and store and tabulate each vote from each paper ballot. The ICP contains a small touch-screen LCD to allow the poll worker to access diagnostic and configuration settings.

In addition, enhanced accessibility voting may be accomplished via optional accessories connected to the ImageCast unit. The ICP utilizes an ATI device to allow voters with disabilities to navigate and submit a voted ballot. This is accomplished by presenting the ballot to the voter in an audio format. The ATI is connected to the tabulator, and allows the voter to listen to an audio voting session consisting of contest and candidate names. The ATI also allows a voter to adjust the volume and speed of audio playback. The cast vote record is recorded electronically when the ATI is used to cast a ballot. There is no paper ballot or paper record produced when the ATI is utilized for voting.

Photograph 2: ImageCast Precinct (ICP)

1.0 INTRODUCTION (CONTINUED)

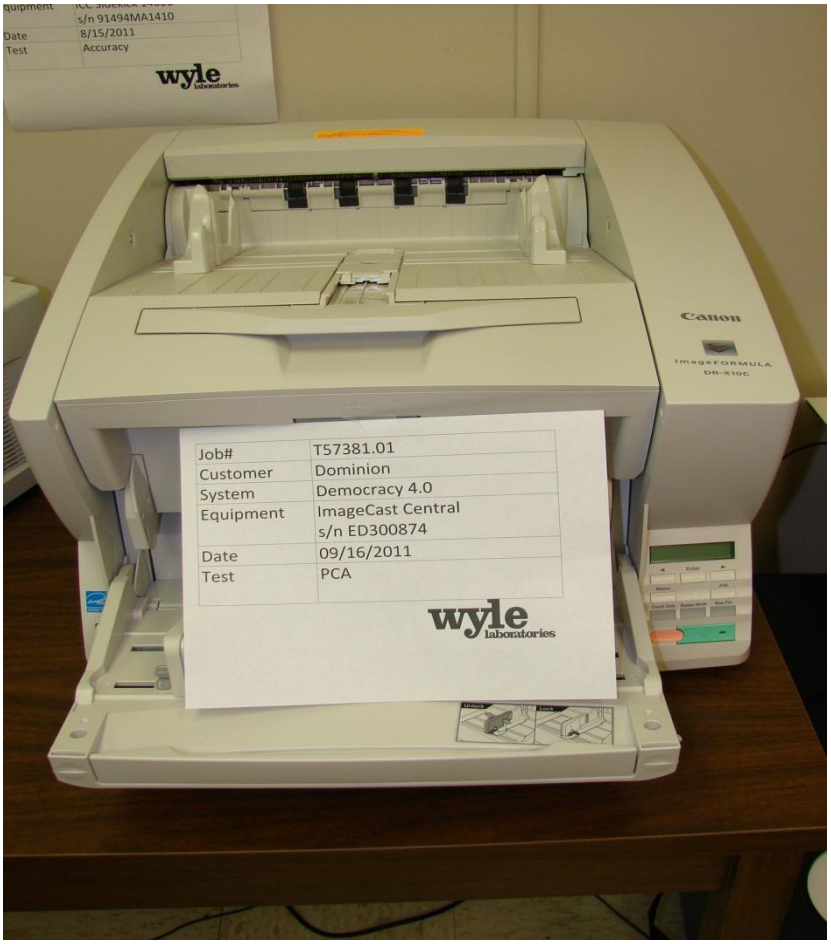
1.4 Target of Evaluation Description (continued)

1.4.1 System Overview (continued)

Central Tabulator: ImageCast Central Count (ICC)

The Dominion Democracy Suite ICC Ballot Counter system is a high-speed, central ballot scan tabulator based on Commercial off the Shelf (COTS) hardware, coupled with the custom-made ballot processing application software. It is used for high speed scanning and counting of paper ballots. Central scanning system hardware consists of a combination of two COTS devices used together to provide the required ballot scanning processing functionality:

- Canon DR-X10C Scanner: used to provide ballot scanning and image transfers to the local ImageCast Central Workstation.
- ImageCast Central Workstation: a COTS computer used for ballot image and election rules processing and results transfer to the EMS Datacenter. The ImageCast Central Workstation is a logical name for the Dominion pre-approved PC workstation hardware which executes the image processing and election rules software application.



Photograph 3: ImageCast Central Count (ICC)

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.2 Block Diagram

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

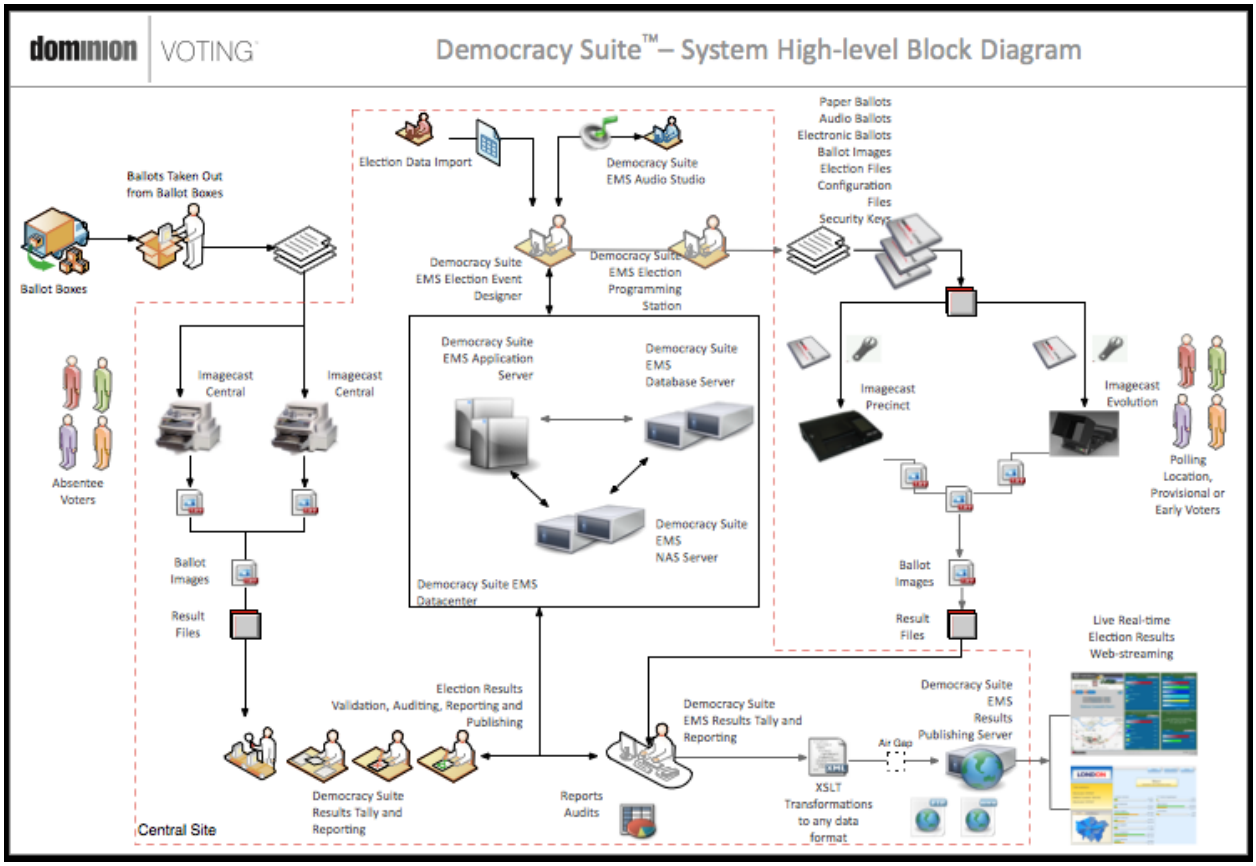


Figure 1-1 System Overview Diagram

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.3 System Limits

The EMS platform will be tested in all two deployable physical hardware configurations:

- EMS Express hardware configuration - all EMS software components are installed on a single physical PC or laptop. This is a standalone configuration.
- EMS Standard hardware configuration - the EMS server components are installed on a single physical server, in addition to the Universal Power Supply (UPS) and Local Area Network (LAN) switch devices, while the EMS client components are installed on one or more physical PCs or laptops. All system components are interconnected in a client-server local LAN environment.

The system limits that Dominion Voting Systems has stated to be supported by the Democracy Suite 4.0 are compiled in the table below.

Table 1-2 Democracy Suite 4.0 System Limits for Portrait Ballot Style

Limit (Maximum Number of)	Value (by configuration)		Limiting Component
	Express	Standard	
Ballot Positions	462	462	22 Inch Portrait Ballot
Precincts in Election	250	1000	Memory
Contests in Election	250	1000	Memory
Candidates/Counters in Election	2500	10000	Memory
Candidates/Counters in Precinct	462	462	22 Inch Portrait Ballot
Candidates/Counters in Tabulator	2500	10000	Memory
Ballot Styles in Election	750	3000	Memory
Contests in a Ballot Style	156	156	22 Inch Portrait Ballot
Candidates in a Contests	231	231	22 Inch Portrait Ballot (Column Span 3)
Ballot Styles in a Precinct	5	5	Memory
Number of Parties	30	30	No Limitation
Vote For in Contest	30	30	No Limitation
Supported Languages per Election	5	5	Memory
Number of Write-ins	462	462	22 Inch Portrait Ballot

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.3 System Limits (continued)

Table 1-3 Democracy Suite EMS 4.0 ImageCast Ballot Target Limits for Portrait Ballot Style

Ballot Length	Maximum Positions (Row x Column)
11 Inch	33 x 2
14 inch	45 x 3
17 Inch	57 x 3
20 Inch	69 x 3
22 Inch	77 x 3

1.4.4 Supported Languages

The following languages have been stated by Dominion Voting Systems to be supported by the Democracy Suite 4.0:

- Alaska Native
- Aleut
- Athabascan
- Eskimo
- Chinese
- Filipino
- French
- English
- Japanese
- Korean
- Vietnamese
- Spanish
- Native (other group specified)
    - Apache, Jicarilla, Keres, Navajo, Seminole, Towa, Ute, Yuman

Dominion Voting Systems also states that any language that has an ISO definition file can be supported by the Democracy Suite voting System.

Note: All stated languages will be verified to be supported; however, only English and Spanish ballots will be cast during functional testing. However Wyle will test 1 character based language (Chinese) during System Integration Testing.

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.5 Supported Functionality

The Democracy Suite 4.0 is designed to support the following voting variations:

- General Election
- Closed Primary
- Early Voting
- Partisan offices
- Non-Partisan offices
- Write-in voting
- Primary presidential delegation nominations
- Straight Ticket voting
- Split Precincts
- Ballot Rotation
- Vote for N of M
- Audio Ballot

As stated in the Supported Functionality Description, the Democracy Suite 4.0 System does not include functions for Cumulative Voting, Ranked Choice Voting (RCV), Open Primary, or Recall Issues; therefore, testing will not be conducted on these functions.

1.4.6 VVSG

The Democracy Suite 4.0 will be tested to all applicable EAC 2005 VVSG requirements. Please refer to the EAC online matrix tool (VRT) for further reference.

1.4.7 Beyond VVSG

Dominion Voting Systems submitted hardware test reports for Dust and Rain Tests on the ICP unit. This testing was performed during State-level certification effort. This testing is out of scope for 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 Dominion for the Democracy Suite version 4.0 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.

2.0 PRE-CERTIFICATION TESTING AND ISSUES (CONTINUED)

An initial Technical Data Package (TDP) review was performed on the Dominion Democracy Suite version 4.0 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 Dominion TDP. The results were reported to Dominion for resolution. Dominion has subsequently revised and resubmitted the TDP. Wyle is performing a review of these documents and will submit the results to Dominion 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 Dominion as informational comments for them to decide whether to address them.

2.1 Evaluation of Prior VSTL Testing

The Dominion Voting Systems Democracy Suite 4.0 is a new voting system that has not been previously tested as a complete system to applicable federal standards in the EAC Program. It will be fully tested and the results will be submitted to the EAC in accordance with the requirements of the EAC Voting System Testing and Certification Manual, Section 4 Certification Testing and Technical Review. Wyle Laboratories performed testing to the EAC 2005 VVSG on the ICP-A configuration that consisted of an ICP unit, with firmware version 4.5.4, and a standalone EMS configuration, version 4.5 RC9, as part of a state test effort. Wyle will be utilizing the data obtained during that test effort to satisfy requirements for this test campaign for the following tests: Electrical, Environmental, Usability, Security, Maintainability, Availability, Safety, and Accuracy (performed via paper-based voting and audio voting sessions). More details of this evaluation are provided in Section 4.4.1 of this document.

2.2 Evaluation of Prior Non-VSTL Testing

Dominion Voting Systems has submitted an ICP and ICE summative usability report per EAC Request for Interpretation (RFI) 2007-03 "EAC Decision on Summative Usability Testing" for the Democracy Suite Version 4.0. Summative usability testing and submission to the VSTL is required by the manufacturer as part of the TDP. The testing focuses on the two components of the Democracy Suite that voters would use to cast and/or print and cast ballots – the ICE and the ICP. Participants in the test assumed the role of voters who cast ballots in person at a polling location as well as the tasks of testing the system used by the special needs voters who required auditory, visual or physical assistance to cast their vote.

2.3 Known Field Issues

This system has never been fielded in the configuration submitted for EAC 2005 VVSG certification testing. The ImageCast Precinct has been utilized in a small number of elections in New York State. There were no systemic or significant issues traceable to voting system performance.

3.0 MATERIALS REQUIRED FOR TESTING

The materials required for certification testing of the Democracy Suite 4.0 voting system include software, hardware, test materials, and deliverable materials to enable the test campaign to occur will be delivered by Dominion Voting Systems to Wyle.

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.1 Software

The tables below list 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 software used for testing telecommunications, 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 Democracy Suite 4.0 EMS Software Platform Component Descriptions

Software Required For Testing	Software Version	Filename
Democracy Suite EMS EED Client Application	4.6	setup.exe: EED_FED_CERT.Setup.msi EED_FED_CERT.Setup_64b.msi
Democracy Suite EMS RTR Client Application	4.6	setup.exe: RTR_FED_CERT.Setup.msi RTR_FED_CERT.Setup_x64.Setup.msi
Democracy Suite EMS Application Server	4.6	setup.exe: EMSApplicationServer_FED_CERT.Setup.msi EMSApplicationServer_FED_CERT.Setup_x64.Setup.msi
Democracy Suite EMS File System Service	4.6	Setup.exe: DVS.Utilities.FileSystemServiceSetup.msi
Democracy Suite EMS Audio Studio Client Application	4.6	setup.exe: EMSAS2010_Setup.msi
Democracy Suite EMS Data Center Manager	4.6	DemocracySuiteEMS_DCM.exe
.NET Framework 3.5 Library	4.0	dotNetFx40_Full_x86_x64.exe
NetAdvantage for .NET 2008 Vol. 1 CLR 2.0	2008 Vol.1 CLR 2.0	NetAdvantage_WinForms_20081_CLR20_Product.exe (for details see document Components_3rdParty_1.0.xlsx)

Table 3-2 Democracy Suite 4.0 ImageCast Precinct Software Component Descriptions

Software Required For Testing	Software Version	Filename
Election Firmware	4.6.1-US	cf2xx.sig
Firmware Updater	4.6.1-US	firmUp.enc
Firmware Extractor	4.6.1-US	FirmwareExtract.enc
Kernel (uClinux)	4.6.1-US	Image.bin.gz
Boot Loader (COLILO)	20040221	colilo.bin

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.1 Software (continued)

Table 3-3 Democracy Suite 4.0 ImageCast Evolution Software Component Descriptions

Software Required For Testing	Software Version	Filename
VotingMachine	4.6.2	GApplication-4.6.2.vhd.7z
libAudio	0.3.7	libAudio-0.3.7.tar.bz2
MCFPGA	1.0.11	ice2_mc_p1.bit
SCFPGA	1.0.7	ice2_scb_p1.bit
Logo Platform	3.0.0	logo_platform.bmp
Logo OS	3.0.0	logo_os.bmp
Atmega Intrusion	1.0.9	logger.bin
Atmega Power	1.0.10	power.bin
Blob	1.2	mpc8347dvs.dtb
Integrated Printer	4.1.6	integratedPrinter.hex, printerFont.hex

Table 3-4 Democracy Suite 4.0 ImageCast Central Software Component Descriptions

Software Required For Testing	Software Version	Filename
ImageCast Central Application	4.0.tbd	ImageCast Central.exe
Image-Analysis DLL	4.0.tbd	ImgProc.dll

Table 3-5 Democracy Suite 4.0 EMS Software Platform Third Party Software Component Descriptions

Software Required For Testing	Software Version	Filename
NetAdvantage for .NET Windows Forms 2008 Subscription	2008 Vol.1 CLR 2.0	NetAdvantage_WinForms_20081_CLR20_Product.exe
TxText Control .NET Version 14	16.0	tx_1600_dotnetserver_sp1.zip
Cepstral Text-to-Speech Desktop Voices	5.1.0	Cepstral_Allison_windows_5.1.0.msi + 3 more voices

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.1 Software (continued)

Table 3-6 Democracy Suite 4.0 EMS Client Application Software Component Descriptions

Software Required For Testing	Software Version	Filename
Microsoft Windows 7 x64	6.1	Microsoft DVD provided
Windows Server 2008 R2 x64	6.1	Microsoft DVD provided
Microsoft SQL Server 2008 R2 x64 or Microsoft SQL Server 2008 Express R2 x64	10.0	Microsoft DVD provided
Microsoft .NET Framework 4.0	4.0	dotNetFx40_Full_x86_x64.exe
Microsoft Visual J# Redistributable 2.0 x64	2.0 x64	vjredist64.exe
Adobe Acrobat Reader 9.3 or higher	9.0	AdbeRdr930_en_US.exe
Dallas 1-Wire Device Driver version 4.0.3b x64	4.0	install_1_wire_drivers_x64_v403beta.msi
Cepstral Text-to-Speech Desktop Voices	5.1.0	Cepstral_Allison_windows_5.1.0.msi + 3 more voices
Java Runtime Environment 6.0	6.0	jre-6u18-windows-x64.exe
Microsoft IIS 7.5	7.5	Microsoft DVD provided

Table 3-7 Democracy Suite 4.0 EMS Software Platform Unmodified COTS Components Descriptions

Software Required For Testing	Software Version	Filename
TX Text Control Library for .NET	16.0	tx_1600_dotnetserver_sp1.zip (for details see document Components_3rdParty_1.0.xlsx)
OneWire API for .NET	4.0.2.0	OneWireAPI.NET.dll (for details see document Components_3rdParty_1.0.xlsx)
SOX – audio converter application	14.3.1	sox.exe (for details see document Components_3rdParty_1.0.xlsx)
Log4net	1.2.10	log4net.dll, log4net.xml (for details see document Components_3rdParty_1.0.xlsx)
NLog – log library	1.0.0.505	NLog.dll (for details see document Components_3rdParty_1.0.xlsx)

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.1 Software (continued)

Table 3-7 Democracy Suite 4.0 EMS Software Platform Unmodified COTS Components Descriptions (continued)

Software Required For Testing	Software Version	Filename
Cepstral Text-to-Speech	5.1.0	Cepstral_Allison_windows_5.1.0.msi + 3 more voices (for details see document Components_3rdParty_1.0.xlsx)
iTextSharp – pdf generation library	4.0.3	itextsharp.dll (for details see document Components_3rdParty_1.0.xlsx)
openssl.exe, libeay32.dll, ssleay32.dll	1.2	openssl.exe, lebeay32.dll, ssleay32.dll (for details see document Components_3rdParty_1.0.xlsx)
SQLite	1.0.65.0	System.Data.SQLite.DLL 32-bit and 64-bit (for details see document Components_3rdParty_1.0.xlsx)
Lame	3.98	System.Data.SQLite.DLL 32-bit and 64-bit (for details see document Components_3rdParty_1.0.xlsx)
Speex	1.0.4	speexdec.exe and speexenc.exe (for details see document Components_3rdParty_1.0.xlsx)
Ghostscript	8.71	gsdll32.dll – both 32-bit and 64-bit (for details see document Components_3rdParty_1.0.xlsx)
PdfToImage.dll	1.2	PdfToImage.dll (for details see document Components_3rdParty_1.0.xlsx)
Tamir.SharpSSH.dll, DiffieHellman.dll, Org.Mentalis.Security.dll – Cryptography	SharpSSh package 1.1.1.13	Tamir.SharpSSH.sll, Diffie.Hellman.dll, Org.Mentalis.Security.dll (for details see document Components_3rdParty_1.0.xlsx)

Table 3-8 Democracy Suite 4.0 ImageCast Precinct Unmodified COTS Software Component Descriptions

Software Required For Testing	Software Version	Filename
PNG Reference Library	1.2.24	libpng-1.2.24.tar.gz
OpenSSL	1.1.2	Openssl-fips-1.1.2.tar.gz
Zlib	1.2.3	Zlib-1.2.3.tar.gz

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.1 Software (continued)

Table 3-9 Democracy Suite 4.0 ImageCast Evolution Unmodified COTS Software Component Descriptions

Software Required For Testing	Software Version	Filename
apache-log4cxx	0.10.0	apache-log4cxx-0.10.0.tar.gz
apr	1.4.4	apr-1.4.4.tar.bz2
apr-util	1.3.11	apr-util-1.3.11.tar.bz2
autoconf	2.57	autoconf-2.57.tar.bz2
bison	2.3	bison-2.3.tar.bz2
busybox	1.18.5	busybox-1.18.5.tar.bz2
ccache	2.4	ccache-2.4.tar.gz
cksum	19990607	cksum-19990607.tar.gz
cramfs	20081121	cramfs-20081121.tar.gz
distcc	2.18.3	distcc-2.18.3.tar.bz2
dtc	1.2.0	dtc-1.2.0.tar.gz
e2fsprogs	1.41.14	e2fsprogs-1.41.14.tar.gz
expat	2.0.1	expat-2.0.1.tar.gz
flex	2.5.33	flex-2.5.33.tar.gz
fontconfig	2.8.0	fontconfig-2.8.0.tar.gz
freetype	2.4.4	freetype-2.4.4.tar.bz2
genext2fs	1.4.1	genext2fs-1.4.1.tar.gz
gen_init_cpio	2.6.25-rc7	gen_init_cpio-2.6.25-rc7.tar.gz
genromfs	0.5.1	genromfs-0.5.1.tar.gz
git	1.5.6.5	git-1.5.6.5.tar.gz
glibc	2.13	glibc-2.13.tar.bz2
glibc-ports	2.13	glibc-ports-2.13.tar.bz2
i2c-tools	3.0.3	i2c-tools-3.0.3.tar.bz2
jpegsrc	v8c	jpegsrc.v8c.tar.gz
libogg	1.2.2	libogg-1.2.2.tar.gz
libpng	1.5.4	libpng-1.5.4.tar.gz
libtool	1.5	libtool-1.5.tar.gz
libusb	1.0.8	libusb-1.0.8.tar.bz2

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.1 Software (continued)

Table 3-9 Democracy Suite 4.0 ImageCast Evolution Unmodified COTS Software Component Descriptions (continued)

libusb-compat	0.1.3	libusb-compat-0.1.3.tar.bz2
linux	2.6.30.9	linux-2.6.30.9.tar.bz2
lkc	1.4	lkc-1.4.tar.gz
mkspooflinks	3.4	mkspooflinks-3.4.tar.gz
mtd-utils	20060302	mtd-utils-20060302.tar.bz2
mux_server		mux_server.c
openssl-fips	1.2.3	openssl-fips-1.2.3.tar.gz
pkg-config	0.21	pkg-config-0.21.tar.gz
ppp	2.4.5	ppp-2.4.5.tar.gz
qt-everywhere	4.7.3	qt-everywhere-opensource-src-4.7.3.tar.gz
skell	1.19	skell-1.19.tar.gz
soundtouch	1.5.0	soundtouch-1.5.0.tar.gz
sparse	0.4	sparse-0.4.tar.gz
speex	1.2rc1	speex-1.2rc1.tar.gz
sqlite	3.7.7.1	sqlite-autoconf-3070701.tar.gz
sysfsutils	2.1.0	sysfsutils-2.1.0.tar.gz
texinfo	4.8	texinfo-4.8.tar.bz2
tiff	3.9.5	tiff-3.9.5.tar.gz
tunctl	1.5	tunctl-1.5.tar.gz
tzcode	2011g	tzcode2011g.tar.gz
tzdata	2011h	tzdata2011h.tar.gz
u-boot-tools	1.1.6	u-boot-tools-1.1.6.tar.bz2
unifdef	1.0	unifdef-1.0.tar.gz
usb-modeswitch	1.1.7	usb-modeswitch-1.1.7.tar.bz2
usb-modeswitch-data	20110227	usb-modeswitch-data-20110227.tar.bz2
wget	1.9.1	wget-1.9.1.tar.gz
yaffs_utils	20060418	yaffs_utils-20060418.tar.gz
zlib	1.2.5	zlib-1.2.5.tar.bz2
rpm	4.0.4	rpm-4.0.4.tar.gz

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.1 Software (continued)

Table 3-10 Democracy Suite 4.0 - ImageCast Central Build Environment Software Build Components (Unmodified COTS)

Software Required For Build	Software Version	Filename
Windows 7	Home Premium	OEM installed, or full CD from Microsoft
Visual Studio	2005	Full CD from Microsoft

Table 3-11 Democracy Suite 4.0 - ImageCast Central Build Environment Setup Software Utilities (Unmodified COTS)

Software Required For Build	Software Version	Filename
7-Zip	9.20	7z920.exe
Active Perl 64-bit	5.12.4.1205	ActivePerl-5.12.4.1205-MSWin32-x64-294981.msi
Active Perl 32-bit	5.12.4.1205	ActivePerl-5.12.4.1205-MSWin32-x86-294981.msi
Nasm	2.09.07	nasm-2.09.07-win32.zip

Table 3-12 Democracy Suite 4.0 - ImageCast Central Software Build Library Source Code (Unmodified COTS)

Software Required For Build	Software Version	Filename
OpenSSL	Fips 1.2.3	openssl-fips-1.2.3.tar.gz

Table 3-13 Democracy Suite 4.0 - ImageCast Central Runtime Software Components (Unmodified COTS)

Software Required For Testing ICC application	Software Version	Filename
Imgcomp.dll	2.11	apiman.zip
1 Wire driver 64-bit	4.03	install_1_wire_drivers_x64_v403.msi
1 Wire driver 32-bit	4.03	install_1_wire_drivers_x86_v403.msi
Kofax VRS	4.50	Full CD from Kofax
Canon Scanner driver	1.8	X10DRIT_V18.exe
VCredist	4/10/2006	vcredist_x86.exe

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.1 Software (continued)

Table 3-14 Democracy Suite 4.0 ImageCast Precinct Modified COTS Software Component Descriptions

Software Required For Testing	Software Version	Filename
uClinux	20070130	uClinux-dist-20070130.tar.gz
COLILO Boot Loader	20040221	Colilo20040221.tar.gz

Table 3-15 Democracy Suite 4.0 ImageCast Evolution Modified COTS Software Component Descriptions

Software Required For Testing	Software Version	Filename
Kernel	2.6.30.9-dvs-8	uImage
U-BOOT	1.3.4.19	u-boot.bin

Table 3-16 Democracy Suite 4.0 EMS Software Build Environment Component Descriptions

Software Required For Testing	Software Version	Filename
Microsoft Windows Server 2008 R2 x64	6.1	Microsoft DVD provided
.NET Framework	4.0	dotNetFx40_Full_x86_x64.exe
Microsoft Visual J# 2.0 Redistributable	2.0 x64	vjredist64.exe
Microsoft Visual Studio 2010	10.0	Microsoft DVD provided (Microsoft patch KB2286556 VS10-KB2286556-x86.exe has to be installed)
Microsoft Visual Studio 2010 Service Pack 1	10.0.30319 SP1	VS2010SP1dvd1.iso
Cruise Control	1.5	CruiseControl.NET-1.5.7256.1-Setup
Nant	0.90	nant-0.90-bin.zip
Csunit	2.1.1	csUnit.2.1.1.BETA.setup
7-Zip	9.20 x64	7z920-x64.msi
NetAdvantage Infragistics	2008 Vol.1 CLR 2.0	NetAdvantage_WinForms_20081_CLR20_Product.exe
Tx Text Control 16.0.NET	16.0	tx_1600_dotnetserver_sp1.zip
Adobe Acrobat Reader 9.3 or higher	9.3	AdbeRdr930_en_US.exe
ImgBurn 2.5 or higher	2.5.1.0	SetupImgBurn_2.5.0.0.exe

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.1 Software (continued)

Table 3-17 Democracy Suite 4.0 ImageCast Precinct Election Firmware Compiler Descriptions

Software Required For Testing	Software Version	Filename
g++ (GNU C++ compiler)	gcc3.4.0-20040603	m68k-uclinux-tools-c++-gcc3.4.0-20040603.sh

Table 3-18 Democracy Suite 4.0 ImageCast Evolution Election Firmware Compiler Descriptions

Software Required For Testing	Software Version	Filename
g++ (GNU C++ compiler)	gcc-4.5.55-eglibc-2.11.55	freescale-powerpc-linux-gnu-2010.09-55.i686.rpm

Table 3-19 Democracy Suite 4.0 ImageCast Precinct Firmware Build Environment Component Descriptions

Software Required For Testing	Software Version	Filename
Ubuntu 10.04 LTS – Long-term support	10.04	ubuntu-10.04.2-desktop-amd64.iso
Toolchain Installation Script	N/A	Toolchain.sh
m68k uClinux tools base gcc	3.4.0-20040603	m68k-uclinux-tools-base-gcc3.4.0-20040603.sh
m68k uClinux tools c++ gcc	3.4.0-20040603	m68k-uclinux-tools-c++-gcc3.4.0-20040603.sh
m68k uClinux tools gdb	20040603	m68k-uclinux-tools-gdb-20040603.sh
OpenSSL	1.1.2	Openssl-fips-1.1.2.tar.gz

Table 3-20 Democracy Suite 4.0 ImageCast Evolution Firmware Build Environment Component Descriptions

Software Required For Testing	Software Version	Filename
Ubuntu	10.04 LTS	ubuntu-10.04.2-desktop-i386.iso
LTIB	10.1.1a	ltib-10-1-1a-sv.tar.gz
g++ (GNU C++ compiler)	gcc-4.5.55-eglibc-2.11.55	freescale-powerpc-linux-gnu-2010.09-55.i686.rpm

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

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's 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 manufacturer provided the hardware listed in Table 3-21 for the purpose of testing two documented system configurations: Standard, and Express. This hardware consists of PCs, Application/Database Servers, encrypted Network Attached Storage (NAS) servers, and ruggedized encrypted portable hard drives.

The system configurations consist of:

- **Standard:** (1) PC, (1) Application Server/ Database Server, (1) encrypted NAS for Application/Database Server
- **Express:** (1) PC and (1) Portable Hard Drive

Table 3-21 Democracy 4.0 Voting System Equipment Description

Equipment	Manufacturer	Version/Model	Specifications	Serial Number
PC1	Dell	Precision T1500	Processor: Intel Core i7-860 2.8 GHz, Memory: 4x 1GB 1333MHz DDR3, Hard Drive Capacity: 500 GB	61VNNM1
PC2	Dell	Precision T1500	Processor: Intel Core i7-860 2.8 GHz, Memory: 4x 1GB 1333MHz DDR3, Hard Drive Capacity: 500 GB	61TPNM1
PC3	Dell	Precision T1500	Processor: Intel Core i7-860 2.8 GHz, Memory: 4x 1GB 1333MHz DDR3, Hard Drive Capacity: 500 GB	61YMNM1
PC4	Dell	Precision T1500	Processor: Intel Core i7-860 2.8 GHz, Memory: 4x 1GB 1333MHz DDR3, Hard Drive Capacity: 500 GB	61TNNM1

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.2 Equipment (continued)

Table 3-21 Democracy 4.0 Voting System Equipment Description (continued)

Equipment	Manufacturer	Version/Model	Specifications	Serial Number
PC5	Dell	Inspiron One 2305	Processor: AMD Athlon II X2 240e 2.8 GHz, Memory: 8GB Dual Channel 1333MHz DDR3, Hard Drive Capacity: 1 TB	564C3P1, 563F3P1
SERVER1	Dell	PowerEdge R610	Processor: Intel Xeon E5620 2.4 GHz, Memory: 8x 2GB 1333MHz DDR3, Hard Drive Capacity: 2x 500 GB	5M9NNM1
SERVER2	Dell	PowerEdge R610	Processor: Intel Xeon E5620 2.4 GHz, Memory: 8x 2GB 1333MHz DDR3, Hard Drive Capacity: 2x 500 GB	5M8PNM1
SERVER3	Dell	PowerEdge R610	Processor: Intel Xeon E5620 2.4 GHz, Memory: 8x 2GB 1333MHz DDR3, Hard Drive Capacity: 2x 500 GB	5M8QNM1
STORAGE1	Rocstor	Guardian 4RM Raid System	Disk space: 2 TB (Striped + Mirrored), Processor: 400 MHz storage I/O, Hot bus interface: eSATA, Drive bus interface: SATA II	ROC7326210 47/SB090101 54
STORAGE2	Rocstor	Guardian 4RM Raid System	Disk space: 2 TB, Processor: 400 MHz storage I/O, Hot bus interface: eSATA, Drive bus interface: SATA II	ROC7326210 45/SB090101 57
STORAGE3	Rocstor	Guardian 4RM Raid System	Disk space: 2 TB, Processor: 400 MHz storage I/O, Hot bus interface: eSATA, Drive bus interface: SATA II	ROC7326210 46/SB090101 61
STORAGE4	Rocstor	Commander 2UE Portable Hard Drive	Hard Drive Capacity: 500 GB	5VJ4DRJP
STORAGE5	Rocstor	Commander 2UE Portable Hard Drive	Hard Drive Capacity: 500 GB	5VJ48VFJ

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.2 Equipment (continued)

In order to perform the software Witness and Trusted Builds, one Personal Computer has been provided as a build machine. The build machine is described in the table below:

Table 3-22 Build Machine Description

Equipment	Manufacturer	Version/Model	Serial Number	COTS/ Non-COTS
Build 1	Super Micro PC w/4 Hard Drives	PC w/4 Hard Drives	BM-57381-001	COTS

To support the test program, Dominion has provided additional supporting hardware for the provided Personal Computers. A list of these items is provided in Table 3-23.

Table 3-23 Dominion 4.0 COTS Voting System Support Equipment Description

Test Material	Make	Model	Quantity	Serial Number
COTS Central High Speed Scanner	Canon	DR-X10C	2	ED300874, ED300880
iButton (SHA-1) with USB Reader/Writer	Maxim	USB R/W: DS9490R iButton: DS1963S	3	4D027C, 4C9CF5, 514DFD
iButton (SHA-1)	Maxim	DS1963S	2	4CE4C9, 4D064A
LCD Monitor	Soyo	18.5” wide LCD	1	DYLM19R6-KLE-10202
LCD Monitor	Samsung	23” wide LCD	1	MY23HVMS701197B
LCD Monitor	Dell	1909W	4	07E-4EUS, 07F-071S, 07F-06US, 07F-074S
LCD Monitor	Dell	N445N	3	2TWC, 2UOC, 2U6C
Audio Adapter	Soundwave	USB Soundwave 7.1 Audio Adapter	2	SW-57381-001, SW-57381-002
PCI Software	Soundwave	Soundwave 7.1 PCI Software	2	n/a
USB Software	Soundwave	USB Soundwave 7.1 Software	1	n/a
Networking Switch	D-Link	D-Link DES-1105 5-Port Switch	1	DRL728A001397
Mouse	Dell	USB w/rollerball	4	G1A00M0M, 10203JTI, LZA30491960, 438027372
Mouse	Microsoft	USB w/rollerball	1	X800898
Keyboard	Kensington	USB	1	D0713000487
Keyboard	Microsoft	USB	1	6968200717217

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.2 Equipment (continued)

Table 3-23 Dominion 4.0 COTS Voting System Support Equipment Description

Test Material	Make	Model	Quantity	Serial Number
Keyboard	IBM	USB	1	2162079
Compact Flash Reader	SanDisk	USB	3	0171618, 0201833, 0171631
Networking Switch	D-Link	DGS-2208 8-Port Switch	2	F36J69C004821, F36J69C004824
Headphones	Radio Shack	33-276-01	1	Headphones
eSATA PCI Card (Installed into Servers and PCs)	SIIG, Inc.	eSATA II PCIe Pro Card	7	n/a
Card Reader	GGI Gear	Compact Flash Card Reader	4	CFRW-57381-001 thru 004
Sony	Headphone	MDR-G45LP-01	1	Sony
Cyber Acoustics Headphone	Cyber Acoustics	ACM-70	2	DVS23000048

Table 3-23 Dominion 4.0 COTS Voting System Support Equipment Description

Test Material	Make	Model	Quantity	Serial Number
Sip & Puff	Origin Instruments	Air Voter	7	AV-57381-001 thru 003, 002251, 002268, 002267
Footswitch Pair	N/A	Enabling Devices	4	RP-57381-001 thru 004
Compact Flash	RiData	CFC-14A	50	Wyle-assigned numbers: CF-XXX

The table below provides the serial numbers of the equipment submitted for testing:

Table 3-24 Democracy 4.0 Voting System Equipment

Equipment	Description	Serial Numbers
ICP	Precinct Count Optical Scanner PCOS 320A	WLDAFBH0001, WLDAFBH0002, WLDAFBH0004, WLDAFBH0005, WLDAFBH0018, WLDAFBH0019, WLDAFBH0023
ICE	Precinct Count Optical Scanner PCOS 400A	ICE2P1005, ICE2P1006, ICE2P1007, ICE2P1008
ICP Ballot Box	Externally secure ballot box	BOX-57381-011, BOX-57381-012, BOX-57381-013, BOX-57381-014, BOX-57381-015
ICE Ballot Box	Externally secure ballot box	BOX-57381-01, BOX-57381-02, BOX-57381-03, BOX-57381-04,

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.3 Test Support Materials

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

The following test materials are required to support the Democracy Suite 4.0 certification testing:

Table 3-25 Democracy Suite 4.0 Test Support Materials

Test Material	Quantity	Make	Model
Hasp Locks (red)	50	N/A	N/A
Tamper Evident Seals	50	N/A	SE-37
Disposable Gloves	3	N/A	N/A
Gloves and Mouthpiece Kit	17	N/A	N/A
Black and Clear Mouthpiece	1	N/A	N/A
ATI Handsets	5	Dominion	ATI-57381-001 thru 005
Black Ballot Privacy Sleeves	4	Dominion	N/A
White Ballot Privacy Sleeves	4	Dominion	N/A
Black Privacy Panels (set of 2 pieces)	4	Dominion	N/A
White Privacy Panels	4	Dominion	N/A
Thermal Printer Rolls	100	N/A	N/A
Combination Lock	2	MASTER Lock	646T
Keyed Lock	4	MASTER Lock	121Q
Security Keys	20	Maxim	N/A
Ballots	8000	Dominion	N/A
Dominion Cleaning Kit	1	Dominion	N/A
Permanent Markers	20	p/n SHARPIE1 BK	N/A

3.4 Deliverable Materials

The materials listed below are to be delivered as part of the Democracy 4.0 System to the users:

Table 3-26 Deliverable Materials

Deliverable Material	Version	Description
Election Event Designer	4.6	EMS client application
Results Tally and Reporting	4.6	EMS client application
Audio Studio	4.6	EMS client application
Application Server	4.6	EMS server application
Datacenter Manager	4.6	EMS server application
ImageCast Evolution	400A w/Firmware version 4.6.2.3 loaded	Precinct ballot scanner and ADA accessible voting device
ImageCast Precinct	320A w/Firmware version 4.6.4 loaded	Precinct ballot scanner and ADA accessible voting device

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.4 Deliverable Materials (continued)

Table 3-26 Deliverable Materials (continued)

Deliverable Material	Version	Description
ImageCast Central Count	Canon DR-X10C w/Firmware version 4.6.3 loaded	Central ballot scanner
ImageCast Evolution Metal Ballot Box	BOX-400A	ICE Metal Ballot box
ImageCast Precinct Metal Ballot Box	BOX-310A	ICP Metal Ballot box
ImageCast Precinct Plastic Ballot Box	BOX-330A	ICP Plastic Ballot box
Rocstor Encrypted NAS	Dell PowerEdge R610	Encrypted Network Attached Storage module for server and data backup
Rocstor Portable Hard Drive	Rocstor Commander 2UE Portable Hard Drive	Encrypted and ruggedized external hard drive
iButton with Reader/Writer	Maxim USB R/W: DS9490R iButton: DS1963S	Security authentication token with programmer
ICE/ICP Headphones	Cyber Acoustics	Headphones used for audio voting
Sip/Puff Device	Origin Instruments Air Voter	Binary input device for disabled voters
Footswitch Pair	Enabling Devices	Binary input device for disabled voters
Compact Flash Cards	CFC-14A	Transport Media
ATI Handset	Dominion	ADA voting device used in conjunction with Binary input devices
ICP System Operation Procedures	1.1.0::147	TDP Document
EMS System Operation Procedures	1.2.0::387	TDP Document
ICE System Operation Procedures	1.0.0::79	TDP Document
ICC System Operation Procedures	1.1.0::67	TDP Document
ICP System Maintenance Manual	1.1.0::58	TDP Document
ICE System Maintenance Manual	1.1.0::109	TDP Document
Election Event Designer User's Guide	1.3.3	TDP Document
Results Tally and Reporting User's Guide	1.2.7	TDP Document
Audio Studio User's Guide	1.2.3	TDP Document

4.0 TEST SPECIFICATIONS

Certification testing of the Democracy Suite 4.0 is the configuration submitted in the EAC application DVS-1001. Wyle qualified personnel will ensure that all certification testing performed on the manufacturer's voting system follows Wyle's 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:

Interpretations

2010-08 EAC Decision on Calling Sequence

2010-07 EAC Decision on Module Length

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

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

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

2010-03 EAC Decision on Database Coding Conventions

2010-01 EAC Decision on Voltage Levels and ESD Test

2009-06 EAC Decision on Temperature and Power Variation

2009-05 EAC Decision on T-Coil Requirements

2009-04 EAC Decision on Audit Log Events

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

2009-02 EAC Decision on Alternate Languages

2009-01 EAC Decision on VVPAT Accessibility New

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

2008-10 EAC Decision on Electrical Fast Transient

2008-09 EAC Decision on Safety Testing

2008-08 EAC Decision on Automatic Bar Code Readers

2008-07 EAC Decision on Zero Count to Start Election

2008-06 EAC Decision on Battery Backup for Central Count

2008-05 EAC Decision on Durability

2008-04 EAC Decision on Supported Languages

2008-03 EAC Decision on OS Configuration

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

2008-01 EAC Decision on Temperature and Power Variation

2007-06 EAC Decision on Recording and Reporting Undervotes

2007-05 EAC Decision on Testing Focus and Applicability

2007-04 EAC Decision on Presentation of Alternative Language

4.0 TEST SPECIFICATIONS (CONTINUED)

2007-03 EAC Decision on Summative Usability Testing

2007-02 EAC Decision on Variable Names

2007-01 EAC Decision on Accessible Design

Notice of Clarifications

NOC 09-005 – Development and Submission of Test Plans for Modifications to EAC Certified Systems

NOC 09-004 – Development and Submission of Test Reports

NOC 09-003 – De Minimis Change Determination Requirement

NOC 09-002 -- Laboratory Independence Requirement

NOC 09-001 -- Requirements for Test Lab Development and Submission of Test Plans

NOC 08-003 -- EAC Conformance Testing Requirements

NOC 08-002 -- EAC Mark of Certification

NOC 08-001 -- Validity of Prior Non-core Hardware Environmental and EMC Testing

NOC 07-005 -- Voting System Test Laboratory Responsibilities in the Management and Oversight of Third Party Testing

NOC 07-004 -- Voting System Manufacturing Facilities

NOC 07-003 -- State Testing Done in Conjunction with Federal Testing within the EAC Program

NOC 07-002 -- VSTL Work with Manufacturers Outside of Voting System Certification Engagements

NOC 07-001 -- Timely Submission of Certification Application

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 Dominion Democracy Suite 4.0 per sections 4.4.3 and 4.4.5. 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.

4.0 TEST SPECIFICATIONS (CONTINUED)

4.1 Requirements (Strategy of Evaluation) (continued)

- **Section 6: Telecommunication** – A test of the telecommunication technologies utilized by the Dominion Democracy Suite 4.0 will be tested for data accuracy and correctness by analyzing the packet level information being transmitted. Section 6.2.6 will be excluded since the Democracy Suite 4.0 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. In addition to functional testing, the source code for the Dominion Democracy Suite 4.0 will be analyzed utilizing Fortify ™ Source Code Analysis (SCA) for security vulnerabilities in addition to the manual line by line review.
- **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 Dominion QA documentation to determine compliance to EAC 2005 VVSG requirements and the requirements stated in the Dominion Voting Systems 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 Dominion documentation to ensure their QA process is being followed. Wyle 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 Dominion's location or conduct an external evaluation utilizing equipment, documents and support information provided by Dominion 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 Dominion configuration management documentation to determine EAC 2005 VVSG compliance and to further determine whether Dominion is following its documented CM requirements within the TDP. During source code review, Wyle qualified personnel will verify that Dominion Voting Systems is following EAC 2005 VVSG CM requirements as well as Dominion CM requirements. Any anomalies will be formally reported to Dominion and the EAC. All equipment received for testing will be checked against Dominion documentation to ensure their CM process is being followed.

4.1.1 Mapping of Requirements to Equipment Type and Features

Please refer to the EAC online matrix tool (VRT) for further reference.

4.1.2 Rationale for 'Not Applicable' Requirements

The Dominion Voting Systems Democracy Suite 4.0 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 – 7.5.4 (Telecommunications and Data Transmission)
- 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)

4.0 TEST SPECIFICATIONS (CONTINUED)

4.1 Requirements (Strategy of Evaluation) (continued)

4.1.2 Rationale for 'Not Applicable' Requirements (continued)

The rationale for not evaluating the Democracy Suite 4.0 to the requirements contained in the indicated sections of the EAC 2005 VVSG is described below. Refer to the EAC online matrix tool for specific requirements that are excluded during this test campaign.

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 Dominion Democracy Suite 4.0 does not use public networks.
7.5.4	This section was intended for a shared operating environment on ballot recording and vote counting equipment. The ICE and ICP use dedicated operating environments and will be excluded from this requirement. The EMS and ICC components do use a shared operating environment and will be tested to this VVSG clause.
7.6	This section pertains to "Voting systems that transmit data over public telecommunications…" The Dominion Democracy Suite 4.0 does not support transmission over public networks.
7.7	No wireless technology is present in the Dominion Democracy Suite 4.0.
7.9	The Dominion Democracy Suite 4.0 is a paper based system.

4.2 Hardware Configuration and Design

The Dominion Voting Systems Democracy Suite is a paper-based optical scan voting system. The Democracy Suite system consists of four major components: the EMS, ICE precinct scanner and ballot marking device, ICP precinct scanner, and ICC central count scanner. The Democracy Suite is comprised of two proprietary pieces of hardware (ICE and ICP) and one piece of COTS hardware (ICC). All EMS 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.

ICP – Wyle Laboratories previously performed testing to the EAC 2005 VVSG on the ICP-A configuration that consisted of an ICP unit, with firmware version 4.5.4, and a standalone EMS configuration, version 4.5 RC9, as part of a state test effort. Wyle will be utilizing the data obtained during that test effort to satisfy requirements for this test campaign for the following tests: Electrical, Environmental, Usability, Security, Maintainability, Availability, Safety, and Accuracy (performed via paper-based voting and audio voting sessions).

ICE - ICE will be set on the ballot box to simulate the actual election configuration. During operational tests the unit will be in auto feed mode ("Shoe-Shine") and scan test ballots for the duration of the operational test. 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.

4.0 TEST SPECIFICATIONS (CONTINUED)

4.2 Hardware Configuration and Design (continued)

ICC - ICC consists of COTS scanner and COTS Workstation PC. The Canon DR-X10C (S/N ED300874) scanner and the Dell Inspiron One 2305 (S/N 564C3P1) Workstation PC contain CE, UL, and FCC labeling. Due to the fact that these components are unmodified COTS equipment, as well as central count equipment, they will be exempt from non-operational hardware testing; however the ICC will undergo Temperature Power testing in conjunction with the ICE. Beyond the Temperature Power test, the ICC will only be utilized in functional and system testing for this campaign.

4.3 Software System Functions

The Dominion Democracy Suite 4.0 System software is written in the C, C++, C# (C Sharp) programming languages. The system software is broken into three areas: EMS, Precinct tabulator software acting as firmware, and central count application running on a COTS workstation.

The Democracy Suite EMS software consists of seven applications listed below:

- Election Event Designer
- Results Tally and Reporting
- Audio Studio
- Datacenter Manager
- Application Server
- Network Attached Storage Server
- Database Server

The Democracy Suite 4.0 contains two precinct tabulators. Both tabulators run software that is treated as firmware. The software applications are ICP and ICE. The Democracy Suite 4.0 has an independent workstation running proprietary software. The ICC application provides the central tabulation function for the system.

4.4 Test Case Design

Wyle 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 use both “Verification” and “Validation” to some degree. There are four basic levels of testing in the V-Model Life Cycle: Component, Integration, System, and Acceptance. Wyle will be evaluating the Dominion Democracy Suite 4.0 to all four levels.

4.4.1 Hardware Qualitative Examination Design

ICP Testing

As stated previously, Wyle Laboratories performed testing to the EAC 2005 VVSG on the ICP-A configuration that consisted of an ICP unit, with firmware version 4.5.4, and a standalone EMS configuration, version 4.5 RC9, as part of a state test effort. Wyle will be utilizing the data obtained during that test effort to satisfy requirements for this test campaign for the following tests: Electrical, Environmental, Usability, Security, Maintainability, Availability, Safety (this testing was witnessed by Wyle personnel at a third party laboratory), and Accuracy (performed via paper-based voting and audio voting

4.0 TEST SPECIFICATIONS (CONTINUED)

4.4.1 Hardware Qualitative Examination Design (continued)

sessions). Prior to initiation of that test effort, Wyle reviewed the results of testing performed on a previous version of the Democracy Suite tested by the New York State Board of Elections.

The version submitted to NYSBOE consisted of an earlier version of the EMS and the ICP. Wyle researched this test campaign and performed a comparison between the ICP version tested in the provided reports and the ICP version submitted as part of the ICP-A test campaign and concluded that some hardware tests could be accepted and any test not accepted would be tested as part of the ICP-A test campaign.

Additionally, Wyle reviewed the results of previous testing in the form of the following test reports submitted by Dominion:

- Sun Microsystems, Advanced Product Testing Lab Test Report Number 08-00735, "Testing Services Report, ImageCast Precinct Ballot Counter & Ballot Marker," dated July 16, 2008
- Criterion Technology Test Report Number 090826-1455R, "EMC Qualification Test Report, Dominion, ImageCast Precinct Ballot Counter With Ballot Box, ICP 300B", dated October 5, 2009
- EMC Integrity Incorporated Test Report Number ETRA80606, Rev. A, "Radiated and Conducted Emissions, ImageCast Precinct Ballot Counter and Ballot Marker," dated July 22, 2008
- EMC Integrity Incorporated Test Report Number TRA80606, Rev. A, "Full Compliance Immunity, ImageCast Precinct Ballot Counter and Ballot Marker," dated July 22, 2008
- Compliance Integrity Services Test Report Number DVS-0807-R02, "Electrical Safety Testing To UL 60950-1: 2007, ImageCast Precinct Counter and Marker," dated August 11, 2008

Wyle performed a hardware qualitative examination to assess if the testing documented in the Dominion-supplied reports was performed under the guidelines of the EAC program, if the tests were performed per the EAC 2005 VVSG, and the scope of the engineering changes implemented since test performance. The results from this examination deemed that the majority of the previous test results required further analysis before they can be accepted for the current test campaign based on the following:

- Previous testing was performed on the ICP with a Ballot Marking Device Attached.
- After initial testing was completed there were multiple ECO's applied to the ICP system. Based on the changes Wyle performed Electrostatic Disruption and Electromagnetic Radiation testing to verify the system operated within acceptable limits and no further electrical testing would be required.

It was noted that initial testing was performed on the ICP with an attached ballot marking device. The ICP equipment configuration submitted to Wyle for the ICP-A test campaign did not include the ballot marking device. To verify that the Ballot Marking device did not significantly alter the unit's electronic signature, analysis was performed using an Electromagnetic Radiation quick scan and an Electromagnetic Susceptibility Test. The resulting electronic signature generated during the quick scan was within acceptable limits; therefore, prior EMI testing was accepted for the ICP-A test campaign.

The Accuracy test performed on the ICP during the ICP-A test campaign is also being utilized to satisfy the requirements for this test effort. Since Wyle considers the ICP as a paper based scanner and a DRE, the Accuracy test for the ICP was performed by using both paper-based and audio ballots. The majority of the

vote processing was utilizing the paper-based functionality, while audio votes were being cast at defined intervals between ballot scans.

4.0 TEST SPECIFICATIONS (CONTINUED)

4.4.1 Hardware Qualitative Examination Design (continued)

After analyzing the processes and researching past testing, Wyle believes that the architecture and integration of the recording process of an audio ballot and the scanning of a paper ballot are similar and use many of the same software modules. Based on this, Wyle concluded that the audio feature should not be subjected to the full requirement of Volume II, Section 4.7.1.1; therefore during test performance, 5000 audio ballot positions were cast to satisfy the execution of the feature. The remaining ballot positions were captured with paper-based voting. All results were validated and verified against the election definition voting matrix for expected results.

Based on the results of the examination, the summary of acceptable testing is provided in the table below. The details of those tests are presented in Section 6.0.

Table 4-2 ICP Hardware Test Examination Results

Test/EAC 2005 VVSG Section	Procedure/Description	Configuration Tested	Status
Accuracy/4.1.1	Ensure the unit can process 1,549,703 consecutive ballot positions correctly within the allowable target error rate.	ICP	Accept
Usability/3.1	Measure of the effectiveness, efficiency, and satisfaction achieved by a specified set of users	ICP	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.	ICP	Accept
Security/7	Tests the ability of the system to detect, prevent, log, and recover from a broad range of security risks identified.	ICP	Accept
Maintainability/4.3.4	Tests the ease in which preventative and corrective maintenance actions can be performed based on design, software, and documentation.	ICP	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)	ICP	Accept
Safety/4.3.8	UL 60950-1 product safety review	ICP	Accept*
Electrical Supply/4.1.2.4	Meets voltage and power requirements of EAC 2005 VVSG Vol. 1 Section 4.1.2.4	ICP	Accept
Electromagnetic Radiation/4.1.2.9	FCC Part 15 Class B for both radiated and conducted emissions	ICP	Accept
Electromagnetic	IEC 61000-4-3 electromagnetic field of 10V/m	ICP	Accept

Susceptibility/4.1.2.10	modulated by a 1kHZ, 80% AM modulation at 80MHz to 1000MHz frequency		

4.0 TEST SPECIFICATIONS (CONTINUED)

4.4.1 Hardware Qualitative Examination Design (continued)

Table 4-2 Hardware Test Examination Results (continued)

Test/EAC 2005 VVSG Section	Procedure/Description	Configuration Tested	Status
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	ICP	Accept
High Temperature/4.1.2.14	MIL-STD-810D, Method 501.2 maximum temperature shall be 140 degrees F	ICP	Accept
Low Temperature/4.1.2.14	MIL-STD-810D minimum temperature shall be -4 degrees F	ICP	Accept
Bench Handling	MIL-STD-810D, Method 516.3 Procedure VI six 4" drops on each edge totaling 24 drops	ICP	Accept
Vibration/4.1.2.14	MIL-STD-810D, Method 514.3 physical shock and vibration during handling and transport	ICP	Accept
Humidity Test/4.1.2.14	MIL-STD-810D, Method 501.2 ten 24 hour humidity cycles	ICP	Accept
Electrical Power Disturbance/4.1.2.5	IEC 61000-4-11 (1994-06) power surges and dips	ICP	Accept
Electrical Fast Transient/4.1.2.6	IEC 61000-4-4 (1995-01)	ICP	Accept
Lightning Surge/4.1.2.7	IEC 61000-4-5 (1995-02)	ICP	Accept
Electrostatic Disruption/4.1.2.8	IEC 61000-4-2 (1995-01) 15kV air discharge and 8kV contact discharge	ICP	Accept
Conducted RF Immunity/4.1.2.11	IEC 61000-4-6 (1996-04) conducted radio frequency energy	ICP	Accept
Magnetic Fields Immunity/4.1.2.12	IEC 61000-4-8 (1993-06) AC magnetic fields of 30 A/m at 60Hz	ICP	Accept

*Safety testing was witnessed by Wyle at a third party laboratory

ICE Testing

The Dominion Democracy Suite 4.0 ICE hardware will be tested by the Wyle Laboratories' EMI, Dynamics, and Environmental test facilities for testing to the hardware requirements in accordance with Wyle Laboratories A2LA certifications 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 qualified personnel at the Wyle Huntsville, AL facility.

4.0 TEST SPECIFICATIONS (CONTINUED)

4.4 Test Case Design (continued)

4.4.1 Hardware Qualitative Examination Design (continued)

The following hardware tests shall be performed on the ICE per Volume I of the EAC 2005 VVSG:

- Electrical Supply (Section 4.1.2.4)
- Electrical Power Disturbance (Section 4.1.2.5)
- Electrical Fast Transient (Section 4.1.2.6)
- Lightning Surge (Section 4.1.2.7)
- Electrostatic Disruption (Section 4.1.2.8)
- Electromagnetic Emissions (Section 4.1.2.9)
- Electromagnetic Susceptibility (Section 4.1.2.10)
- Conducted RF Immunity (Section 4.1.2.11)
- Magnetic Fields Immunity (Section 4.1.2.12)
- Environmental Control – Operating Environment (Section 4.1.2.13)
- Environmental Control – Transit and Storage (Section 4.1.2.14)
- Safety (Section 4.3.8) *This testing will be performed at MET Labs and witnessed by Wyle personnel*

ICC Testing

ICC consists of COTS scanner and COTS Workstation PC. The Canon DR-X10C (S/N ED300874) scanner and the Dell Inspiron One 2305 (S/N 564C3P1) Workstation PC contain CE, UL, and FCC labeling. Due to the fact that these components are unmodified COTS equipment, as well as central count equipment, they will be exempt from non-operational hardware testing; however the ICC will undergo Temperature Power testing in conjunction with the ICE. Beyond the Temperature Power test, the ICC will only be utilized in functional and system testing for this campaign.

Support Equipment

Dominion submitted COTS PCs and Laptops to be used during the test campaign that were labeled CE, UL, and FCC compliant. The supporting documentation for this testing has not been submitted to Wyle at this time. During this test campaign Wyle will review this documentation to ensure that it meets the requirements of the EAC 2005 VVSG.

4.4.1.1 Mapping of Requirements to Specific Interfaces

Please refer to the EAC online matrix tool for further reference on requirements mapping.

4.4.2 Software Module Test Case Design and Data

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

4.0 TEST SPECIFICATIONS (CONTINUED)

4.4 Test Case Design (continued)

4.4.2 Software Module Test Case Design and Data (continued)

Compliance Builds and Security Testing and Review. Wyle will depend heavily on specification-based techniques (black-box testing) for the individual software components.

The most common specification-based techniques applied to the Dominion Voting Systems Democracy Suite 4.0 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 Democracy Suite 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 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 results would be determined to not be repeatable and the test would continue. 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 test approach to be used for the Dominion Democracy Suite 4.0 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 at the Integration Level is "Use Case". The actors that have been identified to use the Dominion Democracy Suite 4.0 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 ICE and ICP 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 ICE and ICP on Election Day.
- Voter – the actor who physically casts the ballot on Election Day.

4.0 TEST SPECIFICATIONS (CONTINUED)

4.4 Test Case Design (continued)

4.4.3 Software Functional Test Case Design and Data (continued)

- 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 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 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 Dominion Democracy Suite 4.0 is intended to support both large and small jurisdictions. Wyle's approach for Dominion Democracy Suite 4.0 will be to execute System Level Testing with a variety of elections that include various combinations of jurisdictions, parties, and ballot styles. Wyle will have three different test setup configurations for the EMS components as referenced in section 1.4.1 of this document.

Wyle 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, volume testing, stress testing, telecommunication testing, usability testing, accessibility testing, and reliability testing activities will be combined to ensure all requirements that are supported by the Dominion Democracy Suite 4.0 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 Dominion Democracy Suite 4.0 will be documented. Any issues documented during testing will be resolved or annotated in the test report.

Wyle will report all issues discovered during this test campaign to the EAC. The EAC has the final determination on whether the system meets all the requirements for an EAC certified system. The ACCEPT/REJECT criteria for Acceptance Level testing is whether or not the data for the test campaign

4.0 TEST SPECIFICATIONS (CONTINUED)

supports a recommendation for certification by 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.

4.5 Security Functions

The purpose of the security testing will be to evaluate the effectiveness of the Democracy Suite in detecting, preventing, logging, and recovering from any security risks identified by simulating attacks on the system. To accomplish this, Wyle has developed internal operating procedures to evaluate the Dominion Democracy Suite 4.0 to the security requirements set forth in the EAC 2005 VVSG. These procedures have been specifically tailored to assess the Dominion Democracy Suite 4.0 to the applicable requirements. Wyle will attempt to defeat the access controls and physical security measures documented in the Dominion technical data package. A threat matrix will be created to determine the risks and vulnerabilities.

Wyle will utilize a combination of functional testing, source code review, and Fortify ™ SCA to evaluate the Democracy Suite. Wyle's strategy for evaluating the Democracy Suite will be to utilize the Express Hardware Configuration and the Standard Hardware Configuration.

The following areas are not applicable to the Democracy Suite 4.0 and are therefore not included in the scope of the security testing:

- Use of Public Networks
- Wireless Communication

Testing will be performed by a qualified security expert. All findings will be reported to Dominion for resolution. Dominion will review all findings and correct risks that violate the standard. All documented risks will be reported as an addendum to the final test report.

4.6 TDP Evaluation

Wyle qualified personnel will perform a comprehensive review of the Dominion TDP to determine compliance to the EAC 2005 VVSG requirements and Dominion-specific requirements. Wyle qualified personnel utilize a TDP Review Matrix which lists every EAC 2005 VVSG requirement pertaining to TDP review. Wyle 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 Dominion 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 Dominion Democracy Suite 4.0 System TDP is provided in Table 4-2.

4.0 TEST SPECIFICATIONS (CONTINUED)

4.6 TDP Evaluation (continued)

Table 4-2 Democracy Suite 4.0 TDP Documents

Democracy Suite 4.0 TDP Documents	System	Version	Date	Document Number
Documents describing overall system performance:				
System Configuration Overview	All	1.2.0::225	3/22/12	2.02
System Security Specification	All	1.1.0::293	3/22/12	2.06
Configuration Management Process	All	1.2.0::148	3/22/12	2.11
Quality Assurance Program	All	1.2.0::74	3/22/12	2.12
System Test and Verification	All	1.1.0::96	3/22/12	2.07
System Test and Verification Suites	All	1.2.0::3	3/22/12	2.07
Personnel Training and Deployment Requirements	All	1.1.0::42	3/22/12	2.10
Documents describing functionality, hardware, software design, maintenance, and operation:				
EMS Functional Description	EMS	1.1.0::209	3/22/12	2.03
ICE Functional Description	ICE	1.2.0::58	3/22/12	2.03
ICP Functional Description	ICP	1.1.0::100	3/22/12	2.03
ICC Functional Description	ICC	1.1.0::48	3/22/12	2.03
ICE Tabulator System Hardware Specification	ICE	1.2.0::254	3/22/12	2.04
ICP Tabulator System Hardware Specification	ICP	1.1.0::67	3/22/12	2.04
ICE System Hardware Characteristics	ICE	1.2.0::77	3/22/12	2.04
ICP System Hardware Characteristics	ICP	1.1.0::40	3/22/12	2.04
EMS Software and Design Specification	EMS	1.0.0::186	3/22/12	2.05
ICE Software and Design Specification	ICE	1.0.0::70	3/22/12	2.05
ICP Software and Design Specification	ICP	1.1.0::93	3/22/12	2.05
ICC Software and Design Specification	ICC	1.0.0::25	3/22/12	2.05
ICP System Operation Procedures	ICP	1.1.0::147	3/22/12	2.08
EMS System Operation Procedures	EMS	1.2.0::387	3/22/12	2.08
ICE System Operation Procedures	ICE	1.0.0::79	3/22/12	2.08
ICC System Operation Procedures	ICC	1.1.0::67	3/22/12	2.08
ICP System Maintenance Manual	ICP	1.1.0::58	3/22/12	2.09
ICE System Maintenance Manual	ICE	1.1.0::109	3/22/12	2.09
EMS System Maintenance Manual	EMS	1.0.0::45	3/22/12	2.09
Election Event Designer Users Guide	EMS	1.3.3	3/22/12	N/A
Results Tally and Reporting Users Guide	EMS	1.2.7	3/22/12	N/A
Audio Studio Users Guide	EMS	1.2.3	3/22/12	N/A
ImageCast Precinct Approved Parts List	ICP	V3	3/22/12	N/A
ImageCast Precinct Configuration Files	ICP	1.0.0::18	3/22/12	N/A
ImageCast Precinct Election Definition Files	ICP	2.5.1	3/22/12	N/A
ImageCast Precinct Firmware Build and Install Document	ICP	1.0.0::19	3/22/12	N/A
ImageCast Precinct Firmware Update	ICP	1.0.0::8	3/22/12	N/A

4.0 TEST SPECIFICATIONS (CONTINUED)

4.6 TDP Evaluation (continued)

Table 4-2 Democracy Suite 4.0 TDP Documents (continued)

Democracy Suite 4.0 TDP Documents	System	Version	Date	Document Number
ImageCast Precinct Technical Guide	ICP	1.0.0::8	3/22/12	N/A
Engineering Product Development Processes	ICP	P0.2	3/22/12	N/A
Dominion Voting C C++ Coding Standard	All	1.0.0::7	3/22/12	N/A
Dominion Voting Usability Study	ICP	1.0.0::20	3/22/12	N/A
Dominion Voting Usability Study	ICE	1.0.0::35	3/22/12	N/A

4.7 Source Code Review

As part of the pre-testing activities, the Dominion Democracy Suite 4.0 source code will be reviewed to the EAC 2005 VVSG coding standards and the manufacturer supplied coding standards. The review will be conducted per the guidelines described in the following paragraphs.

As the source code is received, an SHA1 hash value will be created for each source code file. The source code team will then conducted a visual scan of every line of source code for an initial review and every line of modified source code for a re-review. This is done to identify any violation of EAC 2005 VVSG coding standards or manufacturer supplied coding standards. Each identified violation will be recorded by making notes of the standards violation along with directory name, file name, and line number.

If the review was the initial review, the source code team performed a peer-review on a percentage of the code. This was done to evaluate the correctness of the review and look for standards violations that may have been missed or violations that were noted in error. Any standards violations that the team concluded were recorded in error or missed were then corrected in the code review notes.

A technical summary report of all identified standards violations will be sent to Dominion for resolution. Dominion will then correct all standards violations and re-submit the source code for re-review. This process will be repeated as many times as necessary, until all identified standards violations are corrected. All reports will be included in an anomaly report for source code and submitted to the EAC and included in the final test report.

Dominion Voting Systems uses an auto-feed option designed in the system to repetitively feed ballots in and out of the scanner. This feature is documented as “Auto-Feed” mode or “Shoe Shine” mode. As part of the source code review this function will be inspected in detail to meet the requirements of EAC 2005 VVSG Volume 1 Section 2.2.4 g and h. The final step will be to create a “Trusted Build” from the reviewed source code. The “Trusted Build” will be performed by completed the following tasks in the order listed:

- Clean the build machine
- Retrieve the compliant source code
- Retrieve the installation media for OS, compilers, and build software
- Construct the build environment
- Create digital signatures of the build environment

4.7 Source Code Review (continued)

- 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 a 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 EAC Approved Repository.

The "Trusted Build" for the Dominion Democracy Suite 4.0 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 Dominion Voting Systems. 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 Microsoft Windows XP Professional 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 Dominion QA Plan and CM Plan state that they comply with ISO 9001 and cite internal Dominion ISO 9001 documentation for details. Both the Dominion 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, EAC stated requirements, and with the requirements of the internal Dominion ISO documentation. Also, the Dominion TDP documentation package will be reviewed to determine if the Dominion 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 of this test plan. 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 submitted to Dominion Voting Systems for resolution. Additionally, all test results, including functional test data, will be recorded on the relevant Wyle Laboratories' Operating Procedure and Test Cases. Results will also be recorded real-time in engineering log books.

5.0 TEST DATA (CONTINUED)

5.2 Test Data Criteria

Wyle Laboratories, Inc. will evaluate all test results against the Dominion Voting Systems provided technical documentation for the Democracy Suite 4.0 and the requirements set forth in the EAC 2005 VVSG. The Democracy Suite 4.0 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 Democracy Suite 4.0 documentation. Per the EAC 2005 VVSG, these parameters shall encompass the test tolerances, 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, and the maximum number of interrupts, halts or other system breaks that may occur due to non-test conditions (excluding events from which recovery occurs automatically or where a relevant status message is displayed).

5.3 Test Data Reduction

Test data shall be manually 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 the Wyle 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 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: 25°C ± 10°C (77°F ± 18°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%

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.1 Facility Requirements (continued)

- 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 test responsible agency with sufficient engineering information to substantiate the deviation request, but only when best effort technique and system limitations indicate the need for a deviation.

6.2 Test Set-Up

All voting machine equipment (hardware and software), shall be received and documented utilizing Wyle 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 Dominion Voting Systems, Inc., representative shall be notified.

Wyle 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 Dominion Voting Systems, Inc., representative for resolution. TDP items, including all manuals, and all source code modules received will be inventoried and maintained by the Wyle 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 personnel will properly configure and initialize the system, and verify that it is ready to be tested, by following the procedures detailed in the Democracy Suite 4.0 technical documentation. Wyle will develop an operational status test to be performed prior to and immediately following each hardware test. Wyle will develop the system performance levels to be measured during operational tests.

Wyle 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 Democracy Suite 4.0 System, during the operational hardware tests, and prior to and immediately following the non-operational hardware tests.

<u>Accuracy</u>

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

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: No
- 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

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. Test Pattern 8 was chosen for audio input in an alternative language because it is a basic voting pattern using an ADA device. Test pattern 9 was chosen for audio input to demonstrate support for write-in voting using an ADA device. Test Pattern 3 was chosen for Spanish language input because it is a basic vote pattern using Spanish. Test Pattern 10 was chosen for Spanish language input because it exercises write-in using Spanish.

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

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 election will be an early voting election with at least one machine running all precincts. Voting options for overvoting and undervoting will be exercised. Ballots 7 and 16 were selected for Spanish based language input. Ballots 13 and 17 were selected for casting of ballot using the ADA Audio capability.

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

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. Test patterns 3 and 4 were chosen for input in the Spanish language because they are a basic voting pattern with a write-in. Test patterns 5 and 6 were chosen for audio input using the Spanish language to demonstrate support for write-in voting using an ADA device with and alternative language. Test pattern 7 was chosen for character-based language input because it is a basic vote pattern using Chinese. Test pattern 8 was chosen for character-based language using an ADA device to demonstrate support for character-based ADA device support. Test pattern 9 was chosen for binary input to show support for ADA binary input device. Test pattern 10 was chosen for binary input using ADA audio deceive to show support for binary input and ADA support.

6.2 Test Set-Up (continued)

Primary Election: PRIM-01

A closed primary election in two precincts, 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

This election designed to functionally test an open primary with multiple ballot styles, support for two languages, and support for common voting variations. Test patterns 5 and 18 are input in an alternative language. Test patterns 8 and 18 are input using an ADA audio device. These patterns were select to exercise the write-in functionality in a primary election.

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.

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.2 Test Set-Up (continued)

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

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. Test patterns 3 and 4 were chosen for input in the Spanish language because it is a basic voting pattern with a write-in. Test patterns 5 and 6 were chosen for audio input using the Spanish language to demonstrate support for write-in voting using an ADA device with and alternative language. Test pattern 7 was chosen for Ideographic based language input because it is a basic vote pattern using Chinese. Test pattern 8 was chosen for character based language using an ADA device to demonstrate support for Ideographic based ADA device support. Test pattern 9 was chosen for binary input to show support for ADA binary input device. Test pattern 10 was chosen for binary input using ADA audio deceive to show support for binary input and ADA support.

6.3 Test Sequence

The components of the Democracy Suite 4.0 will undergo all applicable hardware software tests as described in the EAC 2005 VVSG. There is not a required sequence for the tests to be performed. The following sections provide a brief description of the each test:

6.3 Test Sequence (continued)

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

The Non-Operating tests include the following:

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

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

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

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

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

The Operating tests include the following:

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

Lightning Surge – This test demonstrates the voting system's hardware to withstand power line lightning surges during normal operation. This test is equivalent to the procedure of IEC 61000-4-5. The test for lightning surge protection shall be conducted in compliance with the test specified in IEC 61000-4-5 (Volume II, Section 4.8.f).

Electrical Fast Transient – This test demonstrates the voting system's hardware to withstand electrical fast transients during normal operation. This test is equivalent to the procedure of IEC 61000-4-4. The test for electrical fast transient protection shall be conducted in compliance with the test specified in IEC 61000-4-4 (Volume II, Section 4.8.e).

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.1 Hardware Test Descriptions (continued)

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).

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

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

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).

Electrical Power Disturbance – This test demonstrates the voting system's hardware to withstand power disturbances during normal operation. This test is equivalent to the procedure of IEC 61000-4-11 (Volume I, Section 4.1.2.5). The test for power disturbance disruption shall be conducted in compliance with the test specified in IEC61000-4-11 (Volume II, Section 4.8.a).

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

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

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

Safety – a safety inspection will be performed to verify that the EUT meets the following requirements for safety:

a. All voting systems and their components shall be designed to eliminate hazards to personnel or to the equipment itself.

b. Defects in design and construction that can result in personal injury or equipment damage must be detected and corrected before voting systems and components are placed into service.

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.1 Hardware Test Descriptions (continued)

c. Equipment design for personnel safety shall be equal to or better than the appropriate requirements of the Occupational Safety and Health Act, Code of Federal Regulations, Title 29, Part 1910.

Safety testing will be performed off-site at a third party laboratory with Wyle personnel witnessing.

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. 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 Democracy 4.0 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 insure 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 Dominion. 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 restoration of the device gracefully from the failures. Testing will include powering units off while operating, disconnecting various cables and components to ensure operation once restored.

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.2 Software Test Description (continued)

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 a manual line by line review and an automated analysis 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.

Table 6-1 Democracy Suite 4.0 System Software Test Sequence

Test	Description	Procedure	Test Level	Specimen
Compliance Source Code Review (Pre-testing Activity)	Source code review for compliance	WHVS07.2 WOP 5a	Component	Democracy Suite 4.0 Source Code Package
Compliance Build	Using the build documents and source code to construct the EMS	WHVS07.3 WOP 7b	Component	Democracy Suite 4.0
Source Code COTS Review	Source code review to examine 3rd party products for modification and versions	WHVS07.2 WOP 5d	Component	Democracy Suite 4.0 Source Code Package
Baseline OS	RFI 2008-03 OS Configuration	WHVS07.3 WOP 25	Component	Democracy Suite 4.0
Source Code Functional Review	Source code review for functionality and high level software design	WHVS07.2 WOP5b	Component & Integration	Democracy Suite 4.0 Source Code Package
Source Code Security Review (manual – automated)	Source code review for specific security concerns and an automated review using Fortify	WHVS07.2 WOP5c WOP 6a	Component & Integration	Democracy Suite 4.0 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

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.3 System Testing (continued)

- 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

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 will be conducted to insure all applicable EAC 2005 VVSG requirements are met.

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 Dominion in the TDP to go beyond 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.

Volume/Stress/Reliability – Tests to investigate the system's response to conditions that tend to overload the system's capacity to process, store, and report data. The test parameters will focus on the system's stated limits and the ballot logic for areas such as the maximum number of active voting positions, maximum number of ballot styles, maximum candidates, maximum contests, and stated limits within the EMS. This test will be utilized to ensure the system can achieve the manufacturer's TDP claims of what the system can support. Testing will be performed by exercising an election definition and test cases developed specifically to test for volume and stress conditions of the system being tested.

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.3 System Testing (continued)

Each sub-component will be subjected to the test as outlined in the EAC 2005 VVSG as follows:

- The EMS shall be subjected to overload conditions such as processing more than the expected number of ballots/voters per precinct and processing more than expected number of precincts.
- The ICE and ICP shall be subjected to ballot processing at the high volume rates at which the equipment can be operated to evaluate software response to hardware-generated interrupts and wait states.
- The ICC shall be subjected to overload conditions.

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

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

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

The Accuracy test requirements for the ICE will be met by the execution of two accuracy tests. Since Wyle considers the ICE as a paper based scanner and a ballot marker, the first accuracy test for the ICE will be performed by using both paper-based and audio ballots. The majority of the vote processing will be utilizing the paper-based functionality, while audio votes are being cast at defined intervals between ballot scans. After analyzing the processes and researching past testing, Wyle believes the architecture, data flow, and integration of the recording process of an audio ballot and the scanning of a paper ballot in an ICE unit are similar and use many of the same software modules. Based on this, Wyle has concluded that the audio feature should not be subjected to the full requirement of Volume II, Section 4.7.1.1; therefore during test performance, 5000 audio ballot positions will be cast to satisfy the execution of the feature. The remaining ballot positions will be captured with paper-based voting. All results will be validated and verified against the election definition voting matrix for expected results. If the ICE processes the minimum number of ballot positions without error the test shall be accepted. If the ICE should not process the minimum requirement an evaluation will be performed to determine the root cause and the test will not be accepted.

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.3 System Testing (continued)

The second accuracy test will consist of the ICE Ballot Marking Device (BMD). Wyle will utilize a maximum position ballot with the ICE, which will be manually voted in order to verify the components correctly tabulate 1,549,703 ballot positions within the allowable target error rate. All results will be validated and verified against the election definition voting matrix for expected results. If the ICE processes the minimum number of ballot positions, during both tests, without error the test shall be accepted. If the ICE should not process the minimum requirement an evaluation will be performed to determine the root cause and the test will not be accepted.

ICC accuracy will be exercised by using only paper-based ballots. All results will be validated and verified against the election definition voting matrix for expected results. If the ICC processes the minimum number of ballot positions without error the test shall be accepted. If the ICC should not process the minimum requirement an evaluation will be performed to determine the root cause and the test will not be accepted.

The results of previous testing on the ICP will be utilized to satisfy the accuracy test requirements for this test campaign.

System Integration – 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.

Regression Testing

Regression Testing will be performed on all system components to verify all firmware modifications.

Table 6-2 Democracy 4.0 System Testing Sequence

Test	Description	Procedure	Test Level	Specimen	Election Data
Technical Data Package (TDP) Review	Documentation review for compliance, correctness, and completeness	WHVS07.1 WOP 3	Document	TDP package	---
Physical Configuration Audit	Audit hardware and software models and versions	WHVS07.3 WOP 25	Component & System	System hardware and software	---
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

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.3 System Testing (continued)

Table 6-2 Democracy 4.0 System Testing Sequence (continued)

Test	Description	Procedure	Test Level	Specimen	Election Data
Telecommunication	Test of telecommunication technology of the system for accuracy and correctness	WHVS07.6 WOP 31	Integration & System	System	Gen-01 Volume & Stress
Usability/ Accessibility	Testing to the system documentation and EAC 2005 VVSG requirements	WOP 22 WOP 24-1a-g WOP 24-2 a-f	Integration	System	Gen-01 Prim-01
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
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
Accuracy	Test of accuracy to ~1.6 million ballot positions per system component (ICC, ICE, and ICP)	WHVS07.9 WOP 30 WOP 21	System	System	L&A Election
System Integration Test	Test of all system hardware, software and peripherals.	WOP 30	System	System	Gen-01-03 Prim-01&03
Trusted Build	Creation and installation of the final system software	WHVS07.6 WOP 7 WOP 7a	Component	System software	Democracy Suite 4.0 Source Code Package

7.0 TEST OPERATIONS PROCEDURES

7.1 Proprietary Data

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

APPENDIX A

DOMINION VOTING SYSTEMS DEMOCRACY SUITE 4.0 IMPLEMENTATION STATEMENT

2005 VVSG Supported Functionality Declaration rec05-01 (Dominion Version 2.1 20110822)

Dominion Voting Systems - Democracy Suite 4.0 Voting System consisting of:

1. **Election Management System EMS**
2. **ImageCast Evolution- Precinct Count Optical Scanner (PCOS)**
3. **ImageCast Evolution- Precinct Count Optical Scanner (PCOS) with Electronic Ballot Printer (EBP)**
4. **ImageCast Central Central- Count Optical Scanner (CCOS)**

Vendor Name: Dominion Voting **Preparer: Ed Smith**
Date Prepared: August 22, 2011

This section addresses functionality that is covered by the Voluntary Voting System Guidelines (2005).
Identify the functionality supported by marking with a ☑.
Insert Required descriptions where needed (Rotation, VVPAT, Open Primary, Closed Primary, etc).
(P & M= Paper and Marksense ballots)

Voting Variations Functionality & Languages Vol. 1 Sect 2.1.7.2, 2.2.1.3.a, 2.3.3.3, 4.1.5.1.b, 4.1.5.1.d, 5.4.4	Supported	Required description(s)	EMS Comments
Voter Verified Paper Audit Trails			
VVPAT			
Accessibility (vol. 1. sect. 3.2)			
Forward Approach	☑		
Parallel (Side) Approach	☑		
Closed Primary (vol. 1. sect. 2.1.7.2)			
Primary: Closed	☑	A registered voter may vote in any *party primary* regardless of his own party affiliation	Separate ballots will be produced per Party. Non-partisan races can be placed either on a separate ballot or on each Partisan ballot. **Supported.**
Open Primary (vol. 1. sect. 2.1.7.2)			
Primary: Open Standard (provide definition of how supported)		Voter choice of party with	

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Voting Variations Functionality & Languages Vol. 1 Sect 2.1.7.2, 2.2.1.3.a, 2.3.3.3, 4.1.5.1.b, 4.1.5.1.d, 5.4.4	Supported	Required description(s)	EMS Comments
		exclusive rules	
Primary: Open Blanket (provide definition of how supported)	☑		
Partisan & Non-Partisan: (vol. 1, sect. 2.1.7.2)			
Partisan & Non-Partisan: Vote for 1 of N race	☑		**Supported.**
Partisan & Non-Partisan: Multi-member ("vote for N of M") board races	☑		**Supported.**
Partisan & Non-Partisan: "vote for 1" race with a single candidate and write-in voting	☑		**Supported.**
Partisan & Non-Partisan "vote for 1" race with no declared candidates and write-in voting	☑		**Supported.**
Write-In Voting: (vol. 1, sect. 2.1.7.2)			
Write-in Voting: System default is a voting position identified for write-ins.	☑		Image-cast ballots will have separate voting boxes next to Write-in fields. **Supported.**
Write-in Voting: Without selecting a write in position *	☑		.
Write-in: With No Declared Candidates	☑	A race may consist of only Write-in fields.	**Supported.**
Write-in: Identification of write-ins for resolution at central count *	☑	Diversion functionality provided on precinct units	
Primary Presidential Delegation Nominations & Slates: (vol. 1, sect. 2.1.7.2)			
Primary Presidential Delegation Nominations: Displayed delegate slates for each presidential party*	☑		
Slate & Group Voting: one selection votes the slate*	☑		
Ballot Rotation: (vol. 1, sect. 2.1.7.2)			

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Voting Variations Functionality & Languages Vol. 1 Sect 2.1.7.2, 2.2.1.3.a, 2.3.3.3, 4.1.5.1.b, 4.1.5.1.d, 5.4.4	Supported	Required description(s)	EMS Comments
Rotation of Names within an Office; define all supported rotation methods for location on the ballot and vote tabulation/reporting	☑	Top down by precinct, others (bottom up)?	
Straight Party Voting: (vol. 1. sect. 2.1.7.2*)*			
Straight Party: A single selection for partisan races in a general election	☑		**Supported.**
Straight Party: Vote for each candidate individually	☑		**Supported.**
Straight Party: Modify straight party selections with crossover votes	☑		**Supported.**
Straight Party: A race without a candidate for one party	☑		**Supported.**
Straight Party: "N of M race (where "N">1)	☑		**Supported.**
Straight Party: Excludes a partisan contest from the straight party selection.	☑		**Supported.**
Cross-Party Endorsement: (vol. 1. sect. 2.1.7.2*)*			
Cross party endorsements, multiple parties endorse one candidate*	☑		**QA to verify.**
Split Precincts: (vol. 1. sect. 2.1.7.2*)*			
Split Precincts: Multiple ballot styles	☑		**Supported.**
Split Precincts: P & M system support splits with correct contests and ballot identification of each split	☑		**Supported.**
Split Precincts: DRE matches voter to all applicable races.	NA	Not a DRE system	
Split Precincts: Reporting of voter counts (# of voters) to the precinct split level; Reporting of vote totals is to the precinct level			? Number of electors and number of voters (ballots cast) is stored on split level. Reporting is done on split level as well.
Vote N of M: (vol. 1. sect. 2.1.7.2*)*			

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Voting Variations Functionality & Languages Vol. 1 Sect 2.1.7.2, 2.2.1.3.a, 2.3.3.3, 4.1.5.1.b, 4.1.5.1.d, 5.4.4	Supported	Required description(s)	EMS Comments
Vote for N of M: Counts each selected candidate, if the maximum is not exceeded.	☑		**Supported.**
Vote for N of M: Invalidates all candidates in an overvote (paper)	☑		**Supported.**
Recall Issues, with options: (vol. 1. sect. 2.1.7.2)			
Recall Issues with Options: Simple Yes/No with separate race/election. (Vote Yes or No Question)	☑		We do not have correlation between these two contests.
Recall Issues with Options: Retain is the first option, Replacement candidate for the second or more options (Vote 1 of M)	☑		If it is "vote for 1", than it is regular contest: supported.
Recall Issues with Options: Two contests with access to a second contest conditional upon a specific vote in contest one. (Must vote Yes to vote in 2nd contest.)			
Recall Issues with Options: Two contests with access to a second contest conditional upon any vote in contest one. (Must vote Yes or No to vote in 2nd contest)		Overturned - US District Court 7/29/03: CA Election Code sect. 11383	
Cumulative Voting (vol. 1. sect. 2.1.7.2)			
Cumulative Voting: Voters are permitted to cast, as many votes as there are seats to be filled for one or more candidates. Voters are not limited to giving only one vote to a candidate. Instead, they can put multiple votes on one or more candidate.			
Ranked Order Voting (vol. 1. sect. 2.1.7.2)			

2005 VVSG Supported Functionality Declaration rec05-01 (Dominion Version 2.1 20110822)

Voting Variations Functionality & Languages Vol. 1 Sect 2.1.7.2, 2.2.1.3.a, 2.3.3.3, 4.1.5.1.b, 4.1.5.1.d, 5.4.4	Supported	Required description(s)	EMS Comments
Ranked Order Voting: Voters rank candidates in a contest in order of choice. A candidate receiving a majority of the first choice votes wins. If no candidate receives a majority of first choice votes, the last place candidate is deleted, each ballot cast for the deleted candidate counts for the second choice candidate listed on the ballot. The process of eliminating the last place candidate and recounting the ballots continues until one candidate receives a majority of the vote.			
Ranked Order Voting: Voters can write in a ranked vote.			
Ranked Order Voting: A ballot stops being counting when all ranked choices have been eliminated			
Ranked Order Voting: A ballot with two choices ranked the same, stops being counted at the point of two similarly ranked choices.			
Ranked Order Voting: A ballot with a skipped rank counts the vote for the next rank.			
Ranked Order Voting: The total number of votes for two or more candidates with the least votes is less than the votes of the candidate with the next highest number of votes, the candidates with the least votes are eliminated simultaneously and their votes transferred to the next-ranked continuing candidate.			
Provisional or Challenged Ballots (vol. 1. sect. 2.1.7.2*)*			
Provisional/Challenged Ballots: A voted provisional ballots is identified but not included in the tabulation, but can be added in the central count.	☑	Provisional ballots are not included in tabulation.	

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Voting Variations Functionality & Languages Vol. 1 Sect 2.1.7.2, 2.2.1.3.a, 2.3.3.3, 4.1.5.1.b, 4.1.5.1.d, 5.4.4	Supported	Required description(s)	EMS Comments
Provisional/Challenged Ballots: A voted provisional ballots is included in the tabulation, but is identified and can be subtracted in the central count.			
Provisional/Challenged Ballots: Provisional ballots maintain the secrecy of the ballot.	☑	No connection is made between the voter and the cast ballot.	
Overvotes (vol. 1. sect. 5.4.4)	*Must support for specific type of voting system*		
Overvotes: P & M: Overvote invalidates the vote. Define how overvotes are counted.	☑	If a contest is overvoted the number of overvotes always equals the M number. Overvotes are stored per contest	**Supported.**
Overvotes: DRE: Prevented from or requires correction of overvoting.			
Overvotes: If a system does not prevent overvotes, it must count them. Define how overvotes are counted.			
Overvotes: DRE systems that provide a method to data enter absentee votes must account for overvotes.			
Undervotes (vol. 1. sect. 5.4.4)	*Must support*		
Undervotes: System counts undervotes cast for accounting purposes	☑	Undervotes are always counted.	**Supported.**
Blank Ballots (vol. 1. sect. 2.3.3.3, 4.1.5.1.b, 4.1.5.1.d, & 5.4.4)			
Totally Blank Ballots: Any blank ballot alert is tested.	☑		**Supported.**

2005 VVSG Supported Functionality Declaration rec05-01 (Dominion Version 2.1 20110822)

Voting Variations Functionality & Languages Vol. 1 Sect 2.1.7.2. 2.2.1.3.a. 2.3.3.3. 4.1.5.1.b. 4.1.5.1.d. 5.4.4	Supported	Required description(s)	EMS Comments
Totally Blank Ballots: If blank ballots are not immediately processed, there must be a provision to recognize and accept them	☑		**Supported.**
Totally Blank Ballots: If operators can access a blank ballot, there must be a provision for resolution.	☑		
Display/Printing Multi-Lingual Ballots (vol. 1. sect. 2.2.1.3.a*)*	*Must support one* ☑		
Spanish	☑		
Alaska Native (Other Group specified)			
Aleut			
Athabascan			
Eskimo	AK		
Native (Other Group Specified)			
Chinese	☑		
Filipino*	CA		
Japanese*	CA		
Korean*	CA		
Vietnamese*	CA		
Apache	AZ		
Cent/So American			
Cheyenne			
Chickasaw			
Choctaw			
Navajo	AZ		

2005 VVSG Supported Functionality Declaration rec05-01 (Dominion Version 2.1 20110822)

Voting Variations Functionality & Languages Vol. 1 Sect 2.1.7.2, 2.2.1.3.a, 2.3.3.3, 4.1.5.1.b, 4.1.5.1.d, 5.4.4	Supported	Required description(s)	EMS Comments
Other Tribe-Specified	LA, NM	French, Jicarilla, Keres, Navajo, Towa).	
Paiute			
Pueblo			
Seminole	FL		
Shoshone			
Sioux			
Tohono O'Odham			
Tribe not specified			
Ute	CO		
Yaqui			
Yuman	AZ		
Demonstrates the voting system capability to handle the designated language groups. (vol. 1 sect. 2.2.1.3.a)			
Default language (English),	☑		**Supported.**
Secondary language using a Western European font	☑		**Supported.**
Ideographic language (such as Chinese or Korean),	☑		Ballots can be created, but LCD monitor on ICP and ICE cannot show these characters, and can not print on the print tape.
Non-written languages requiring audio support	☑		**Supported.**

NOTE: System supports all ISO approved languages.

2005 VVSG Supported Functionality Declaration rec05-01 (Dominion Version 2.1 20110822)

This section covers any additional functionality provided by the submitted system that is not accounted for in the VVSG.

Additional Vendor Provided functionality	Description
<Please enter the high level component within which the functionality resides>	
<Please enter a listing of the additional functionality, within the high level component >	
<Please enter the high level component within which the functionality resides>	
<Please enter a listing of the additional functionality, within the high level component >	
<Please enter the high level component within which the functionality resides>	
<Please enter a listing of the additional functionality, within the high level component >	

End of Supported Functionality Declaration

APPENDIX B

DOMINION VOTING SYSTEMS PROJECT SCHEDULE

ID	Task Name	Duration	Start	Finish	Predecessors
1	EAC Application	0 days	Fri 3/19/10	Fri 3/19/10	
2	EAC Kickoff Meeting	3 days	Tue 5/18/10	Fri 5/21/10	
3	**Technical Data Package Review**	**436 days**	**Mon 3/15/10**	**Mon 11/21/11**	
4	Partial Document Submission	1 day	Mon 3/15/10	Tue 3/16/10	
5	Document Review for VVSG Requirements	406 days	Mon 3/15/10	Mon 10/10/11	4
6	Document Discrepancy Report	5 days	Mon 10/10/11	Mon 10/17/11	5
7	Dominion Review of Report and Correct Documents	10 days	Mon 10/17/11	Mon 10/31/11	6
8	Document Re-Review	10 days	Mon 10/31/11	Mon 11/14/11	7
9	Final Report TDP Review	5 days	Mon 11/14/11	Mon 11/21/11	8
10	**Source Code Review**	**391 days**	**Mon 5/3/10**	**Mon 11/7/11**	
11	**Review EMS**	**360.06 days**	**Mon 5/17/10**	**Fri 10/7/11**	
12	Initial Submission of EMS Coding Standards	1 day	Mon 5/17/10	Tue 5/18/10	
13	Initial Review of EMS Coding Standards	2 days	Tue 5/18/10	Thu 5/20/10	12
14	Submission of EMS Coding Standards	1 day	Tue 9/21/10	Wed 9/22/10	
15	Review EMS Coding Standards	1 day	Wed 9/22/10	Thu 9/23/10	14
16	EMS Source Code Submission	1 day	Mon 6/14/10	Tue 6/15/10	
17	**EMS Source Code Review**	**340.06 days**	**Mon 6/14/10**	**Fri 10/7/11**	
18	Wyle Source Code Review	30 days	Mon 6/14/10	Mon 7/26/10	
19	Wyle Report	2 days	Mon 7/26/10	Wed 7/28/10	18
20	Manufacturer Review	97 days	Wed 7/28/10	Tue 12/14/10	19
21	Wyle Receives Revised Code	1 day	Tue 12/14/10	Wed 12/15/10	20
22	Wyle Source Code Review	12 days	Wed 12/15/10	Tue 1/4/11	21
23	Wyle Report	1 day	Tue 1/4/11	Wed 1/5/11	22
24	Manufacturer Review	24 days	Wed 1/5/11	Tue 2/8/11	23
25	Wyle Receives Revised Code 4.0.8	1 day	Tue 2/8/11	Wed 2/9/11	24
26	Wyle Source Code Review	29 days	Wed 2/9/11	Tue 3/22/11	25
27	Wyle Report	1 day	Tue 3/22/11	Wed 3/23/11	26
28	Manufacturer Review	8 days	Wed 3/23/11	Mon 4/4/11	27
29	Wyle Receives Revised Code 4.0.10	1 day	Mon 4/4/11	Tue 4/5/11	28
30	Wyle Source Code Review	20 days	Tue 4/5/11	Tue 5/3/11	29
31	Wyle Report	1 day	Tue 5/3/11	Wed 5/4/11	30
32	Manufacturer Review	66 days	Wed 5/4/11	Thu 8/4/11	31
33	Wyle Receives Revised Code 4.6.00	1 day	Thu 8/4/11	Fri 8/5/11	32
34	Wyle Source Code Review	5 days	Fri 8/5/11	Fri 8/12/11	33

ID	Task Name	Duration	Start	Finish	Predecessors
35	Wyle Report	1 day	Fri 8/12/11	Mon 8/15/11	34
36	Manufacturer Review	9 days	Mon 8/15/11	Fri 8/26/11	35
37	Wyle Receives Revised Code 4.6.02	1 day	Fri 8/26/11	Mon 8/29/11	36
38	Wyle Source Code Review	6 days	Mon 8/29/11	Tue 9/6/11	37
39	Wyle Report	1 day	Tue 9/6/11	Wed 9/7/11	38
40	Manufacturer Review	5 days	Wed 9/7/11	Wed 9/14/11	39
41	Wyle Receives Revised Code 4.6.03	1 day	Thu 9/15/11	Fri 9/16/11	40
42	Wyle Source Code Review	1 day	Fri 9/16/11	Mon 9/19/11	41
43	Wyle Report	1 day	Mon 9/19/11	Tue 9/20/11	42
44	Manufacturer Review	5 days	Tue 9/20/11	Tue 9/27/11	43
45	Wyle Receives Revised Code 4.6.04	1 day	Thu 9/22/11	Tue 9/27/11	44
46	Wyle Source Code Review	1 day	Tue 9/27/11	Wed 9/28/11	45
47	Wyle Report	0 days	Wed 9/28/11	Wed 9/28/11	46
48	Manufacturer Review	5 days	Wed 9/28/11	Wed 10/5/11	47
49	Final Review	2 days	Wed 10/5/11	Fri 10/7/11	48
50	**Review ICP FIRMWARE**	**381 days**	**Mon 5/17/10**	**Mon 11/7/11**	
51	Submission of ICP Coding Standards	1 day	Mon 5/17/10	Tue 5/18/10	
52	Review ICP Coding Standards	2 days	Wed 7/7/10	Fri 7/9/10	51
53	ICP Code Submission	0 days	Fri 6/4/10	Fri 6/4/10	
54	**ICP Source Code Review**	**356 days**	**Mon 6/21/10**	**Mon 11/7/11**	**52,53**
55	Wyle Source Code Review	19 days	Mon 6/21/10	Fri 7/16/10	
56	Wyle Report	2 days	Fri 7/16/10	Tue 7/20/10	55
57	Manufacturer Review	63 days	Wed 7/21/10	Mon 10/18/10	56
58	Wyle Receives Revised Code	1 day	Mon 10/18/10	Tue 10/19/10	57
59	Wyle Source Code Review	13 days	Tue 10/19/10	Fri 11/5/10	58
60	Wyle Report	2 days	Fri 11/5/10	Tue 11/9/10	59
61	Manufacturer Review	50 days	Tue 11/9/10	Mon 1/24/11	60
62	Wyle Receives Revised Code 4.014	1 day	Mon 1/24/11	Tue 1/25/11	61
63	Wyle Source Code Review	21 days	Tue 1/25/11	Wed 2/23/11	62
64	Wyle Report	1 day	Wed 2/23/11	Thu 2/24/11	63
65	Manufacturer Review	13 days	Thu 2/24/11	Tue 3/15/11	64
66	Wyle Receives Revised Code 4.0.16	1 day	Tue 3/15/11	Wed 3/16/11	65
67	Wyle Source Code Review	4 days	Wed 3/16/11	Tue 3/22/11	66
68	Wyle Report	1 day	Tue 3/22/11	Wed 3/23/11	67

Project: Certification Revised Schedule
Date: Wed 11/30/11

Task, Split, Milestone, Summary, Project Summary, External Tasks, External Milestone, Inactive Task, Inactive Milestone, Inactive Summary, Manual Task, Duration-only, Manual Summary Rollup, Manual Summary, Start-only, Finish-only, Progress, Deadline

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ID	Task Name	Duration	Start	Finish	Predecessors
69	Manufacturer Review	14 days	Wed 3/23/11	Tue 4/12/1168	
70	Wyle Receives Revised Code 4.0.19	1 day	Tue 4/12/11	Wed 4/13/1169	
71	Wyle Source Code Review	2 days	Wed 4/13/11	Fri 4/15/1170	
72	Wyle Report	1 day	Fri 4/15/11	Mon 4/18/1171	
73	Manufacturer Review	2 days	Mon 4/18/11	Wed 4/20/1172	
74	Wyle Receives Revised Code 4.0.20	1 day	Wed 4/20/11	Thu 4/21/1173	
75	Wyle Source Code Review	2 days	Thu 4/21/11	Mon 4/25/1174	
76	Wyle Report	0 days	Mon 4/25/11	Mon 4/25/1175	
77	Manufacturer Review	9 days	Mon 4/25/11	Fri 5/6/1176	
78	Wyle Receives Revised Code 4.0.21	1 day	Fri 5/6/11	Mon 5/9/1177	
79	Wyle Source Code Review	3 days	Mon 5/9/11	Thu 5/12/1178	
80	Wyle Report	1 day	Thu 5/12/11	Fri 5/13/1179	
81	Manufacturer Review	6 days	Fri 5/13/11	Mon 5/23/1180	
82	Wyle Receives Revised Code 4.0.24	0 days	Mon 5/23/11	Mon 5/23/1181	
83	Wyle Source Code Review	1 day	Mon 5/23/11	Tue 5/24/1182	
84	Wyle Report	0 days	Tue 5/24/11	Tue 5/24/1183	
85	Manufacturer Review	65 days	Tue 5/24/11	Tue 8/23/1184	
86	Wyle Receives Revised Code 4.0.28	1 day	Tue 8/23/11	Wed 8/24/1185	
87	Wyle Source Code Review	2 days	Wed 8/24/11	Fri 8/26/1186	
88	Wyle Report	2 days	Thu 8/25/11	Tue 8/30/1187	
89	Manufacturer Review	7 days	Tue 8/30/11	Thu 9/8/1188	
90	Wyle Receives Revised Code	1 day	Thu 9/8/11	Fri 9/9/1189	
91	Wyle Receives Revised Code 4.0.29	1 day	Wed 9/7/11	Thu 9/8/1190	
92	Wyle Source Code Review	7 days	Fri 9/9/11	Tue 9/20/1191	
93	Wyle Report	1 day	Fri 8/19/11	Wed 9/21/1192	
94	Manufacturer Review	7 days	Wed 9/21/11	Fri 9/30/1193	
95	Wyle Receives Revised Code 4.0.30	1 day	Fri 9/30/11	Mon 10/3/1194	
96	Wyle Source Code Review	1 day	Mon 10/3/11	Tue 10/4/1195	
97	Wyle Report	7 days	Thu 9/22/11	Thu 10/13/1196	
98	Manufacturer Review	7 days	Thu 10/13/11	Mon 10/24/1197	
99	Wyle Receives Revised Code 4.6.2	1 day	Mon 10/24/11	Tue 10/25/1198	
100	Wyle Source Code Review	1 day	Tue 10/25/11	Wed 10/26/1199	
101	Wyle Report	1 day	Wed 10/26/11	Thu 10/27/1100	
102	Manufacturer Review	3 days	Thu 10/27/11	Tue 11/1/1101	

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ID	Task Name	Duration	Start	Finish	Predecessors
103	Final Review	4 days	Tue 11/1/11	Mon 11/7/11	102
104	**Review ICC Firmware**	**340 days**	**Mon 6/3/10**	**Fri 8/26/11**	
105	Submission of ICC Coding Standards	1 day	Mon 5/17/10	Tue 5/18/10	
106	Review ICC Coding Standards	2 days	Tue 5/18/10	Thu 5/20/10	105
107	Central Count Code Submission	0 days	Mon 5/3/10	Mon 5/3/10	
108	**ICC Source Code Review**	**288 days**	**Wed 7/14/10**	**Fri 8/26/11**	
109	Wyle Source Code Review	14 days	Wed 7/14/10	Tue 8/3/10	
110	Wyle Report	4 days	Tue 8/3/10	Mon 8/9/10	109
111	Manufacturer Review	155 days	Mon 8/9/10	Fri 3/18/11	110
112	Wyle Receives Revised Code 4.0.12	1 day	Fri 3/18/11	Mon 3/21/11	111
113	Wyle Source Code Review	11 days	Mon 3/21/11	Tue 4/5/11	112
114	Wyle Report	1 day	Tue 4/5/11	Wed 4/6/11	113
115	Manufacturer Review	10 days	Wed 4/6/11	Wed 4/20/11	114
116	Wyle Receives Revised Code 4.0.14	0 days	Wed 4/20/11	Wed 4/20/11	115
117	Wyle Source Code Review	3 days	Wed 4/20/11	Mon 4/25/11	116
118	Wyle Report	1 day	Mon 4/25/11	Tue 4/26/11	117
119	Manufacturer Review	19 days	Tue 4/26/11	Mon 5/23/11	118
120	Wyle Receives Revised Code 4.017	0 days	Mon 5/23/11	Mon 5/23/11	119
121	Wyle Source Code Review	1 day	Mon 5/23/11	Tue 5/24/11	120
122	Wyle Report	1 day	Tue 5/24/11	Wed 5/25/11	121
123	Manufacturer Review	26 days	Wed 5/25/11	Thu 6/30/11	122
124	Wyle Receives Revised Code 4.0.22	1 day	Thu 6/30/11	Fri 7/1/11	123
125	Wyle Source Code Review	7 days	Fri 7/1/11	Tue 7/12/11	124
126	Wyle Report	1 day	Tue 7/12/11	Wed 7/13/11	125
127	Manufacturer Review	9 days	Wed 7/13/11	Tue 7/26/11	126
128	Wyle Receives Revised Code 4.0.25	1 day	Tue 7/26/11	Wed 7/27/11	127
129	Wyle Source Code Review	4 days	Wed 7/27/11	Tue 8/2/11	128
130	Wyle Report	0 days	Tue 8/2/11	Tue 8/2/11	129
131	Manufacturer Review	1 day	Tue 8/2/11	Wed 8/3/11	130
132	Wyle Receives Revised Code 4.0.26	0 days	Wed 8/3/11	Wed 8/3/11	131
133	Wyle Source Code Review	1 day	Wed 8/3/11	Thu 8/4/11	132
134	Wyle Report	0 days	Thu 8/4/11	Thu 8/4/11	133
135	Manufacturer Review	1 day	Thu 8/4/11	Fri 8/5/11	134
136	Wyle Receives Revised Code 4.0.27	1 day	Fri 8/5/11	Mon 8/8/11	135

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ID	Task Name	Duration	Start	Finish	Predecessors
137	Wyle Source Code Review	1 day	Mon 8/8/11	Tue 8/9/11	136
138	Wyle Report	0 days	Tue 8/9/11	Tue 8/9/11	137
139	Manufacturer Review	1 day	Tue 8/9/11	Wed 8/10/11	138
140	Wyle Receives Revised Code 4.6.2	1 day	Wed 8/10/11	Thu 8/11/11	139
141	Wyle Source Code Review	1 day	Thu 8/11/11	Fri 8/12/11	140
142	Wyle Report	0 days	Fri 8/12/11	Fri 8/12/11	141
143	Manufacturer Review	5 days	Fri 8/12/11	Fri 8/19/11	142
144	Final Review	5 days	Fri 8/19/11	Fri 8/26/11	143
145	**Review ICE Firmware**	**367 days**	**Mon 5/3/10**	**Tue 10/4/11**	
146	Submission of ICE Coding Standards	1 day	Mon 5/24/10	Tue 5/25/10	
147	Review ICE Coding Standards	2 days	Tue 5/25/10	Thu 5/27/10	146
148	ICE Code Submission	0 days	Mon 5/3/10	Mon 5/3/10	
149	**ICE Source Code Review**	**322 days**	**Mon 7/5/10**	**Tue 10/4/11**	
150	Wyle Source Code Review	20 days	Mon 7/5/10	Mon 8/2/10	
151	Wyle Report	4 days	Tue 8/3/10	Mon 8/9/10	150
152	Manufacturer Review	60 days	Mon 8/9/10	Mon 11/1/10	151
153	Wyle Receives Revised Code 1.0.8	1 day	Mon 11/1/10	Tue 11/2/10	152
154	Wyle Source Code Review	37 days	Tue 11/2/10	Wed 12/29/10	153
155	Wyle Report	1 day	Wed 12/29/10	Thu 12/30/10	154
156	Manufacturer Review	87 days	Thu 12/30/10	Mon 5/2/11	155
157	Wyle receives Revised Code 1.0.16	1 day	Mon 5/2/11	Tue 5/3/11	156
158	Wyle Source Code Review	15 days	Tue 5/3/11	Tue 5/24/11	157
159	Wyle Report	1 day	Tue 5/24/11	Wed 5/25/11	158
160	Manufacturer Review	47 days	Wed 5/25/11	Fri 7/29/11	159
161	Wyle receives Revised Code 4.1.3.2	1 day	Fri 7/29/11	Mon 8/1/11	160
162	Wyle Source Code Review	8 days	Mon 8/1/11	Thu 8/11/11	161
163	Wyle Report	1 day	Thu 8/11/11	Fri 8/12/11	162
164	Manufacturer Review	26 days	Fri 8/12/11	Mon 9/19/11	163
165	Wyle receives Revised Code 4.6	1 day	Fri 9/16/11	Mon 9/19/11	164
166	Wyle Source Code Review	2 days	Fri 9/16/11	Tue 9/20/11	165
167	Wyle Report	2 days	Mon 9/19/11	Tue 9/20/11	166
168	Manufacturer Review	5 days	Wed 9/21/11	Tue 9/27/11	167
169	Wyle receives Revised Code 4.6.2.1	0 days	Wed 9/14/11	Wed 9/14/11	168
170	Wyle Source Code Review	3 days	Thu 9/15/11	Mon 9/19/11	169

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ID	Task Name	Duration	Start	Finish	Predecessors
171	Wyle Report	2 days	Mon 9/19/11	Tue 9/20/11	170
172	Manufacturer Review	5 days	Wed 9/21/11	Tue 9/27/11	171
173	Wyle Receives Revised Code	1 day	Wed 9/28/11	Wed 9/28/11	172
174	Final Review	3 days	Thu 9/29/11	Mon 10/3/11	173
175	**Source Code Review Completion**	**0 days**	**Mon 11/7/11**	**Mon 11/7/11**	
176	Final Report Source Code Review Test	0 days	Mon 11/7/11	Mon 11/7/11	174,144,49,103
177	**Creation of the Build Environment**	**79 days**	**Mon 1/10/11**	**Fri 4/29/11**	
178	Receive Build Equipment	5 days	Mon 1/10/11	Mon 1/17/11	
179	Receive Build Documentation	64 days	Mon 1/10/11	Fri 4/8/11	
180	Scrub Build PC's	5 days	Fri 4/8/11	Fri 4/15/11	179
181	Load OS and Compilers According to Build Instructions	5 days	Fri 4/15/11	Fri 4/22/11	180
182	Initial Creation of Build Environment Complete	5 days	Fri 4/22/11	Fri 4/29/11	181
183	**Test Plan**	**377 days**	**Wed 5/5/10**	**Thu 10/20/11**	
184	Receive Documentation	45 days	Mon 5/17/10	Mon 7/19/10	
185	Receive Partial Shipment of Hardware Equipment	1 day	Wed 5/5/10	Thu 5/6/10	
186	Draft Test Plan	20 days	Fri 10/22/10	Fri 11/19/10	
187	Draft Test Plan Reviewed by Dominion	10 days	Fri 11/19/10	Tue 12/7/10	186
188	Wyle/Dominion Review of Test Plan	56 days	Tue 12/7/10	Fri 2/25/11	187
189	Draft Test Plan Update	1 day	Fri 2/25/11	Mon 2/28/11	188
190	Draft Test Plan Reviewed by Dominion	21 days	Mon 2/28/11	Tue 3/29/11	189
191	Revise Draft	5 days	Tue 3/29/11	Tue 4/5/11	190
192	Test Plan to EAC	1 day	Thu 4/21/11	Fri 4/22/11	
193	EAC Review	20 days	Fri 4/22/11	Fri 5/20/11	192
194	Review TR's Comments	10 days	Fri 5/20/11	Fri 6/3/11	193
195	Revise Draft	14 days	Fri 9/9/11	Thu 9/29/11	
196	Create Test Plan Package	5 days	Thu 9/29/11	Thu 10/6/11	195
197	Test Plan Approved by EAC	10 days	Thu 10/6/11	Thu 10/20/11	196
198	**Physical Configuration Audit**	**357 days**	**Wed 5/5/10**	**Thu 9/22/11**	
199	**PCA Hardware Configuration**	**350 days**	**Wed 5/5/10**	**Tue 9/13/11**	
200	PCA Initial Hardware Submitted	1 day	Wed 5/5/10	Thu 5/6/10	
201	PCA Initial Hardware Photographed	10 days	Thu 5/6/10	Thu 5/20/10	200
202	PCA Proprietary Hardware Documentation Submitted	1 day	Thu 5/6/10	Fri 5/7/10	201
203	PCA COTS Initial Hardware Documentation Submitted	1 day	Fri 5/7/10	Mon 5/10/10	202
204	PCA Proprietary Initial Hardware Verification Against CM	12 days	Tue 11/23/10	Mon 12/13/10	203

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ID	Task Name	Duration	Start	Finish	Predecessors
205	PCA COTS Initial Hardware Verification Against CM	1 day	Wed 11/24/10	Mon 12/13/10	204
206	PCA Hardware Discrepancy Resolution	10 days	Mon 12/13/10	Wed 12/29/10	205
207	PCA Final Hardware Photographed	2 days	Tue 9/6/11	Thu 9/8/11	200
208	PCA Final Verification with Hardware and CM Documentation	2 days	Thu 9/8/11	Mon 9/12/11	207
209	PCA Report Hardware	1 day	Mon 9/12/11	Tue 9/13/11	208
210	**PCA SCAP Checklist (Baseline of OS)**	**278 days**	**Tue 8/24/10**	**Thu 9/22/11**	
211	Research FDCC for all OS and Server for System	10 days	Tue 8/24/10	Tue 9/7/10	
212	Submit Benchmark Checklist to Manufacturer	53 days	Tue 9/7/10	Fri 11/19/10	211
213	Manufacturer Review	83 days	Fri 11/19/10	Tue 3/22/11	212
214	Analysis Manufacturers Response	3 days	Tue 3/22/11	Fri 3/25/11	213
215	Report to Manufacturer Any Discrepancies	2 days	Fri 3/25/11	Tue 3/29/11	214
216	Re-Analysis Checklist	2 days	Mon 9/19/11	Wed 9/21/11	
217	Report to EAC VSTL Findings	1 day	Wed 9/21/11	Thu 9/22/11	216
218	**Functional Configuration Audit**	**376 days**	**Thu 7/1/10**	**Thu 12/15/11**	
219	**Pre FCA Setup**	**320 days**	**Thu 7/1/10**	**Wed 9/28/11**	
220	EMS Version Installed	4 days	Thu 7/1/10	Wed 7/7/10	
221	Pre-Voting Test Case Sequencing, Specific Test Case Design and Data Inputs	62 days	Wed 7/7/10	Fri 10/1/10	220
222	EMS Version 4.0 Installed	2 days	Fri 10/1/10	Tue 10/5/10	221
223	Pre-Voting Test Case Sequencing, Specific Test Case Design and Data Inputs	237 days	Tue 10/5/10	Wed 9/7/11	222
224	Voting Test Case Sequencing, Specific Test Case Design, and Data Inputs	5 days	Wed 9/7/11	Wed 9/14/11	223
225	Post-Voting Test Case Sequencing, Specific Test Case Design, and Data Inputs	5 days	Wed 9/14/11	Wed 9/21/11	224
226	Usability Test Case Sequencing, Specific Test Case Design, and Data Inputs	5 days	Wed 9/21/11	Wed 9/28/11	225
227	**FCA Execution**	**28 days**	**Mon 11/7/11**	**Thu 12/15/11**	
228	Pre-Voting Execution	10 days	Mon 11/7/11	Mon 11/21/11	10,223
229	Voting Execution	5 days	Mon 11/21/11	Mon 11/28/11	228
230	Post Voting Execution	10 days	Mon 11/28/11	Mon 12/12/11	229
231	Complete FCA	0 days	Mon 12/12/11	Mon 12/12/11	230
232	**FCA Completion**	**3 days**	**Mon 12/12/11**	**Thu 12/15/11**	
233	Report FCA Test	3 days	Mon 12/12/11	Thu 12/15/11	231
234	**Usability Execution**	**10 days**	**Wed 9/28/11**	**Wed 10/12/11**	
235	Usability Start	0 days	Wed 9/28/11	Wed 9/28/11	226
236	Complete Usability	6 days	Wed 9/28/11	Thu 10/6/11	235
237	Complete Usability	1 day	Thu 10/6/11	Fri 10/7/11	236
238	**Usability Completion**	**3 days**	**Fri 10/7/11**	**Wed 10/12/11**	

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ID	Task Name	Duration	Start	Finish	Predecessors
239	Report Usability	3 days	Fri 10/7/11	Wed 10/12/11	237
240	**Hardware Testing**	**148 days**	**Thu 5/26/11**	**Tue 12/20/11**	
241	**Electrical Tests ICP**	**42 days**	**Thu 5/26/11**	**Mon 7/25/11**	
242	Electromagnetic Radiation (FCC)	2 days	Thu 5/26/11	Mon 5/30/11	
243	Electromagnetic Susceptibility	2 days	Tue 6/7/11	Thu 6/9/11	
244	**Environmental Transportation Tests ICP**	**13 days**	**Wed 6/1/11**	**Mon 6/20/11**	
245	Bench Handling	1 day	Fri 6/17/11	Mon 6/20/11	
246	Vibration	1 day	Fri 6/17/11	Mon 6/20/11	
247	Low Temperature	1 day	Mon 6/13/11	Tue 6/14/11	
248	High Temperature	1 day	Tue 6/14/11	Wed 6/15/11	247
249	Humidity	8 days	Wed 6/1/11	Mon 6/13/11	
250	**Other Hardware Tests ICP**	**22 days**	**Thu 6/23/11**	**Mon 7/25/11**	
251	Electrical Power Supply (2 hour Battery Backup)	1 day	Tue 7/12/11	Wed 7/13/11	
252	Temperature Power/Reliability	5 days	Thu 6/23/11	Thu 6/30/11	
253	Acoustic	3 days	Wed 7/20/11	Mon 7/25/11	
254	Product Safety	3 days	Mon 7/11/11	Thu 7/14/11	
255	Maintainability	5 days	Thu 7/14/11	Thu 7/21/11	254
256	**Electrical Tests ICE**	**31 days**	**Fri 9/9/11**	**Mon 10/24/11**	
257	Electromagnetic Radiation (FCC)	1 day	Fri 9/9/11	Mon 9/12/11	
258	Electrical Power Disturbance	1 day	Tue 9/20/11	Wed 9/21/11	
259	Electrostatic Disruption	2 days	Fri 10/14/11	Tue 10/18/11	260
260	Electrostatic Susceptibility	2 days	Wed 10/12/11	Fri 10/14/11	263
261	Electrical Fast Transient	1 day	Mon 9/19/11	Tue 9/20/11	
262	Lightning Surge	1 day	Wed 9/21/11	Thu 9/22/11	
263	Lightning Surge Retest	1 day	Tue 10/11/11	Wed 10/12/11	
264	Conducted RF Immunity	2 days	Tue 10/18/11	Thu 10/20/11	259
265	Magnetic Fields Immunity	2 days	Thu 10/20/11	Mon 10/24/11	264
266	Electrical Tests Complete	1 day	Mon 10/24/11	Tue 10/25/11	265
267	**Environmental Transportation Tests ICE**	**16 days**	**Fri 9/30/11**	**Mon 10/24/11**	
268	Bench Handling	1 day	Fri 10/21/11	Mon 10/24/11	269
269	Vibration	1 day	Thu 10/20/11	Fri 10/21/11	272
270	Low Temperature	1 day	Fri 9/30/11	Mon 10/3/11	
271	High Temperature	1 day	Mon 10/3/11	Tue 10/4/11	270
272	Humidity	12 days	Tue 10/4/11	Thu 10/20/11	271

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273	**Other Hardware Tests**	**28 days**	**Mon 10/10/11**	**Thu 11/17/11**	
274	Electrical Power Supply (2 hour Battery Backup) ICE	1 day	Mon 10/24/11	Tue 10/25/11	268
275	Electrical Power Supply (2 hour Battery Backup) ICC	1 day?	Mon 12/5/11	Tue 12/6/11	
276	Temperature Power/Reliability - ICC/ICE	4 days	Tue 12/13/11	Mon 12/19/11	275
277	Acoustic - ICE	3 days	Mon 10/24/11	Thu 10/27/11	268
278	Product Safety - ICE	5 days	Mon 9/26/11	Mon 10/3/11	
279	Maintainability - ICC-ICE	5 days	Mon 10/10/11	Mon 10/17/11	
280	**Completion of All Hardware Testing**	**5 days**	**Tue 12/13/11**	**Tue 12/20/11**	
281	Hardware Test Report	5 days	Tue 12/13/11	Tue 12/20/11	273,266,267
282	**System Level Performance Testing**	**57.5 days**	**Thu 10/27/11**	**Wed 1/18/12**	
283	**Accuracy Test**	**5 days**	**Mon 12/19/11**	**Tue 12/27/11**	
284	Execution of Accuracy Test	4 days	Mon 12/19/11	Fri 12/23/11	267,276
285	Completion of Accuracy Test	1 day	Fri 12/23/11	Tue 12/27/11	284
286	**Volume and Stress Test**	**6 days**	**Tue 12/27/11**	**Thu 1/5/12**	
287	Execution of Volume and Stress Test	5 days	Tue 12/27/11	Wed 1/4/12	285
288	Completion of Volume and Stress Test	1 day	Wed 1/4/12	Thu 1/5/12	287
289	**Security Test**	**44 days**	**Thu 10/27/11**	**Thu 12/29/11**	
290	**Access Controls Review (WoP 6)**	**5 days**	**Wed 11/30/11**	**Wed 12/7/11**	
291	Completion of Access Control Review	5 days	Wed 11/30/11	Wed 12/7/11	226,10
292	**Source Code Automated Review (Fortify)**	**10 days**	**Thu 10/27/11**	**Thu 11/10/11**	
293	Run Fortify on Software Supported	3 days	Thu 10/27/11	Tue 11/1/11	
294	Report to Manufacturer	2 days	Tue 11/1/11	Thu 11/3/11	293
295	Review Manufacturers Response	2 days	Thu 11/3/11	Mon 11/7/11	294
296	Regression Test	1 day	Mon 11/7/11	Tue 11/8/11	295
297	Report Source Code Automated Review	1 day	Tue 11/8/11	Wed 11/9/11	296
298	Submit Findings to EAC	1 day	Wed 11/9/11	Thu 11/10/11	297
299	**Penetration Test**	**7 days**	**Wed 12/7/11**	**Fri 12/16/11**	
300	Discovery Phase	3 days	Wed 12/7/11	Mon 12/12/11	291
301	Exploration Phase	2 days	Mon 12/12/11	Wed 12/14/11	300
302	Risk Assessment	2 days	Wed 12/14/11	Fri 12/16/11	301
303	**Security Assessment**	**5 days**	**Fri 12/16/11**	**Fri 12/23/11**	
304	Report Security Assessment	5 days	Fri 12/16/11	Fri 12/23/11	302
305	**Completion of Security Test**	**3 days**	**Fri 12/23/11**	**Thu 12/29/11**	
306	Final Report Security Assessment	3 days	Fri 12/23/11	Thu 12/29/11	304

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307	**Telecommunication Testing**	**6 days**	**Mon 12/19/11**	**Wed 12/28/11**	
308	Setup Telecom Testing	1 day	Mon 12/19/11	Tue 12/20/11	267,276
309	Execute Telecom Testing	4 days	Tue 12/20/11	Tue 12/27/11	308
310	Report Telecom Testing	1 day	Tue 12/27/11	Wed 12/28/11	309
311	Completion of Telecom Test	0 days	Wed 12/28/11	Wed 12/28/11	310
312	**System Integration Testing**	**9.5 days**	**Thu 1/5/12**	**Wed 1/18/12**	
313	**GEN 01 - Contests, Candidates, Alt Language, Split Precinct, and Audio Ballot**	**3 days**	**Thu 1/5/12**	**Tue 1/10/12**	
314	GEN 01 Setup	1 day	Thu 1/5/12	Fri 1/6/12	288
315	GEN 01 Execution	1 day	Fri 1/6/12	Mon 1/9/12	314
316	GEN 01 Complete	1 day	Mon 1/9/12	Tue 1/10/12	315
317	**GEN 02 - N of M, Recall, Ranked Order, Early Voting, Alt Language and Audio Ballot**	**3 days**	**Tue 1/10/12**	**Fri 1/13/12**	
318	GEN 02 Setup	1 day	Tue 1/10/12	Wed 1/11/12	316
319	GEN 02 Execution	1 day	Wed 1/11/12	Thu 1/12/12	318
320	GEN 02 Complete	1 day	Thu 1/12/12	Fri 1/13/12	319
321	**GEN 03 - Ideographic Language, Audio Ballot, and ADA Devices**	**3 days**	**Fri 1/13/12**	**Wed 1/18/12**	
322	GEN 03 Setup	1 day	Fri 1/13/12	Mon 1/16/12	320
323	GEN 03 Execution	1 day	Mon 1/16/12	Tue 1/17/12	322
324	GEN 03 Complete	1 day	Tue 1/17/12	Wed 1/18/12	323
325	**PRIM 01 - Closed Primary, Split Precinct, Multiple Ballot Styles, and Audio Ballot**	**3 days**	**Thu 1/5/12**	**Tue 1/10/12**	
326	PRIM 01 Setup	1 day	Thu 1/5/12	Fri 1/6/12	288,302
327	PRIM 01 Execution	1 day	Fri 1/6/12	Mon 1/9/12	326
328	PRIM 01 Complete	1 day	Mon 1/9/12	Tue 1/10/12	327
329	**PRIM 03 - Closed Primary, Ideographic Language, and ADA devices**	**3 days**	**Wed 1/11/12**	**Mon 1/16/12**	
330	PRIM 03 Setup	1 day	Wed 1/11/12	Thu 1/12/12	
331	PRIM 03 Execution	1 day	Thu 1/12/12	Fri 1/13/12	330
332	PRIM 03 Complete	1 day	Fri 1/13/12	Mon 1/16/12	331
333	**Completion of System Integration Testing**	**0.5 days**	**Wed 1/18/12**	**Wed 1/18/12**	
334	Final Report System Integration Tests	0.5 days	Wed 1/18/12	Wed 1/18/12	324,332
335	**All Testing Activities Completed**	**0.5 days**	**Wed 1/18/12**	**Thu 1/19/12**	
336	Verification and compilation of all test data	0.5 days	Wed 1/18/12	Thu 1/19/12	3,10,177,183,198,218,240
337	**PCA Completion**	**3 days**	**Thu 1/26/12**	**Tue 1/31/12**	
338	Regression Ali Changes to PCA that Occurred during the Test Campaign	2 days	Thu 1/26/12	Mon 1/30/12	335

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ID	Task Name	Duration	Start	Finish	Predecessors
339	Final Report PCA	1 day	Mon 1/30/12	Tue 1/31/12	338
340	**Final Trusted Build**	**7 days**	**Thu 1/19/12**	**Mon 1/30/12**	
341	Verify Build Environment	1 day	Thu 1/19/12	Fri 1/20/12	335
342	Trusted Build	3 days	Fri 1/20/12	Wed 1/25/12	341
343	Install and Verify System Build	1 day	Wed 1/25/12	Thu 1/26/12	342
344	Final Trusted Build Complete	1 day	Thu 1/26/12	Fri 1/27/12	343
345	Delivery of Images to EAC Repository	1 day	Fri 1/27/12	Mon 1/30/12	344
346	**Post Testing Activities**	**40 days**	**Thu 1/19/12**	**Thu 3/15/12**	
347	**Certification Report**	**40 days**	**Thu 1/19/12**	**Thu 3/15/12**	
348	Initial Draft Report 90%	5 days	Thu 1/19/12	Thu 1/26/12	335
349	Manufacturer Review	3 days	Thu 1/26/12	Tue 1/31/12	348,336
350	Final Test Report for Submission to EAC for Review	5 days	Tue 1/31/12	Tue 2/7/12	349
351	EAC Review	20 days	Tue 2/7/12	Tue 3/6/12	350
352	Address Comments From TR's	5 days	Tue 3/6/12	Tue 3/13/12	351
353	Submit Final Report	2 days	Tue 3/13/12	Thu 3/15/12	352

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