Certification Test Plan

Report Number 07-V-ESS-035-CTP-01

Election Systems & Software
Unity 3.2.0.0 Voting System
Includes:
AM, EDM, ESSIM, HPM, ERM & the intElect DS200 Scanner

Test Plan Rev 03

September 26, 2007

Prepared for:

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Accredited by the Election Assistance Commission (EAC) for Selected Voting System Test Methods or Services

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Revision History

Date	Description of Revision	Author	Revision No.
05/04/2007	Initial Test Plan	D. Watz	Rev 00
5/14/2007	Review of Test Plan	M. Santos, J. Garcia, D. Valdez	Rev 01
5/22/2007	Final Review of Test Plan with changes	J. Garcia	Rev 01
6/20/2007	Update EAC comments from Conference Call 6/8/07	K. Swift	Rev 02
9/26/2007	Updates from EAC comments document 9/21/07	D. George	Rev 03

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1 INTRODUCTION

This Master Certification Test Plan outlines the approach SysTest Labs will implement to perform Federal Election Commission (FEC) Voting System Standards Certification testing of the Unity 3.2.0.0 Voting System by Election Systems and Software (ES&S). The purpose of this document is to provide a clear and precise plan for test elements required to ensure effective Certification testing as outlined in the VSS Vol. 1: Section 9.6.2.1, Vol. 1: 7.7, and Vol. 2: 2.2 through 2.8. The ES&S Unity 3.2.0.0 Voting System consists of an Election Management System: Audit Manager (AM), Election Data Manager (EDM), ES&S Ballot Image Manager (ESSIM), Hardware Programming Manager (HPM), and Election Reporting Manager (ERM). The AM tracks users and provides security for the Unity Election System. The EDM is used to create the initial election data. The ESSIM provides the tools for designing and printing ballots. The main function of the HPM is to organize the election data. However, the HPM may also be used for election definition. (Election definition in the HPM is not supported in this certification.) The ERM reports the results of the election.

The ES&S Unity 3.2.0.0 Voting System also consists of a DS200 precinct count scanner, which is an optical scan paper ballot tabulator that accepts ballots inserted in any direction and reads both sides of the ballot simultaneously.

The objective of this test plan is to outline the certification test tasks. This test plan:
- Identifies items that need to be tested;
- Defines the test approach;
- Identifies required hardware, support software, and tools to be used for testing; and
- Identifies the types of tests to be performed.

Certification Test Plan Attachments

The following attachments apply to this Certification Test Plan:

Attachment A: Technical Data Package Documents
Attachment B: Supported Functionality Declaration
Attachment C: List of Source Code Reviewed - **PROPRIETARY**
Attachment D: Hardware Test Plan

SysTest Labs will provide certification testing for ES&S on the Unity 3.2.0.0 Voting System. The resulting certification will be to the FEC VSS 2002.

This effort includes the Physical Configuration Audit (including the Technical Data Package documentation review and source code review) as defined by the EAC VVSG 2005 Vol. 2, section 2. The Functional Configuration Audit will consist of an assessment of ES&S' testing to the ES&S System Requirements Specification, as outlined in the FEC VSS Vol. 1 section 2, as well as the performance of functional and system level integration tests. This includes developing a thorough test plan, managing system configurations, generating test cases as needed based on the set of test requirements (in addition to the test cases and procedures furnished by ES&S), test execution, and analysis of test results.

1.1 References

1. Federal Election Commission Voting System Standards (FEC VSS), April 2002. Volumes I and II.
2. Election Assistance Commission Voluntary Voting System Guidelines (EAC VVSG), 2005 Version 1.0. Volumes I and II.
3. NIST NVLAP Handbook 150: 2006.
4. NIST NVLAP Handbook and 150-22: 2005.
5. EAC Testing and Certification Program Manual, United States Election Assistance Commission, 2006
6. SysTest Labs Quality System Manual, Revision 1.0, prepared by SysTest Labs, dated November 3, 2006.

1.2 Terms and Abbreviations

These terms and abbreviations will be used throughout this document:

Table 1 - Matrix of Terms & Abbreviations

Term	Abbreviation	Description
Audit Manager	AM	Audit Manager is ES&S' tracking program for the Unity software suite. AM tracks user activity in AM, EDM and ESSIM.
Election Data Manager	EDM	Election Data Manager is a database system that stores all of a jurisdiction's precinct, office, and candidate information. It is used in conjunction with other Unity software to format and print ballots, program ballot scanning equipment, and produce Election Day reports.
ES&S Ballot Image Manager	ESSIM	ES&S Ballot Image Manager is a publishing tool used to design and print ballots with the election information stored in EDM.
Election Reporting Manager	ERM	The Election Reporting Manager is ES&S' election results reporting program, used to generate paper and electronic reports for poll workers, candidates, and the media. ERM can display updated election totals on a monitor as ballot data is tabulated and can send result reports directly to media outlets over the Internet. ERM is designed to support a wide range of ES&S ballot scanning equipment and can produce reports for both central count systems and precinct count systems.
Hardware Programming Manager	HPM	Hardware Programming Manager enables the user to import, format, and convert the election definition files for ballot scanning equipment.
intElect DS200	DS200	The intElect DS200 is the operational environment hardware for the Unity 3.2.0.0 Voting System. It is an optical scan paper ballot tabulator that accepts ballots inserted in any direction and reads both sides of the ballot simultaneously.
Unity Release	N/A	The system configuration(s) of ES&S hardware and software voting system(s).

2 PRE-CERTIFICATION TESTS

2.1 Pre-Certification Test Activity

SysTest Labs has conducted a Physical Configuration Audit of the documents submitted for review in the ES&S Technical Data Package, including Functional Requirements, Specifications, Procedures, System Overview, Configuration Management Plan, and Quality Assurance Program. The review was against the **EAC VVSG 2005**, **Volumes I and II,** for each of the submitted individual components of the Unity 3.2.0.0 Voting System. For any FEC VSS 2002 requirements that are more demanding than the EAC VVSG 2005, SysTest Labs reviewed the ES&S documents to those 2002 requirements.

SysTest Labs has conducted a Functional Configuration Audit review of the vendor test cases delivered as part of the Technical Data Package. The review was conducted against the **FEC VSS 2002 Volume I,** for each of the submitted components. Any requirements that were identified as not being tested, or insufficiently tested, have been included in the Test Cases that SysTest will execute.

The results of these audit reviews, as well as the discrepancies generated, will be included in the Certification Report.

Unity 3.2.0.0 is a full certification and thus all code is subject to a full review against the FEC VSS 2002. SysTest Labs has conducted a source code review of the submitted code in the following languages: C, C++, and Cobol. Tools utilized by SysTest include Practiline Line Counter: a commercial application used to determine the counts of executable and comment lines; Module Finder: a SysTest proprietary application used to parse module names from C/C++ and VB code and populate the identified module names into the review documents; ExamDiff Pro: a commercial application used to compare revised code to previously reviewed code; and KEdit: a commercial text editor application running a SysTest proprietary macro used to parse module names from Cobol code and populate the identified module names into the review document.

SysTest Labs utilizes a team approach in reviewing and managing the tasks of receiving the code to be reviewed, determining the volume of code to be reviewed, reviewing the vendor's internal coding standards and determining if there are any variances from the prescribed Standards, creating the review work documents, distributing the code to be reviewed along with the created work documents to the project code reviewers, reviewing the code, performing peer reviews, creating discrepancy reports, and receiving modified code and other vendor responses.

Prior to testing, SysTest Labs will conduct a trusted build according to the approved standard lab procedure that details this process. The process includes interviews of key vendor staff to evaluate vendor processes and process conformance in the areas of configuration management and quality assurance. Preparation for the trusted build includes obtaining and reviewing the vendor-defined procedure for constructing the build platform, verifying the target build platform, and acquiring the necessary materials. Execution of the trusted build complies with SysTest Labs' detailed build procedure and results in a compact disk containing the installation files. Finally, the conclusion of the trusted build consists of record-keeping and archiving procedures that occur at SysTest Labs, and the resulting media is submitted to the EAC-approved software repository.

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2.2 Pre-Certification Assessment Results

SysTest Labs has conducted a pre-certification test assessment. This assessment includes the review of the Technical Data Package (Documentation and Vendor Testing) and source code changes for each submitted component of the Unity 3.2.0.0 Voting System.

Based upon the findings of the pre-certification assessment for ES&S, SysTest Labs has determined that ES&S' Test Plan, Procedures, and Scripts are consistent with the FEC Voting System Standards for TDP documentation. Issues were noted in a discrepancy report that was provided to ES&S for resolution prior to completion of testing.

Full assessment, review, and correction of the ES&S TDP will be completed as part of the execution of this Certification Test Plan. Also to be executed as part of this Certification Test Plan are the required Readiness Test, a sampling of ES&S' test cases based on the supported functionality for this certification, the SysTest Labs Gen01 test case, and a system accuracy test.

3   MATERIALS REQUIRED FOR TESTING

3.1   Software/Firmware

Items identified in the table reflect all software and firmware required to perform hardware, software, telecommunications, security and integrated system tests.

Table 2 - Matrix of Required Software/Firmware

Manufacturer	Application(s)	Version	Test Type
ES&S	Audit Manager	7.4.1.0	Pre-Voting
ES&S	ES&S Ballot Image Manager	7.6.0.0	Pre-Voting
ES&S	Election Data Manager	7.7.0.0	Pre-Voting
ES&S	Hardware Programming Manager	5.5.1.0	Pre-Voting
ES&S	Election Reporting Manager	7.3.1.0	Post-Voting
Manufacturer	**COTS Application(s)**	**Version**	**Unity Application**
Microsoft Corporation	Microsoft Windows	Windows '98 or higher	ERM
RM/COBOL	RM COBOL RUNTIME System	11.01	ERM & HPM
Linux	Linux from scratch	6.0	DS200

3.2   Equipment (Hardware)

Equipment identified in the table reflects all hardware required to perform hardware, software, security and integrated system tests.

Table 3 - Matrix of Required Hardware

Item	Manufacturer	O/S Version	Type
intElect DS200 (Precinct Count Scanner) SN 0002w/Ballot Box SN 3016 and SN 0010 w/Ballot Box 2007,	ES&S	Hardware 1.0 Firmware 1.0.0.0	Voting
Dell Optiplex gx260, s/n # 7B0WL21 and SN#1GIJR1480FL	Dell	Windows XP, SP2	Personal Computer

3.3   Test Materials

Items identified in the table reflect all test materials required to perform hardware, software, security and integrated system tests.

Table 4 - Matrix of Test Materials

Item
Printer paper rolls
PC Card
USB Memory Stick

3.4   Deliverable Materials

In addition to the hardware and software identified in sections 3.1, 3.2, and 3.3, ES&S delivered the Technical Data Package for the Unity 3.2.0.0 Voting System.

Please see Attachment A for a complete list of TDP documents.

3.5 Proprietary Data

SysTest Labs will indicate which portions of reports are considered proprietary information. We understand material that is not classified as proprietary, including test plans and test reports, will become publicly available. Proprietary information will be submitted in a separate attachment to the EAC, and marked "Proprietary" in the file name.

4   TEST SPECIFICATIONS

4.1 Hardware Configuration and Design

Certification testing will occur for conformance to Vol. 1 Sect. 4 Hardware Standards and Vol. 2 Sect. 4 Hardware Testing of the EAC VVSG 2005.

The Hardware Configuration Audit will confirm that the configurations match. In order to conduct system level integration tests, SysTest Labs may need to include minimal repeats of the operational tests to confirm there are no changes to systemic responses.

Table 5 - Matrix of Hardware Configuration

Item	Manufacturer	Serial Number	O/S Version	Hardware Test and test lab	Description of Use
In Precinct					
intElect DS200*	ES&S	0001, 0002, 0003, 0004, 0010, 0011	FW v. 1.0.0.0 HW v. 1.0	See Hardware Test Plan	Scanner
Steel Ballot Box	ES&S	2007, 3016, 2804	N/A	See Hardware Test Plan	Ballot Box
AC Power Adapter	Wall Industries	S/N 72573403; S/N 72573415; S/N 72573407, S/N 72573413; S/N 72632719, S/N 72632720	N/A	See Hardware Test Plan	Power Adapter
Thermal Paper*	Seiko	P/N NAP-0080-025S - (SS080-025B)	N/A	See Hardware Test Plan	Paper

*The Seiko printer is embedded in the intElect DS200

4.2 Software System Functions

The scope of testing for the software certification (*Vol. 2, Sect. 5)* and system-level tests (*Vol. 2, Sect. 6)* as defined in the FEC VSS April 2002 includes:

- Pre-Certification Test Assessment (*Vol. 2, Section A.2*), reflecting the Technical Data Package (EAC VVSG 2005 *Vol. 2, Sect. 2*) document examination portions of the Physical Configuration Audit and the Functional Configuration Audit
- Physical Configuration Audit: (*Vol. 2, Sect. 6.6*)
  - Establishment of the software/hardware configuration baseline used in testing
  - Full Source Code Review (*Vol.2 Sect. 5.4*)
  - Review of ES&S's functional specification for adequacy or discrepancy
  - Execution of the Trusted Build and comparison to the code tested
- Functional Configuration Audit: (*Vol. 2, Sect. 6.7*)
  - Creation and issuance of a Master Certification Test Plan (*Vol. 2, Section A*)
  - Review, evaluation, creation, and execution of Functional Tests (*Vol. 2, Section A*)
  - Performance of System Level Integration Tests (*Vol. 2, Sect. 6*)

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4.2.1 System Functional Testing

Review of ES&S's functional specification, test plans, test cases, and test results demonstrates the following functional areas are included in the Unity 3.2.0.0 System's overall capabilities, pre-voting, voting, and post-voting functions. This functionality will be verified by the tests performed (*Vol. 2, Section A*). System functional tests shall be performed on the ES&S AM, EDM, ESSIM, HPM, ERM, and DS200 for the purpose of assessing the response of the software to a range of conditions (*Vol. 2, Sect. 4.3.5*).

Table 6 - Matrix of System Functional Testing

Function	Test Methodology
Ballot Preparation Functions	
a. Ballot preparation subsystem	Verify the election is defined for election day, and one more precinct/polling place can be defined.
Before, During & After Processing of Ballots	
b.1. Logic Test – Interpretation of Ballot Styles & recognition of precincts	Verify in Functional Tests: Verify voting variation functionality identified by ES&S for the ES&S Unity 3.2.0.0 Voting System (Vol. 1. Section 2.2.8.2).
b.2. Accuracy Tests- Ballot reading accuracy	Verify recording of 1,549,703 consecutive ballot positions on the DS200 scanner. -Accuracy Ballot is loaded onto a USB -Report of the initialization process -Display the function selections -Open polls -Zero Report -Scan ballots, Close polls, Run totals report and Audit Log 13 times
b.3. Status Tests- Equipment statement &memory contents	Verify in Functional Tests: Equipment statement & memory contents at the corresponding intervals outlined in user documentation for the functions a. b.4, c 1-7 and d. 1-8
b.4. Report Generation – Produce test output data	Verify in Functional Tests: Clearing Election Totals Manual data entry Generating a Zero Report Testing an Election Creating Test Reports Clearing Totals for Election Day Selecting Reporting Groups Loading Scanner Totals Producing Election Reports Displaying Election Information ERM Election Results
b 5. Report Generation- Produce audit data	Verify in Functional Tests: System audit reports voting
Polling Place Functions	
c.1. Opening the polls, accepting & counting ballots	Verify in Functional Tests: Zero Reports DS200: Scan paper ballots Alerts for over votes and under votes
c.2. Monitoring equipment status	Verify in Functional Tests: Equipment status as identified in user documentation
c.3. Equipment response to commands	Verify in Functional Tests:

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Function	Test Methodology
	Equipment (DS200) response to all voter and poll worker commands as identified in user documentation Messages generated by the equipment that require an action by the voter or poll worker before operation continues--as in blank ballots, overvotes, and undervotes as defined in election setup.
c.4. Generating real-time audit messages	Verify Verified in Functional Tests: Print DS200 audit log Each audit message contains a timestamp. Election name, software, and firmware are listed at the beginning of each audit log. Count of ballots processed is included in log of uploaded results. Error messages. Precinct ID is identified for all results pertaining to insertions, additions, and deletions.
c.5: Closing polls and disabling ballot acceptance	Verify in Functional Tests: Inability to cast additional ballots DS200: Close of polls Inability to scan additional ballots
c.6. Generating election data reports.	Verify in Functional Tests: Generation of precinct reports
c.7. Transfer ballot count to central counting location	Verify in Functional Tests: Reading the USB from the ERM Telecommunication is not supported in this certification
Central Count Functions	
*d.1.*Process ballot deck for > 2 precincts with 3 split precincts per precinct for a total of 6 ballot styles	Verify in Functional Tests: Process of ballot decks on the DS200
d.2. Monitoring equipment status	Verify in Functional Tests: Equipment status as identified in user documentation
d.3. Equipment response to commands	Verify in Functional Tests: Equipment (DS200) responds to all voter and poll worker commands as identified in user documentation (Messages generated by the equipment that require an action by the voter or poll worker before operation continues--as in blank ballots, overvotes, undervotes as defined in election setup)
d.4. Integration with peripherals equipment or other data processing systems	See b.3
d.5. Generating real-time audit messages.	See b.4
d.6. Generating precinct-level election data reports	See b.3
d.7. Generating summary election data reports	See b.3
d.8. Transfer of detachable memory module to the processing equipment	See b.3

GEN 01 is SysTest Labs' System level test case for a general non-straight party election. The object of the GEN 01 test case is to test the core functionality of the voting system. This is accomplished by using the vendor's manual(s) to create a general election, vote the general election, and tally the results. GEN 01 will test such items as: a minimum of two precincts; split precincts, with three splits per precinct; multi-member boards; group voting; write-in voting; overvotes; and undervotes. GEN 01 will cover all aspects of the voting cycle, from pre-voting functions, such as ballot creation (election definition) to post-voting functions (tally reporting and audit logs).

Test Case	
GEN 01	The object of this test case is to verify core functionality by using the vendor's manual to create general election ballots, vote, and tally, with the following required functionality: - Define election contests, candidates, issues etc. (V1:2.2.6) - Maintain accurate and complete audit records (V1:2.2.5.2.1) - Maintain accurate and complete error and status messages (v1:2.2.5.2.2, 2.2.5.2.3) - Accurately record scanned ballots - Ensure undervotes are counted as cast votes - Reporting of separate accumulation of Undervotes and Overvotes - Ensure Overvotes are allowed when scanned - Maintain integrity of Vote and Audit data - Party affiliation is identified on the ballot - Accurate Definition, Count, Reporting for Election Day, Absentee - paper, with the results tallied (V1:2.2.2.1) - Write-in voting: Voting position identified for write-ins - Correctly tabulate (V1:2.2.8.1) - Have a Ballot Counter (V1:2.2.9) - Blank ballots

Table 7 - Matrix of Other System Testing

System Tests	Test Methodology
Volume Test	
Accuracy Test Case	System's response to processing more than the expected number of ballots/voters per precinct, to processing more than the expected number of precincts, or to any other similar conditions that tend to overload the system's capacity to process, store, and report data.
Stress Tests	
Hardware test Plan	Hardware test labs test the limits outside the range of 'normal' but within specifications for the units as defined in the VSS standards Vol.1: Section 3. System's responses to transient overload conditions. Subject polling place devices to ballot processing at the high volume rates, evaluate software response to hardware-generated interrupts and wait states.
Usability Tests	
GEN01 Test Case	Responses to input, text syntax, error message content, and audit message input.
Accessibility Test	
Accessibility is not being supported in this certification.	N/A
Security Test	
Security Test Case	Incorporates systems security provisions, unauthorized access, deletion or modification of data, audit trail data, and modification or elimination of security mechanisms. The vendor documentation will be reviewed to ensure sufficient detail is present to operate the voting system in a secured implementation. Where the vendor statements assert the voting system is secured via mechanisms and seals, procedures will test the presence and effectiveness of such controls.
Telecom Test	
Telecom Test Case	ES&S does not support data transmission via telecommunications. SysTest will not test transmission on the DS200. The DS200 does have an internal modem; however, it needs DAM to transmit. The DAM is not supported in this event.

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System Tests	Test Methodology
Performance Tests	
GEN 01 Test Case and Accuracy Test (Test Hardware Test Plan)	Test accuracy, processing rate, ballot format, handling capability and other performance attributes claimed by the vendor. Perform End-to-End System Level Testing validating a predicted result. Perform a Data Accuracy test validating reading of 1,549,703 consecutive ballot positions on the system Accuracy Test. Percept tests to requirements as defined in VSS Vol.1: Section 3.
Recovery Tests	
Hardware Test Plan	Exercise system's ability to recover from hardware and data errors. Validate battery backup and recovery from error conditions, incorporated into Hardware test lab tests to requirements as defined in VSS Vol. 1: Section 3. (See also Hardware Tests)

4.3 Test Case Design

4.3.1 Hardware Qualitative Examination Design

SysTest Labs reviewed the overall system capabilities, pre-voting, voting, and post-voting functions. ES&S Unity 3.2.0.0 hardware is incorporated into the standard set of system level test cases with the augmentation of functionality-specific validation steps.

4.3.2 Hardware Environmental Test Case Design

Hardware environmental certification testing will be performed for conformance to Vol 1. Sect. 3 of the FEC VSS April 2002. SysTest Labs' environmental hardware test subcontractor, Percept Technology Laboratories, performs full environmental certification testing for conformance to Vol. 1 Sect. 3 Hardware Standards and Vol. 2 Sect. 4 Hardware Testing of the April 2002 FEC VSS as outlined in the ES&S Unity 3.2.0.0 Log, prepared by Percept Technology Laboratories (Vol .2, Section A.4.3.2).

4.3.3 Software Module Test Case Design and Data

SysTest Labs reviewed the test case design documents and data as provided by ES&S. In evaluating each module, with respect to flow control parameters and data on both entry and exit, SysTest Labs assesses the logical correctness, the adequacy of the code's modularity and construction, the implementation of the algorithms in assembly language (if used), the absence of hidden code, and the extent to which "industry standard" characteristics are incorporated (Vol. 2, Section A.4.3.3).

4.3.4 Software Functional Test Case Design

SysTest Labs has reviewed the functional test case design documents and data as provided by ES&S against a detailed matrix of system functions and the test cases that exercise them. SysTest Labs has prepared a test procedure describing all test ballots, operator procedures, and the data content of output reports. SysTest Labs will design and conduct all appropriate module and integrated functional tests found necessary (Vol. 2, Section A.4.3.4).

4.3.5 System-level Test Case Design

SysTest Labs reviewed the system-level test case design documents and data as provided by ES&S. SysTest Labs will conduct all appropriate module and integrated functional tests found

necessary, in addition to the standard set of system level tests run against all voting systems (Vol.2, Section A.4.3.5).

4.3.6 Sampling Methodology

SysTest Labs reviewed the system-level and functional test case documents and data provided by ES&S. SysTest Labs will repeat a sample of the vendor's test cases according to the following guideline:

Review all vendor test cases and select 1 test case from a high-risk area for sampling, such as:
- Security
- Data Accuracy
- Audit log
- Tabulating

Test Cases that will be sampled:

SysTest Labs has selected test case 5.4 - Polls Closed: Audit Log Report as the sample test case because audit log reporting is an integral part of testing voting systems. The audit log records every action taken during the course of the election. The audit log not only keeps a record of tally information, but also keeps a record of status and error messages. The audit log can also be useful in litigation if an election is ever in question.

4.4 EAC Interpretations

This test engagement utilizes only standard VSTL test methods that conform to the EAC Testing and Certification Program Manual and the appropriate voting system standard. No additional EAC interpretations affect the test plan and test methodology.

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5 TEST DATA

5.1 Data Recording

The FEC Voting System Standards, Volume 2 Test Standards, will measure certification-testing progress against the standards defined for paper-based systems. SysTest Labs will create forms for the source code, TDP, and testing reviews. They will be stored in electronic format at SysTest Labs. SysTest Labs will record all activity via status report emails to the voting system vendor, ES&S.

The testing process involves the assessment of:

- Operational accuracy in the recording and processing of voting data, as measured by the error rate articulated in Volume I, Section 3.
- Operational failure or the number of unrecoverable failures under conditions simulating the intended storage, operation, transportation, and maintenance environments for voting systems, using an actual time-based period of processing test ballots.
- System performance and function under normal and abnormal conditions; completeness and accuracy of the system documentation and configuration management records to enable purchasing jurisdictions to effectively install, test, and operate the system.

5.2 Test Data Criteria

SysTest Labs will evaluate test results against the documents and software provided by ES&S. These documents shall be used to customize a standard set of system level tests. Testing will be conducted as an independent verification and validation across the entire voting system. A greater depth of testing will be given to places where there are code changes and changes to documentation. In the standard system level tests, elections are customized to the functionality supported by the Unity 3.2.0.0 Voting System. System performance shall be measured against a predicted result.

5.3 Test Data Reduction

SysTest Labs will process the test data by manually recording data in the Test Case records and SysTest Labs templates.

6 TEST PROCEDURE AND CONDITIONS

6.1 Facility Requirements

Testing will be performed on site at ES&S, Omaha, NE, in a secured room. All TDP and test documentation is stored on site at SysTest Labs, Denver, CO, in the project directory on the Voting server.

VSTL testing at a client site must meet the conditions under which testing is performed at SysTest Labs' laboratory.

SysTest Labs performs VSTL functional and system level testing at SysTest Labs' facility unless testing at the client site is necessitated by logistics related to the characteristics of one or more components of the voting system under test. Environmental hardware testing for voting systems may only be executed at the environmental hardware testing subcontractor's facility or their alliance lab facilities.

Prior to any VSTL test activities that occur at a client's site, both equipment and facility will be examined and analyzed to ensure that competent and up-to-date temporary facility support exists for testing of voting system technologies, in compliance with SysTest Labs' VSTL test standards and accepted practices of test engineering. If the equipment or facility is found not to be in compliance, SysTest Labs will identify, to the client, any necessary improvements in the equipment and facility. SysTest Labs assures that these improvements are made before client-site testing can begin.

When testing is performed at a Vendor facility, SysTest Labs requires that our test staff follow all protocols associated with recording, reporting, maintaining and controlling all test results. In addition, to ensure the integrity of all tests and recorded results, SysTest Labs requires that all test results be stored only on computer equipment provided and controlled by SysTest Labs, e.g., test staff laptop computers. SysTest Labs will control access to the test equipment, including hardware, software and firmware and the test room.

SysTest Labs always ensures voting rooms doors are kept locked at all times, unless the current activity requires that the door be opened. Vendors are never left unattended in a voting room at any time.

6.2 Test Setup

The ES&S Voting System test platform will be set up, as part of the Physical Configuration Audit, in the standard configuration identified in the vendor TDP documents listed in **Attachment A** TDP Documents. The software will be installed, versions verified, and made operational. The hardware will also be set up and versions verified according to the vendor TDP documents. Once the hardware and software have been set up, SysTest Labs will proceed with testing the system.

6.3 Test Sequence

While there is no required sequence for performing voting system certification testing and audits, predecessor tasks are required for some testing. Tasks and any applicable predecessor tasks are identified in Table 6 - Matrix of System Functional Testing.

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6.4 Test Operations Procedures

The SysTest Labs VSTL Test Team will provide step-by-step procedures for each test case to be conducted. Each step shall be assigned a test step number and this number, along with critical test data and test procedures information, shall be tabulated onto a test report form for test control and the recording of test results.

An inventory will be performed to verify the voting equipment received contains hardware and software elements as defined in the TDP. Prior to commencement of Functional System testing, the PCA will include verification that the system can be configured using the system operations manuals.

Throughout the testing effort, test procedures will be marked with the test result of **Accept** or **Reject**. If a failure of a test procedure precludes attempting subsequent test procedures, the test procedures that cannot be executed will be marked as **NT**, Not Testable. **NS** (not supported) indicates requirements that apply to features that are not supported in the configuration being tested. For expected functionality that is not implemented, the test procedure will be marked as **NT**, Not Testable. If a test procedure is not applicable to the current certification test effort it will be marked as **NA**, Not Applicable. **NA** would also be entered for any subsequent step that is not applicable. Test results Reject, NT, and NA will include comments by the tester explaining the reason for the result.

Issues encountered during review and testing will be documented on the Unity 3.2.0.0 Voting Discrepancy Report. Any non-conformities to the requirements of the FEC VSS April 2002 will be marked as **Documentation Discrepancies** or **Functional Discrepancies** (a discrepancy occurs when the voting system component does not meet defined requirements or specifications). ES&S must address all discrepancies prior to issuance of the Certification Report. Issues that are encountered during testing, but are not addressed by the FEC VSS April 2002 will be added to the Discrepancy report and noted as **Informational**. ES&S has the option to address Informational issues. All responses provided by ES&S are noted in the Discrepancy Report appendix to the Certification Report.

The test cases and procedures are contained in a separate document.

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7 Approval Signatures

SysTest Labs:
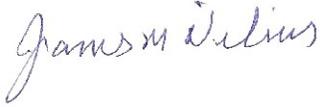
James M Nilius
Vice President, Compliance Services
September 27, 2007

Client:

Sue McKay
Director of Certification
September 27, 2007

End of Certification Test Plan

Certification Test Plan
Report No. 07-V-ESS-035-CTP-01 Rev 03

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