

# Certification Test Plan

Report Number V-HIC-004-CTP-01

**Hart InterCivic**

**Hart Voting System 6.4**

**ECM Manager, BOSS, Ballot Now, eSlate, eScan, VBO, JBC, Rally,  
Tally, and SERVO**

Test Plan Rev 03

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Prepared for:

<b>Vendor Name</b>	Hart InterCivic
<b>Vendor Address</b>	1650 Coal Creek, Suite E Lafayette, CO 80026

Prepared by:



216 16<sup>th</sup> St.  
Suite 700  
Denver, CO 80202



NVLAP LAB CODE 200733-0

*Accredited by the Election Assistance  
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## Revision History

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# 1 INTRODUCTION

This Certification Test Plan outlines the approach SysTest Labs will implement to perform Election Assistance Commission Certification testing to the 2002 FEC Voting Systems Standards and the Help America Vote Act (HAVA) on the Hart Voting System 6.4 by Hart InterCivic. The purpose of this document is to provide a clear and precise plan for test elements required to ensure effective Certification testing.

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
- Identifies the types of tests to be performed
- Contains the test schedules
- Identifies the required human resources

SysTest Labs will provide software and system certification testing for Hart InterCivic, on the Hart Voting System 6.4. 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) and the Functional Configuration Audit (including an assessment of Hart InterCivic's testing to the Hart InterCivic's System Requirements Specification and the requirements outline in the FEC VSS Vol. 1 section 2 and 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 Hart InterCivic), test execution, and analysis of results.

Testing also includes non-core hardware environmental testing, which will be performed by Approved Hardware Subcontractor, which has attained American Association for Laboratory Accreditation Certification Number 2217.01 and other SysTest Labs-approved labs.

## 1.1 Preliminary Test Plan

This version of the Certification Test Plan and accompanying Hart InterCivic documentation is preliminary. The newly established EAC process requires review and approval of this plan before testing can take place. In order to expedite timely completion of Hart's certification and to ensure that the test plan includes all required elements, it must be submitted for EAC approval prior to the completion of product design and the start of most testing. Any issues found shall be resolved and documented in the final version of this test plan to be executed by SysTest Labs and partners.

## 1.2 References

1. Federal Election Commission Voting System Standards (FEC VSS), April 2002. *Volume I Performance Standards & Volume II Test Standards*
2. NIST NVLAP Handbook 150: 2006.
3. NIST NVLAP Handbook and 150-22: 2005.

4. EAC Testing and Certification Program Manual, United States Election Assistance Commission, 2006
5. SysTest Labs Quality System Manual, Revision 1.0, prepared by SysTest Labs, dated November 3, 2006.

See also section 3.4 for a list of vendor deliverables.

### 1.3 Terms and Abbreviations

These terms and abbreviations will be used throughout this document:

Table 1 - Matrix of Terms & Abbreviations

Term	Abbreviation	Description
Advanced Technology Attachment	ATA	ANSI group X3T10's official name for a disk drive IDE implementation that integrates the controller on the disk drive itself.
Ballot Now		The Hart InterCivic software application that prints an Election's paper ballots on demand. The voted ballots can be digitally imaged by Ballot Now or an eScan to extract the cast vote records (CVRs) for delivery to the Tally application
Ballot Origination Software System	BOSS	The Hart InterCivic software application that creates a BOSS Election database for an election that uses the Hart InterCivic, Election Solutions Group's Hart Voting System.
Cast Vote Record	CVR	The electronic record of the ballot cast by a voter produced by an eSlate voting unit or from a paper ballot converted by Ballot Now or eScan.
Disabled Access Unit	DAU eSlate	A Hart InterCivic eSlate voting unit consisting of an eSlate voting unit with additional hardware capable of accepting input from tactile input (jelly) switches or a sip-and-puff device, of reading an Audio card, and of playing audio files through a headphones.
eCM Manager		The Hart InterCivic software application that manages secret keys and PINs for the eSlate Cryptographic Module (eCM).
eScan		A self-contained voting terminal that scans from hand-fed election or absentee paper ballots that were printed by Hart InterCivic's Ballot Now software application and converts the information to CVRs on an MBB.
eSlate System		A set of voting equipment used for election activities at individual polling places. Includes the eSlate voting units, DAU eSlate voting units, JBCs, VBOs, Election MBBs, and all accessories for polling place voting.
Hart Election Management System	Hart EMS	The software suite for the Hart VS. Includes BOSS, Tally, Ballot Now, Rally, SERVO, and, eCM Manager.
Hart Voting System	Hart VS, HVS	A completely integrated electronic and paper ballot voting system that supports Early, Election Day, and Absentee voting. Includes the Hart Election Management System, the eSlate System, and the eScan.
Judge's Booth Controller	JBC	The eSlate System console device for controlling up to 12 eSlate/DAU voting devices. The JBC requires an Election MBB when it is used to generate access codes for the voters.
Mobile Ballot Box	MBB	A PC Card (flash card) created by BOSS that stores ballot style information. The MBB is a memory card that carries all Election information to and from individual polling places. The JBC uses the MBB to send out ballot information to the eSlates and to record CVRs and audit logs. Voted MBBs are read into the Tally System directly or through Rally. The eScan uses the MBB to decode scanned paper ballots and to record

Term	Abbreviation	Description
		<p>CVRs and audit logs.</p> <p>Ballot Now uses an Election MBB to create a Ballot Now Election database. Ballot Now reads the MBB to determine the number of ballot styles and reads further information detailing the layout of the ballots. With this information, Ballot Now can print out paper ballots and scan paper ballots for contest results. Ballot Now saves the CVRs to an MBB and the MBB is then read by Tally to complete the Election.</p> <p>The eScan uses an MBB to record CVRs from scanned, voted paper ballots.</p>
Mobile Ballot Box Card Reader	MBB Card Reader	Serves as an interface between a PC and an ATA Flash storage device. A single chip in the MBB Card Reader interfaces between the USB connector and the PCMCIA connector.
Rally		The Hart VS application that reads, stores, and transfers CVRs via local area network or modem connection to a PC running the Tally application.
System for Election Records and Verification of Operations	SERVO	The Hart InterCivic System for Election Records and Verification of Operations software application, which is an election records and recount management system for the eSlate System and the eScan System.
Tally		The Hart InterCivic tabulation software application.
Verifiable Ballot Option	VBO	The HART InterCivic VS VVPAT (Voter Verifiable Paper Audit Trail) device that can be connected to the eSlate voting unit inside the voting booth in order to print a paper record of every ballot cast through the eSlate voting unit. Also available for Demonstration eSlates. eSlates used with the VBO device require additional hardware capable of communicating with the VBO device. The VBO requires a dedicated connection to power or to batteries

## 2 Assessment

This section describes pre-certification assessment activities.

### 2.1 Assessment Test Activity

SysTest Labs has conducted a partial review of the preliminary Hart InterCivic Technical Data Package, including functional requirements, software design documentation and specification, end-user documentation, and test plan, cases and procedures for each of the submitted components of the Hart Voting System 6.4. These components include Hart InterCivic ECM Manager, BOSS, Ballot Now, eSlate, eScan, VBO, JBC, Rally, Tally, and SERVO.

These reviews were conducted in accordance with **FEC VSS April 2002**, specifically *Volume 1 Performance Standards & Volume 2 Testing Standards*.

### 2.2 Pre-Certification Assessment Results

Based on the findings of the pre-certification assessment for Hart Voting System 6.4, and those activities conducted in the supplied Test Reports for previous VVSTL testing, SysTest Labs has determined that Hart InterCivic's Test Plan, Procedures and Scripts are generally consistent with the FEC Voting System Standards for TDP documentation. Issues were noted in a discrepancy report that was provided to Hart InterCivic for resolution prior to completion of testing.

Full assessment, review and correction of the Hart TDP will be completed as part of the execution of this Certification Test Plan.

### 3 MATERIALS REQUIRED FOR TESTING

This section details software, hardware, and materials required for testing.

#### 3.1 Software

Items identified in the table reflect all software required to perform hardware, software, telecommunications, security and integrated system tests. Final version numbers have not been assigned but will be documented as part of the test report.

**Table 2 - Matrix of Required Software**

Manufacturer	Application(s)	Firmware Version	Test Type
Hart InterCivic	eCM Manager	1.2	Full
Hart InterCivic	Ballot Origination Software System (BOSS)	4.5	Full
Hart InterCivic	Ballot Now	3.4	Full
Hart InterCivic	eSlate	5.0	Full
Hart InterCivic	eScan	1.4	Full
Hart InterCivic	Rally	2.4	Full
Hart InterCivic	Tally	4.4	Full
Hart InterCivic	SERVO	5.0	Full
Hart InterCivic	JBC	5.0	Full
Hart InterCivic	VBO	TBD	Full

#### 3.2 Equipment (Hardware)

Equipment identified in the table reflects all hardware types required to perform hardware, software, telecommunications, security and integrated system tests. Actual quantities, manufacturers, models, serial numbers and other key information for each will be recorded as part of the test data. Final Hart firmware version numbers have not been assigned but will be documented as part of the test report.

**Table 3 - Matrix of Required Hardware**

Item	Manufacturer	Version	Description of Use
In Precinct: eSlate System	Hart InterCivic		
JBC	Hart InterCivic	TBD	Judge's Booth Controller
eSlate DRE	Hart InterCivic	TBD	DRE
VBO Device	Hart InterCivic	TBD	Voter Verification Paper Printer
eSlate Voting Booth	Hart InterCivic	TBD	Voting Booth
In Precinct: eScan System	Hart InterCivic		
eScan	Hart InterCivic	TBD	Ballot Scanner
eScan Ballot Box	Hart InterCivic	TBD	Ballot Box
Central Count & Absentee			
COTS PC	Dell		Lap Top, Desktop computers
COTS Printer	Hewlett Packard		Printer
COTS Scanners	Various		Scanner
COTS Card Readers	Various		Card Reader

### 3.3 Test Materials

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

**Table 4 - Matrix of Test Materials**

Item	Details
Paper rolls	Paper for VBO, JBC and eScan printers
MBB (Mobile Ballot Box)	Flash memory cards that carry the ballot styles
Headphones	Use with eSlate System
Tactile input switches	
Sip-and-puff devices	Feature for voters with disabilities
eCM Security Keys	A physical, universal serial bus security device that contains the signing key required for programming the JBCs and eScans, and for access to secure functions in the BOSS, Ballot Now, Tally, Rally, and SERVO applications
Fire wire Cable	
Cross Over Network Cable	
Quatech SPP-100 Parallel PCMCIA Card	
Fire wire PCMCIA Card	Works with COTS scanner used with Ballot Now
USB ATA Reader	Used for I/O with PC cards (the 'Mobile Ballot Boxes')

### 3.4 Deliverable Documentation

In addition to the hardware and software identified in sections 3.1, 3.2, and 3.3, Hart InterCivic will deliver their complete TDP for review. The TDP documents are defined by Hart document # 1001062 “TDP Overview Hart Voting System 6.4”

NOTE: The vendor will provide the list below as customer deliverables.

1. 1000847 - Ballot Now Operations Manual
2. 1000846 - BOSS Operations Manual
3. 1000848 - eCM Manager Operations Manual
4. 6300-170 - eSlate System User Guide For Cities, School Districts and other Small Entities
5. 6400-111 - Hart Voting System Early Voting Desk Reference
6. 6400-112 - Hart Voting System Election Day Desk Reference
7. 6300-001 - Hart Voting System Management and Tasks Training Manual
8. 1000853 - Hart Voting System Product Description
9. 6300-006 - Hart Voting System Support Procedures Training Manual
10. 1000849 - Rally Operations Manual
11. 1000851 - SERVO Operations Manual
12. 1000850 - Tally Operations Manual
13. 1001060 - TDP Abstracts Hart Voting System 6.4
14. 1001062 - TDP Overview Hart Voting System 6.4

### 3.5 Proprietary Data

SysTest Labs considers all software, equipment, hardware, test and deliverable materials as the private property of Hart InterCivic and shall handle them in an appropriate manner.

## 4 TEST SPECIFICATIONS

This section outlines hardware configuration, software system functions, and test case design.

### 4.1 Hardware Configuration and Design

Hardware testing will be performed to determine conformance to *Vol. 1 Sect. 3 Hardware Standards* and *Vol. 2 Sect. 4 Hardware Testing* of the FEC VSS April 2002. The Hardware Configuration Audit will confirm all tested configurations match. In order to conduct system level integration tests, SysTest Labs will need to include minimal repeats of the operational tests to confirm no changes to systemic responses. SysTest Labs will use one of the standard elections designed for this test plan to confirm the machine's functions are behaving correctly and operating in the correct modes.

### 4.2 Software System Functions

The scope of the Software System Functions tests is the software certification (*Vol. 2, Sect. 5*) and system-level tests (*Vol. 2, Sect. 6*) as defined in the FEC VSS April 2002, including:

- Review of the Technical Data Package (*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*)
  - Establish the software/hardware configuration baseline used in testing,
  - Source Code Review (*Vol.2 Sect. 5.4*) of all changes,
  - Review Hart InterCivic's functional specification for adequacy or discrepancy.
  - Witness and comparison of the Final Build to the code tested.
- Functional Configuration Audit: (*Vol. 2, Sect. 6.7*)
  - Creation and issuance of a Master Certification Test Plan (*Vol. 2, Section 8.*)
  - Review, evaluation, creation, execution of Functional Tests (*Vol.2. Section 4.3.3 & 4.3.4*),
  - Initiate System Level Integration Tests (*Vol. 2, Sect. 6*)

#### 4.2.1 Software Functional Testing

Review of Hart InterCivic's functional specification, test plans, test cases and test results shall demonstrate the following functional areas are included in the Hart Voting System 6.4 overall system capabilities, pre-voting, voting and post-voting functions. This functionality will be verified by the test performed. (*Vol.2, Sect. 4.3.1, 4.3.3 and 4.3.4*)

Table 5 - Matrix of Functional Testing

Function	Test Methodology
<b>Ballot Preparation Functions</b>	
a. Ballot preparation subsystem	Verify in End-to-End System Level Tests: Opening an Election Database User Login Setup User Accounts Create an Election Entering Jurisdiction Definitions Entering Precinct Definitions Entering District Definitions Entering Contest Definitions Entering Precinct-Level Contest Definitions Entering Polling Place Definitions Entering Rotation Definitions

Function	Test Methodology
	Entering Active Contest Definitions Translation and Recording Exporting and Importing Generating Ballot Formats Writing MBBs and Audio Cards Data Importing Data Exporting Reporting
<b>Before, During &amp; After Processing of Ballots</b>	
<i>b.1.</i> Logic Test – Interpretation of Ballot Styles & recognition of precincts	Verify in End-to-End System Level Tests: All voting variations functionality identified by Hart InterCivic in the Hart Voting System 6.4 for Supported Functionality Declaration. (Vol.1. Section 2.2.8.2)
<i>b.2.</i> Accuracy Tests- Ballot reading accuracy	Verify recording of 1,549,703 consecutive ballot positions on the eSlate, eScan, and Ballot Now systems.
<i>b.3.</i> Status Tests- Equipment statement & memory contents	Verify in End-to-End System Level Tests: Equipment statement & memory contents at the corresponding intervals outlined in user documentation for the functions a., b.4, b.5, c 1-8 and d 1-10.
<i>b.4.</i> Report Generation – Produce test output data	Verify in End-to-End System Level Tests: Collecting vote totals from MBBs in Tally Viewing and printing reports in Tally Resolving write-in votes in Tally Managing provisional ballots in Tally Managing retrievable ballots in Tally Adjusting vote counts manually in Tally Reading MBBs in Rally Generating Reports in Rally
<i>b.5.</i> Report Generation- Produce audit data	System audit reports for all pre-vote, voting and post voting applications.
<b>Polling Place Functions</b>	
<i>c.1.</i> Opening the polls, accepting & counting ballots	Verify in End-to-End System Level Tests: eSlate, eScan, and Ballot Now systems setup Opening the polls eSlate, eScan, and Ballot Now systems operation eSlate system positioning for handicapped voters Closing the polls and obtaining results Closing the eSlate, eScan, and Ballot Now systems
<i>c.2.</i> Monitoring equipment status	Verify in End-to-End System Level Tests: Equipment status as identified in user documentation
<i>c.3.</i> Equipment response to commands	Verify in End-to-End System Level Tests: Equipment response to all voter and poll worker commands as identified in user documentation
<i>c.4.</i> Generating real-time audit messages	Verify in End-to-End System Level Tests: Real time audit recording all voter and poll worker commands as identified in user documentation
<i>c.5:</i> Closing polls and disabling ballot acceptance	Verify in End-to-End System Level Tests: Close of polls Inability to cast additional ballots
<i>c.6.</i> Generating election data reports.	Verify in End-to-End System Level Tests: Generation of precinct reports
<i>c.7.</i> Transfer ballot count to central counting location	Verify in End-to-End System Level Tests: Writing election to the Central Count Location as identified in user documentation.
<i>c.8.</i> Electronic transmission	Verify in End-to-End System Level Tests:

Function	Test Methodology
	Transmission of MBBs to Tally (central count) on both a wide and a local area network. Interruption of transmission of MBBs to Tally on both a wide and a local area network.
<b>Central Count Functions</b>	
d.1.Process ballot deck or PMD for >1 precinct	Verify in End-to-End System Level Tests: Process of ballot decks on the eSlate, eScan, and Ballot Now systems.
d.2. Monitoring equipment status	Verify in End-to-End System Level Tests: Equipment status as identified in user documentation
d..3. Equipment response to commands	Verify in End-to-End System Level Tests: Equipment response to all voter and poll worker commands as identified in user documentation
d.4. Integration with peripherals equipment or other data processing systems	See B.4
d.5. Generating real-time audit messages.	See B.5.
d.6. Generating precinct-level election data reports	See B.4
d.7. Generating summary election data reports	See B.4
d.8. Transfer of detachable memory module to the processing equipment	See B.4
d.9. Electronic transmission of data to other processing equipment	Verify in End-to-End System Level Tests: Electronic transmission as identified in user documentation
d.10. Producing output data for interrogation by external display devices	Verify in End-to-End System Level Tests: Output data produced for interrogation by external display devices as identified in user documentation

#### 4.2.2 System Level Testing

System level tests shall be performed on the Hart Voting System 6.4 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 Level Testing

System Tests	Test Methodology
<b>Volume Test</b>	
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;	Accuracy Test Case
<b>Stress Tests</b>	
System response to transient overloads conditions. Subject polling place devices to ballot processing at the high volume rates, evaluate software response to hardware-generated interrupts and wait states.	Approved Hardware Subcontractor tests to limits outside the range of 'normal' but within specifications for the units.
<b>Usability Tests</b>	
Responses to input, text syntax, error message content, and audit message input	All System Level Test Cases.
<b>Accessibility Test</b>	
Exercises system capabilities of voters with disability features	Initiate a review of the Accessibility Checklist against the eSlate system. Initiate a general election and primary election that exercises all voter-facing messages in the both visual and audio ballot

System Tests	Test Methodology
	formats for the languages identified by Hart InterCivic in the eSlate system and Hart Voting System 6.4 Supported Functionality Declaration.
<b>Security Test</b>	
Exercises systems security provisions, unauthorized access, deletion or modification of data, audit trail data, and modification or elimination of security mechanisms.	Incorporate systems security provisions, unauthorized access, deletion or modification of data, audit trail data, and modification or elimination of security mechanisms into the system level testing.
<b>Performance Tests</b>	
Tests accuracy, processing rate, ballot format, handling capability and other performance attributes claimed by the vendor	All System Level Test Case 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 eSlate, eScan, and Ballot Now systems. Perform a volume test of network transmission of results via a customer local wide area network. Perform Data Accuracy test validating reading of consecutive ballots positions on the eSlate, eScan, and Ballot Now systems.
<b>Recovery Tests</b>	
Exercise system's ability to recover from hardware and data errors.	Validate battery back up and recovery of from error conditions, incorporated into System Level Testing.

### 4.3 Test Case Design

#### 4.3.1 Hardware Qualitative Examination Design

SysTest Labs shall review the overall system capabilities, pre-voting, voting, and post-voting functions. Hart InterCivic Hart Voting System 6.4 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 to determine conformance to Vol 1. Sect. 3 of the FEC VSS April 2002. SysTest Labs' environmental hardware test sub-contractor, approved Hardware Subcontractors 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.

#### 4.3.3 Software Module Test Case Design and Data

SysTest Labs shall review the test case design documents and data as provided by Hart InterCivic. 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.

#### 4.3.4 Software Functional Test Case Design

SysTest Labs shall review the functional test case design documents and data as provided by Hart InterCivic against a detailed matrix of system functions and the test cases, which 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.

#### **4.3.5 System-level Test Case Design**

SysTest Labs shall review the system-level test case design documents and data as provided by Hart InterCivic. 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.

#### **4.3.6 Sampling Methodology**

SysTest Labs shall review the system-level and functional test case documents and data as provided by Hart InterCivic. SysTest Labs will repeat a sample of the vendor's test cases according to the following guideline:

Review all vendor test cases and randomly select test cases from the following high-risk areas for sampling:

- Security
- Data accuracy
- Audit log
- Tabulating
- Transmitting (VPN, LAN, etc.)

### **4.4 Standard VSTL Test Methods and Uncertainty of Test Data Measurement**

This test engagement utilizes only standard VSTL test methods that conform to the EAC Testing and Certification Program Manual. As such, this test engagement will involve the generation and measurement of nominal type test data only.

For all tests conducted by SysTest Labs in this engagement, other than the Accuracy Test, the involvement of only nominal type test data means that uncertainty of measurement issues are not applicable.

If an Accuracy Test is conducted during this engagement, measurement of uncertainty will pertain only to the extent of confirming that the number of actual ballot position inputs matches the projected ballot position inputs.

Other uncertainty of measurement issues may attach to hardware specific voting system equipment tests. SysTest Labs can obtain details on management of measurement uncertainty for those tests from subcontractor laboratories upon request.

### **4.5 EAC Interpretations**

This test engagement currently utilizes only standard VSTL test methods that conform to the EAC Testing and Certification Program Manual and the appropriate voting system standard. Future EAC

interpretations may affect the test plan and test methodology. If such interpretations do affect this test plan, the interpretation and effect will be documented here.

## **5 TEST DATA**

This section addresses SysTest Labs' handling of the certification test data.

### **5.1 Data Recording**

Test data recording according to the FEC Voting System Standards, Volume 2 Test Standards, will indicate certification testing progress and results against the standards defined for Direct Recording Electronic Voting Systems. SysTest Labs will complete forms for the source code, TDP and testing reviews. These forms will be stored in electronic format at SysTest Labs. SysTest Labs will record all activity via status report emails to the voting system vendor, Hart InterCivic.

### **5.2 Test Data Criteria**

SysTest Labs will evaluate Hart InterCivic's test plans against the documents and software provided by Hart InterCivic. 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 Hart Voting System 6.4. 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

This section outlines the procedures and conditions for certification testing.

### 6.1 Facility Requirements

Testing will be performed on site at

- SysTest Labs, Denver, Colorado; and
- Facilities of Approved Hardware Subcontractors

All TDP and test documentation is stored in the project directory at SysTest Labs.

### 6.2 Test Set-up

Hart InterCivic's Voting System test platform will be set up, as part of the Physical Configuration Audit, in the standard configuration identified in the Hart Voting System 6.4 system documentation. All equipment and programs will be installed and made operational and with the typical complement of accessories and preloaded programs present in the system under test.

### 6.3 Test Sequence

While there is no required sequence for performing voting system software certification testing and audits, predecessor tasks are required for some testing. Tasks and any applicable predecessor tasks are identified in Table 8 - Matrix of Testing Tasks.

### 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 procedure information, shall be tabulated onto a test report form for test control and the recording of test results.

Table 7 - Matrix of Testing Tasks

#	Task Description	Predecessor Task(s)
1.	Project Management	None
2.	TDP PCA documentation review	Receipt of TDP
3.	Source Code Review	Receipt of TDP Receipt of Source Code
4.	TDP FCA (test) documentation review; assess testing; selection of Regression Test Cases	Receipt of TDP (test materials)
5.	Master Certification Test Plan	Pre-Certification assessment completed
6.	Hart InterCivic Hart Voting System 6.4 specific customization of System Level Test Suite If COTS: Complete automated test scripts	Receipt of TDP (user manuals)
7.	PCA: Verify and configure the Hart InterCivic Hart Voting System 6.4 hardware and software, per the TDP	Receipt of TDP Receipt of voting hardware and software
8.	Execute Environmental Hardware Testing.	Certification Test Plan Approval by the EAC Receipt of voting hardware and software at environmental hardware subcontractor.
9.	Execute Functional Regression Testing	Certification Test Plan Approval by the EAC
10.	Execute System Level Test including accuracy, reliability, and security.	Certification Test Plan Approval by the EAC Customization of System Level Test Suite including accuracy, reliability and security

#	Task Description	Predecessor Task(s)
11.	On going documentation of any issues uncovered in testing. Issues are placed on the Discrepancy Report, as they are found.	Review of PCA and FCA Documentation Review of Source Code Execution of Functional Regression Testing. Execution of System Level Testing
12.	Regression test to validate the correction of all discrepancies identified.	Receipt of satisfactory responses to each discrepancy, from Hart InterCivic.
13.	Observe final code build and validate that it is the same as the tested code.	Completion of all documentation review, source code review and testing.
14.	Issuance of the VSTL Certification Report	Completion of all reviews, audits, and testing. Compilation and evaluation of results. Documentation of evaluation.
15.	Submit the VSTL Certification Report to the EAC Technical Committee and deliver a copy to Hart InterCivic.	Completion of the Certification Report. SysTest Labs' QA review of the certification report
16.	Issuance of the Certification number to EAC and Hart InterCivic.	Acceptance of the Certification Report by EAC Payment of all outstanding invoices owed SysTest Labs

An inventory will be performed to verify the Hart InterCivic Hart Voting System 6.4 received contains hardware and software elements as defined by the TDP. Prior to commencement of Functional or System Level testing, the PCA will include verification that the system can be configured using the system operations manuals.

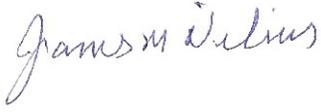
Throughout the testing effort, test procedures will be marked with the test result of **Accept** or **Reject**. If a failure of a test procedure precludes attempting subsequent test procedures, the test procedures that cannot be executed will be marked as **NT**, Not Testable. For expected functionality 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 Hart InterCivic Hart Voting System 6.4 Discrepancy Report. Issues that do not conform to the requirements of the FEC VSS April 2002 will be marked as Documentation Defects or Functional discrepancies (a discrepancy occurs when the software does not meet defined software requirements or specifications). Hart InterCivic must address all discrepancies prior to issuance of the Certification Test 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**. Hart InterCivic has the option to address Informational issues. All responses provided by Hart InterCivic are noted in the Discrepancy Report appendix to the Certification Test Report.

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

## 7 Approval Signatures

### SysTest Labs:



James M. Nilius  
Vice President, Compliance Services  
5/24/07

### Client:

Andrew J. Rodgers  
Program Manager, Voting Systems  
5/24/07

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End of Certification Test Plan

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