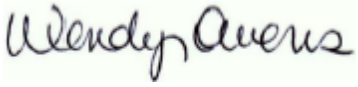
Test Report

Clear Ballot Group
ClearVote 1.3 Voting System
Certification Testing



Prepared by: _____

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v. 01-02-CBG-006.02

1 Introduction

The purpose of this Test Report is to document the procedures that Pro V&V, Inc. followed to perform certification testing of the Clear Ballot Group's ClearVote 1.3 Voting System to the requirements set forth in the Election Assistance Commission (EAC) 2005 Voluntary Voting System Guidelines (VVSG).

1.1 Scope

The scope of this testing campaign incorporated a sufficient spectrum of physical and functional tests to verify that the ClearVote 1.3 Voting System conformed to the applicable EAC 2005 VVSG requirements, with the exception of Volume I, Section 4.1.2.13.

Specifically, the testing event has the following goal:

- Evaluate the ClearVote 1.3 Voting System to the applicable requirements of the EAC 2005 VVSG

1.2 References

The documents listed below were utilized in the development of this Test Report:

- Pro V&V, Inc. Test Plan "Clear Ballot Group ClearVote 1.3 Voting System Certification Testing dated September 12, 2016
- ClearVote 1.3 Technical Documentation Package
- Election Assistance Commission (EAC) 2005 Voluntary Voting System Guidelines (VVSG)
- Help America Vote Act (HAVA) of 2002, Public Law 107-252, 42 U.S.C. § 15301 *et seq.*

1.3 Terms and Abbreviations

"BMD" – Ballot Marking Device

"Clear Ballot" – Clear Ballot Group

"COTS" – Commercial Off-The-Shelf

"DRE" – Direct Record Electronic

"EAC" – Election Assistance Commission

"EMS" – Election Management System

"FCA" – Functional Configuration Audit

"PCA" – Physical Configuration Audit

"TDP" – Technical Data Package

"HAVA" – Help America Vote Act

"2005 VVSG" – 2005 Voluntary Voting System Guidelines

2 Test Candidate

A description of the system tested, as taken from the manufacturer's technical documentation is provided in the paragraphs below.

The ClearVote 1.3 Voting System is a voting system encompassing all aspects of election management, including election definition and configuration, ballot creation, voting, vote data management, reporting, and auditing. The ClearVote 1.3 Voting System is a browser-based voting system that consists of the major components listed below:

ClearDesign

ClearDesign is an interactive set of applications which are responsible for all pre-voting and post-voting groups of activities in the process of defining and managing elections. This includes ballot design, proofing, layout, and production.

ClearAccess

ClearAccess is an accessible touchscreen ballot marking device (BMD) used for the creation of paper ballots that can be scanned and tabulated by ClearCount.

ClearCount

ClearCount is a central, high-speed, optical scan ballot tabulator coupled with ballot processing applications.

The ClearVote 1.3 Voting System utilizes the data flows and configurations depicted in the following figures to exchange information, as taken from the Clear Ballot-provided technical documentation:

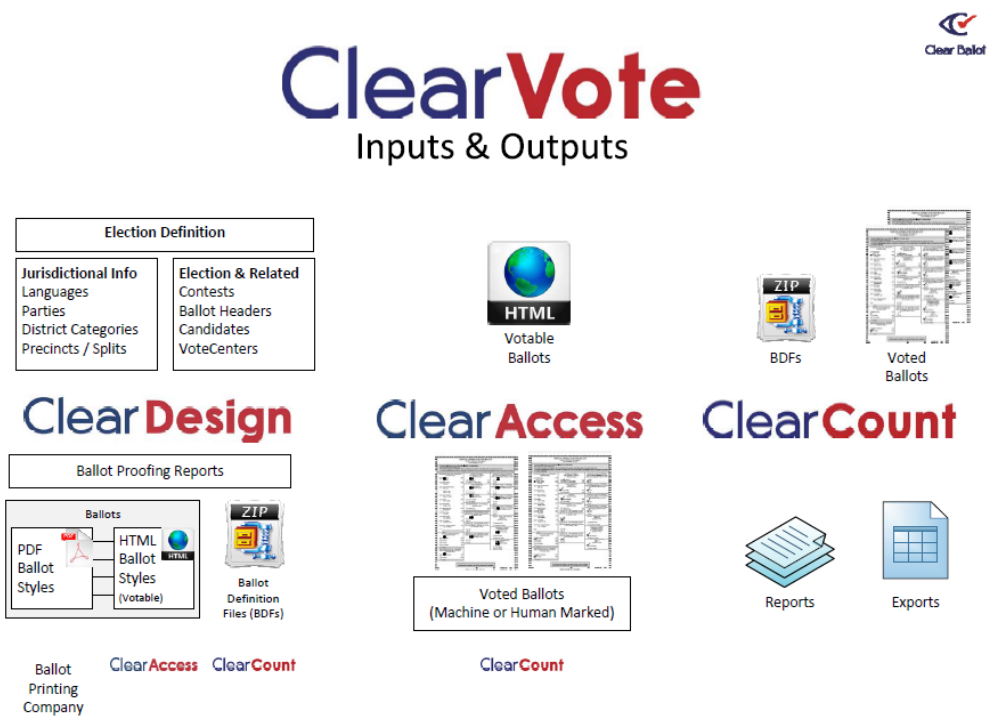


Figure 2.1 ClearVote Inputs & Outputs Diagram

The inputs and outputs of the ClearVote System depicted in Figure 2.1 are listed below:

- Inputs: Election Definition
- Outputs: Ballot proofing reports, PDF ballot styles, HTML Anywhere ballot marking files, Ballot Definition files

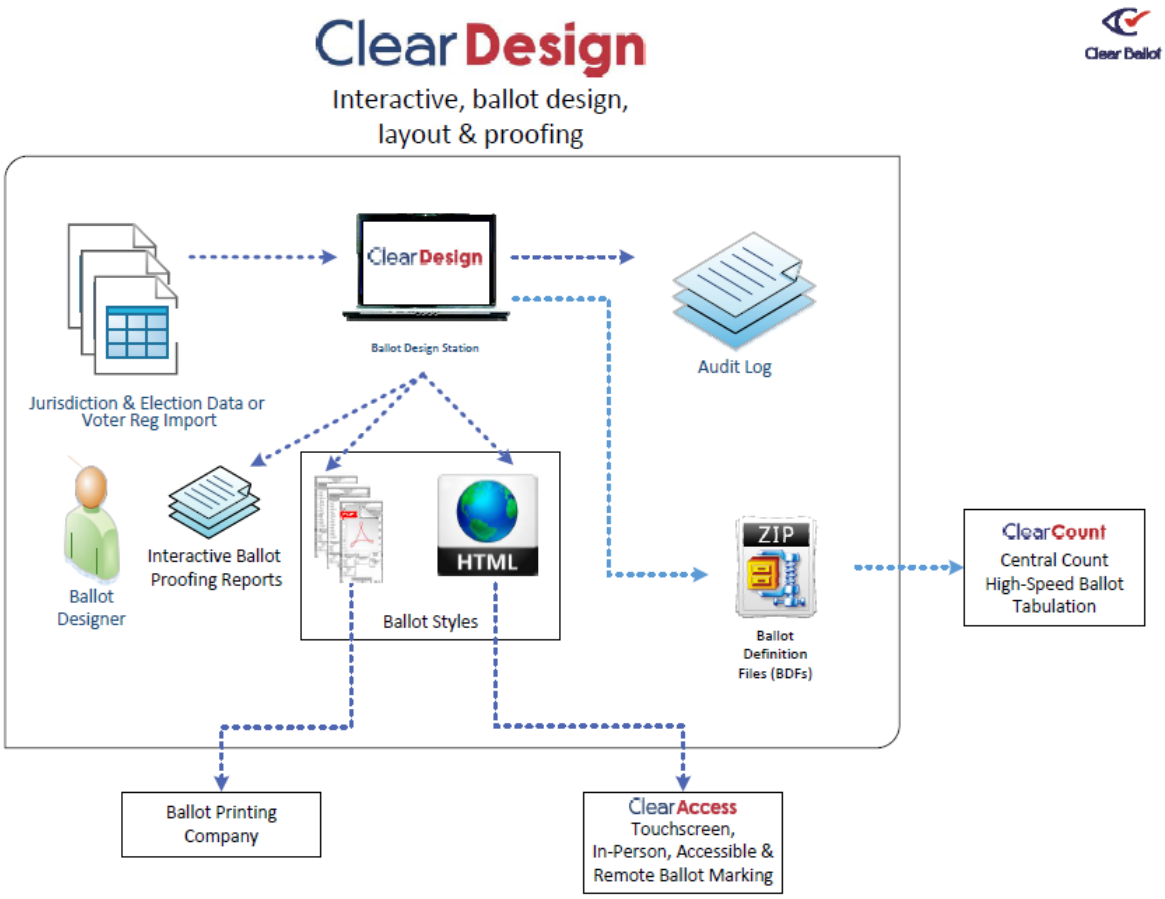


Figure 2.2 ClearDesign Interactive, Ballot Design, Layout, and Proofing Diagram

As illustrated in Figure 2.2, ballot design, proofing, layout, and production are accomplished in ClearDesign, the ballot design component of the ClearVote product family. The ClearDesign system consists of the following physical components (all of which are unmodified COTS hardware and are connected via closed, wired Ethernet connections): DesignServer, DesignStation(s), and router.

Figure 2.3 ClearAcess Touchscrren, In-Person, and Accessible Ballot Marking Diagram

ClearAccess, depicted in figure 2.3, is an accessible touchscreen ballot marking device (BMD) used for the creation of paper ballots that can be scanned and tabulated by ClearCount. The ClearAccess ballot marking system consists of one or more Ballot Marking Stations (BMS) having the following physical components (all of which consist of standalone, unconnected, unmodified COTS hardware): Ballot Marking Device (BMD), privacy screen, Personal Assistive Technology Devices (PATS), USB flash drive, and laser printer.

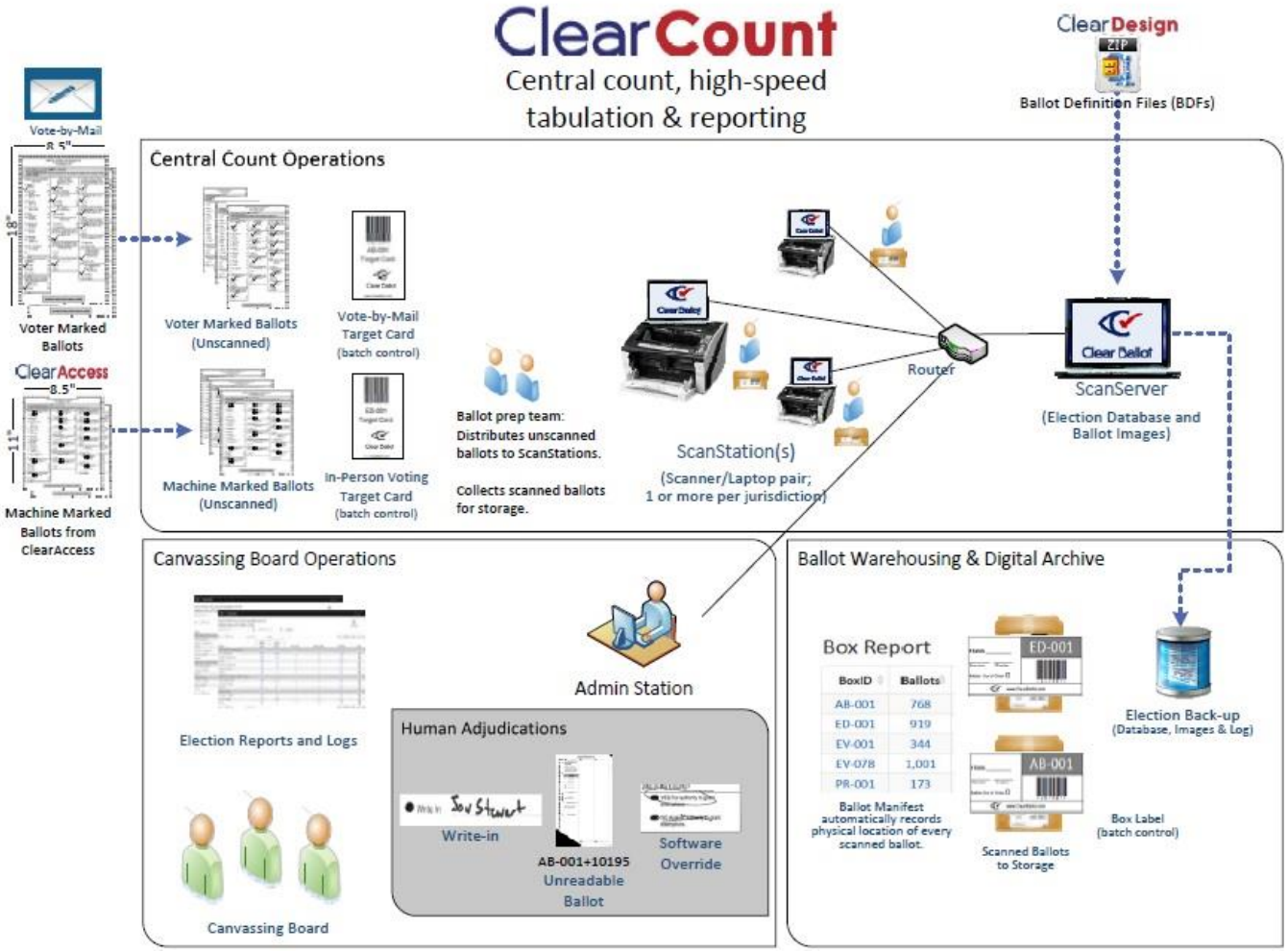


Figure 2.4 ClearCount Central Count Tabulation and Reporting Diagram

Tabulation and reporting at the central location is accomplished by ClearCount, as depicted in Figure 2.4.

The follow table 2.1 provides the software components of the ClearVote 1.3 Voting System that were evaluated during this test effort.

Table 2.1: Software /Firmware Versions

Software /Firmware	Version
ClearDesign Components, Version 1.3	
Ubuntu	14.04.3 server
MySQL Linux	5.5.32 The database engine
Apache2	2.22-6ubuntu5.1
libapache2-mod-fcgid	1:2.3.7-0.ubuntu2
PhantomJS	1.9.01-1
Python 2	2.7.6
Python web.py	1:0.37+20120626-1
Python MySQL dB library	1.2.3-2ubuntu1
Python SQLAlchemy	0.8.4-1build1
Python Pillow library	2.3.0-1ubuntu3
Python dbutils library	1.1
Python xlrd library	0.9.4
Python rtf library	0.2.1
Python FontTools library	3
Python PyCrypto library	2.6.1
JavaScript jQuery	1.10.2
JavaScript DataTables	1.10.5
JavaScript Bootstrap	3.0.0
JavaScript jQuery-Impromptu	5.2.3
JavaScript jQuery-qrcode	1.0
JavaScript jQuery-splitter	0.14.0
JavaScript jQuery-ui	1.10.4
JavaScript jscolor	1.4.2
JavaScript tinymce	4.1.9
JavaScript fastclick	1.0.4
JavaScript libmp3lame	na
JavaScript jszip	na
JavaScript papaparse	4.1.2
ClearAccess Components, Version 1.3	
Windows	8.1 or 10
Python	2.7.10
Python web.py	0.38
Python pywin32 library	2.2.0
Python pyCrypto library	2.6.1
JavaScript DataTables	1.10.5
JavaScript jQuery	1.10.2

ClearCount Components, Version 1.3	
webCBG.fcgi	na
sql\cbgweb.sql	na
Debconf	1.5.49ubuntu1
python	2.7.4
python-mysqldb	1.2.3-1ubuntu1
PIL-python-imaging	1..7+2.0.-1ubuntu0.1
PyInstaller	2.0
python-webpy	1:0.37+20120626-1
Ubuntu Server	13.04-serveramd64
mysqlserver	5.5.32
apache2	2.2.22-6ubuntu5.1
libapache2-mod-fcgid	1:2.3.7-0.ubuntu2
samba	2:3.6.9-1ubuntu1.1
JavaScript Bootstrap library	2.3.2
JavaScript Chosen library	1.0.0
JavaScript jQuery library	1.10.2
J JavaScript jQuery-migrate library	1.2.1
JavaScript DataTables library	1.9.4
JavaScript FixedHeader library	2.0.6
JavaScript hotkeys library	no version, dated May 25, 2013
JavaScript pep library	no version, dated Oct 4, 2013
JavaScript tooltip library	1.3
JavaScript LESS library	1.3.3
JavaScript TableTools library	2.1.5
ZeroClipboard.js	na

The follow table 2.2 provides the hardware components of the ClearVote 1.3 Voting System that were evaluated during this test effort.

Table 2.2: Hardware Components

ClearVote 1.3 Voting System Component	Serial Number(s)
ClearDesign Components	
Dell Precision M2800	13Q0362
Dell Laptop Latitude E5570	927QQC2
TRENDnet Switch TEG-S80g	CA11238032857
ClearAccess Components	
Dell OptiPlex 3240 All In One	F0B6B02
Dell Inspiron 15 5000 Series 2 in 1 (Windows 10)	29XF1C2
Oki Data Laser Printer Model: B432dn	SAK5B007647A0
Brother Laser Printer	U63879M4N628612,

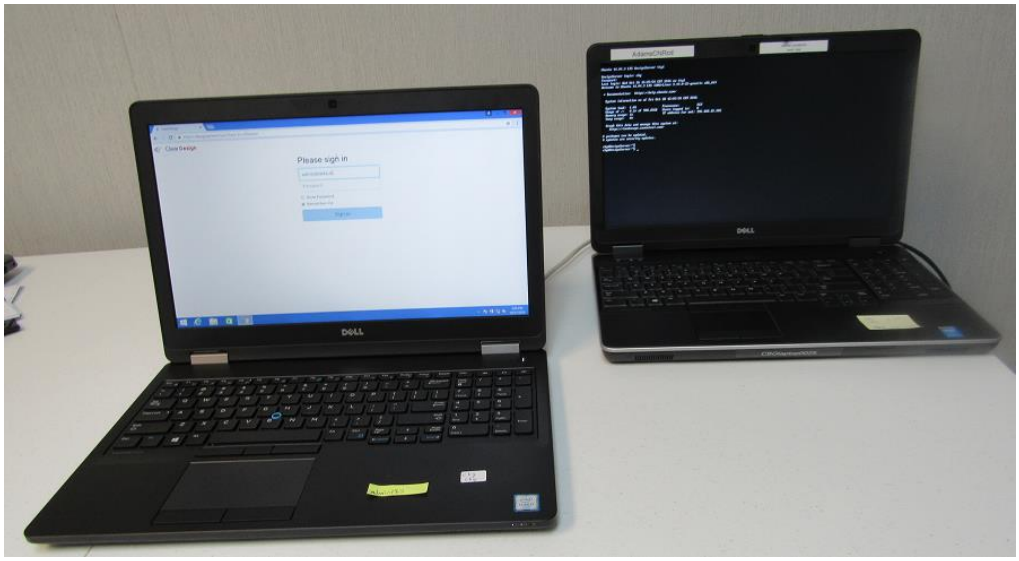
Model: HL-L2340DW	U63879M4N628617, & U63879M4N628535
HP OfficeJet 100 Mobile printer	MY648F10JG
HP Inkjet Printer Model: HP7612	CN6343R0D6
APC Smart-UPS 1500 (for All In One PC) Model: SMT1500	3S1525X07491
APC Smart-UPS 2200 (for the Laser Printers) Model: SMT2200	AS1603160039
Origin Instruments Sip/Puff Breeze with Headset Model: BZ2	AC-0313-H2
Storm EZ Access Keypad Model: BZ2	1500005
Hamilton Buhl Over-Ear Stereo Headphones Model:HA-7	CLR-002-20-HP
ElectionSource Table Top Voting Booth (Privacy Screen) Model: VB-60B	CLR-002-21-VB
Hosa Technology Male 3.5 mini to Female ¼" Adapter	Model: GMP112
Hamilton Buhl Sanitary Headphone Covers	Model: HYGENX45
Security Seals Model: MRS2-12030	CLR-002-22-Seal
ClearCount Components	
Fujitsu fi-6800 Scanner	A9HCA00737
Fujitsu fi-6670 Scanner	AAADC00936
Fujitsu fi-7180 Scanner	A20D000798
IBML ImageTrac Lite Scanner 6000 series	A-108126000019
IBML ImageTrac DS series Scanner 1210	763SHT416568M100050029
Toshiba Laptop Model: S55-A5167	1E098351S, 1E123732S, & 1E068199U
Lenovo Laptop Model: Y50-70 20378 59441402	CB34965397& CB34673854
Dell Laptop Latitude E5570	5537MC2, J2ZQQC2, & FXDQQC2
HP ProBook Laptop Model: 4540s	CLR-002-23-Laptop
Lenovo Server Tower Model: TS140	MJ03T42D
Dell 22 inch Monitor Model: S2240M	CN-0CFGKT-64180-58B-0X3T
Apex Boxx Server	B159306
APC Smart-UPS 1500 (for Fujitsu scanners) Model: SMT1500	3S1525X07491
APC Smart-UPS 2200 (for IBML scanners) Model: SMT2200	AS1603160039
TP-Link VPN Router Model: HP7612	2149342000209
TRENDnet TEW-733GR	C1408RN800574
NETGEAR ProSAFE FVS318G 8-Port Gigabit VPN Firewall (FVS318G-200NAS)	40F266BA00280
Lenovo USB Portable DVD Writer Model: GP60NB50	411HV005130 & 411HR027583

2.2 Testing Configuration

The testing event utilized one setup of the ClearVote 1.3 Voting System and its components. The following is a breakdown of the ClearVote 1.3 Voting System components and configurations for the test setup:

Standard Testing Platform:

The standard testing platform consisted of one ClearVote 1.3 Voting System in a standalone configuration. In the pre-election phase of testing, ballots were created utilizing ClearDesign, the EMS component of the ClearVote 1.3 Voting System. Ballot styles were then imported into ClearAccess for ballot marking. Once ballots were marked and the polls were closed, ballot reconciliation procedures were performed and the ballots were tabulated by ClearCount, the central count tabulation and reporting component of the ClearVote 1.3 Voting System.



Photograph 2-1 ClearDesign Configuration

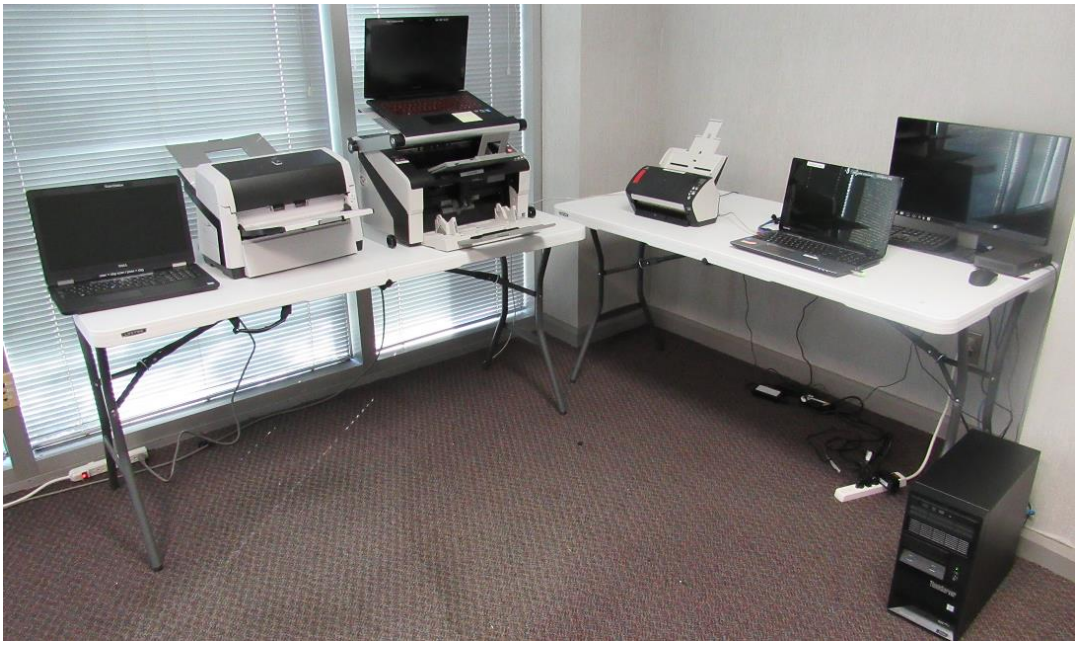
The tested configuration for ClearDesign consists of the following components:

- ClearDesign Server Laptop (Dell Precision M2800 or Dell Laptop Latitude E5570)
- Client Laptop (Dell Laptop Latitude E5570)
- Brother Laser Printer (Model: HL-L2340DW) (not pictured)
- TRENDnet Switch (Model: TEG-S80g) (not pictured)

Photograph 2-2 ClearAccess Configuration

The tested configuration for ClearAccess consists of the following components:

- ClearAccess All-in-One (Model: Dell Optiplex 3240)
- Brother Laser Printers (Model: HL-L2340DW)
- Oki Laser Printers (Model: B432dn)
- HP InkJet Printer (Model: HP7612) *(not picture)*
- Storm EZ Access Keypad (Model: EZ08-22201)
- Origin Instruments Sip/Puff Breeze (Model: BZ2)
- Over-ear Stereo Headphone (Model: Hamilton Buhl HA-7)
- ClearAcess Laptop (Model: Dell Inspiron 15 5000 Series) (*not pictured)*
- HP OfficeJet 100 Mobile printer (*not pictured)*
- ElectionSource Table Top Voting Booth Privacy Screen (Model: VB-60B) (*not pictured)*
- Battery Backup (APC Smart-UPS 1500 (for the All in One PC) (*not pictured)*
- Battery Backup (APC Smart-UPS 2200 (for laser printers) (*not pictured)*



Photograph 2-3 ClearCount Configuration

The tested configuration for ClearCount consists of the following components:

- ScanServer Laptop (Lenovo: Y50-70 or Dell: E5570 or HP: ProBook 4540s)
- ScanServer Tower (Lenovo: TS140)
- ScanStation Laptop (Toshiba: S55-A5167 or Lenovo: Y50-70 or Dell: E5570)
- ScanStation Tower (Apex Boxx Server used for IBML Image-Trac Lite Scanner) (*not pictured)*
- ClearCount Scanner (Fujitsu fi-6800)
- ClearCount Scanner (Fujitsu fi-6670)
- ClearCount Scanner (Fujitsu fi-7180)
- ClearCount Scanner (IBML ImageTrac Lite Scanner 6000 series) (*not pictured)*
- ClearCount Scanner (IBML ImageTrac DS series Scanner 1210 or 1155) (*not pictured)*
- TP-LINK VPN Router (Model: TL-R600VPN) (*not pictured)*
- Battery Backup (APC Smart-UPS 1500 (for Fujitsu scanners) (*not pictured)*
- Battery Backup (APC Smart-UPS 2200 (for IBML scanners) (*not pictured)*
- NETGEAR ProSAFE FVS318G 8-Port Gigabit VPN Firewall (Model: FVS318G)

2.3 Test Support Equipment/Materials

All test support equipment/ materials required to facilitate testing were supplied by Clear Ballot.

2.4 Technical Data Package

This subsection lists all manufacturer provided documentation that is relevant to the system that was tested.

Table 2.1: Technical Data Package

Document Name	Version	Document Number
ClearAccess Acceptance Test Version 1.3	1.1	100109-10002
ClearAccess Build Procedures Version 1.3	1.4	100051-10001
ClearAccess Functional Description Version 1.3	3.0	100049-10002
ClearAccess 1.3 Hardware Specification	2.1	100085-10002
ClearAccess Installation Guide Version 1.3	7.1	100053-10007
ClearAccess Maintenance Guide Version 1.3	7.0	100052-10005
ClearAccess Poll Worker Guide Version 1.3	6.1	100054-10006
ClearAccess Security Specification Version 1.3	4.0	100050-10002
ClearAccess TDP Software Specification Version 1.3	2.0	100099-10001
ClearAccess Supervisor Guide Version 1.3	7.1	100055-10005
ClearAccess System Overview Version 1.3	2.0	100044-10002
ClearAccess Voter Guide Version 1.3	2.2	100056-10004
ClearCount 1.3 Ballot Definition File Guide	2.2	100048-10003
ClearCount 1.3 Database Specification	1.1	100005-10001
ClearCount 1.3 Election Administration Guide	3.2	100004-10009
ClearCount 1.3 Reporting Guide	2.3	100070-10005
ClearCount 1.3 System Overview	3.2	100025-10005
ClearCount 1.3 Acceptance Test Checklist	1.1	100102-10001
ClearCount 1.3 Election Preparation and Installation Guide	3.2	100006-10005
ClearCount 1.3 Glossary	3.2	100008-10005

ClearCount 1.3 Scanner Operator's Guide	1.2	100013-10002
ClearCount 1.3 Security Specification	3.2	100026-10005
ClearCount 1.3 Software Design and Specification	3.1	100019-10005
ClearCount 1.3 Functionality Description	3.2	100021-10006
ClearCount 1.3 System Operations Procedures	3.2	100024-10005
ClearDesign 1.3 Build Procedure	1.3	100083-10001
ClearDesign 1.3 Functionality Description	1.3	100046-10001
ClearDesign 1.3 Software Design and Specification	1.2	100072-10003
ClearDesign 1.3 Acceptance Test Checklist	1.1	100011-10002
ClearDesign 1.3 Administration Guide	3.4	100062-10007
ClearDesign 1.3 Installation Guide	3.5	100063-10004
ClearDesign 1.3 User Guide	3.4	100041-10007
ClearDesign 1.3 Database Definitions	1.1	100103-10001
ClearDesign 1.3 Security Specification	1.2	100045-10003
ClearDesign 1.3 System Overview	1.2	100043-10003
ClearVote 1.3 Approved Parts List	3.3	100101-10002
ClearVote 1.3 Personnel Deployment and Training Plan	3.4	100058-10005
ClearVote 1.3 Configuration Management Plan	3.2	100057-10005
ClearVote 1.3 Quality Assurance Program	3.3	100059-10005
ClearVote Security Policy Version 1.3	1.0	100086-10001
ClearVote 1.3 Hardware Specification	3.2	100060-10005
ClearVote 1.3 System Maintenance Manual	3.2	100061-10005
ClearVote 1.3 Test and Verification Specification	3.2	100073-10001
Ballot Stock Specification Version 1.0	2.0	100067-10002
Usability Test Report of ClearAccess	--	Dated 10/17/2016
Supplemental COTS Documents	--	--

3 Test Process and Results

The following sections outline the test process that was followed to evaluate the ClearVote 1.3 Voting System against the test goals defined in Section 2.

3.1 General Information

All testing, with exception of the IBML testing, was conducted by qualified Pro V&V personnel at the Pro V&V test facility located in Huntsville, AL. The IBML testing was conducted by qualified Pro V&V personnel at the IBML facility located in Irondale, AL.

As stated in section 1.2, Hardware Requirements listed in the EAC 2005 VVSG Volume I Section 4.1.2.13 were not tested as part of this test campaign.

3.2 Test Cases/Procedures

Test procedures were developed to evaluate the system being tested against the stated requirements. Prior to execution of the required test procedures, the system under test was subjected to testing initialization to establish the baseline for testing and ensure that the test candidate matched the expected test candidate and that all equipment and supplies are present.
The following tasks were completed during the testing initialization:

- Ensure proper system of equipment. Check network connections, power cords, keys, etc.
- Check version numbers of (system) software and firmware on all components.
- Verify the presence of only the documented COTS.
- Ensure removable media is clean
- Ensure batteries are fully charged.
- Inspect supplies and test decks.
- Record protective counter on all tabulators.
- Review physical security measures of all equipment.
- Record basic observations of the testing setup and review.
- Record serial numbers of equipment.
- Retain proof of version numbers.

3.3 Test Results

The procedures that were utilized during the test engagement and the results obtained are summarized in the following paragraphs. During the evaluation, the test team made observations of general system behavior.

TDP Review - This review was conducted for stated functionality review and verification. Results of the review of each document were entered on the TDP Review Checklist and were reported to Clear Ballot for disposition of any discrepancies. This process was ongoing until all discrepancies were resolved. Any documents that were revised during the TDP review process were compared with the previous document revision to determine changes made, and the document was re-reviewed to determine whether the discrepancies had been resolved.

Summary Findings:

During execution of the test procedure, it was verified that the technical documentation provided for the ClearVote 1.3 Voting System was successfully subjected to the TDP review with all discrepancies that were noted during the review being resolved.

Source Code Review - The Source Code Review was a formal review of the submitted source code to specific requirements. The requirements may be published standards, manufacturer supplied requirements, and/or third party supplied requirements. The Source Code Review included a Trusted Build of the submitted source code.

Summary Findings:

During execution of the test procedure, it was verified that the source code provided for the ClearVote 1.3 Voting System successfully met the requirements. After a review of the submitted code was completed, all issues were reports and resolved prior to the Trusted Build.

Trusted Build (EAC equivalent Compliance Build) – To perform the trusted build Clear Ballot-submitted source code, COTS, and Third Party software products were inspected and combined to create the executable code. Additionally, during the performance of the compliance build, the build documentation was reviewed.

Summary Findings:

During execution of the Trusted Build, the source code submitted by Clear Ballot Group and reviewed by PRO V&V was successfully built using the submitted COTS and third party software products, and the reviewed build documentation.

Functional Configuration Audit (FCA) – During this area of testing, the specific functionality of the system under evaluation that is claimed by the manufacturer was targeted to ensure the product functioned as documented. This testing used both positive and negative test data to test the robustness of the system.

Summary Findings:

During the test case design and execution phases of the FCA, a number of issues were identified and submitted to Clear Ballot for resolution. Clear Ballot addressed these issues with source code changes as well as other forms of remediation as required. All discrepancies were resolved prior to conclusion of this test campaign unless otherwise noted.

A list of the discrepancies identified is presented below:

ClearDesign

Discrepancy # 1 – After creating an election in ClearDesign, the volume levels cannot be adjusted in ClearAccess using touchscreen, keypad, or sip and puff.

ClearAccess

Discrepancy # 2 – After creating an election in ClearDesign, the volume levels cannot be adjusted in ClearAccess using touchscreen, keypad, or sip and puff.

Discrepancy # 3 – EAC VVSG Vol I Section 3.1.6.d.i states: "On touch screens, the sensitive touch areas shall have a minimum height of 0.5 inches and minimum width of 0.7 inches. The vertical distance between the centers of adjacent areas shall be at least 0.6 inches, and the horizontal distance at least 0.8 inches." The touch areas of the screen that allow the voter to adjust the display and audio settings are not a minimum of 0.5 inches in height. The touch areas of the screen that displays the contests and candidates fully conform to this requirement. On the Dell Optiplex 3240, all touch areas conform to this requirement if the zoom level on the display is set to large or extra-large. Clear Ballot has agreed that this is a non-conformance. No fix was provided for discrepancy. Pro V&V has documented this non-conformance at the end of this report.

Discrepancy # 4 – When using the sip and puff, the voter cannot get access to the volume and rate of speech controls that are available on the touchscreen and keypad.

Discrepancy # 5 – The APC UPS model SMT1500 did not meet the 2 hours back-up battery requirement for ClearAccess when configured with the Oki Laser Printer model B432dn.

ClearCount

Discrepancy # 6 – The Fujitsu fi-6800 scanner would not function properly. The input hopper would not rise up to feed the ballots into the scanner properly.

During the performance of the functional configuration audit each component and subcomponent of the voting system was functionally evaluated as designed and documented in the TDP. The FCA included a test of system operations in the sequence in which they would normally be

performed. These system operations and functional capabilities were categorized as follows by the phase of election activity in which they are required:

- Overall System Capabilities: These functional capabilities apply throughout the election process. They include security, accuracy, integrity, system audit ability, election management system, vote tabulation, ballot counters, telecommunications, and data retention.
- Pre-voting Capabilities: These functional capabilities are used to prepare the voting system for voting. They include ballot preparation, the preparation of election-specific software (including firmware), the production of ballots, the installation of ballots and ballot counting software (including firmware), and system and equipment tests.
- Voting System Capabilities: These functional capabilities include all operations conducted at the polling place by voters and officials including the generation of status messages.
- Post-voting Capabilities: These functional capabilities apply after all votes have been cast. They include closing the polling place; obtaining reports by voting machine, polling place, and precinct; obtaining consolidated reports; and obtaining reports of audit trails.
- Maintenance, Transportation and Storage Capabilities: These capabilities are necessary to maintain, transport, and store voting system equipment.

Throughout the performance of the FCA, the assigned test personnel input both positive and negative test data to trigger normal and abnormal conditions. At the conclusion of the FCA, the test personnel analyzed all deficiencies and determined the voting system's ability to perform in accordance with all representations concerning functionality, usability, security, accessibility, and sustainability were compliant with requirements; therefore, it was verified that the ClearVote 1.3 Voting System successfully completed the FCA with all actual results obtained during test execution matching the expected results.

Telecommunications – This area of testing evaluated the requirements for telecommunications between networked components. For this campaign various cables were disconnected at several stages of system operation to make sure the system responded in an adequate manner. This could include continuing to operate as normal, somehow properly alerting the user, and/or compensating in a manner that maintained the integrity of the election.

Summary Findings:

During this portion of testing, ClearVote 1.3 Voting System was configured for normal field use. During execution of the test procedure, it was verified that the ClearVote 1.3 Voting System successfully met the requirements for telecommunications between the components.

Physical Configuration Audit (PCA) – A PCA was performed to compare the voting system components submitted for testing to the manufacturer's technical documentation. The PCA was conducted in two phases: Initial and Final. The Initial PCA was conducted in order to baseline the system prior to test campaign commencement. The Final PCA was conducted in order to verify the final software and hardware configurations.

Summary Findings:

During execution of the test procedure, the components of the ClearVote 1.3 Voting System were documented by component name, model, serial number, major component, and any other relevant information needed to identify the component. For COTS equipment, every effort was made to verify that the COTS equipment had not been modified for use. Additionally, each technical document submitted in the TDP was recorded by document name, description, document number, revision number, and date of release. At the conclusion of the test campaign, test personnel verified that any changes made to the software, hardware, or documentation during the test process were fully and properly documented

Security – During the execution of this test case, the system was inspected to verify that various controls and measure were in place in order to meet the objectives of the security standards which include: protection of the critical elements of the voting system; establishing and maintaining controls to minimize errors; protection from intentional manipulation, fraud and malicious mischief; identifying fraudulent or erroneous changes to the voting system; and protecting the secrecy in the voting process.

Summary Findings:

To evaluate the security of the voting system, test personnel first verified that the manufacturer's TDP contained documented access and physical controls and then, following the manufacturer's documented procedures, configured the voting system for use and functionally verified that the documented controls were in place and were adequate to meet the stated requirements. Information which was not present in the TDP was presented to Clear Ballot for resolution. Clear Ballot then submitted updated documentation which was reviewed to ensure that the required information was present. During execution of the test procedure, it was verified that the ClearVote 1.3 Voting System successfully completed the security evaluation with all actual results obtained during test execution matching the expected results

Usability – The system under evaluation was subjected to usability testing to determine the effectiveness, efficiency, and satisfaction of the system performance when used by the voter. This testing included additional requirements for task performance such as independence and privacy.

Summary Findings:

To perform the usability test, the assigned test personnel followed the manufacturer's documented instructions to setup and configure the voting system as for normal operation at the polling place, with privacy screens and peripheral devices in place. An operational status check was then performed to verify system operation. The assigned test personnel then verified that each function and capability presented to the voter operated as expected and documented. During execution of the test procedure, it was verified that the ClearVote 1.3 Voting System successfully complied with the Usability requirements.

Accessibility – The system under evaluation was subjected to accessibility testing to evaluate the system against the requirements for accessibility. These requirements are intended to address HAVA 301 (a) (3) (B) of which the goal is to make the voting system independently accessible to as many voters as possible.

Summary Findings:

To perform the accessibility test, the assigned test personnel followed the manufacturer's documented instructions to setup and configure the voting system as for normal operation at the polling place, with privacy screens and peripheral devices in place. An operational status check was then performed to verify system operation. The assigned test personnel then verified that each function and capability presented to the voter operated as expected and documented. During execution of the test procedure, it was verified that the ClearVote 1.3 Voting System successfully completed the accessibility tests with all actual results obtained during test execution matching the expected results

Acoustic Test – This testing was performed to verify that the system under evaluation met the applicable requirements for audio presentation of the ballot. This test was performed as part of the Accessibility Testing.

Summary Findings:

During this portion of testing, ClearVote 1.3 Voting System was configured for normal field use. Headphones were used to ensure voters with associated issues could still vote. During execution of the test procedure, it was verified that the ClearVote 1.3 Voting System successfully met the requirements for the audio presentation of the ballot.

Electrical Supply – Components of voting systems that require an electrical supply shall meet the following standards:

- All voting machines shall also be capable of operating for a period of at least 2 hours on backup power, such that no voting data is lost or corrupted nor normal operations interrupted. When backup power is exhausted the voting machine shall retain the contents of all memories intact
- Central count voting systems shall operate with the electrical supply ordinarily found in central tabulation facilities or computer room facilities (Nominal 120 Vac/60Hz/1, nominal 208 Vac/60Hz/3 or nominal 240 Vac/60Hz/2).
- Request for Interpretation 2008-06 (Battery Back Up for Central Count)
- Request for Interpretation 2009-03 (Battery Back Up for Central Count)

Summary Findings:

The ClearVote 1.1 Voting System successfully completed the requirements of the Electrical Supply Test.

Maintainability – The maintainability of the system represents the ease with which preventive and corrective maintenance actions can be performed based on the design characteristics of the system being evaluated and the process the manufacturer has in place for prevention and reacting to failures.

Summary Findings:

ClearVote 1.1 Voting System successfully completed the requirements of the Maintainability Test.

Accuracy – An accuracy test was performed to ensure that the voting system components could process ballot positions within the allowable target error rate. This test was designed to test the ability of the system to "capture, record, store, consolidate, and report" specific voter selections and absences of a selection.

Summary Findings:

To perform the Accuracy Test, test ballots were scanned by ClearCount along with each Fujitsu and IBML scanners and a results report was generated. Each ballot had 608 ballot positions and a total of 3000 ballots were scanned resulting in a total of 1,824,000 ballot positions being read accurately. During execution of the test procedure, it was verified that the ClearVote 1.3 Voting System successfully completed the accuracy test with all actual results obtained during test execution matching the expected results.

Volume/Stress Test - The Volume and Stress Tests were designed to investigate the voting system's response to transient overload conditions, processing more than the expected number of ballots/voter per precinct and processing more than expected number of precincts. This test was an attempt to overload the system's capacity to process, store, and report data. The test method for performing the Volume/Stress Test was execution.

Summary Findings:

Successful testing included voting ballots over a set time at a fast rate, creating an election with more precincts over the stated limit, overloading ballot bins, utilizing more than the appropriate number of hardware and/or inputs, and using paper ballots that represented the formatting extremes. During execution of the test procedure, it was verified that the ClearVote 1.3 Voting System successfully completed the test with all actual results obtained during test execution matching the expected results.

System Integration – The system level certification tests addressed the integration of the hardware and software. This testing focused on the compatibility of the voting system software components and subsystems with one another and with other components of the voting system. During test performance, the system was configured as would be for normal field use.

Summary Findings:

To perform the System Integration test, a General Election was designed in ClearDesign. The election was then loaded into the ClearAccess ballot marking device. Ballots were marked using the ClearAccess and were read by ClearCount. The results were adjudicated by ClearCount for results reporting. During execution of the test procedure, it was verified that the ClearVote 1.3 Voting System successfully completed the system level integration tests with all actual results obtained during test execution matching the expected results.

Quality Assurance and Configuration Management Reviews – These reviews examined the voting system QA and CM procedures. The Quality Assurance and Configuration Management reviews were performed by appraising the manufacturer's exhibited activities and associated practices during the test campaign and documented details in their TDP to ensure full knowledge and control of the components of a system, starting with its initial development progressing through its ongoing maintenance and enhancement, and including its operational life cycle.

Summary Findings:

During execution of the test procedure, it was verified that the ClearVote 1.3 Voting System successfully completed the Quality Assurance and Configuration Management Reviews.

Regression Testing – Regression testing was performed as needed on the system components to verify that all functional and/or software modifications made during the test campaign did not adversely affect the system and its operation.

Summary Findings:

Regression Testing was performed to verify that functional testing discrepancies discovered during the test case design process for the Functional Configuration Audit were addressed by Clear Ballot. Each discrepancy was tested to verify that it functioned correctly as described in the TDP. During execution of the test procedure, it was verified that the ClearVote 1.3 Voting System successfully completed the functional regression test with all actual results obtained during test execution matching the expected results.

3.5 Additional Testing

As stated in section 3.1 of this test report, Pro V&V personnel performed offsite testing for the IBML scanners that included the ImageTrac Lite Scanner 6000 series and the ImageTrac DS 1210/1155 series Scanner. Pro V&V performed various testing that included FCA, Accuracy, Volume and Stress, System Integration, and Security. During execution of the test procedures, it was verified that the IBML scanners successfully completed the testing with all actual results obtained during test execution matching the expected results.

As part of the ClearVote 1.3 testing campaign, Clear Ballot submitted for review and testing the Write-In Tool version 1.2.3. The Write-In Tool is a software tool used to efficiently adjudicate

write-in candidates from ballots counted using ClearVote products. Pro V&V performed a functional source code review and a trusted build of the source code. Pro V&V also performed functional testing and a review of the following TDP documents associated with the Write-In Tool.

- ClearVote Write-In Adjudication Guide v5.0
- ClearVote Write-Ins Tool Technical Data Package v1.0

During execution of the test procedures, it was verified that the Write-In Tool successfully completed the testing with all actual results obtained during test execution matching the expected results.

4 Conclusions

Based on the results obtained during the test campaign, Pro V&V determines that the ClearVote 1.3 Voting System, as presented for evaluation, meets the requirements to the Election Assistance Commission 2005 Voluntary Voting Systems Guidelines for the requirements that were tested. Pro V&V, Inc. has determined that ClearVote 1.3 Voting System is in compliance with Election Assistance Commission 2005 Voluntary Voting Systems Guidelines with the exceptions stated below in this report.

- The ImageTrac DS series Scanner 1210/1155 is not a FCC Part 15 Class B compliant scanner as required by 2005 VVSG Volume II section 4.8. However, it does meet the FCC Part 15 Class A emissions.

- The touch areas of the screen that allow the voter to adjust the display and audio settings are not a minimum of 0.5 inches in height as required by 2005 VVSG Volume I section 3.1.6.d.i. However, the touch areas of the screen that displays the contests and candidates fully conform to this requirement. On the Dell Optiplex 3240, all touch areas conform to this requirement if the zoom level on the display is set to large or extra-large.