Test Report for EAC 2005 VVSG Certification Testing
Clear Ballot Group ClearVote 2.0 Voting System

EAC Project Number: CBG-CV-20

Version: 03

Date: 09/30/2019

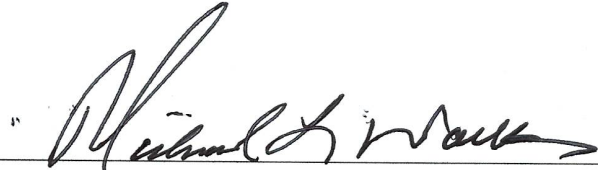U.S. Election Assistance Commission

VSTL

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SIGNATURES

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REVISIONS

Revision	Description	Date
00	Initial Release	08/30/2019
01	Updated based on comments from EAC	09/25/2019
02	Highlights Removed	09/26/2019
03	Updated TOC and Appendix Headings	09/30/2019

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1.0 INTRODUCTION

The purpose of this Test Report is to document the procedures that Pro V&V, Inc. followed to perform certification testing during a system modification campaign for the Clear Ballot Group (CBG) ClearVote 2.0 Voting System to the requirements set forth for voting systems in the U.S. Election Assistance Commission (EAC) 2005 Voluntary Voting System Guidelines (VVSG), Version 1.0. Certification testing of ClearVote 2.0 was performed to ensure the applicable requirements of the EAC VVSG 1.0 and the EAC Testing and Certification Program Manual, Version 2.0 were met. Additionally, all EAC Request for Interpretations (RFI) and Notices of Clarification (NOC) relevant to the system under test were incorporated in the test campaign.

Prior to submitting the voting system for testing, CBG submitted an application package to the EAC for certification of the ClearVote 2.0 Voting System. The application was accepted by the EAC and the project was assigned the unique Project Number of CBG-CV-20.

1.1 Description and Overview of EAC System Being Modified

The EAC Certified System that is the baseline for the submitted modification is described in the following subsections. All information presented was derived from the previous Certification Test Report, the EAC Certificate of Conformance and/or the System Overview.

The following subsections describe the baselined ClearVote 1.5 System. The following sections contain a product description and an overview of the design methodology of the ClearVote 1.5 Voting System, as taken from the Clear Ballot Group technical documentation.

The ClearVote 1.5 Voting System is a paper-based optical scan voting system consisting of the following major components: ClearDesign (ballot design and EMS), ClearCount (central count, tabulation, and election reporting), ClearCast (precinct count and tabulation), and ClearAccess (accessible voting and ballot marking device).

ClearDesign

ClearDesign is an Election Management System consisting of an interactive set of applications which are responsible for all pre-voting activities necessary for defining and managing elections. This includes ballot design, ballot proofing, ballot layout, and ballot production. The ClearDesign system consists of the physical components listed below. All of the components and generation of voting machine election definition file packages are unmodified COTS that are connected via a wired, closed, and isolated network not connected to any other systems or the Internet.

- DesignServer: A laptop or desktop computer running Ubuntu with the ClearDesign software and hosting the election database.

- DesignStation(s): One or more laptop or desktop running Windows used to connect to the DesignServer. A browser is used to perform the necessary tasks. A user with administration privileges will be able to define users and manage the elections.

- Network Switch: Used to connect the DesignStations to the DesignServer using a wired, closed Ethernet-based network.

ClearCount

ClearCount is a central, high-speed, optical scan ballot tabulator coupled with ballot processing applications. The ClearCount software runs on unmodified COTS laptop or desktop computers running the Windows operating system and supports specific models of Fujitsu scanners. The ClearCount central-count system running an Ubuntu Linux operating system, with Ethernet connections to workstations running the Windows operating system consists of the physical components listed below. All of the components are unmodified COTS that are connected via a wired, closed, and isolated network not connected to any other systems or the Internet.

- <u>ScanServer</u>: A laptop or desktop computer running the ClearCount software and hosting its election database and the web server that serves its election reports.

- <u>ScanStation(s)</u>: One or more laptop or desktop/scanner pairs used to scan and tabulate ballots.

- <u>Network Switch</u>: Used to connect the ScanStations to the ScanServer using a wired, closed Ethernet.

- <u>Election Administration Station and/or Adjudication Station:</u> One or more Windows laptop or desktop computers installed with browser software. This station can serve multiple uses: user administration, election administration, adjudication, and reporting. This station is also used to consolidate the vote totals and ballot images from the ClearCast precinct tabulator. The vote totals and ballot images are consolidated by the ClearCount Software via the ClearCast USB drive.

All files that make up the ClearCount software reside on a single ScanServer that is shared by all client ScanStations. The Tabulator software is executed by the ScanStations at run-time from files that reside on the ScanServer. The only software programs that have to be installed on ScanStations, apart from the Windows operating system, are the Fujitsu ScandAll Pro software and drivers required by the scanner hardware.

The ClearCount software consists of the following components:

- <u>Tabulator:</u> The Tabulator application handles ballot tabulation. The Tabulator software is stored on the ScanServer and an instance of Tabulator runs on each ScanStation. The Tabulator program analyzes the incoming image and transfers them to the local output folder named CBGBallotImages. The ScanServer retrieves the images from the folder and uploads them into the Election database.

- <u>Election Database:</u> A centralized election database that resides on the ScanServer and collects the output of each Tabulator.

- <u>Election Reports:</u> A browser-based suite of reports that provides election results and analysis and allows election officials to review individual ballot images. A web server on the ScanServer serves the reports.

- <u>Card Resolutions tool:</u> A browser-based application that allows election officials to review and appropriately resolve unreadable voted ballots.

- <u>User and Election Database Management through browser-based applications:</u> On the User Administration dashboard, the administrator can add, rename, or delete users, assign permissions, and change user passwords. On the Election Administration dashboard, the administrator can create or delete an election, set an election as active, and back up or restore an election.

ClearCast

The ClearCast tabulator is a precinct count ballot scanning solution suitable for early and election in-person voting, including processing ballots printed by the ClearAccess accessible ballot marking device. The ClearCast application runs on the precinct count-based tabulator, and is used to scan, count and tally marked ballots. Its functionality is divided into three essential modes, Election Mode (Early Voting and/or Election Day), which is used to process voter cast ballots, Pre-Election Mode, this occurs prior to Election Mode, and is used to test all system functionality subsequent to the start of the election, and Post-Election Mode, which is used to perform administrative functions following the close of the election.

ClearAccess

ClearAccess is an accessible touchscreen ballot marking device (BMD) used for the creation of paper ballots that can be scanned and tabulated by ClearCast or ClearCount. The ClearAccess components of the ClearVote 1.5 voting system uses both unmodified and modified off-the-self hardware. Laptop and desktop computers are combined with personal assistive devices, printers, and uninterruptible power supplies to form a ballot-marking device.

1.1.1 Baseline Certified System

The baseline system for this modification is the ClearVote 1.5 Voting System. The tables below describe the certified equipment and firmware versions.

Detailed descriptions of the ClearVote 1.5 test campaign are contained in Pro V&V Report No. TR-CBG-2018-01.01 Rev D, which is available for viewing on the EAC's website at www.eac.gov.

The individual components listed below are compiled to create the ClearVote 1.5 voting system (ClearCast 1.5.1, ClearCount 1.7.1, ClearDesign 1.5.1, and ClearAccess 1.5.1).

Table 1-1. Voting System Software

Firmware/Software	Version
ClearDesign Components, Version 1.5.1	
Windows	10 Pro 1607
Google Chrome	55.0.2883.87
Ubuntu	16.04.4 LTS
MySQL	5.7.21
Apache	2.4.18
libapache2-mod-fcgid	2.3.9
PhantomJS	1.9.8
Usbmount	0.0.22
Unzip	6.0.20
Samba	4.3.11
Python PIP	8.1.1
Zip	3.0.11

Table 1-1. Voting System Software *(continued)*

Firmware/Software	Version
Pyinstaller	3.2.1
Python JSMIN	2.2.1
Python	2.7.12
Python webpy	0.38
Python MySQL DB	1.3.7
SQLAlchemy	1.0.15
Python Pillow	3.1.2
Python Flup	1.0.2
Python DBUtils	1.1
Python XLRD	0.9.4
Python FontTools library	3.0
Python RTF	0.2.1
OpenSSL (FIPS)	2.0.10
OpenSSL	1.0.2g
DataTable	1.10.16
DataTable Buttons	1.4.2
DataTable Buttons JSZip	2.5.0
DataTable Buttons Pdfmake	0.1.32
DataTablePlugins	1.10.16
bootstrap	3.0.0
jquery	1.10.2
jquery-impromptu	5.2.3
jquery-qrcode	1.0
jquery-splitter	0.14.0
jquery-ui	1.10.4
jscolor	1.4.2
tinymce	4.1.9
libmp3lame	0.5.0
jszip	3.1.2
papaparse	4.1.2
jsmin	12/4/2003
ClearAccess Components, Version 1.5.1	
Windows	10 Pro 1607
Google Chrome	61.0.3163.100
Nsis	3.01
PyInstaller	3.2
Python	2.7.10

Table 1-1. Voting System Software *(continued)*

Firmware/Software	Version
webpy	0.38
Python-future	0.15.2
pefile	2016.3.28
pywin	223
jquery	1.10.5
DataTables	1.10.5
ColVis	1.1.1
ColReorder	1.1.2
jsmin	2003-12-04
Brother printer driver	1.0.1.0
Okidata printer driver	1.0.0.0
Zebra CoreScanner Driver	3.03.0001
ClearCast Components, Version 1.5.1	
scanner_control	0.0.33
Ubuntu	18.04.1 LTS
google_chrome	70.0.3538.110
zeromq	4.2.3
pyinstaller	3.2.1
openssl-fips	2.0.10
openssl	1.1.0g
libScanAPI.a	1.1.3
DataTables	1.10.5
JTSage DateBox	4.0.0
jQuery.NumPad	1.4
jQuery	1.12.4
jquery.ui	1.11.3
ClearCount Components, Version 1.7.1	
Windows	10 Pro 1607
Google Chrome	55.0.2883.87
Ubuntu	16.04.1 LTS
Apache	2.4.18
libapache2-mod-fcgid	2.3.9
Python(part of Ubuntu)	2.7.12
Pillow (part of Ubuntu)	3.1.2
MySQLdb (part of Ubuntu)	1.3.7
PyInstaller	3.2.1
PollyReports	1.7.6

Table 1-1. Voting System Software *(continued)*

Firmware/Software	Version
OpenSSL	1.0.2g
OpenSSL FIPS Object Module	2.0.10
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
ColVis	1.0.8
JavaScript TableTools library	2.1.5
ZeroClipboard	1.0.4-TableTools2
JavaScript FixedHeader library	2.0.6
JavaScript hotkeys library	0.8
JavaScript tooltip library	1.3
JavaScript pep library	1.0
JavaScript LESS library	1.3.3
Fujitsu fi-6400	PaperStream 1.30.0
Fujitsu fi-6800	PaperStream 10.10.710
Fujitsu fi-7180	PaperStream 1.4.0

Table 1-2. Voting System Equipment

Component	Model	Serial Number
ClearDesign Components		
Dell Latitude (client)	5590	9W5D1N2
Dell Precision (client)	T3620	GSKRMV2 & GSKSMN2
Dell PowerEdge (server)	T440	H6JZLN2
Dell PowerEdge (server)	T130	5G0YLN2
Dell 24 inch Monitor	SE2416H	FVWV5G2
Dell 22 inch Monitors	E2216HV	36765D2 & 90665D2
Cisco 8-Port Switch	SG250-08	PSZ21451MLJ
Lenovo USB DVD Burner	LN-8A6NH11B	8SSDX0H33226L1CB7107099
Sabrent 13 port USB 2.0 Hub	HB-U14P	1996
SySTOR Multiple USB Duplicator	SYS-USBD-11	ES-27095
Zebra Technologies Bar Code Scanner	DS457	18059000501984, 18059000501981, 18095000500487, 18095000500491

Table 1-2. Voting System Equipment *(continued)*

	ClearAccess Components	
ELO 15 inch AIO	E-Series (15E2)	A18C004079, A18C004075, A18C004071, A18C004077, A18C004080, L17C014810, & K17C012858
ELO 20 inch AIO	X-Series (20X2)	D18Q000334, D18Q000335, B18Q001601, B18Q001599 & B18Q000597
Brother Laser Printer	HL-L2350DW	U64964A8N238333 & U64964A8N238334
Oki Data Laser Printer	B432dn	AK5B007647A0
Storm EZ Access Keypad	EZ08-222013	15000005, 15000007, 15020478
Origin Instruments Sip/Puff Breeze with Headset	AC-0313-H2	CBG-SP-001, 002, 003
Monoprice Over the Ear Pro Headphones	8323	CBG-mono-001, 002, 003
ElectionSource Table Top Voting Booth (Privacy Screen)	VB-60B	CBG-VB-001
3M EMI Copper Foil Shielding Tape, , ¼ inch	1181	1181-CBG1
Lexan or acrylic plastic cover (8 mm)	2"x4"	Cover-CBG1
3/4" 2 mil Kapton tape	S-17213	CBG-KAP01
APC Smart-UPS	SMT2200C	AS1809160852
	ClearCount Components	
Dell Latitude (client)	5590	5M5D1N2, 3T8D1N2, 4P4F1N2, B5TD1N2, DP5D1N2, FV8D1N2
Dell Precision (client)	T3620	GSKQMN2
Dell PowerEdge (server)	T440	H6J5MN2
Dell PowerEdge (server)	T130	5G0ZLN2
Fujitsu Scanner	fi-7180	A20DC10302 & A20D000798
Fujitsu Scanner	fi-6800	A9HCA00737 & A9HCC00543
Fujitsu Scanner	fi-6400	AKHCC00362 & AKHCC00609
Lenovo USB DVD Burner	LN-8A6NH11B	8SSDX0H33226L1CB7107099
Western Digital 4 TB External HD	WDBFJK0040HBK -NESN	WCC7K7YF11ZD
Western Digital 8 TB External HD	WDBFJK0080HBK -NESN	75H4PXJD
Netac Keypad Encryption Portable Hard Disk	K390	R4JT22619T
CORSAIR Flash Padlock 3	CMFPLA3B-32GB	CBG-Pad-002

Table 1-2. Voting System Equipment *(continued)*

ClearCount Components		
Dell 24 inch Monitor	P2415Q	3TZSJ92
Dell 22 inch Monitor	P2217	7818672
Dell 22 inch Monitor	S2240M	CN-0CFGKT-64180-58B-0X3T
Cisco 8-Port Switch	SG250-08	PSZ21451MYX
Cisco 26-Port Switch	SG250-26	DNI203400A6 & DNI203400AW
NETGEAR 8-Port Gigabit VPN Firewall	FVS318G	40F266BA00280
TP-LINK 5-Port Gigabit Switch	TL-SG105E	216C319009010
Sabrent 13 port USB 2.0 Hub	HB-U14P	1997
APC Smart-UPS	SMT1500	3S1525X07491
Lenovo USB DVD Burner	LN-8A6NH11B	8SSDX0H33226L1CB7107099
EZ Scanning Shelves	Model: WorkEZ	CBG-EZ-001, 002,003, & 004
ClearCast Components		
ClearCast	Model D, Revision 4	CCD1902007 CCD1902009, CCD1902010, CCD1902013
Ballot Bag	CBG-BAG-002	BAG001 through BAG004
CORSAIR Flash Padlock 3	CMFPLA3B-32GB	CBG-Pad-001 through 010
Wurth ferrites	74271142,74275812 74275813,74271132 ,74271722	FRT001 through FRT020

1.2 References

- Election Assistance Commission 2005 Voluntary Voting System Guidelines (VVSG) Version 1.0, Volume I, "Voting System Performance Guidelines", and Volume II, "National Certification Testing Guidelines"

- Election Assistance Commission Testing and Certification Program Manual, Version 2.0

- Election Assistance Commission Voting System Test Laboratory Program Manual, Version 2.0

- National Voluntary Laboratory Accreditation Program NIST Handbook 150, 2016 Edition, "NVLAP Procedures and General Requirements (NIST Handbook 150-2016)", dated July 2016

- National Voluntary Laboratory Accreditation Program NIST Handbook 150-22, 2008 Edition, "Voting System Testing (NIST Handbook 150-22)", dated May 2008

- United States 107th Congress Help America Vote Act (HAVA) of 2002 (Public Law 107-252), dated October 2002

- Pro V&V, Inc. Quality Assurance Manual, Revision 7.0

- Election Assistance Commission "Approval of Voting System Testing Application Package" letter dated July 12, 2018
- EAC Requests for Interpretation (RFI) (listed on www.eac.gov)
- EAC Notices of Clarification (NOC) (listed on www.eac.gov)
- Pro V&V Test Report No. TR-CBG-2018-01.01 Rev D, "Test Report for EAC 2005 VVSG Certification Testing Clear Ballot Group ClearVote 1.5 Voting System", dated 01/29/18
- Clear Ballot Group's Technical Data Package *(A listing of the ClearVote 2.0 documents submitted for this test campaign is listed in Section 3.1.2 of this Test Report)*

1.3 Terms and Abbreviations

This subsection lists terms and abbreviations relevant to the hardware, the software, or this Test Plan.

"ADA" – Americans with Disabilities Act 1990

"BMD" – Ballot Marking Device

"CBG" – Clear Ballot Group

"CM" – Configuration Management

"COTS" – Commercial Off-The-Shelf

"DRE" – Direct Record Electronic

"EAC" – United States Election Assistance Commission

"EMS" – Election Management System

"FCA" – Functional Configuration Audit

"HAVA" – Help America Vote Act

"ISO" – International Organization for Standardization

"NOC" – Notice of Clarification

"PCA" – Physical Configuration Audit

"QA" – Quality Assurance

"RAM" – Random Access Memory

"RFI" – Request for Interpretation

"TDP" – Technical Data Package

"UPS" – Uninterruptible Power Supply

"VSTL" – Voting System Test Laboratory

"VVSG" – Voluntary Voting System Guidelines

2.0 CERTIFICATION TEST BACKGROUND

The ClearVote 2.0 is a modification of a previously certified system (ClearVote 1.5). Pro V&V performed an evaluation of results from the previous test campaign to determine the scope of testing required for certification of the ClearVote 2.0. Based on this evaluation, Pro V&V determined that testing from the previous test campaign would establish the baseline and that the focus of this test campaign would be on the documented system updates.

2.1 Revision History

The table below details the version history of the ClearVote 2.0 System:

Table 2-1. ClearVote 2.0 System Revision History

System Version	Certification Type	Baseline System	Certification Number
ClearVote 1.4	New System	--- (Original System)---	CBG-CV-14
ClearVote 1.5	Modification	ClearVote 1.4	CBG-CV-15
ClearVote 2.0	Modification	ClearVote 1.5	CBG-CV-20*

*Upon grant of certification by the EAC

2.2 Scope of Testing

The scope of testing focused on evaluating the modifications detailed in Section 2.2.1 of this Test Report. Primarily, these modifications focused on upgrades to the components of the previously certified ClearVote 1.5. To determine the ClearVote 2.0 test requirements, the submitted modifications were evaluated against each section of the EAC VVSG 1.0 to determine the applicable tests to be performed. Based on this assessment, it was determined that multiple areas within the EAC VVSG 1.0 would be evaluated to encompass the required tests.

A breakdown of the areas and associated tests is listed below:

- EAC VVSG 1.0 Volume 1, Section 2: Functional Requirements
    - System Integration Testing
    - Functional Configuration Audit (FCA)
    - Physical Configuration Audit (PCA), including System Loads & Hardening
    - Technical Documentation Package (TDP) Review
    - Accuracy Testing
- EAC VVSG 1.0 Volume 1, Section 3: Usability and Accessibility Requirements
    - Usability and Accessibility Testing
    - Technical Documentation Package (TDP) Review
- EAC VVSG 1.0 Volume 1, Section 4: Hardware Requirements
    - Environmental Requirements
        - Electrical Tests (ClearCast and ClearAccess)
        - Environmental Tests (ClearCast and ClearAccess)
        - Technical Documentation Package (TDP) Review

- EAC VVSG 1.0 Volume 1, Section 5: Software Requirements
    - Source Code Review, Compliance Build, Trusted Build, and Build Document Review
    - Technical Documentation Package (TDP) Review
    - Functional Configuration Audit (FCA)
- EAC VVSG 1.0 Volume 1, Section 7: Security Requirements
    - Security Testing
    - Technical Documentation Package (TDP) Review
    - Functional Configuration Audit (FCA)

2.2.1 Modification Overview

The submitted modifications to the ClearVote 2.0 System consist primarily of software changes to accommodate defect resolutions, enhancements, and improved security and user interface features. Hardware modifications to ClearCast and ClearAccess are also submitted for this evaluation.

To verify the modifications were successfully addressed throughout the test campaign, each modification was tracked and verified to be addressed during the execution of the relevant test area. For example, source code changes were verified during the source code review. Modifications requiring functional test verification were evaluated by executing the standard Accuracy Test, the System Integration Test, or during performance of the FCA. Modifications that were not adequately evaluated during the performance of these tests were subjected to specifically designed test cases.

Additionally, Pro V&V functionally verified that any corrected issues from the baseline system were not present in the modified system and that all enhancements implemented did not adversely impact system performance.

2.2.1.1 List of Changes

The modifications include the following specific changes between the ClearVote 2.0 system and the previously certified baseline ClearVote 1.5 system, as taken from the change notes. Detailed information on how the modifications will be addressed is included in Appendix A.

The submitted modifications include the following summarized changes from version 1.5 to 2.0:

ClearAccess

- A minor UI enhancement
- Enhanced security: encryption of the ADF
- Support for printing of ballot stubs with serial numbers
- Defect fixes
- New UPS

ClearCast

- Various UI enhancements
- Workflow enhancements
- Report printing enhancements
- Security enhancements
- Other enhancements
- Code maintenance
- Defect fixes
- Hardware enhancements

ClearCount

- UI enhancements
- XML and report enhancements
- Security enhancements
- Single-row cross endorsement
- Code maintenance
- Defect fixes

ClearDesign

- UI enhancements
- Ballot enhancements
- Performance enhancements
- Security enhancements
- Other enhancements
- Code maintenance
- Defect fixes

Note: For a more detailed listing of the changes, please refer to Appendix A of this Test Report and/or the *ClearVote 2.0 Change Notes, Clear Ballot Part Number: 100128-10016*.

2.2.2 Block Diagram

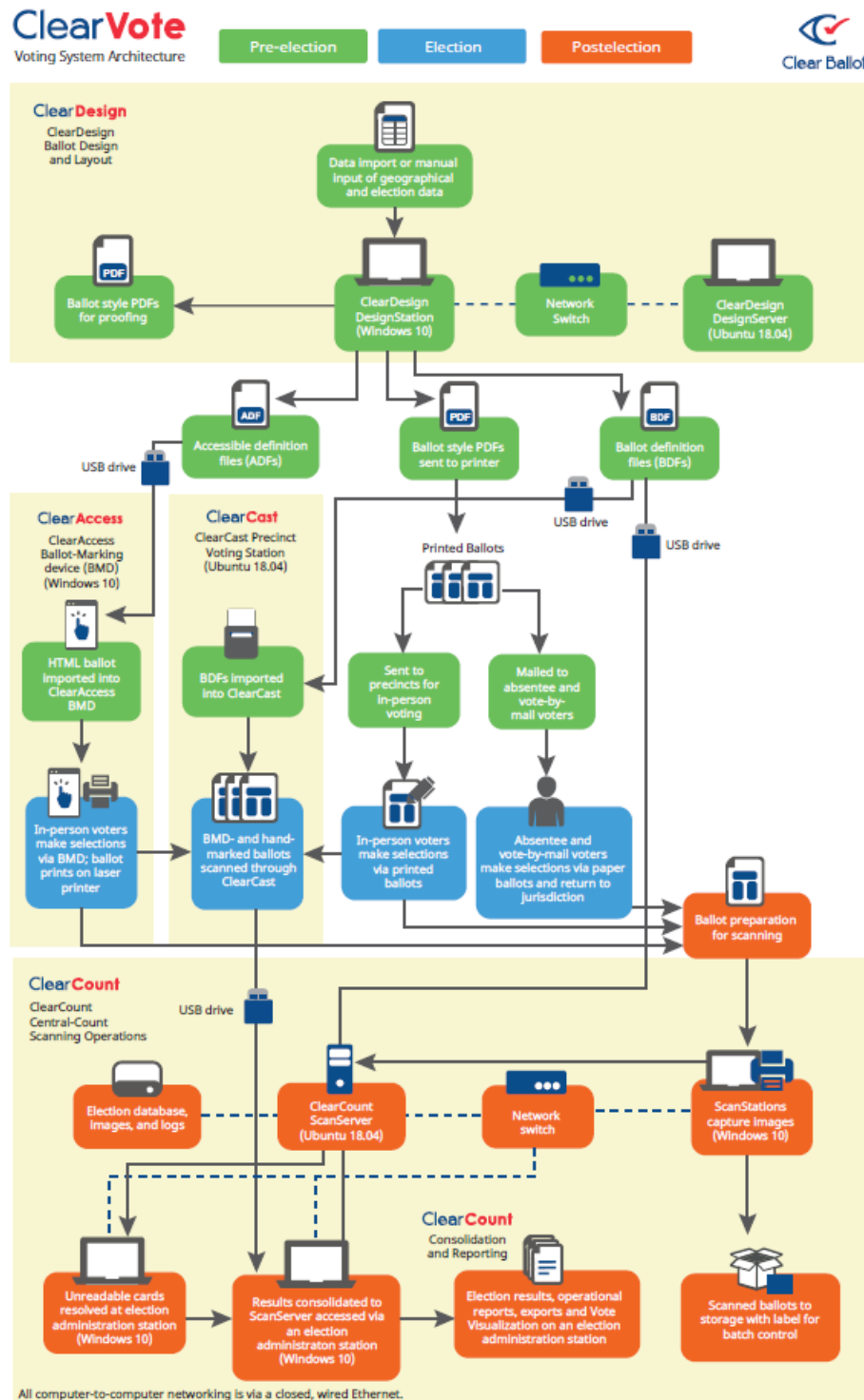The system overview of the submitted voting system is depicted in Figure 2-1.

Figure 2-1. ClearVote 2.0 System Overview

2.2.3 System Limits

The system limits that were verified to be supported by the ClearVote 2.0 Voting System during this test campaign or during testing of the baselined system are listed in the tables below.

Table 2-2. System Limits for ClearDesign

Characteristic	Limit
Precincts in an election	3200
Contests in an election	3200
Candidates/Counters in an election	3200
Ballot Styles in an election	3200
Contests in a ballot style	60
Candidates in a contest	300
Ballot styles in a precinct	50
Number of political parties	50
"vote for" in a contest	50
Supported languages in an election	15
Number of write-ins	50

The maximum ballot positions for the ClearVote 2.0 Voting System were verified to be as follows:

Table 2-3. Maximum Oval Positions for ClearDesign

Ballot Size	Oval positions per side
5 inch	60
11 inch	180
14 inch	240
17 inch	300
19 inch	360
22 inch	420

Table 2-4. System Limits for ClearCount

Scanner Model	Sustained (not burst speed) ballots per hour						Typical county size (central count)
	8.5x5	8.5x11	8.5x14	8.5x17	8.5x19	8.5x22	
fi-6400	5592	3624	2928	2448	2350	2236	Large (>100k voters)
fi-6800	7822	5508	4155	3352	3000	2800	Large (>100k voters)
fi-7180	3396	2040	1692	1400	1300	1200	Small (<25k voters)
ClearCount can have a maximum of 10 ScanStation/Scanner pairs							

2.2.4 Supported Languages

The submitted voting system supports:

- English
- Spanish
- Chinese
- Korean
- Vietnamese
- Danish
- Dutch
- Flemish
- French
- German
- Italian
- Japanese
- Norwegian
- Portuguese
- Swedish

Due to the limited scope of testing, only English and Spanish language ballots were cast during the performance of functional testing. Additionally, one character based language (Chinese) was tested during System Integration Testing.

2.2.5 Supported Functionality

The ClearVote 2.0 was verified to support the following voting variations:

- General Election
- Primary Election (Open and Closed)
- Early Voting
- Partisan/Non-Partisan Offices
- Write-In Voting
- Primary Presidential Delegation Nominations
- Straight Party Voting
- Split Precincts
- Vote for N of M
- Ballot Rotation
- Provisional or Challenged Ballots
- Cross-party endorsement
- Judge initials

2.2.6 VVSG

The ClearVote 2.0 was evaluated against the relevant requirements contained in the EAC VVSG 1.0.

2.2.7 RFIs

There are no RFIs released by the EAC as of the date of this Test Report that pertain to this test campaign that were not in effect at the time of the baseline system certification.

2.2.8 NOCs

There are no NOCs released by the EAC as of the date of this Test Report that pertain to this test campaign that were not in effect at the time of the baseline system certification.

3.0 TEST FINDINGS AND RECOMMENDATION

The ClearVote 2.0 Voting System was evaluated against the relevant requirements contained in the EAC 2005 VVSG, Volumes I and II. The focus of this test campaign was on the modifications made to the baselined certified system. The summary findings and recommendations for each area of testing are provided in the following sections.

3.1 Summary Findings and Recommendation

Summary findings for the System Level Testing (System Integration Testing, Accuracy Test, and FCA), Hardware Testing, and Source Code Review are detailed in the relevant sections of this report. In addition to these areas of testing, a PCA, a limited TDP Review, and a QA & CM System Review were performed, as described below.

3.1.1 Physical Configuration Audit (PCA)

The physical configuration audit compares the voting system components submitted for qualification to the manufacturer's technical documentation, and shall include the following activities:

- Establish a configuration baseline of software and hardware to be tested; confirm whether manufacturer's documentation is sufficient for the user to install, validate, operate, and maintain the voting system

- Verify software conforms to the manufacturer's specifications; inspect all records of manufacturer's release control system; if changes have been made to the baseline version, verify manufacturer's engineering and test data are for the software version submitted for certification

- If the hardware is non-COTS, Pro V&V shall review drawings, specifications, technical data, and test data associated with system hardware to establish system hardware baseline associated with software baseline

- Review manufacturer's documents of user acceptance test procedures and data against system's functional specifications; resolve any discrepancy or inadequacy in manufacturer's plan or data prior to beginning system integration functional and performance tests

- Subsequent changes to baseline software configuration made during testing, as well as system hardware changes that may produce a change in software operation are subject to re-examination

Summary Findings

During execution of the PCA, the components of the ClearVote 2.0 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.

3.1.2 TDP Review

In order to determine compliance of the modified TDP documents with the EAC 2005 VVSG, a limited TDP review was conducted. This review focused on TDP documents that have been modified since the certification of the baseline system. The review consisted of a compliance review to determine if each regulatory, state, or manufacturer-stated requirement had been met based on the context of each requirement. Results of the review of each document were entered on the TDP Review Checklist and reported to the manufacturer for disposition of any anomalies. This process was ongoing until all anomalies were resolved. Any revised documents 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 subject requirements had been met.

Summary Findings

The submitted TDP was determined to be in compliance with the requirements set forth in the EAC 2005 VVSG. A listing of all documents contained in the ClearVote 2.0 TDP is provided in Table 3-1.

Table 3-1. ClearVote 2.0 TDP Documents

Document Number	Description	Version
ClearVote Documents		
100128	ClearVote 2.0 Change Notes	1.1
100101	ClearVote 2.0 Approved Parts List	1.1.13
100067	ClearVote 2.0 Ballot Stock and Printing Specification	1.0.11
100057	ClearVote 2.0 Configuration Management Plan	1.0.16
100069	ClearVote 2.0 Glossary	1.0.10
100058	ClearVote 2.0 Personnel Deployment and Training Plan	1.0.11
100059	ClearVote 2.0 Quality Assurance Program	1.0.12

Table 3-1. ClearVote 2.0 TDP Documents *(continued)*

Document Number	Description	Version
100086	ClearVote 2.0 Security Policy	1.0.12
100071	ClearVote 2.0 System Overview	1.1
100073	ClearVote 2.0 Test and Verification Specification	1.0.12
ClearDesign Documents		
100011	ClearDesign 2.0 Acceptance Test Checklist	1.0.6
100133	ClearDesign 2.0 Accessible Definition File Guide	1.0
100062	ClearDesign 2.0 Administration Guide	1.0.9
100131	ClearDesign 2.0 Ballot Definition File Guide	1.0
100083	ClearDesign 2.0 Build Procedures	1.0.7
100103	ClearDesign 2.0 Database Specification	1.0.6
100046	ClearDesign 2.0 Functionality Description	1.0.12
100098	ClearDesign 2.0 Hardware Specification	1.0.10
100063	ClearDesign 2.0 Installation Guide	1.0.23
100082	ClearDesign 2.0 Maintenance Guide	1.0.10
100045	ClearDesign 2.0 Security Specification	1.0.12
100072	ClearDesign 2.0 Software Design and Specification	1.0.18
100043	ClearDesign 2.0 System Overview	1.0.13
100074	ClearDesign 2.0 System Identification Guide	1.1
100041	ClearDesign 2.0 User Guide	2.0.11
ClearCount Documents		
100102	ClearCount 2.0 Acceptance Test Checklist	1.0.10
100009	ClearCount 2.0 Build Procedures	1.5
100005	ClearCount 2.0 Database Specification	1.0.9
100004	ClearCount 2.0 Election Administration Guide	1.0.17
100006	ClearCount 2.0 Election Preparation and Installation Guide	1.2.8
100021	ClearCount 2.0 Functionality Description	1.0.12
100022	ClearCount 2.0 Hardware Specification	1.0.12
100023	ClearCount 2.0 Maintenance Guide	1.0.13
100070	ClearCount 2.0 Reporting Guide	1.0.12
100013	ClearCount 2.0 Scanner Operator Guide	1.1.6

Table 3-1. ClearVote 2.0 TDP Documents *(continued)*

Document Number	Description	Version
100026	ClearCount 2.0 Security Specification	1.0.12
100019	ClearCount 2.0 Software Design and Specification	1.0.13
100024	ClearCount 2.0 System Operations Procedures	1.0.11
100025	ClearCount 2.0 System Overview	1.0.12
100130	ClearCount 2.0 Quick Start Guide XML Report Conversion Tool	---
100047	ClearCount 2.0 System Identification Guide	1.1
	ClearCast Documents	
100094	ClearCast 2.0 Build Procedures	1.2.4
100079	ClearCast 2.0 Functionality Description	1.5.4
100134	ClearCast 2.0 Hardware Acceptance Test Checklist	1.1
100081	ClearCast 2.0 Hardware Specification	1.5.1
100080	ClearCast 2.0 Installation Guide	1.4.1
100089	ClearCast 2.0 Maintenance Guide	1.8.1
100090	ClearCast 2.0 Poll Worker Guide	1.7.1
100084	ClearCast 2.0 Security Specification	1.4.4
100135	ClearCast 2.0 Software Acceptance Test Checklist	1.1
100093	ClearCast 2.0 Software Design and Specification	1.4.3
100097	ClearCast 2.0 System Identification Guide	1.2
100100	ClearCast 2.0 Supervisor Guide	1.8.2
100078	ClearCast 2.0 System Overview	1.4.5
	ClearAccess Documents	
100109	ClearAccess 2.0 Acceptance Test Checklist	1.1.1
100051	ClearAccess 2.0 Build Procedures	1.1.1
100049	ClearAccess 2.0 Functionality Description	1.5.3
100085	ClearAccess 2.0 Hardware Specification	1.5.1
100053	ClearAccess 2.0 Installation Guide	1.7.5
100052	ClearAccess 2.0 Maintenance Guide	1.8.1
100054	ClearAccess 2.0 Poll Worker Guide	1.8.1
100050	ClearAccess 2.0 Security Specification	1.4.6
100099	ClearAccess 2.0 Software Design and Specification	1.5.1

Table 3-1. ClearVote 2.0 TDP Documents *(continued)*

Document Number	Description	Version
100055	ClearAccess 2.0 Supervisor Guide	1.8.1
100044	ClearAccess 2.0 System Overview	1.6.4
100056	ClearAccess 2.0 Voter Guide	1.1.3
100126	ClearAccess 2.0 Hardware Compliance Addendum	---
100038	ClearAccess 2.0 System Identification Guide	1.2

3.1.3 QA & CM System Review

The Clear Ballot Group Quality and Configuration Management Manuals were reviewed for their fulfillment of Volume I, Sections 8 and 9, and the requirements specified in Volume II, Section 2. The requirements for these sections establish the quality assurance and configuration standards for voting systems to which manufacturers must conform and require voting system manufacturers to implement a quality assurance and configuration management program that is conformant with recognized ISO standards. As part of the review process, the Clear Ballot Group TDP documents were reviewed to determine if the stated policies were being followed.

Summary Findings

This testing utilized the TDP Review in conjunction with the PCA to determine compliance to the EAC 2005 VVSG requirements and the requirements stated in the Clear Ballot Group technical documentation. The review of the Quality Assurance and Configuration Management documentation focused on the Clear Ballot Group's adherence to its stated QA and CM processes. No discrepancies were noted during the reviews.

3.1.4 Source Code Review, Compliance Build, Trusted build, and Build Documentation Review

Pro V&V reviewed the submitted source code to the EAC 2005 VVSG and the manufacturer-submitted coding standards using both Automated Source Code Review and Manual Review methods. Prior to initiating the software review, Pro V&V verified that the submitted documentation is sufficient to enable: (1) a review of the source code and (2) Pro V&V to design and conduct tests at every level of the software structure to verify that design specifications and performance guidelines are met.

Summary Findings

- Automated Source Code Review: The Automated Source Code Review was performed to review the changes in the source code from the previously certified ClearVote 1.5 voting system. No source code issues were found during the Automated Source Code review.

- Manual Source Code Review: The Manual Source Code review was performed on 10% of the comments for compliance to VVSG Volume Section 5.2.7. No source code issues were found during the Manual Source Code review.

- Compliance Build: The compliance build was performed following the compliance review. Once the compliance review was performed and the source was deemed stable enough to proceed with testing, the source code and all additional packages were compiled into a Compliance Build.

Trusted Build: The trusted build consisted of inspecting customer submitted source code, COTS, and Third Party software products and combining them to create the executable code. This inspection followed the documented process from the "United States Election Assistance Commission Voting System Test Laboratory Program Manual" Section 5.5 – 5.7. Performance of the trusted build includes the build documentation review. The Trusted Build was performed following the completion of the Functional Configuration Audit.

3.1.5 Security Testing

A complete security evaluation was performed on the baselined system. The evaluation of the baselined system was accomplished by utilizing a combination of documentation review, functional testing, source code review, automated network and vulnerability scanners, as well as manual inspection. Test cases were developed in an attempt to defeat the access controls and security measures documented in the system TDP. During the execution of these test procedures, the physical, technical, and administrative security controls were evaluated to determine if the security posture of the system components 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. Tests conducted verified that the security mechanisms specified in the TDP Security Specification were implemented and adequately protect the system. Administrative Security was tested by examining the system's documented security instructions and procedures for effectiveness and breadth. Logical Security was tested as part of FCA by conducting the following tests on system components: Vulnerability Scans, SCAP Scans, and Physical Bypass Attempts.

To meet the objectives of this test campaign, the modified components were evaluated to determine the effectiveness of their physical security measures and to determine if the modification adversely impacted results from the baseline test campaign.

Summary Findings

As a result of the Security Testing, it was determined that the ClearVote 2.0 met the requirements of the security review. Any deficiencies encountered during testing were successfully resolved.

3.1.6 System Level Testing

System Level testing was implemented to evaluate the complete system. This testing included all proprietary components and COTS components (software, hardware, and peripherals) in a configuration of the system's intended use. For software system tests, the tests were designed according to the stated design objective without consideration of its functional specification. The system level hardware and software test cases were prepared independently to assess the response of the hardware and software to a range of conditions.

Pro V&V reviewed the manufacturer's program analysis, documentation, and module test case design and evaluated the test cases for each module with respect to flow control parameters and entry/exit data.

The software system functions for the previously certified voting system (ClearVote 1.5) remained unchanged for the submitted modifications. The ClearVote 2.0 Election Management System (EMS) consists of a set of applications responsible for all pre-voting and post-voting activities used in election definition and management process. The ClearVote 2.0 EMS applications are as follows:

- ClearDesign
- ClearCount

System Level Testing included the evaluations of the following test areas FCA, Accuracy Testing, and System Integration Testing. Each of these areas is reported in detail in the subsections that follow.

Component Level Testing was implemented during the FCA for each component and subcomponent. During the source code review, compliance builds, and security testing, Pro V&V utilized limited structural-based techniques (white-box testing). Additionally, specification-based techniques (black-box testing) were utilized for the individual software components.

Pro V&V defined the expected result for each test and the ACCEPT/REJECT criteria for certification. If the system performed as expected, the results were accepted. If the system did not perform as expected, an analysis was performed to determine the cause. If needed, the test was repeated in an attempt to reproduce the results. If the failure could be reproduced and the expected results were not met, the system was determined to have failed the test. If the results could not be reproduced, the test continued. Any errors encountered were documented and tracked through resolution.

To verify the modifications were successfully addressed throughout the test campaign, each modification was tracked and verified to be addressed during the execution of the relevant test area. For example, source code changes were verified during the source code review. Modifications requiring functional test verification were evaluated by executing the standard Accuracy Test, the System Integration Test, or during performance of the FCA. Modifications that were not adequately evaluated during the performance of these tests were subjected to specifically designed test cases.

3.1.6.1 Functional Configuration Audit (FCA)

The functional configuration audit encompasses an examination of manufacturer's tests, and the conduct of additional tests, to verify that the system hardware and software perform all the functions described in the manufacturer's documentation submitted in the TDP.

In addition to functioning according to the manufacturer's documentation, tests are conducted to ensure all applicable EAC 2005 VVSG requirements are met.

For this campaign FCA testing included several exhaustive paths applied in concert:

- <u>FCA-VVSG Testing</u>: Each component of the system was evaluated against a standardized test-case suite centered upon requirements stated in the VVSG and administered through a test-management software tool. All applicable tests-cases were performed while any non-applicable test-cases were logged as "n/a" for substantiation. The system operations and functional capabilities were categorized in the tool as follows by the phase of election activity in which they are required:

    o <u>Pre-voting Capabilities</u>: 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.

    o <u>Voting System Capabilities</u>: These functional capabilities include all operations conducted at the polling place by voters and officials including the generation of status messages.

    o <u>Post-voting Capabilities</u>: 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; tabulation of paper ballots at the central location; accumulation of results from all voting methods; obtaining consolidated reports; and obtaining reports of audit trails.

- <u>FCA-Claims Testing</u>: System user instructions and procedures found in the TDP were followed to verify their accuracy and completeness. In addition any functional claims discovered in the TDP that were not specifically examined in other areas or that were items of interest were also tested.

- <u>FCA-Mapping</u>: Any modified functional paths (buttons, dropdowns, etc.) were mapped by qualified VSTL personnel, to help ensure all functional options had been noted and exercised. Any items of interest were examined and/or tested.

All issues (if any) found during these efforts are detailed in Section 3.3. Any issues noted were tracked using an issue tracking software program and issue tracking spreadsheets.

<u>Summary Findings</u>

All functional tests were successfully executed. During execution of the test procedure, it was verified that the ClearVote 2.0 System successfully completed the system level integration tests with all actual results obtained during test execution matching the expected results. At the conclusion of the test campaign, it was determined that any issues communicated to Clear Ballot Group had been successfully reconciled.

3.1.6.2 Accuracy

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

Summary Findings

The ClearVote system was tested by utilizing a combination of hand marked (70%) and pre-marked (30%) ballots to achieve an accuracy rate greater than 1,549,703 correct ballot positions. The ClearVote system was tested by using all of the available ballot sizes to cast a sufficient number of ballots to achieve an accuracy rate greater than 1,549,703 correct ballot positions.

The ClearVote 2.0 System successfully passed the Accuracy Test. All deficiencies encountered during the Accuracy Test are detailed in Section 3.3. Any issues noted were successfully resolved. During execution of the test procedure, it was verified that the ClearVote 2.0 System successfully completed the test with all actual results obtained during test execution matching the expected results.

3.1.6.3 System Integration

System Integration is a system level test for the integrated operation of both hardware and software. System Integration evaluates the compatibility of the voting system software components or subsystems with one another, and with other components of the voting system environment. This compatibility was determined through functional tests integrating the voting system software with the remainder of the system. During test performance, the system was configured exactly as it would for normal field use. This included connecting all supporting equipment and peripherals including ballot boxes, voting booths (regular and accessible), and any physical security equipment such as locks and ties.

Summary Findings

During System Integration testing, three General Elections and three Primary Elections were successfully exercised on the voting system, as described below:

Three general elections with the following breakdowns:

— General Election GEN-01: A basic election held in 4 precincts, one of which is a split precinct. This election contains 19 contests compiled into 4 ballot styles. 5 of the contests are in all 4 ballot styles. The other 15 contests are split between at least 2 of the precincts with a maximum of 4 different contest spread across the 4 precincts.

— General Election GEN-02: A basic election held in 3 precincts. This election contains 15 contests compiled into 3 ballot styles. 10 of the contests are in all 3 ballot styles with the other five split across the 3 precincts.

— General Election GEN-03: A basic election held in 2 precincts. This election contains 8 contests and compiled into 2 ballot styles. 4 of the contests are in both ballot styles. The other 4 contests are split between the two precincts. This election is designed to functionally test the handling of multiple ballot styles, support for at least three languages including a character-based language, support for common voting variations, and audio support for at least three languages and an ADA binary input device.

Three primary elections with the following breakdowns:

— Primary Election PRIM-01: Open Primary Election in two precincts. This election contained thirty contests compiled into five ballot styles. Each ballot style contains 6 contests.

— Primary Election PRIM-02: Open Primary Election held in two precincts. This election contained thirteen contests compiled into three ballot styles. One contest is in all three ballot styles; all other contests are independent.

— Primary Election PRIM-03: A basic election held in 2 precincts. This election contains 10 contests and is compiled into 2 ballot styles. 2 of the contests are in both ballot styles. The other 8 contests are split between the two parties' ballots. This Primary Election is designed to functionally test the handling of multiple ballot styles, support for at least three languages including a character-based language, support for common voting variations, and audio support for at least three languages and an ADA binary input device.

The ClearVote 2.0 System successfully passed the System Integration Test. All deficiencies encountered during the System Integration test are detailed in Section 3.3. Any issues noted were successfully resolved. During execution of the test procedure, it was verified that the ClearVote 2.0 System successfully completed the system level integration tests with all actual results obtained during test execution matching the expected results.

3.1.7 Usability and Accessibility Testing

Usability & Accessibility testing was performed to evaluate the ClearVote 2.0 voting system to the applicable requirements. Testing specifically focused on the ClearAccess and ClearCast units and the modifications implemented since the certification of the baseline system.

Usability was defined generally as a measure of the effectiveness, efficiency, and satisfaction achieved by a specified set of users with a given product in the performance of specified tasks. The Accessibility portion of testing evaluated the requirements for accessibility. These requirements are intended to address HAVA 301 (a) (3) (B).

During test performance, the ClearVote 2.0 voting system was configured as per the Clear Ballot TDP. The configured system was tested to the VVSG 1.0 requirements utilizing TestLink which maintains all applicable test cases. Utilization of both negative and positive inputs were entered into the system and documented into TestLink to allow for traceability and reproducibility. All components were evaluated for applicable requirements in which all deficiencies were documented within TestLink and Mantis for tracking purposes. Regression testing was performed on all identified issues to ensure resolution and compliance to the requirements.

<u>Summary Findings</u>

The ClearCast and ClearAccess components successfully met the requirements of the Usability and Accessibility evaluation. Any deficiencies encountered during testing were successfully resolved.

3.1.8 Hardware Testing

The hardware configuration and design for the modification are unchanged from the baseline system. The ClearVote 2.0 Voting System consists of the following major components: ClearDesign, ClearAccess, ClearCast, and ClearCount. ClearVote is comprised of one proprietary hardware component (ClearCast) and two COTS hardware components (ClearCount) and (ClearAccess). All ClearDesign functions are managed by proprietary software running on COTS PCs/laptops/servers, which is excluded from hardware testing.

Previous hardware examinations were performed on the certified baseline system (ClearVote 1.5). The updates to the modified system (ClearVote 2.0) required the following hardware and electrical testing to be performed:

Electrical Tests:

- Electrical Power Disturbance – ClearAccess

- Electromagnetic Radiation – ClearCast, ClearAccess

- Electrostatic Disruption – ClearCast, ClearAccess

- Electromagnetic Susceptibility – ClearAccess

- Electrical Fast Transient – ClearCast, ClearAccess

- Lightning Surge – ClearAccess

- Conducted RF Immunity – ClearAccess

- Magnetic Fields Immunity – ClearAccess

- Electrical Supply – ClearCast, ClearAccess

Environmental Tests:

- Bench Handling – ClearCast

- Vibration – ClearCast

- Temperature Power Variation - ClearAccess

- Acoustic – ClearAccess

Pro V&V utilized third party testing during the performance of hardware testing. All hardware testing was performed at the NTS Longmont facility located in Longmont, Colorado. All testing at the NTS Longmont facility was witnessed on-site by Pro V&V personnel, with the exception of Temperature Power Variation Test in which Pro V&V qualified staff executed all testing.

Summary Findings

Electrical Testing was performed on the ClearVote 2.0 components listed above. The procedures and results for this testing are included in the following NTS Test reports:

- ITR-PR097807, presented in Attachment B

- ITR-PR100763, presented in Attachment B

- ETR-PR100763, presented in Attachment B

The test results from this testing are summarized below:

Table 3-2. Electrical Hardware Test Results

Standard/Method	Description	Criteria	Class/Level	Result
FCC 15.107 ICES-003 VVSG Vol. 1 4.1.2.9	Power Line Conducted Emissions	Normal Operation & No Data Loss	Class B	Pass
FCC 15.109 ICES-003 VVSG Vol. 1 4.1.2.9	Radiated Emissions	Normal Operation & No Data Loss	Class B	Pass *&**

Table 3-2. Electrical Hardware Test Results *(continued)*

Standard/Method	Description	Criteria	Class/Level	Result
EN61000-4-11 VVSG Vol. 1 4.1.2.5	Electrical Power Disturbance	Normal Operation & No Data Loss	Various	Pass
EN61000-4-4 VVSG Vol. 1 4.1.2.6	Electrical Fast Transient	Normal Operation & No Data Loss	±2kV - Mains	Pass
EN61000-4-5 VVSG Vol. 1 4.1.2.7	Lightning Surge	Normal Operation & No Data Loss	±2kV Line - Line ±2kV Line - Ground	Pass
EN61000-4-2 VVSG Vol. 1 4.1.2.8	Electrostatic Disruption	Normal Operation & No Data Loss	±8kV Contact ±15kV Air	Pass ***
EN61000-4-3 VVSG Vol. 1 4.1.2.10	Electromagnetic Susceptibility	Normal Operation & No Data Loss	10 V/m, 80 MHz – 1 GHz	Pass
EN61000-4-6 VVSG Vol. 1 4.1.2.11	Conducted RF Immunity	Normal Operation & No Data Loss	10 Vrms, 150 kHz – 80 MHz	Pass
EN61000-4-8 VVSG Vol. 1 4.1.2.12	Magnetic Immunity	Normal Operation & No Data Loss	30 A/m	Pass

* During test performance, an issue was detected with the ClearAccess Configuration. The configuration was outside of the allowable range during the emissions test. Clear Ballot was notified of the issue and performed an analysis of the occurrence and implemented a corrective action by adding ferrites to the USB (ATI, printer, and bar code scanner) connections on the ELO E and using a back-up OKI printer. For a detailed description of the corrective actions please refer to the NTS Report No: ETR-PR100763. This configuration was successfully tested and regression testing was performed on the system to verify that the change did not adversely impact previous test results. For detailed instructions, see document # 100126-10016: ClearAccess Hardware Compliance Addendum.

** During test performance, an issue was detected with the ClearCast unit. The unit was outside of the allowable range during the emissions test. Clear Ballot was notified of the issue and performed an analysis of the occurrence and implemented a corrective action by replacing the HDMI cable of the display to the unit. For a detailed description of the corrective actions please refer to the NTS Report No: ETR-PR100763. This configuration was successfully tested and regression testing was performed on the system to verify that the change did not adversely impact previous test results.

*** During test performance, an issue was detected with ClearAccess components, (The ELO E-series All-in-One computer and CyberPower UPS). The components stopped functioning during +/-15 kV Air discharge. Clear Ballot was notified of the issues and performed an analysis. Clear Ballot implemented a corrective action of adding 2 mil polymide film tape around the CPU enclosure. The same polymide film tape was used on the CyberPower UPS's LCD screen and the Okidata printer's LCD screen. For detailed instructions of the corrective actions, please see document # 100126-10016: ClearAccess Hardware Compliance Addendum. This configuration

was successfully tested and regression testing was performed on the system to verify that the change did not adversely impact previous test results.

Environmental Testing was performed on the ClearVote 2.0 components listed above. The procedures and results for this testing are included in the following NTS Test reports:

- TR-PR097808 Rev. 0, presented in Attachment B

The test results from this testing are summarized below:

Table 3-3. Environmental Hardware Test Results

Standard/Method	Description	Criteria	Result
MIL-STD-810D, 516.3, I-3.8 VVSG Vol. 1 4.1.2.14, VVSG Vol. 2 4.6.2	Shock – Bench Handling	Normal Operation & No Data Loss	Pass
MIL-STD-810D, 514.3, I-3.2.1 VVSG Vol. 1 4.1.2.14, VVSG Vol 2 4.6.3	Vibration - Basic Transportation	Normal Operation & No Data Loss	Pass
MIL-STD-810D, 501.2/502.2 VVSG Vol 1 4.1.2.13, 4.3.3, VVSG Vol 2 4.7.1	Reliability, Temperature-Power Variation Testing	Normal Operation & No Data Loss	Pass
VVSG Vol. 1 3.1.7.1, 3.2.2.2 (c)	Acoustic Noise Level Test	Normal Operation & No Data Loss	Pass

All tests were completed successfully without issue.

3.2 Anomalies and Resolutions

When a result is encountered during test performance that deviates from what is standard or expected, a root cause analysis is performed. Pro V&V considers it an anomaly if no root cause can be determined. In instances in which a root cause is established, the results are then considered deficiencies.

Summary Findings

There were no anomalies encountered during this test campaign.

3.3 Deficiencies and Resolutions

Any violation of the specified requirement or a result encountered during test performance that deviates from what is standard or expected in which a root cause is established was considered to be a deficiency. Any deficiencies encountered were logged throughout the test campaign into the Pro V&V tracking system (Mantis) for disposition and resolution. In each instance, if applicable, the resolutions were verified to be resolved through all required means of testing (regression testing, source code review, and TDP update) as needed.

The noted deficiencies are listed in Table 3-4.

Table 3-4. Noted Deficiencies

ID#	Test Category	Deficiency	Resolution
480	Hardware	Radiated Emissions: ClearCast	This issue was resolved by replacing the HDMI cable of the display to the unit.
481	Hardware	Radiated Emissions: ClearAccess	This issue was resolved by adding ferrites to the USB (ATI, printer, and bar code scanner) connections on the ELO E and using a back-up OKI printer. This can only be performed by qualified CBG personnel prior to initial use. For detailed instructions please see document # 100126-10016: ClearAccess Hardware Compliance Addendum
482	Hardware	Electrostatic Disruption: ClearAccess	This issue was resolved by adding 2 mil polymide film tape around the ELO E's CPU enclosure. The same polymide film tape was also used on the CyberPower UPS's LCD screen and the Okidata printer's LCD screen. This can only be performed by qualified CBG personnel prior to initial use. For detailed instructions please see document # 100126-10016: ClearAccess Hardware Compliance Addendum
483	System Loads & Hardening	ClearDesign build would not load onto the server	A source code update was required so that build would successfully load. Functional regression testing was performed to verify that the issue was resolved.
484	TDP	Minor edits and revisions needed during review.	All issues were corrected with new submissions of the affected documents.

4.0 RECOMMENDATION FOR CERTIFICATION

The ClearVote 2.0 Voting System, as presented for testing, successfully met the requirements set forth for voting systems in the U.S. Election Assistance Commission (EAC) 2005 Voluntary Voting System Guidelines (VVSG), Version 1.0. Additionally, Pro V&V, Inc. has determined that the ClearVote 2.0 functioned as a complete system during System Integration Testing. Based on the test findings, Pro V&V recommends the EAC grant the ClearVote 2.0 system, as identified in Tables 4-1 and 4-2, certification to the EAC 2005 VVSG.

Table 4-1. ClearVote 2.0 Voting System Software

Firmware/Software	Version
ClearDesign Components, Version 2.0.1	
Windows	10 Pro 1607

Table 4-1. ClearVote 2.0 Voting System Software *(continued)*

Firmware/Software	Version
Google Chrome	55.0.2883.87
Ubuntu	18.04.1 LTS
MySQL	5.7.26
Apache	2.4.18
libapache2-mod-fcgid	2.3.9
PhantomJS	1.9.8
Unzip	6.0.21
Samba	4.7.6
Python PIP	9.0.1
Zip	3.0.11
Pyinstaller	3.2.1
Python JSMIN	2.2.1
Python	2.7.15
Python webpy	0.38
Python MySQL DB	1.3.10
SQLAlchemy	1.0.15
Python Pillow	5.1.0
Python Flup	1.0.2
Python DBUtils	1.1
Python XLRD	0.9.4
Python FontTools library	3.0
Python RTF	0.2.1
OpenSSL (FIPS)	2.0.10
OpenSSL	1.0.2g
DataTable	1.10.16
DataTable-Buttons	1.4.2
DataTable-Buttons-JSZip	2.5.0
DataTable-Buttons-Pdfmake	0.1.32
DataTablePlugins	1.10.16
bootstrap	3.0.0
jquery	1.10.2
jquery-impromptu	5.2.3
jquery-qrcode	1.0
jquery-splitter	0.14.0
jquery-ui	1.10.4
jscolor	1.4.2

Table 4-1. ClearVote 2.0 Voting System Software *(continued)*

Firmware/Software	Version
tinymce	4.1.9
libmp3lame	0.5.0
jszip	3.1.2
papaparse	4.1.2
jsmin	12/4/2003
ClearAccess Components, Version 2.0.1	
Windows	10 Pro 1607
Google Chrome	61.0.3163.100
nsis	3.01
PyInstaller	3.2
Python	2.7.10
webpy	0.38
Python-future	0.15.2
pefile	2018.8.8
pywin	223
jquery	1.10.2
DataTables	1.10.16
jsmin	2003-12-04
Zebra scanner driver	3.04.0007
ClearCast Components, Version 2.0.0	
scanner_control	0.0.33
Ubuntu	18.04.1 LTS
google_chrome	76.0.3809.87-1
zeromq	4.2.3
pyinstaller	3.2.1
openssl-fips	2.0.10
openssl	1.0.2g
libScanAPI.a	1.1.4
DataTables	1.10.16
JTSage DateBox	4.0.0
jQuery.NumPad	1.4
jQuery	1.12.4
jquery.ui	1.11.3
ClearCount Components, Version 2.0.1	
Windows	10 Pro 1607

Table 4-1. ClearVote 2.0 Voting System Software *(continued)*

Firmware/Software	Version
Google Chrome	55.0.2883.87
Ubuntu	18.04.1 LTS
Apache	2.4.29
libapache2-mod-fcgid	2.3.9
Python(part of Ubuntu)	2.7.15
MySQLdb (part of Ubuntu)	5.7.26
PyInstaller	3.2.1
PollyReports	1.7.6
OpenSSL	1.1.0g
OpenSSL FIPS Object Module	2.0.10
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
ColVis	1.0.8
JavaScript TableTools library	2.1.5
ZeroClipboard	1.0.4-TableTools2
JavaScript FixedHeader library	2.0.6
JavaScript hotkeys library	0.8
JavaScript tooltip library	1.3
JavaScript pep library	1.0
JavaScript LESS library	1.3.3
Fujitsu fi-6400	PaperStream 1.30.0
Fujitsu fi-6800	10.10.710
Fujitsu fi-7180	PaperStream 1.4.0
Aptitude	1.6.11
auditd	2.8.2
debconf	1.5.66
pmount	0.9.23
Samba	4.7.6
udisks	2.7.6

Table 4-2. ClearVote 2.0 Voting System Equipment

Component	Model	Serial Number
ClearDesign Components		
Dell Latitude Laptop (client)	5580, 5590	CF3L3G2, B5TD1N2
Dell OptiPlex (client)	7440	JXDFHH2
Dell Precision Tower (client)	T3620	GSKRMV2 & GSKSMN2
Dell PowerEdge Server (server)	T130, T140, T440, T630	5G0YLN2, 8BFH3W2, H6JZLN2, GCHLHL2
Dell 24 inch Monitor	SE2416H	FVWV5G2
Dell 22 inch Monitors	E2216HV	36765D2 & 90665D2
Cisco 8-Port Switch	SG250-08	PSZ21451MLJ
LG DVD Burner	GP65NB60	LG-DVD-001
Anker 10 port USB 3.0 Hub	AK-68ANHUB-B10A	22XGHFWC, 22XGHGKX
SySTOR Multiple USB Duplicator	SYS-USBD-11	ES-27095
Corsair Flash Padlock 3 32 GB	Secure USB 3.0 Flash Drive	CMFPLA3B-32GB
SanDisk Extreme Go 64 GB USB	3.1 USB Drive	SDCZ800-064G-G46
SanDisk Ultra Flair 32 GB USB	3.0 Drive	SDCZ73-032G-A46, SDCZ73-032G-G46
ClearAccess Components		
ELO 15 inch AIO	E-Series (ESY15E2)	L17C014810 & A18C004080
Dell OptiPlex AIO	5250	HCGMGK2
Oki Data Laser Printer	B432dn	AK5B007647A0 & AK91021454C0
ELO 20 inch AIO	X-Series (ESY20X2)	D18Q000334, D18Q000335, B18Q001601, B18Q001599 & B18Q000597
Oki Data Laser Printer	B432dn-B	AK8C017016C0, AK8C017022C0
Dell Inspiron 15"	7000 Series	80S1YD2
Brother Laser Printer	HL-L2340DW	U63879M4N62861
Brother Laser Printer	HL-L2350DW	U6496A8N238333
Micrologic Tray Kit	B432TrayKit	CBG-MTK-001
Zebra Technologies Bar Code Scanner	DS457-SR, CBL-58926-05	18059000501984, 18059000501981, 18095000500487, 18095000500491
Storm EZ Access Keypad	EZ08-222013	15000005, 15000007, 15020478
Origin Instruments Sip/Puff Breeze with Headset	AC-0313-MUV	CBG-SP-001, 002, 003

Table 4-2. ClearVote 2.0 Voting System Equipment *(continued)*

Component	Model	Serial Number
Samson Over-Ear Stereo Headphones	SASR350	SR350J8G390 & SR350J8G396
Clear Ballot Privacy Screen	CB-1097-1.5	CBG-PVS-001
Ergotron Neo-Flex	Widescreen Lift Stand	33-329-085
Corsair Flash Padlock 3 32 GB	Secure USB 3.0 Flash Drive	CMFPLA3B-32GB
SanDisk Extreme Go 64 GB USB	3.1 USB Drive	SDCZ800-064G-G46
SanDisk Ultra Flair 32 GB USB	3.0 Drive	SDCZ73-032G-A46, SDCZ73-032G-G46
Wurth	742-711-32, 742-712-22, 742-717-22	FRT021 through FRT025
Polymide Film Tape	1" 2 mil	CV-1210-2.0
Polymide Film Tape	2" 2 mil	CV-1211-2.0
Polymide Film Tape	4" 2 mil	CV-1212-2.0
APC Smart-UPS	SMT2200C	AS1809160852
Lifetime 4-Foot Folding Table	4428	FT-001
LG DVD Burner	GP65NB60	LG-DVD-002
CyberPower Smart App UPS	PR1500RT2U	PY3HZ2002933, PY3HZ2003000
ClearCount Components		
Dell Latitude Laptops (ScanStation)	5580, 5590	2F3L3G2, 9W5D1N2
Dell Precision Tower (Election Administration)	T3620	GSKQMN2
Dell Latitude Laptops (Election Administration)	5580, 5590	C9S22G2, 5M5D1N2
Dell PowerEdge Server (ScanServer)	T130, T140, T330, T440	5G0ZLN2, 8BFJ3W2, FHV9RD2, H6J5MN2
Dell OptiPlex (Election Administration)	7440	JXDFHH2
Fujitsu Scanner	fi-7180	A20DC10302 & A20D000798
Fujitsu Scanner	fi-6800	A9HCA00737 & A9HCC00543
Fujitsu Scanner	fi-6400	AKHCC00362 & AKHCC00609
LG DVD Burner	GP65NB60	LG-DVD-003
Western Digital 4 TB External HD	WDBFJK0040HBK -NESN	WCC7K7YF11ZD
Western Digital 8 TB External HD	WDBFJK0080HBK -NESN	75H4PXJD

Table 4-2. ClearVote 2.0 Voting System Equipment *(continued)*

Component	Model	Serial Number
Netac Keypad Encryption Portable Hard Disk	K390	R4JT22619T
Dell 24 inch Monitor	P2415Q	3TZSJ92
Dell 22 inch Monitor	P2217	7818672
Cisco 8-Port Switch	SG250-08	PSZ21451MYX
Cisco 26-Port Switch	SG250-26	DNI203400A6 & DNI203400AW
Corsair Flash Padlock 3 32 GB	Secure USB 3.0 Flash Drive	CMFPLA3B-32GB
SanDisk Extreme Go 64 GB USB	3.1 USB Drive	SDCZ800-064G-G46
SanDisk Ultra Flair 32 GB USB	3.0 Drive	SDCZ73-032G-A46, SDCZ73-032G-G46
Anker USB Hub	AK-68ANHUB-B10A)	22XGHFWC, 22XGHGKX
APC Smart-UPS	SMT-1500C	3S1831X12280
WorkEZ Executive Scanning Shelf	WEEs (661799222990)	CBG-EZ-001, 002, 003, & 004
StarTech 4-Port VGA KVM Switch w/Hub	SV431USB	G73011TG80247
ClearCast Components		
ClearCast	Model D Revision 5	041902446, 041902447, 041902453
Corsair Flash Padlock 3 32 GB	Secure USB 3.0 Flash Drive	CMFPLA3B-32GB
SanDisk Extreme Go 64 GB USB	3.1 USB Drive	SDCZ800-064G-G46
SanDisk Ultra Flair 32 GB USB	3.0 Drive	SDCZ73-032G-A46, SDCZ73-032G-G46
Ballot Bag	CV-1032-1.5, CV-113-1.5	bag001, bag002
Ballot Box	CV-1082-2.0	box001
Wurth Ferrites	74271142,74275812 74275813,74271132 ,74271722	FRT001 through FRT020

APPENDIX A
MODIFICATION TABLE

Table A-1. System Modifications

Enhancement Area	Description
ClearAccess	
UI Enhancement	Change the Settings, Zoom option label from "Normal" to "Default".
Security Enhancement	Import encrypted ADF files into ClearAccess.
	Do not allow the system administrator to close the election before polls are closed.
	Require a poll worker or election administrator to log in before the start of voting.
	Retain the last ballot status when the system restarts.
General Enhancement: Printing stubs and serial numbers	Enabling and disabling the printing of stubs.
	Printing a unique number on a stub.
Fixed Defects	On log pages, the icon for the sorting direction is no longer missing.
ClearCast	
UI Enhancements	Make the use of the Back and Close buttons consistent on all screens.
	Improve the handling of long election and jurisdiction names in pop-up windows.
	Improve the handling of long vote center and "voter group"/counter group names.
	Previously, when the Vote Suspended report printed, the buttons in the pop-up windows, such as Pause printing and Cancel printing, were misaligned. The release has aligned these buttons.
	Provide a UI cue when the Submit button is pushed.
	Use the Language button to display translated language names.
	Make the terminology consistent for UI text edits.
	Improve the alignment of the LAT Testing screen footer.
	Update the graphics on Election Management screens for handling USB drives.
	Improve the Voter Screen UI for the Language button.
	This release contains improved icons for showing the battery status on the voter-facing UI screen.
	When an election has one language, remove the Language button.
	Move the language selections down on the Voter screen.
	The loading icon no longer shows the company logo and has a new graphic animation.
Workflow Enhancements	Improve the workflow for changing the maintenance password.
	Closing an election logs out a user.
	Always display the warning "storage media almost full" message when this situation occurs.
	Change the "ballot successful cast" screen to two seconds.
	Do not show the Results buttons before voting for L&A testing.
	Remove extraneous buttons from the Repeat Scan page.
	Remove "Pause Printing" from ClearCast.

Table A-1. System Modifications *(continued)*

Enhancement Area	Description
Report Enhancements	Display the BDF version on an Open election/polls report.
	Add an Election Closed report
	Ensure that long log entries not cut off.
	List precincts by PrecinctOrder in the Precinct Totals report.
	Reports by precinct show only the applicable contests.
	Enhance Report By Precinct.
	Add "Straight Party Option" to reports.
	The Results by Precinct report shows card counts for each precinct.
	The Write-ins report shows only the appropriate contests for each precinct.
	Add text to the "print out of paper" message to remind the user to remove the plastic core of the old roll.
	Print the "resume" header when the printer continues after running out of paper.
	Display the "Level" header when printing the system log.
	Reduce the height of the Write-ins report to improve the display the actual write-in candidates.
	Improve the handling of out-of-paper situations to ensure no loss of printed data.
	Replace ChoiceName with ChoiceShortName in reports because ChoiceName now contains the long choice name.
	Improve message-header formatting of the election log.
Security Enhancements	Load elections from encrypted BDF files.
	Encrypt ballot images and tabulation results on ClearCast USB drives.
	Adjust role permissions.
	Do not allow the system administrator to close an election before polls are closed.
	Add password-complexity rules for the System Administrator and Maintenance roles.
	Do not allow the Maintenance role to change the System Administrator password.
	Log the make and model of all connected devices.
	ClearCast will decrypt the encryption password for each login.
General Enhancements	Display the low disk space message before scanning the ballot.
	Changed the ClearCast install grub menu text.
	Automatically shut down the machine when the splash screen appears and the machine is using battery power.
	Save the serial number and protected counter when a reinstallation occurs.
	Modified the Installer to retain the contents of the /pcos partition during the upgrade process
	Detect when the thermal paper roll is removed.

Table A-1. System Modifications *(continued)*

Enhancement Area	Description
Code Maintenance	Update the copyright year.
	Modify ClearCount imports based on modules.
	Remove the eject usb code.
	Remove the PDI scanner source and tools from ClearCast source and build.
	Remove the Cyberpower 650 UPS source and tools from ClearCast source and build.
	Remove the web.py session object because it is not used.
	Fix bare exceptions in src-pcos.
	ClearCast templates (printer and HTML) now have inputs, outputs, and calls listed in the source code.
	Remove the message variable from input.html template.
Fixed Defects	An unhandled exception in the system log no longer causes the DataTable in the front-end JavaScript to crash.
	The Election Closed Report will print multiple times if the USB drive is removed just before closing the election.
	Setting the Date/Time back in the ClearCast UI no longer causes "a stop job is running for MYSQL (xmin/ 10min)" message.
	The image accompanying the rejection message for judge's initials no longer disappears if the language changes.
	On ballots with multiple errors, some error messages previously failed to appear. This situation no longer occurs.
	The write-ins report will now filter out overvoted choices.
	Clear Ballot has corrected errors that were previously in the ballot_styles.html printer template
	Canceling the printing of a report now adds an end blank space.
	The UI bottom border line on various screens was in wrong place and is now correct.
	The L&A testing Print Write-Ins report now prints correctly.
	When a user changes a password, ClearCast authenticates the old password before the user enters a new password.
	Reporting data is no longer lost when the paper is removed and not replaced for 48 hours or more.
	ClearCast no longer shows a "shutting down" message during transition states.
	When canceling printing when out of paper, the buffer no longer needs to be cleared before the gray box dismisses.
	This release has fixed some formatting issues in summary total reports.
	This release corrects the error message that appears when using four characters or fewer as the Machine Name on ClearCast.
ClearCount	
UI Enhancements	On the Side (Card Information) page, change the label "Style ID" to be "Card Style ID".
	Remove the pop-up message asking for confirmation of a modification: "This already got adjudicated by an algorithm."

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Table A-1. System Modifications *(continued)*

Enhancement Area	Description
XML and Report Enhancements	Import the Contest District from BDF.
	Add District to the Contest elements in XML.
	Add Candidate Party Subtotals to ClearCount XML.
	Change choice (candidate) short name to the long name in reports.
Security Enhancements	Updated BDF content needs a password and bypass option.
	Create elections from encrypted and unencrypted BDFs.
	ClearCount can merge encrypted ballot images and results from ClearCast.
	Disable the display of vote totals as the default option.
	Limit network connections to known voting system components.
	Upgrade ClearCount to Ubuntu 18.04.1 LTS.
General Enhancement: Single-Row Cross Endorsement	Count Straight Party Votes for Single Row Cross-Endorsed Candidate.
	Support Single Row Cross-Endorsed Candidates.
Code Maintenance	Update Copyright Year.
	Add __init__.py files to ClearCount.
	Run pylint on all files on commits.
Fixed Defects	The message for votes rejected due to missing judge's initials previously appeared incorrectly in non-votes section of Vote Visualization page.
	Clear Ballot has adjusted Oval Visualization so that the ballot-image thumbnail size accurately reflects the available space after the load of the oval is complete.
ClearDesign	
UI Enhancements	The terms "under vote" and "over vote" have changed to "undervote" and "overvote" throughout the UI.
	ClearDesign has added the word "Warn" to the "Straight Voter Group Overvote" column header of the Device Types report.
	Version 2.0 contains enhanced error messages around voter group limits for candidates.
	On the Device Type screens, the term "PIN" has changed to "Password".
Ballot Enhancements	Do not cover ovals with the margin background color specified in the layout styles for the entity types.
	Add a macro for the stub number to iterate upon when printing from PrintNow or ClearAccess.
	Enhance the Sample Ballot (Provisional Ballot) to use most layout style formatting.
	Include an option to allow "Write-in" to appear on the line.
Performance Enhancements	Allow cancellation of ballot printing to PDFs.
	Turn off database auto-flush for read-only queries.
	Place the datatable data in the HTML file as a JSON array to improve the performance with loading large datasets.
	Specify joinedload for entities when loading list data.

Table A-1. System Modifications *(continued)*

Enhancement Area	Description
Security Enhancements	The export of encrypted BDF files.
	The export of encrypted ADF files.
	Show the encryption key in view mode of device type entity.
	Create Python crypto API for RSA key pair generation and RSA encryption.
	Upgrade ClearDesign to Ubuntu Version 18.04.1 LTS.
	Set minimum password lengths for poll worker and election PINS.
General Enhancements	Both Sound Off and Screen Off should not be allowed for the ClearAccess default settings.
	Print stubs are not on by default.
	The Stubs button is now off by default when viewing cards.
	Layout options now inherit consistently in the detail pane for contests and headers.
	ClearDesign issues a warning when you import large images so that you can avoid performance issue when printing PDFs.
	Pasting as plain text in the HTML editor is the default.
	District Association was added to Contests.csv in the BDF.
	Re-enable Straight Party Voting with the Cross Endorsed Type: Once on Ballot.
	Modify the BDF to include "once on ballot" multi-endorsed candidates.
	Remove invalid macros from the default welcomeText for ClearAccess.
	Update ClearCast default messages to match recent changes.
	When printing cards, ClearDesign issues a warning that the BDF cannot be created when no vote center is present.
Code Maintenance	Update the copyright Year.
	Fix cbg.js jshint error.
	Clean up EnumModel so pylint understands it.
	Remove task.import_election_task dependency from Election.
	Change the @hybrid_property decorator to a simple @property decorator.
Fixed Defects	
Fixed Defects	Copy and pasted images have absolute URLs rather than relative URLs.
	A reset of device messages does not always update messages correctly.
	OCRV throws an error when processing the "é" character.
	Editing of the full name of a Contest results in invalidated cards for templated elections.
	Borders for Entity Style Contest Questions previously appeared around the response set in addition to the question.

APPENDIX B

Hardware Test Reports

(Provided Separately)

Electrical Test Reports

NTS - ITR-PR097807 Emissions & Immunity

NTS - ETR-PR100763 Emissions

NTS - ITR-PR100763 Immunity

Environmental Test Report

NTS - TR-PR097808-REV0 Environmental

APPENDIX C

Trusted Builds

Trusted Builds

The ClearVote 2.0 Voting System Trusted Build was performed using the steps described in section 5.5 of the EAC Voting System Testing and Certification Program Manual, Version 2.0. The Trusted Build yielded the following software outputs which are described below along with their associated Filenames and Hash Values in SHA 256 format:

ClearAccess Version 2.0.1 – The ClearAccess trusted build was performed using the "ClearAccess 2.0 Build Procedures" document Version 1.1.1, dated 04/12/2019, provided by Clear Ballot Group.   The trusted build yielded the following output file and the associated Hash Value:

- ClearAccess-2.0.1 Installer.exe
  SHA256: f29abfa796845c4fdabce931c3c9251a841540b7ec2c070c0ec0f2be17918548

ClearCast Version 2.0.0 – The ClearCast trusted build was performed using the "ClearCast 2.0 Build Procedures" document Version 1.5.3, dated 06/21/2019, provided by Clear Ballot Group.   The trusted build yielded the following output file and the associated Hash Value:

- ClearCastImage_200605d159_20190731.iso
  SHA256: 46b8686323a73776a6b60fa197d7e8a35c05ab276468d529868617255fef8216

ClearCount Version 2.0.1 – The ClearCount trusted build was performed using the "ClearCount 2.0 Build Procedures" document Version 1.5, dated 04/12/2019, provided by Clear Ballot Group.   The trusted build yielded the following output file and the associated Hash Value:

- clearcount-2019-06-27.iso
  SHA256: be674eca49eac9e27e1db1895e364bbede90c4ea18cfdd0c3c0a3bcc311a7fb6

ClearDesign Version 2.0.1 – The ClearDesign trusted build was performed using the "ClearDesign 2.0 Build Procedures" document Version 1.0.7, dated 04/12/2019, provided by Clear Ballot Group.   The trusted build yielded the following output files and their associated Hash Values:

- clearDesign-2.0.1.zip
  SHA256: 9144766268d0188d9a4e14bf947afa98fdd5c883b9c67677ecd7bf0ef6133afb

- install-setup.zip
  SHA256: 584e174a1206c7cf3c2957758e7428ae790e5f1da7a5a576cc208099e7c15b49

APPENDIX D

Warrant of Accepting Change Control Responsibility

TR-01-01-CBG-004-01.03

August 26, 2019

Mr. Michael Walker   **Sent Electronically**
Pro V and V
Huntsville, Alabama 35802

Re: Clear Ballot Group Warrant of Accepting Change Control Responsibility as defined in Appendix B of the EAC VSTL Program Manual and NOC 09-004

Mr. Walker

In agreement with and concerning the requirement referenced above, Clear Ballot Group, Inc. warrants to incorporate all changes made to the ClearVote 2.0 voting system during the test campaign to any deployed voting system, and its components before a mark of EAC Certification is applied to the system and or its components.

Sincerely,

Afua Twumasi-Ankrah
Certification and Government Relations Manager

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APPENDIX E

AS-RUN TEST PLAN

(Provided Separately)

TP-01-01-CBG-004-01.As-Run