Exh. 6

Test Report

Dominion Voting Systems
D-Suite 5.5-A Voting System
Georgia State Certification Testing

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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 Dominion Voting Systems D-Suite 5.5-A Voting System Voting System to the requirements set forth for voting systems in the State of Georgia Election Systems Certification Program.

1.1 Authority

The State of Georgia has a unified voting system whereby all federal, state, and county elections are to use the same voting equipment. Beginning in 2020, the unified voting system shall be an optical scanning voting system with ballot marking devices.

The Georgia Board of Elections, under the authority granted to it by the Georgia Election Code, has the duty to promulgate rules and regulations to obtain uniformity in the practices and procedures of local election officials as well as to ensure the fair, legal, and orderly conduct of primaries and elections. The Georgia Board of Elections is to investigate frauds and irregularities in primaries and elections and report violations for prosecution. It can issue orders, after the completion of appropriate proceedings, directing compliance with the Georgia Election Code.

The Georgia Secretary of State is designated as the Chief Election Official and is statutorily tasked with developing, programing, building, and reviewing ballots for use by counties and municipalities on the unified voting system in the state. The Georgia Election Code provides that the Secretary of State is to examine and approve an optical scanning voting system and ballot marking devices prior to their use in the state. County Boards of Elections (CBE) may only use an optical scanning voting system and ballot marking devices that have been approved and certified and that may be continuously reviewed for ongoing certification, by the Secretary of State. The Secretary of State has authority to decertify voting systems. The Secretary of State has promulgated rules and regulations that govern the voting system certification process.

1.2 References

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

- 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 HB 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
- Pro V&V, Inc. Quality Assurance Manual, Revision 7.0
- United States 107th Congress Help America Vote Act (HAVA) of 2002 (Public Law 107-252), dated October 2002
- Dominion Voting Systems D-Suite 5.5-ATechnical Data Package

1.3 Terms and Abbreviations

The terms and abbreviations applicable to the development of this Test Plan are listed below:

"BMD" – Ballot Marking Device

"COTS" – Commercial Off-The-Shelf

"EAC" – Election Assistance Commission

"EMS" – Election Management System

"FCA" – Functional Configuration Audit

"PCA" – Physical Configuration Audit

"TDP" – Technical Data Package

"VSTL" – Voting System Test Laboratory

"2005 VVSG" – EAC 2005 Voluntary Voting Systems Guidelines

1.4 Background

The State of Georgia identified the Dominion Voting Systems D-Suite 5.5-A Voting System to be evaluated as part of this test campaign. This report documents the findings from that evaluation.

functions, which are essential to the conduct of an election in the State of Georgia, were evaluated.

The scope of this testing event incorporated a sufficient spectrum of physical and functional tests to verify that the D-Suite 5.5-A Voting System conformed to the State of Georgia requirements. Specifically, the testing event had the following goals:

- Ensure proposed voting systems provide support for all Georgia election management requirements (i.e. ballot design, results reporting, recounts, etc.).

- Simulate pre-election, Election Day, absentee, recounts, and post-election activities on the corresponding components of the proposed voting systems for the required election scenarios.

2 TEST CANDIDATE

The D-Suite 5.5-A Voting System is a paper-based optical scan voting system consisting of the following major components: The Election Management System (EMS), the ImageCast Central (ICC), the ImageCast Precinct (ICP), and the ImageCast X (ICX) BMD. The D-Suite 5.5-A Voting System configuration is a modification from the EAC approved D-Suite 5.0 system configuration. The D-Suite 5.5-A Voting System will be configured with the KNOWiNK Pollpad which utilizes the ePulse Epoll data management system, for voter registration purposes.

The following table provides the software and hardware components of the D-Suite 5.5-A Voting System that were tested, identified with versions and model numbers:

Table 2-1 D-Suite 5.5-A Voting System

D-Suite 5.5-A Voting System Component	Firmware/Software Version	Hardware Model
Software Applications		
EMS Election Event Designer (EED)	5.5.12.1	---
EMS Results Tally and Reporting (RTR)	5.5.12.1	---
EMS Application Server	5.5.12.1	---
EMS File System Service (FSS)	5.5.12.1	---
EMS Audio Studio (AS)	5.5.12.1	---
EMS Data Center Manager (DCM)	5.5.12.1	---
EMS Election Data Translator (EDT)	5.5.12.1	---
ImageCast Voter Activation (ICVA)	5.5.12.1	---

Table 2-1 D-Suite 5.5-A Voting System *(continued)*

D-Suite 5.5-A Voting System Component	Firmware/Software Version	Hardware Model
Device Configuration File (DCF)	5.4.01_20170521	---
Polling Place Scanner (PPS) and Peripherals		
ImageCast Precinct (ICP)	5.5.3-0002	PCOS-320C
ICP Ballot Box	---	BOX-330A
EMS Standard Configuration		
Dell Server R640	---	R640
Dell Precision 3430	---	3430
Dell Network Switch	---	X10206P
EMS Express Configuration		
Dell Precision 3420	---	3420
Dell Monitor	---	P2419H
Dell Network Switch	---	X1008
Central Scanning Device (CSD) Components		
ImageCast Central	5.5.3.0002	---
Canon DR-G1130 Scanner	---	DR-G1130
Canon DR-M160II Scanner	---	DR-M160II
Dell Optiplex 3050AIO Computer	Windows 10 Pro	3050AIO
ADA Compliant Ballot Marking Device		
Avalue ImageCast X Prime 21" BMD	5.5.10.30	HID-21V
HP M402dne Printer	---	M402dne
ePollbook Solution		
KNOWiNK Poll Pad	---	iPad Air Rev. 2
KNOWiNK ePulse Epoll Data Management System	---	---

2.1 Testing Configuration

The following is a breakdown of the D-Suite 5.5-A Voting System components and configurations for the test setup:

Standard Testing Platform (D-Suite 5.5-A):

The system will be configured in the EMS Standard configuration with an Adjudication

The precinct polling station setup will consist of ImageCast X Prime 21" BMD's and ImageCast Precinct tabulators with plastic ballot boxes. The ImageCast X Prime 21" BMD's will be set up as accessible voting stations.

The KNOWiNK Epollbook solution consisting of the Poll Pad and ePulse Epoll data management system, will be setup and interfaced as required with the EMS Standard configuration.

Dominion Voting Systems is expected to provide all previously identified software and equipment necessary for the test campaign along with the supporting materials listed in section 2.2. The State of Georgia is providing the election definitions and ballots.

Express Testing Platform (D-Suite 5.5-A):

The system will be configured in the EMS Express configuration. This platform will be used to test all scenarios as provided by the election definition.

The central office setup will be an EMS Express configuration accompanied by both Canon DR-G1130 and Canon DR-M160II Central Scan tabulators and their associated PC's.

The precinct polling station setup will consist of ImageCast X Prime 21" BMD's and ImageCast Precinct tabulators with plastic ballot boxes. The ImageCast X Prime 21" BMD's will be set up as accessible voting stations.

The KNOWiNK Epollbook solution consisting of the Poll Pad and ePulse Epoll data management system, will be setup and interfaced as required with the EMS Standard configuration.

Dominion Voting Systems provided all previously identified software and equipment necessary for the test campaign along with the supporting materials ,election definitions, and ballots

2.2 Test Support Equipment/Materials

The following materials, if required, were supplied by Dominion Voting Systems to facilitate testing:

- USB Flash Drives

- Ballot Paper
- Marking Devices
- Pressurized air cans
- Lint-free cloth
- Cleaning pad and isopropyl alcohol
- Labels
- Other materials and equipment as required

3 TEST PROCESS AND RESULTS

The following sections outline the test process that was followed to evaluate the D-Suite 5.5-A Voting System under the scope defined in Section 1.5.

3.1 General Information

All testing was conducted under the guidance of Pro V&V by personnel verified by Pro V&V to be qualified to perform the testing. The examination was performed at the Pro V&V, Inc. test facility located in Cummings Research Park, Huntsville, AL.

3.2 Testing Initialization

Prior to execution of the required test scenarios, the systems under test underwent testing initialization to establish the baseline for testing and ensure that the testing candidate matched the expected testing candidate and that all equipment and supplies were present.

The following were completed during the testing initialization:

- Ensure proper system of equipment. Check 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

- Retain proof of version numbers.

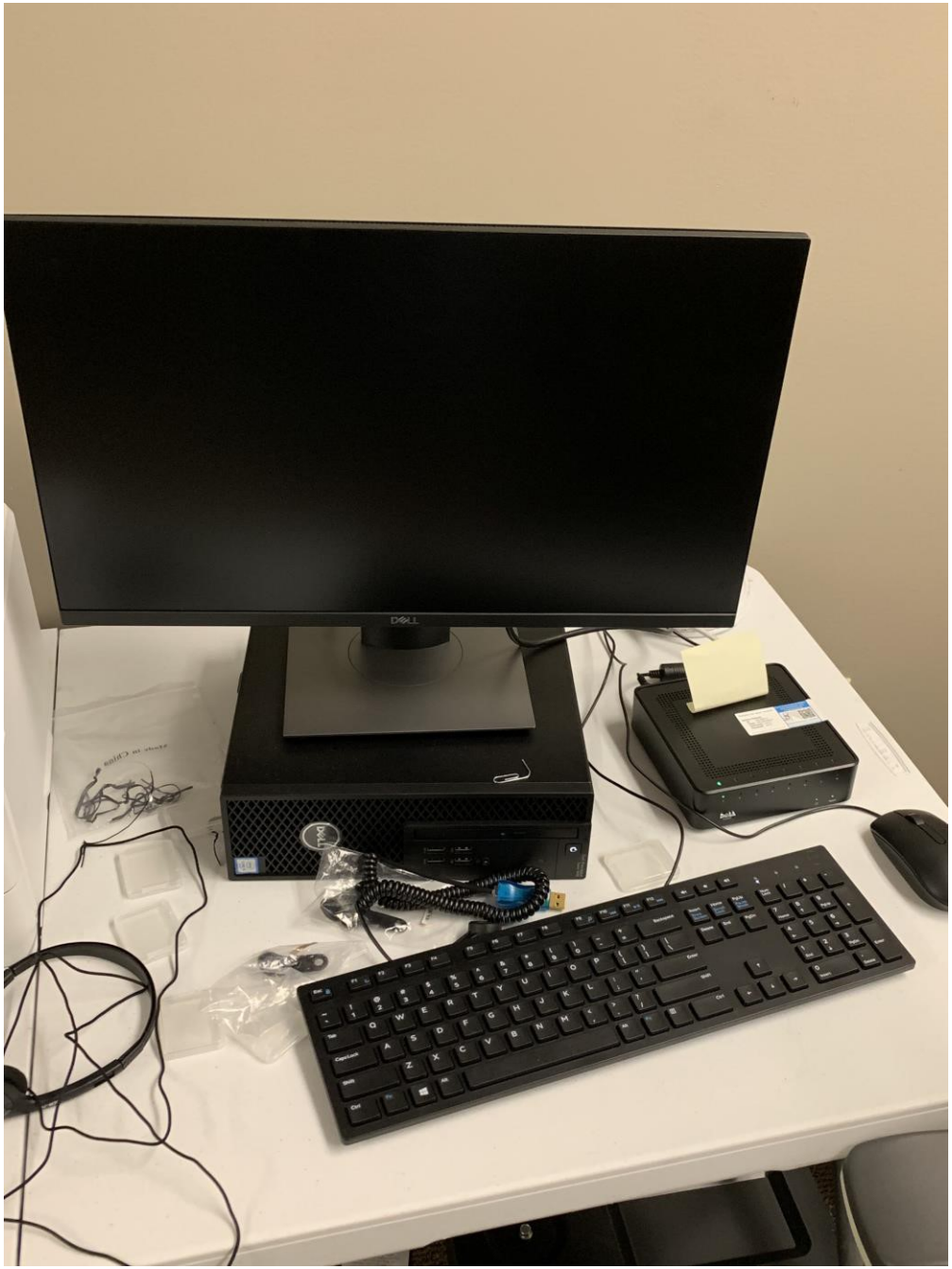
3.3 Summary Findings

The voting system was evaluated against the requirements set forth for voting systems by the State of Georgia. A Conditions of Satisfaction Checklist was developed based on each identified test requirements. Throughout the test campaign, Pro V&V executed tests, inspected resultant data and performed technical documentation reviews to ensure that each applicable requirement was met. The Conditions of Satisfaction Checklist is presented in Section 4 of this test report. The Summary Findings from each area of evaluation are presented in the following sections.

3.3.1 Physical Configuration Audit (PCA) and Setup

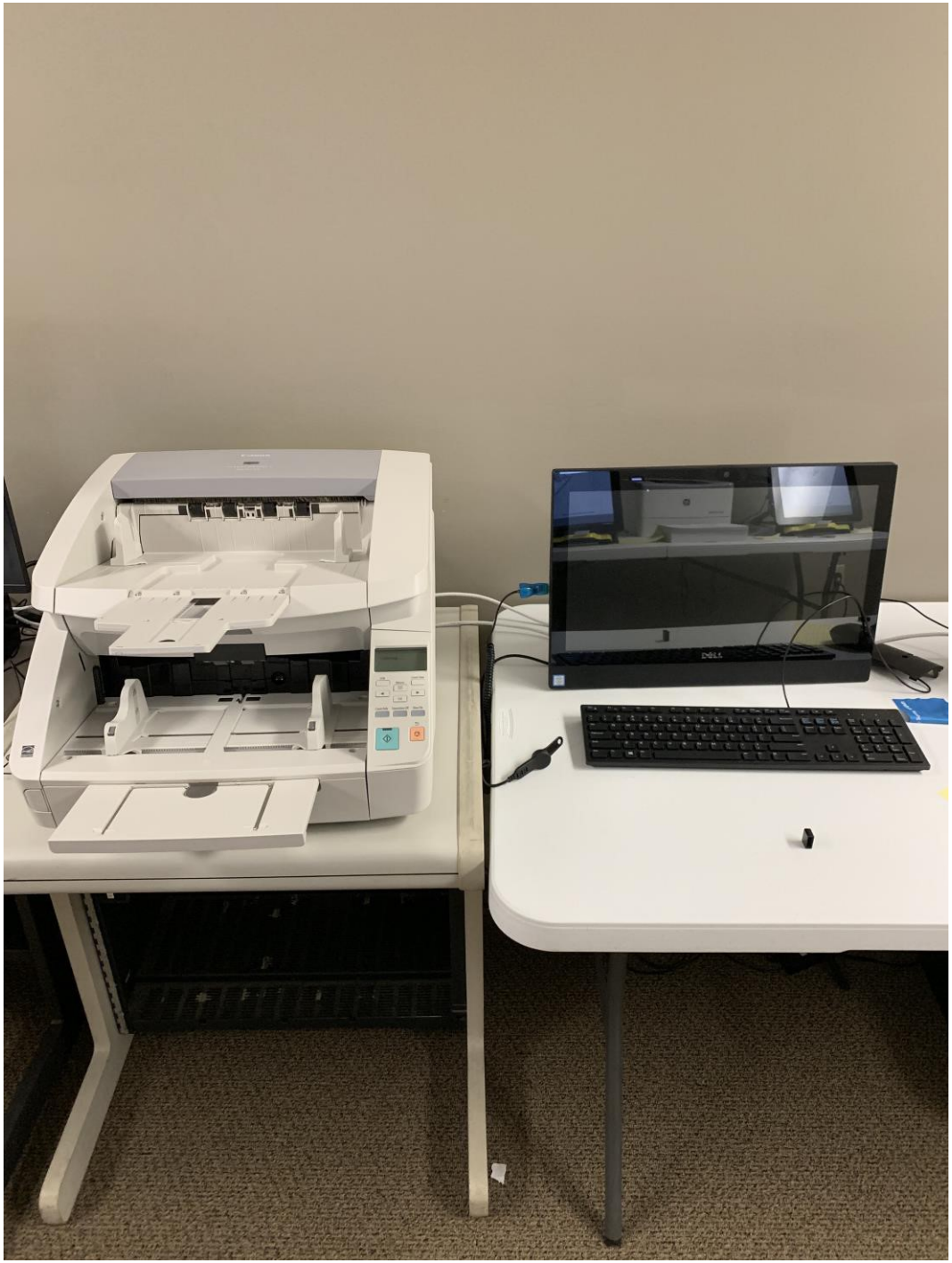
Prior to test initiation, the D-Suite 5.5-A Voting System was subjected to a Physical Configuration Audit (PCA) to baseline the system and ensure all items necessary for testing were present. This process included validating that the hardware and software components received for testing matched hardware and software components proposed and demonstrated to the State during the RFP process. This process also included validating that the submitted components matched the software and hardware components which have obtained EAC certification to the Voluntary Voting System Guidelines (VVSG) Standard 1.0, by comparing the submitted components to the published EAC Test Report. The system was then setup as designated by the manufacturer supplied Technical Documentation Package (TDP).

Photographs of the system components, as configured for testing, are presented below:

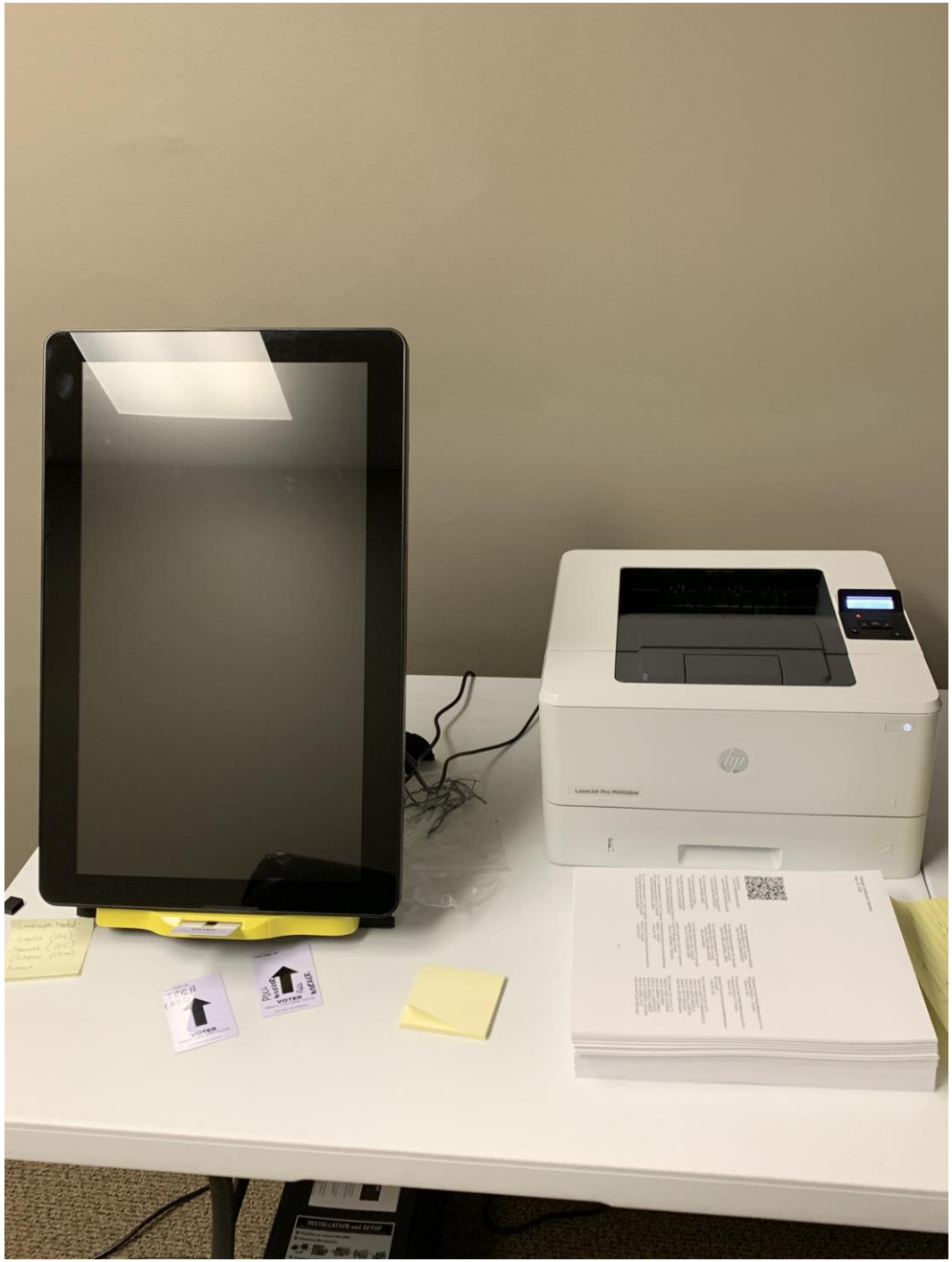


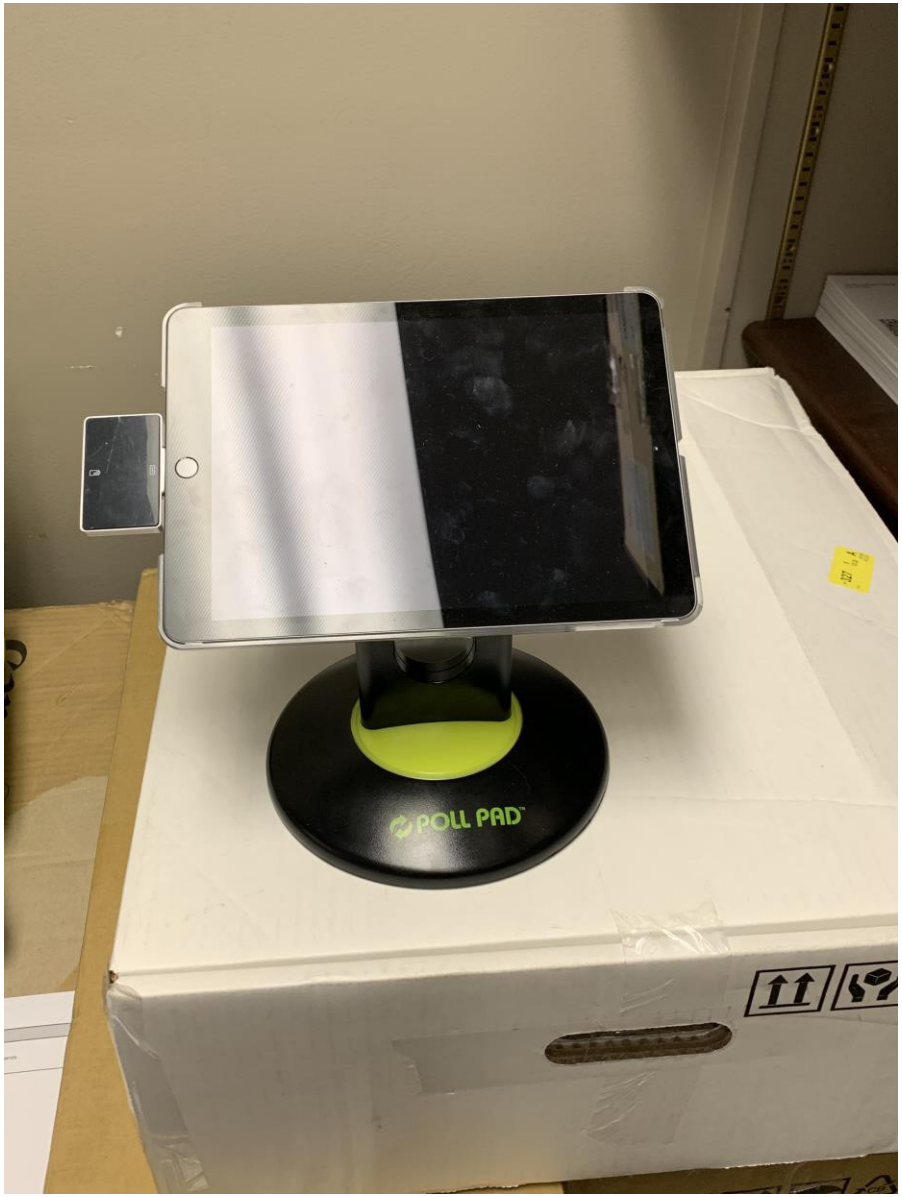
Photograph 1: EMS Express Configuration

Photograph 2: EMS Standard Configuration




DELL
Canon


VOTER
VOTER



Photograph 6: ePollbok

A pre-certification election was then loaded and an Operational Status Check was performed to verify satisfactory system operation. The Operational Status Check consisted of processing ballots and verifying the results obtained against known expected results from pre-determined

Summary Findings

During execution of the test procedure, the components of the D-Suite 5.5-A 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, the Operational Status Check was successfully completed with all actual results obtained during test execution matching the expected results.

3.3.2 System Level Testing

System Level Testing included the Functional Configuration Audit (FCA), the Accuracy Test, the Volume and Stress Test, and the System Integration Test. This testing included all proprietary components and COTS components (software, hardware, and peripherals).

During System Level Testing, the system was configured exactly as it would for normal field use per the manufacturer. This included connecting the supporting equipment and peripherals.

3.3.2.1 Functional Configuration Audit (FCA)

The Functional Configuration Audit (FCA) encompassed an examination of the system to the requirements set forth by the State of Georgia Election Systems Certification Program as designed in the Test Plan, and which are included in this report in the Conditions of Satisfaction Checklist.

Summary Findings

The D-Suite 5.5-A system successfully passed the FCA Tests without any noted issues. The individual testing requirements and their results can be seen in the included Conditions of Satisfaction Checklist.

3.3.2.2 Accuracy Testing

The Accuracy Test ensured that each component of the voting system could process at least 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

Summary Findings

The D-Suite 5.5-A system successfully passed the Accuracy Test. It was noted during test performance that the ICP under test experienced a memory lockup after scanning approximately 4500 ballots. The issue was presented to Dominion for resolution. Dominion provided the following analysis of the issue:

The ICP uClinux operating system does not have a memory management unit (MMU) and, as such, it can be susceptible to memory fragmentation. The memory allocation services within the ICP application are designed to minimize the effects of memory fragmentation. However, if the ICP scans a large number of ballots (over 4000), without any power cycle, it can experience a situation where the allocation of a large amount of memory can fail at the Operating System level due to memory fragmentation across the RAM. This situation produces an error message on the ICP which requires the Poll Worker to power cycle the unit, as documented. Once restarted, the ICP can continue processing ballots without issue. All ballots scanned and counted prior to the power cycle are still retained by the unit; there is no loss in data.

Pro V&V performed a power cycle, as instructed by Dominion, and verified that the issue was resolved and that the total ballot count was correct. Scanning then resumed with no additional issues noted.

A total of 1,569,640 voting positions were processed on the system with all actual results verified against the expected results. The individual testing requirements and their results can be seen in the included Conditions of Satisfaction Checklist.

3.3.2.3 Volume and Stress Testing

The Volume & Stress Tests consisted of tests designed to investigate the system's ability to meet the requirement limits and conditions set forth by the State of Georgia Election Systems Certification Program as designed in the Test Plan, and which are included in this report in the Conditions of Satisfaction Checklist.

Summary Findings

The D-Suite 5.5-A system successfully passed the Volume and Stress Tests without any noted issues. The individual testing requirements and their results can be seen in the included

3.3.2.4 System Integration Test

System Integration is a system level test that evaluates the integrated operation of both hardware and software. System Integration tests the compatibility of the voting system software components, or subsystems, with one another and with other components of the voting system environment. This functional test evaluates the integration of the voting system software with the remainder of the system.

During test performance, the system was configured as it would be for normal field use, with a new election created on the EMS and processed through the system components to final results.

Summary Findings

The D-Suite 5.5-A system successfully passed the System Integration Test without any noted issues. The individual testing requirements and their results can be seen in the included Conditions of Satisfaction Checklist.

3.3.3 e-Pollbook Testing

The ePolllbook Test evaluated the ability of the designated ePollbook to produced voter activation cards that could be successfully processed by the BMD.

Summary Findings

The D-Suite 5.5-A system successfully passed the ePollbook Test without any noted issues. The individual testing requirements and their results can be seen in the included Conditions of Satisfaction Checklist.

3.3.4 Ballot Copy Testing

The Ballot Copy Test evaluated the ability of a photocopy of a ballot produced by the system to be successfully processed by the system's tabulators.

Summary Findings

The D-Suite 5.5-A system successfully passed the Ballot Copy Test without any noted issues. The individual testing requirements and their results can be seen in the included Conditions of

3.3.5 Trusted Build and Software Hash Delivery

At test campaign conclusion, HASH signatures and software installation packets of the tested software were generated for delivery to the State of Georgia.

4 Conditions of Satisfaction

The voting system was evaluated against the requirements set forth for voting systems by the EAC 2005 VVSG and the State of Georgia. Throughout this test campaign, Pro V&V executed tests, inspected resultant data and performed technical documentation reviews to ensure that each applicable requirement was met. The Conditions of Satisfaction Checklist developed for this test campaign is presented in Table 4-1.

Table 4-1 Conditions of Satisfaction Checklist

DOMINION Conditions of Satisfaction Checklist		
Area	**Condition**	**Test Result**
FCA	Single FCA Test Election database(s) containing Republican and Democratic Primaries (Open Primary) and one Non-Partisan election	PASS
FCA	Database is being built for a single county jurisdiction	PASS
FCA	Republican Primary = 5 Races (1 statewide, 2 countywide, 3 county district level)	PASS
FCA	Democratic Primary = 5 Races (1 statewide, 1 countywide, 1 state district level, 2 county district level)	PASS
FCA	Non-Partisan Election = 1 Race (1 statewide)	PASS
FCA	Republican and Democratic races contain 1 to 8	PASS

Table 4-1 Conditions of Satisfaction Checklist *(continued)*

DOMINION Conditions of Satisfaction Checklist		
Area	**Condition**	**Test Result**
FCA	Non-Partisan race contains 4 candidates and 1 write-in	PASS
FCA	All races are Vote for One	PASS
FCA	County contains 5 Precincts, for results reporting purposes	PASS
FCA	Each precinct is split at both state district and county district level	PASS
FCA	Election Day Voting [4 total], 1 Vote Center containing 2 precincts	PASS
FCA	Election Day Voting [4 total], 3 Polling Locations containing 1 precinct each	PASS
FCA	Advance Voting [2 total], Each polling location houses all 5 Precincts	PASS
FCA	Prepare election media from EMS to program PPS's (Polling Place Scanners) and BMD's for Advance Voting Polling locations	PASS
FCA	Prepare election media from EMS to program PPS's and BMD's for Election Day Polling locations	PASS
FCA	Prepare election media from EMS to program CSD's (Central Scan Devices) system for processing of mail-out absentee ballots and provisional ballots	PASS

Table 4-1 Conditions of Satisfaction Checklist *(continued)*

DOMINION Conditions of Satisfaction Checklist		
Area	**Condition**	**Test Result**
FCA	Prepare election media from EMS to program CSD's for processing Advance Voting ballots generated by BMDs	PASS
FCA	Prepare election media from EMS to program CSD's for processing Election Day ballots generated by BMDs	PASS
FCA	Produce watermarked Sample ballots for public distribution	PASS
FCA	Prepare a test deck (Deck 1) of voted ballots with a known result using all available vote positions on all ballot styles generated by the test scenario, including write-ins, overvotes, undervotes, and blank ballots.	PASS
FCA	Prepare an Absentee test deck (Deck 2) of voted absentee ballots with a known result, to be used on the CSD, including write-ins, overvoted races, and blank ballots.	PASS
FCA	Vote test deck (Deck 1) on each BMD and print BMD ballots for each ballot in the test deck	PASS
FCA	Scan ballots created from the BMD's into the associated PPS's	PASS
FCA	Scan the Absentee test deck (Deck 2) on the CSD and confirm the CSD separates ballots by various conditions for physical review when scanning (i.e..	PASS

Table 4-1 Conditions of Satisfaction Checklist *(continued)*

DOMINION Conditions of Satisfaction Checklist		
Area	**Condition**	**Test Result**
FCA	Prepare printouts from PPS's documenting results tabulated and verify them against test deck	PASS
FCA	Prepare printouts from CSD documenting results tabulates and verify them against test deck	PASS
FCA	Scan ballots created from BMD's on the CSD	PASS
FCA	Prepare printouts from CSD documenting results tabulated and verify them against Absentee test deck (Deck 2)	PASS
FCA	Upload to EMS the election media used in PPS and CSD devices	PASS
FCA	Prepare printouts from EMS documenting the results tabulated and verify them against test deck contents	PASS
FCA	Prepare printouts documenting results at various reporting levels:	PASS
FCA	Prepare printouts documenting results at various reporting levels: Precinct	PASS
FCA	Prepare printouts documenting results at various reporting levels: Polling Place	PASS
FCA	Prepare printouts documenting results at various reporting levels: vote Type	PASS

Table 4-1 Conditions of Satisfaction Checklist *(continued)*

DOMINION Conditions of Satisfaction Checklist		
Area	**Condition**	**Test Result**
Accuracy	General election	PASS
Accuracy	21 Contests in election	PASS
Accuracy	2 Column Ballot	PASS
Accuracy	5 Precincts	PASS
Accuracy	Election is produced at County Level	PASS
Accuracy	No Counting Groups	PASS
Accuracy	Incumbency is supported	PASS
Accuracy	No Straight Party Voting	PASS
Accuracy	Non-Partisan contests only (Candidates are not directly linked to parties, but are labeled by party on the ballot)	PASS
	Parties (for labeling purposes): o Democratic	PASS

Table 4-1 Conditions of Satisfaction Checklist *(continued)*

DOMINION Conditions of Satisfaction Checklist		
Area	**Condition**	**Test Result**
Accuracy	Write-Ins present in all races	PASS
Accuracy	Proposed State Wide Referendums	PASS
Accuracy	Advance Voting (Early Voting)	PASS
Accuracy	Elections for Judges are Non-Partisan	PASS
Accuracy	N of M Voting o Test N of M – 6 of 8 o Test N of M – 8 of 10	PASS
Accuracy	1000 Ballots printed from BMD using 3 units as follows (Unit 1: 250 ballots, unit 2: 250 ballots, unit 3: 500 ballots)	PASS
Accuracy	Run the Accuracy Test Election on BMD & Verify results against known expected results	PASS
Accuracy	Run the Accuracy Test Election on PPS & Verify results against known expected results	PASS
Accuracy	Run the Accuracy Test Election on CSD & Verify results against known expected results	PASS
Accuracy	Reporting: Winners: Contest reports review	PASS

Table 4-1 Conditions of Satisfaction Checklist *(continued)*

DOMINION Conditions of Satisfaction Checklist		
Area	**Condition**	**Test Result**
Accuracy	Election Night Reporting: Export Election Night Results in the following formats: o Common Data Format (CDF)	PASS
Accuracy	Election Night Reporting: Export Election Night Results in the following formats: o Non-CDF	PASS
Accuracy	Accuracy in ballot counting and tabulation shall achieve 100% for all votes cast (1,549,703 ballot positions)	PASS
V&S	Volume & Stress Open Primary Election	PASS
V&S	400 Precincts	PASS
V&S	1 County	PASS
V&S	150 Ballot Styles	PASS
V&S	30 Ballot Styles in 1 Precinct	PASS
V&S	3 Languages (English, Spanish, Korean)	PASS
		PASS

Table 4-1 Conditions of Satisfaction Checklist *(continued)*

DOMINION Conditions of Satisfaction Checklist		
Area	**Condition**	**Test Result**
V&S	30 candidates in 1 contest	PASS
V&S	Referendum (Approximately 15000 words)	PASS
V&S	Referendum: Test using 10pt Arial Font (Currently used in State of Georgia)	PASS
V&S	Referendum: Test using 12pt Sans Serif font (To Accommodate future changes)	PASS
V&S	Referendum: Verify at Normal Size	PASS
V&S	Referendum: Verify when Zoomed-In (Text size increased)	PASS
V&S	Candidate Name Lengths – (Must support 25 characters) – Verify to make sure they display properly	PASS
V&S	Candidate Name Lengths – Check Translations	PASS
V&S	Candidate Name Lengths – Check appearance on BMD Printed Ballot	PASS
V&S	Candidate Name Lengths – Check appearance on Ballot Review Screen	PASS

Table 4-1 Conditions of Satisfaction Checklist *(continued)*

DOMINION Conditions of Satisfaction Checklist		
Area	**Condition**	**Test Result**
V&S	Tabulator Reports – Tabulators print 3 copies of Zero Proof Reports, and Results Reports	PASS
V&S	Run the V&S Test Election on BMD & Verify results against known expected results	PASS
V&S	Run the V&S Test Election on PPS & Verify results against known expected results	PASS
V&S	Run the V&S Test Election on CSD & Verify results against known expected results	PASS
V&S	Reporting: Winners: Contest reports review	PASS
V&S	Reporting: Results: Precinct summary reports, precinct-based reporting, reporting by Congressional District Level	PASS
Epollbook	Verify that the Pollbook can program voter activation cards for BMD	PASS
Epollbook	Verify that voter activation cards activate the correct ballot styles when used on the BMD's	PASS
Ballot Copy	Verify whether or not a ballot produced by the BMD, can be photocopied, and then have the photocopied ballot be successfully cast on:	PASS

Table 4-1 Conditions of Satisfaction Checklist *(continued)*

DOMINION Conditions of Satisfaction Checklist		
Area	**Condition**	**Test Result**
System Integration	Run the SI Test Election on BMD & Verify results against known expected results	PASS
System Integration	Run the SI Test Election on PPS & Verify results against known expected results	PASS
System Integration	Run the SI Test Election on CSD & Verify results against known expected results	PASS
System Integration	Reporting: Winners: Contest reports review	PASS
System Integration	Reporting: Results: Precinct summary reports, precinct-based reporting, reporting by Congressional District Level	PASS