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Test Report for EAC 2005 VVSG Certification Testing
Dominion Voting Systems Democracy Suite (D-Suite) Version
5.5-B Voting System

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SIGNATURES

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REVISIONS

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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 Dominion Voting Systems Democracy Suite (D-Suite) 5.5-B 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 D-Suite 5.5-B 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, Dominion Voting Systems submitted an application package to the EAC for certification of the D-Suite 5.5-B Voting System. The application was accepted by the EAC and the project was assigned the unique Project Number of DVS-DemSuite5.5-B.

1.1 Description and Overview of EAC Certified 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 D-Suite 5.5-B Voting System is a paper-based optical scan voting system with a hybrid paper/DRE option consisting of the following major components: The Election Management System (EMS), the ImageCast Central (ICC), the ImageCast Precinct (ICP and ICP2), the ImageCast X (ICX) DRE w/ Reports Printer, ImageCast X (ICX) DRE w/VVPAT, the ImageCast Evolution (ICE), and the ImageCast X (ICX) BMD. The D-Suite 5.5-B Voting System configuration is a modification from the EAC approved D-Suite 5.5 system configuration.

The following subsections describe the baselined D-Suite 5.5 Voting System.

Election Management System (EMS)

The D-Suite 5.5 EMS consists of various components running as either a front-end/client application or as a back-end/server application. A listing of the applications and a brief description of each is presented below.

Front-end/Client applications:

- **EMS Adjudication:** Represents the client component responsible for adjudication, including reporting and generation of adjudicated result files from ImageCast Central tabulators and adjudication of write-in selections from ImageCast Precinct and ImageCast Central tabulators. This client component is installed on both the server and the client machines.

- EMS Audio Studio: A client application that represents an end-user helper application used to record audio files for a given election project. As such, it is utilized during the pre-voting phase of the election cycle.
- EMS Election Data Translator: End-user application used to export election data from election project and import election data into election project.
- EMS Election Event Designer: A client application that integrates election definition functionality together with ballot styling capabilities and represents a main pre-voting phase end-user application
- ImageCast Voter Activation: An application, installed on a workstation or laptop at the polling place, which allows the poll workers to program smart cards for voters. The smart cards are used to activate voting sessions on ImageCast X.
- EMS Results Tally and Reporting: A client application that integrates election results acquisition, validation, tabulation, reporting, and publishing capabilities and represents the main post-voting phase end-user application.

Back-end/Server applications:

- EMS Adjudication Service: Represents a server side application which provides ballot information such as contests, candidates and their coordinates from EMS to the Adjudication application.
- EMS Application Server: Represents a server side application responsible for executing long running processes, such as rendering ballots, generating audio files and election files, etc.
- EMS Database Server: Represents a server side RDBMS repository of the election project database which holds all the election project data, including pre-voting and post-voting data.
- EMS Data Center Manager: A server application that represents a system level configuration application used in EMS back-end data center configuration.
- EMS File System Service: A back-end application that acts as a stand-alone service that runs on client machines, enabling access to low level operating system API for partitioning CF cards, reading raw partition on ICP CF card, etc.
- EMS NAS Server: Represents a server side file repository of the election project file based artifacts, such as ballots, audio files, reports, log files, election files, etc.
- Smart Card Helper Service: A service that is installed on a workstation or laptop at the polling place, and provides required data format for programming smart cards for ImageCast devices, or, for jurisdiction's voting registration system in case of integration.

ImageCast Precinct (ICP)

The ICP device is a hybrid precinct optical scan paper/DRE ballot counter designed to provide six major functionalities: ballot scanning, second chance voting, accessible voting, ballot review, tabulation, and poll worker functions.

For ballot scanning functionality the ICP scans marked paper ballots, interprets voter marks on the paper ballots and stores the ballots for tabulation when the polls are closed.

Second Chance voting refers to scenarios in which an error has been detected on the voter's paper ballot (e.g., blank ballot, undervoted ballot, overvoted ballot, misread ballot, cross-over voted ballot), and the ICP notifies the voter by displaying a message or providing an audio visual cue, that one of these situations has been detected, and offers the voter an opportunity to reject and fix their ballot, or to cast the ballot as-is.

Accessible voting allows voters with disabilities to listen to an audio representation of a ballot and use a hand held controller called an Audio Tactile Interface (ATI) to make vote selections, which are then saved directly to the ICP when the voter casts their Accessible Voting ballot.

The Ballot Review feature allows a voter to review their vote selections using an audio or visual representation, which displays or presents the voter with a complete listing of all contests contained on the ballot and an indication of the results which will be recorded for each contest once the voter's ballot is cast.

The Tabulation of paper ballots and Accessible Voting ballots cast by voters is performed when the polls are closed on the ICP unit and the unit tabulates the results, generates results files for aggregation into RTR, and prints a results report containing the results of the ballots cast.

For poll worker functions the ICP contains a small touch-screen LCD to allow the poll worker to initiate polling place activities, diagnostics and reports.

ImageCast Central (ICC) Count Scanner

The ICC is a high-speed, central ballot scan tabulator based on Commercial off the Shelf (COTS) hardware, coupled with the custom-made ballot processing application software. It is used for high speed scanning and counting of paper ballots.

ImageCast X (ICX)

The Democracy Suite ImageCast X (ICX) consists exclusively of COTS available hardware and operating system, while the applications installed on top customize its behavior to turn it into a Ballot Marking Device (BMD) or a Direct-Recording Electronic (DRE) device with or without a Voter Verifiable Paper Audit Trail (VVPAT). ICX application is the application that verifies voter's session eligibility, using the smart card and then presents the appropriate ballot to the voter. When a voter is satisfied with choices selected, ICX application verifies them and produces an Electronic Mobile Ballot or stores the votes onto a memory device. The ICX is designed to perform the following functions:

- Ballot marking and printing of electronic mobile ballots (in BMD mode)
- Ballot review and second chance voting
- Accessible voting and ballot marking
- Saving voting results (in DRE mode)
- Printing votes on a voter verifiable paper audit trail device (when VVPAT is in use)

1.1.1 Baseline Certified System

The baseline system for this modification is the D-Suite 5.5 Voting System. The tables below describe the certified equipment and firmware versions. Detailed descriptions of the D-Suite 5.5 test campaign are contained in Pro V&V Report No. TR-01-01-DVS-2017-02.01 Rev. B, which is available for viewing on the EAC’s website at www.eac.gov.

This subsection lists the proprietary and COTS software to be provided by the manufacturer as part of the test campaign.

Table 1-1. Democracy Suite 5.5 EMS Software Component Descriptions

| Software | Version | Filename | Configuration | |
|---------------------------------------|----------|--|---------------|---------|
| | | | Standard | Express |
| EMS Election Event Designer (EED) | 5.5.12.1 | setup.exe: EED_FED_CERT_Setup_x64.msi | X | X |
| EMS Results Tally and Reporting (RTR) | 5.5.12.1 | setup.exe: RTR_FED_CERT_Setup_x64.msi | X | X |
| EMS Application Server | 5.5.12.1 | setup.exe: APPS_FED_CERT_Setup_x64.msi | X | X |
| EMS File System Service (FSS) | 5.5.12.1 | setup.exe: FSSSetup.msi | X | X |
| EMS Audio Studio (AS) | 5.5.12.1 | setup.exe: EMSAudioStudioSetup.msi | X | X |
| EMS Data Center Manager (DCM) | 5.5.12.1 | DemocracySuiteEMS_DCM.exe | X | X |
| EMS Election Data Translator (EDT) | 5.5.12.1 | setup.exe: EDTSetup_x86.msi EDTSetup_x64.msi | X | X |
| ImageCast Voter Activation (ICVA) | 5.5.12.1 | setup.exe: ICVASetup.msi | X | X |
| EMS Adjudication (Adj.) | 5.5.8.1 | DVS ImageCast Adjudication Client Setup.msi | X | X |
| EMS Adjudication Service | 5.5.8.1 | DVS Adjudication Services Setup.msi | X | X |
| Smart Card Helper Service | 5.5.12.1 | setup.exe: SmartCardServiceSetup.msi | X | X |

Table 1-2. Democracy Suite 5.5 ImageCast Precinct Software Component Descriptions

| Firmware/Software | Version | Filename |
|--|------------|---------------------|
| Election Firmware | 5.5.3-0002 | cf2xx.sig |
| Firmware Updater | 5.5.3-0002 | firmUp.enc |
| Firmware Extractor | 5.5.3-0002 | FirmwareExtract.enc |
| Kernel (uClinux) | 5.5.3-0002 | image.bin.gz |
| Boot Loader (COLILO) | 20040221 | colilo.bin |
| Asymmetric Key Generator | 5.5.3-0002 | Keygen.enc |
| Asymmetric Key Exchange Utility | 5.5.3-0002 | KeyExchange.enc |
| Firmware Extractor (Uses Technician Key) | 5.5.3-0002 | TechExtract.enc |

Table 1-3. Democracy Suite 5.5 ImageCast Central Software Component Descriptions

| Firmware/Software | Version | Filename |
|-------------------------------|------------|------------|
| ImageCast Central Application | 5.5.3.0002 | ICCSup.exe |

Table 1-4. Democracy Suite 5.5 ImageCast X Software Component Descriptions

| Firmware/Software | Version | Filename |
|-------------------|-----------|----------|
| ICX Application | 5.5.10.25 | ICX.apk |

Table 1-5. Democracy Suite 5.5 EMS Client/Server Software Component Descriptions

| Firmware/Software | Version | Filename | Configuration | |
|--|------------------|---|---------------|---------|
| | | | Standard | Express |
| Microsoft Windows Server | 2012 R2 Standard | Physical Media from Microsoft | X | |
| Microsoft Windows | 10 Professional | Physical Media from Microsoft | X | X |
| .NET Framework | 3.5 | Physical Media from Microsoft | X | X |
| Microsoft Visual J# | 2.0 | vjredist64.exe vjredist.exe | X | X |
| Microsoft Visual C++ 2013 Redistributable | 2013 | vc_redist_x64.exe vc_redist_x86.exe | X | X |
| Microsoft Visual C++ 2015 Redistributable | 2015 | vc_redist.x64.exe vc_redist.x86.exe | X | X |
| Java Runtime Environment | 7u80 | jre-7u80-windows-x64.exe jre-7u80-windows-i586.exe | X | X |
| Java Runtime Environment | 8u144 | jre-8u144-windows-x64.exe jre-8u144-windows-i586.exe | X | X |
| Microsoft SQL Server 2016 Standard | 2016 Standard | Physical Media from Microsoft | X | |

Table 1-5. Democracy Suite 5.5 EMS Client/Server Software Component Descriptions (continued)

| Firmware/Software | Version | Filename | Configuration | |
|--|-----------|--|---------------|---------|
| | | | Standard | Express |
| Microsoft SQL Server 2016 Service Pack 1 | 2016 SP1 | SQLServer2016SP1-KB3182545-x64-ENU.exe | X | |
| Microsoft SQL Server 2016 SP1 Express | 2016 SP1 | SQLEXPADV_x64_ENU.exe | | X |
| Cepstral Voices | 6.2.3.801 | Allison (English): Cepstral_Allison_windows_6.2.3.801.exe Alejandra (Spanish): Cepstral_Alejandra_windows_6.2.3.801.exe | X | X |
| Arial Narrow Fonts | 2.37a | ARIALN.TTF ARIALNB.TTF ARIALNBI.TTF ARIALNI.TTF | X | X |
| Maxim iButton Driver | 4.05 | install_1_wire_drivers_x86_v405.msi install_1_wire_drivers_x64_v405.msi | X | X |
| Adobe Reader DC | AcrobatDC | AcroRdrDC1501020060_en_US.exe | X | X |
| Microsoft Access Database Engine | 2010 | AccessDatabaseEngine.exe AccessDatabaseEngine_x64.exe | X | X |
| Open XML SDK 2.0 for Microsoft Office | 2.0 | OpenXMLSDKv2.msi | X | X |

Table 1-6. Democracy Suite 5.5 EMS Software Platform Unmodified COTS Component Descriptions

| Firmware/Software | Version | Filename |
|--|----------------------|--|
| Infragistics NetAdvantage Win Forms 2011.1 | 2011 Vol.1 | NetAdvantage_WinForms_20111.msi |
| Infragistics NetAdvantage WPF 2012.1 | 2012 Vol.1 | NetAdvantage_WPF_20121.msi |
| TX Text Control Library for .NET | 16.0 | TXText Control.NET for Windows Forms 16.0.exe |
| SOX | 14.3.1 | sox.exe , libgomp-1.dll, pthreadgc2.dll, zlib1.dll |
| NLog | 1.0.0.505 | NLog.dll |
| iTextSharp | 5.0.5 | itextsharp.dll |
| OpenSSL | 1.0.2k & 2.0.14 FIPS | openssl.exe, libeay32.dll, ssleay32.dll |

Table 1-6. Democracy Suite 5.5 EMS Software Platform Unmodified COTS Component Descriptions (continued)

| Firmware/Software | Version | Filename |
|---|------------|---|
| SQLite | 1.0.103.0 | System.Data.SQLite.DLL (32-bit and 64-bit) |
| Lame | 3.99.4 | lame.exe |
| Speex | 1.0.4 | speexdec.exe and speexenc.exe |
| Ghostscript | 9.04 | gsdll32.dll (32-bit and 64-bit) |
| One Wire API for .NET | 4.0.2.0 | OneWireAPI.NET.dll |
| Avalon-framework-cvs-20020806 | 20020806 | avalon-framework-cvs-20020806.jar |
| Batik | 0.20-5 | batik.jar |
| Fop | 0.20-5 | fop.jar |
| Microsoft Visual J# 2.0 Redistributable Package-Second Edition(x64) | 2.0 | vjc.dll , vjsjbc.dll, vjslibcw.dll, vjsnativ.dll , vjssupuilib.dll , vjsvwaux.dll |
| Entity framework | 6.1.3 | EntityFramework.dll |
| Spreadsheetlight | 3.4.3 | SpreadsheetLight.dll, SpreadsheetLight.xml |
| Open XML SDK 2.0 For Microsoft Office | 2.0.5022.0 | DocumentFormat.OpenXml.dll, DocumentFormat.OpenXml.xml |

Table 1-7. Democracy Suite 5.5 ImageCast Precinct Unmodified COTS Component Descriptions

| Firmware/Software | Version | Filename |
|---------------------|---------|----------------------------|
| OpenSSL 1.0.2k | 1.0.2k | openssl-1.0.2k.tar.gz |
| OpenSSL FIPS 2.0.10 | 2.0.10 | openssl-fips-2.0.10.tar.gz |
| Zlib | 1.2.3 | Zlib-1.2.3.tar.gz |

Table 1-8. Democracy Suite 5.5 ImageCast X Unmodified COTS Component Descriptions

| Firmware/Software | Version | Filename |
|---------------------------------|---------|--|
| Google Text-to-Speech Engine | 3.11.12 | ARM: com.google.android.tts_3.11.12-210311121_minAPI19(armeabi-v7a)(nodpi).apk x86: com.google.android.tts_3.11.12-210311123_minAPI15(x86)(nodpi).apk |
| ICX Prime Android 5.1.1 Image | 0405 | 0405_5.1.1-01.12_user_android_x86.iso |
| ICX Classic Android 4.4.4 Image | 0.0.98 | byt_t_crv2_64-ota-BCX18-V0.0.98.zip |

Table 1-9. Democracy Suite 5.5 ImageCast Central Software Build Library Source Code (Unmodified COTS)

| Firmware/Software | Version | Filename |
|---------------------|---------|----------------------------|
| OpenSSL 1.0.2k | 1.0.2k | openssl-1.0.2k.tar.gz |
| OpenSSL FIPS 2.0.10 | 2.0.10 | openssl-fips-2.0.10.tar.gz |

Table 1-10. Democracy Suite 5.5 ImageCast Central Runtime Software Components (Unmodified COTS)

| Firmware/Software | Version | Filename |
|---------------------------------------|------------|-------------------------------------|
| 1-Wire Driver (x86) | 4.05 | install_1_wire_drivers_x86_v405.msi |
| 1-Wire Driver (x64) | 4.05 | install_1_wire_drivers_x64_v405.msi |
| Canon DR-G1130 TWAIN Driver | 1.2 SP6 | G1130_DRIT_V12SP6.exe |
| Canon DR-M160II TWAIN Driver | 1.2 SP6 | M160II_DRIT_V12SP6.exe |
| Visual C++ 2013 Redistributable (x86) | 12.0.30501 | vc redistrib_x86.exe |

Table 1-11. Democracy Suite 5.5 ImageCast Precinct Modified COTS Software Component Descriptions

| Firmware/Software | Version | Filename |
|-------------------|----------|------------------------------|
| uClinux | 20070130 | uClinux-dist-20070130.tar.gz |
| COLILO Bootloader | 20040221 | Colilo20040221.tar.gz |

Table 1-12. Democracy Suite 5.5 ImageCast X Modified COTS Software Component Descriptions

| Firmware/Software | Version | Filename |
|-----------------------|---------|-------------------------|
| Zxing Barcode Scanner | 4.7.5 | BS-4.7.5.zip |
| SoundTouch | 1.9.2 | Soundtouch-1.9.2.tar.gz |

Table 1-13. Democracy Suite 5.5 EMS Software Build Environment Component Descriptions

| Firmware/Software | Version | Filename |
|---|-----------------|--|
| Windows 10 Professional | 10 Professional | Physical Media from Microsoft |
| .NET Framework 3.5 | 3.5 | Physical Media from Microsoft |
| Internet Information Server (IIS) | 10.0 | Physical Media from Microsoft |
| 7-Zip | 9.20 (64 Bit) | 7z920-x64.msi |
| Visual Studio 2015 Professional with Update 3 | 2015 Update 3 | en_visual_studio_professional_2015_with_update_3_x86_x64_web_installer_8922978.exe |

Table 1-13. Democracy Suite 5.5 EMS Software Build Environment Component Descriptions
(continued)

| Firmware/Software | Version | Filename |
|--|----------------|--|
| .NetDiscUtils | 0.10 | DiscUtilsBin-0.10.zip |
| Infragistics NetAdvantage Win Forms 2011.1 | 2011.1 | NetAdvantage_WinForms_20111.msi |
| Infragistics Net Advantage – WPF 2012.1 | 2012.1 | NetAdvantage_WPF_20121.msi |
| TX Text Control 16.0.NET | 16 | TX Text Control.NET for Windows Forms 16.0.exe |
| Speex | 1.0.4 | speex_win32_1.0.4_setup.exe |
| Microsoft Visual J# | 2.0 | vjredist64.exe |
| iTextSharp | 5.0.5 | itextsharp-5.0.5-dll.zip |
| Ghostscript | 9.0.4 | gs904w32.exe gs904w64.exe |
| Nlog | 1.0.0.505 | NLog-1.0-Refresh-bin.zip |
| OneWireAPI.NET | 4.0 | 1-wiresdkver400_beta2.zip |
| Lame | 3.99.4 | lame3.99.4-20120130.zip |
| Sox | 14.3.1 | sox-14.3.1-win32.zip |
| Avalon Framework | 20020806 | avalon-framework-cvs-20020806.jar.zip |
| Fop | 0.20-5 | fop-0.20.5.jar |
| Batik | 0.20-5 | batik-1.5-fop-0.20-5.jar |
| SQLite | 1.0.103.0 | sqlite-netFx46-setup-bundle-x64-2015-1.0.103.0.exe |
| OpenSSL 1.0.2k | 1.0.2k | openssl-1.0.2k.tar.gz |
| OpenSSL FIPS 2.0.10 | 2.0.10 | openssl-fips-2.0.10.tar.gz |
| Strawberry Perl | 5.24.1.1 | strawberry-perl-5.24.1.1-64bit.msi |
| Patch | 2.5.9-7 | patch-2.5.9-7-bin.zip |
| ISOnewspaper | 30.4 | ISOnewspaper30v4_gr.icc.zip |
| Ogg Vorbis Encoder | 2.88 | oggenc2.88-1.3.5-generic.zip |
| Ogg Vorbis Encoder | 1.10.1 | oggdecV1.10.1.zip |
| Prism Mvvm | 1.1.1 | prism.mvvm.1.1.1.nupkg |
| Bitmiracle.libtiff.net | 2.4.560 | Bitmiracle.libtiff.net.2.4.560.nupkg |
| Prism | 4.0.0 | prism.4.0.0.nupkg |
| Prism.UnityExtensions | 4.0.0 | prism.unityextensions.4.0.0.nupkg |
| PDF Printing | 2.9.5.2 | PDFPrinting.zip |
| Entity Framework | 6.1.3.net45 | entityframework.6.1.3.nupkg |

Table 1-13. Democracy Suite 5.5 EMS Software Build Environment Component Descriptions
(continued)

| Firmware/Software | Version | Filename |
|---------------------------------------|--------------|-------------------------------|
| WiX | 3.10 | Wix310.exe |
| Spreadsheet Light | 3.4.3 | spreadsheetlight.3.4.3.nupkg |
| Open XML SDK 2.0 for Microsoft Office | 2.0 | OpenXMLSDKv2.msi |
| Adobe Reader DC | AcrobatDC | AcroRdrDC1501020060_en_US.exe |
| Arial Narrow Fonts | 2.37a | ArialNarrowFonts.zip |
| SSH.NET | 2016.1.0 | SSH.NET-2016.1.0-bin.zip |
| SSMS | 14.0.17119.0 | SSMS-Setup-ENU.exe |
| TwainDSM | 2.3.0 | Twaindsm-2.3.0.win.bin |

Table 1-14. Democracy Suite 5.5 ICC Software Build Environment Component Descriptions

| Firmware/Software | Version | Filename |
|---------------------|---------|----------------------------|
| NASM Assembler | 2.12.02 | nasm-2.12.02-win32.zip |
| OpenSSL 1.0.2k | 1.0.2k | openssl-1.0.2k.tar.gz |
| OpenSSL FIPS 2.0.10 | 2.0.10 | openssl-fips-2.0.10.tar.gz |
| CSC3-2010 | N/A | CSC3-2010.crl |
| tss-ca-g2 | N/A | tss-ca-g2.crl |

Table 1-15. Democracy Suite 5.5 Adjudication Software Build Environment Component Descriptions

| Firmware/Software | Version | Filename |
|---|-----------|--|
| Microsoft Enterprise Library | 5.0 | Enterprise Library 5.0.msi |
| Microsoft Prism | 4.0.0 | Prism.4.0.0.nupkg |
| Microsoft Identity Foundation SDK | 4.0 | WindowsIdentityFoundation-SDK-4.0.msi |
| Toggle Switch Control Library | 1.1.1 | ToggleSwitch 1.1.1.zip |
| Infragistics NetAdvantage Ultimate 2013.1 | 2013.1 | NetAdvantage_20131_PlatformInstaller.zip |
| iTextSharp | 5.5.1 | itextsharp-all-5.5.1.zip |
| CLR Security | June 2010 | clrsecurity_june10.zip |
| OpenSSL 1.0.2k | 1.0.2k | openssl-1.0.2k.tar.gz |
| OpenSSL FIPS 2.0.10 | 2.0.10 | openssl-fips-2.0.10.tar.gz |
| Community MSI Extensions | 1.4 | msiext-1.4.zip |
| TreeViewEx | 3.0.0.0 | TreeViewEx.dll |

Table 1-16. Democracy Suite 5.5 ImageCast Precinct Election Firmware Compiler Descriptions

| Firmware/Software | Version | Filename |
|------------------------|-------------------|---|
| g++ (GNU C++ compiler) | gcc3.4.0-20040603 | m68k-uclinux-tools-c++-gcc3.4.0-20040603.sh |

Table 1-17. Democracy Suite 5.5 ImageCast Precinct Firmware Build Environment Component Descriptions

| Firmware/Software | Version | Filename |
|-------------------------------|----------------|--|
| Ubuntu 16.04.1 | 16.04.1 | ubuntu-16.04.1-desktop-i386.iso |
| Toolchain Installation Script | N/A | Toolchain.sh |
| m68k uClinux tools base gcc | 3.4.0-20040603 | m68k-uclinux-tools-base-gcc3.4.0-20040603.sh |
| m68k uClinux tools c++ gcc | 3.4.0-20040603 | m68k-uclinux-tools-c++-gcc3.4.0-20040603.sh |
| m68k uClinux tools gdb | 20040603 | m68k-uclinux-tools-gdb-20040603.sh |
| OpenSSL 1.0.2k | 1.0.2k | openssl-1.0.2k.tar.gz |
| OpenSSL FIPS 2.0.10 | 2.0.10 | openssl-fips-2.0.10.tar.gz |

Table 1-18. Democracy Suite 5.5 ImageCast X Firmware Build Environment Component Descriptions

| Firmware/Software | Version | Filename |
|-------------------|---------|----------------------------------|
| Ubuntu 14.04.4 | 14.04.4 | ubuntu-14.04.4-desktop-amd64.iso |

Table 1-19. D-Suite 5.5 Configuration Files

| Configuration File | Version | Filename |
|----------------------------------|--------------------|----------------------------|
| Machine Configuration File (MCF) | 5.5.10.20_20180806 | MCF_5.5.10.20_20180806.mcf |
| Device Configuration File (DCF) | 5.4.01_20170521 | DCF_5.4.01_20170521.dcf |

Table 1-20. D-Suite 5.5 Voting System Equipment

| Component | Serial Number |
|--|--|
| <i>Proprietary Hardware</i> | |
| ImageCast Precinct Optical Scanner PCOS-320C | AAFAJFM0061, AAFAJFN0030, AAFAJGI6764, AAFAJEL0352 |
| ImageCast Precinct Optical Scanner PCOS-320A | AANAGCP0347, AANAGCP0002 |
| ICP Ballot Box BOX-330A | AAUCCFX0083, AAUCCGI0011 |
| ICX Inline EMI Filter | [DVS-EMIFILTER-001] thru [DVS-EMIFILTER-003] |
| <i>COTS Hardware</i> | |

Table 1-20. D-Suite 5.5 Voting System Equipment (continued)

| Component | Serial Number |
|-------------------------------------|---|
| ICX aValue 15" Tablet (SID-15V) | 0E14AF00014, B03G005400006, B033G00540008, 9E274118, 1D274118, Baytrail98D750C0, Baytrail12034DCC, Baytrail9A6550C8 |
| ICX aValue 21" Tablet (SID-21V) | 0E14AF00027, B03G005500019, 03G005500009, 0039BZ2D, 0039B209, Baytrail0039B22D, BaytrailF1B2587F, BaytrailF1B25983 |
| A Value 21" ICX DRE (Prime) | 1707101522, 1707101789, 1707101730, 1707101887, 1707101710, 1707101725, 1707101731, 1708100916, 1708100876, 1708100915, 1707101845, 1707101778, 1717101720, 1707101845, 1707101722, 1707202552, 1711300282, 1707100089, 1707101795, 1707101793, 17101793 |
| SII Thermal Printer | 1115271A, 1115273A, 115270A, 1115275A |
| KFI VRP3 Thermal Printer (VVPAT) | KPR000000715, KPR0000078339, KPR0000078377, KRP000000711, KPR000000712, KPR170900010119, KPR0000078337, KPR0000078364, KPR170900008115, KPR0000078339, KPR170900008116, KPR170900010347, KPR170900009733, KPR170900010120, KPR170900010119, KPR170900010337, KPR170900010338, KPR170900010348 |
| Dell OptiPlex 7440 All In One | HVNRFB2, HVNQFB2, HVNPFB2 |
| Dell PowerEdge R630 | 4Z07T52 |
| Dell PowerEdge R640 | JMP9CM2 |
| Canon imageFormula DR-G1130 Scanner | GF301092, GF304418 |
| Canon DR-M160II Scanner | GX333569, GX333573, GX324846, GX326272, GX319353 |
| Dell Precision T3420 PC | HS0VFB2, HS0TFB2, HS0RFB2, HS0SFB2, 4TB3MN2, F575HH2 |
| HP LaserJet Pro Printer M402dn | PHBQF20342, PHBQF20345, PHBQC12619, PHBQC19613, PHBQC12519, PHBQD18790, PHBQC12616, PHBQG09329 |
| HP LaserJet Pro Printer M402dne | PHB5D00782, PHB5D04714, PHB5F04770, PHB5B18304, PHB5D04713 |
| Dell OptiPlex 9030 All-In-One | CF73S52 |
| Dell Ultrasharp 24" Monitor U2414H | 1PVZ152, 62VZ152 |
| Dell OptiPlex 3050 All-In-One | 19YWWK2 |
| Smart Card Reader ACR39 | RR374-010362 |

Table 1-21. D-Suite 5.5 Voting System Support Equipment

| Component | Serial Number |
|---|---|
| Dell Monitor KM632 | FYNTY12, CKX6Y12, CN-0524N3-72461-59H-6U5U |
| Dell Monitor P2414Hb | CN-0524N3-74261-5AH-2DNU, CN-0524N3-74261-5AH-2DAU |
| Dell DVD Multi Recorder GP60NB60 | [DVS-Dell-001] |
| Dell Latitude E7450 Laptop | 30GFH72, 369FH72 |
| Dell Latitude e3480 Laptop | 1VD3NJ2 |
| Maxim iButton Programmer DS9490R# with DS1402 | [DVS-Maxim-001] thru [DVS-Maxim-006] |
| APC Smart-UPS SMT1500 | 3S1536X06436, 3S1536X06475, 3S1536X06461, 3S1536X06485, 3S1536X06484, 3S1536X06322, 3S1536X07467, 3S1536X06485, 3S1536X06272, 3S1536X06201, 3S1536X07305, 3S1504X00395, 3S1504X00396, 3S1716X02289, W51530180004, 3S171X06059 |
| Dell X1008 Network Switch | 4R8XX42, 26SXX42 |
| Dell X1018 Network Switch | 6TN7Y42, 63SXX42 |
| Enabling Devices Sip and Puff | [DVS-enabling devices-001] - [DVS-enabling devices-002] |
| Cyber Acoustics Headphones ACM-70 | [DVS-cyber acoustics-001] - [DVS-cyber acoustics-005] |
| 4-Way Joystick Controller S26 | PME QC 1550 12, [DVS-JOY-001], [DVS-JOY-002] |
| Enablemart # 88906 Rocker (Paddle) Switch | [DVS-paddle-001] |
| Dell PowerConnect 2808 Network Switch | 3S2P0Z1 |
| IOGEAR SDHC/microSDHC 0U51USC410 Card Reader | 8632, 8633 |
| Lexar USB 3.0 Dual-Slot Reader | 24020845007435 |
| Hoodman Steel USB 3.0 UDMA Reader 102015 | [DVS-hoodman-001] |
| ATI Handset | 98862010101-035, 98862010103-075, 00659010100-046, 98862010100-232, 093015-1-1, 00659010100-035 |
| ATI-USB Handset | 02440010100-011, [DVS-ATIUSB-001], [DVS-ATIUSB-002], B104326-1-4-040, B104326-1-4-035 |
| ACS PC-Linked Smart Card Reader ACR39U | RR374-006272, RR374-010356, RR374-010365 |
| Lexar Professional CF Card Reader Workflow CFR1 | 24050361400108, 24050361401994, 24050361401991, 24050361401990 |
| CORCOM Filter P/N#: 15EMC1 | [DVS-CorcomEMIFilter-001] |
| Delta Filter P/N#: 16PDCG5C | [DVS-DeltaEMIFILTER-001] |
| Kingston Card Reader FCR-HS4 | 08738174208132 |

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 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
- 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 1.0
- Election Assistance Commission “Approval of Voting System Testing Application Package” letter dated May 6, 2016
- EAC Requests for Interpretation (RFI) (listed on www.eac.gov)
- EAC Notices of Clarification (NOC) (listed on www.eac.gov)
- Dominion Voting Systems Technical Data Package (*A listing of the D-Suite 5.5-B 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

“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
- “ICC” – ImageCast Central
- “ICE” – ImageCast Evolution
- “ICP” – ImageCast Precinct
- “ICX” – ImageCast X
- “ISO” – International Organization for Standardization
- “NOC” – Notice of Clarification
- “PCA” – Physical Configuration Audit
- “QA” – Quality Assurance
- “RFI” – Request for Interpretation
- “TDP” – Technical Data Package
- “UPS” – Uninterruptible Power Supply
- “VSTL” – Voting System Test Laboratory
- “VVPAT” – Voter Verifiable Paper Audit Trail
- “VVSG” – Voluntary Voting System Guidelines

2.0 CERTIFICATION TEST BACKGROUND

The D-Suite 5.5-B system is a modification of a previously certified system (D-Suite 5.5). Pro V&V performed an evaluation of results from the previous test campaign to determine the scope of testing required for certification of the D-Suite 5.5-B. 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 D-Suite 5.5-B System:

Table 2-1. D-Suite 5.5-B System Revision History

| System Version | Certification Type | Baseline System | Certification Number |
|----------------|--------------------|--------------------------|----------------------|
| D-Suite 5.0 | New System | --- (Original System)--- | DVS-DemSuite5.0 |
| D-Suite 5.5 | Modification | D-Suite 5.0 | DVS-DemSuite5.5 |
| D-Suite 5.5-B | Modification | D-Suite 5.5 | DVS-DemSuite5.5-B * |

*Upon grant of certification by the EAC

2.2 Scope of Testing

The scope of testing focused on the addition of the ImageCast Evolution (ICE) optical ballot hybrid precinct-based scanner and BMD, the ICP2 optical ballot counter, the InoTec HiPro 821 Scanner, and the Canon imageFORMULA DR-M260 Scanner. To evaluate the D-Suite 5.5-B test requirements, the submitted modifications were evaluated against each section of the EAC 2005 VVSG to determine the applicable tests to be performed.

Based on this assessment, it was determined that multiple areas within the EAC 2005 VVSG would be evaluated to encompass the required tests. A breakdown of the areas and associated tests is listed below:

- EAC 2005 VVSG 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
 - Volume & Stress Testing
 - Accuracy Testing
- EAC 2005 VVSG Volume 1, Section 3: Usability & Accessibility
 - Usability & Accessibility Testing
 - Technical Documentation Package (TDP) Review
- EAC 2005 VVSG Volume 1, Section 4: Hardware Requirements
 - Hardware Testing
 - Technical Documentation Package (TDP) Review
- EAC 2005 VVSG 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 2005 VVSG Volume 1, Section 7: Security Requirements
 - Security Testing
 - Technical Documentation Package (TDP) Review
 - Functional Configuration Audit (FCA)

2.2.1 Modification Overview

The Dominion Democracy Suite 5.5-B Voting System is a modified voting system configuration that includes upgrades to the components of the D-Suite 5.5 Voting System. Section 2.2.1.1 details changes between this system and the baseline of the Democracy Suite 5.5 Voting System.

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 Detailed List of Changes

General Modifications

- Addition of ImageCast Evolution (ICE), a precinct-level, optical scan, ballot counter (tabulator) designed to perform three major functions: ballot scanning and tabulation, ballot review and second chance voting, and accessible voting and ballot marking. *Submitted version: ICE firmware version 5.5.6.5, model number PCOS 410A.*
- Addition of InoTec HiPro 821 Scanner as a component for the ImageCast Central Count (ICC). *Submitted version: ICC software application version 5.5.32.5, HiPro 821 Scanner driver version 1.2.3.17.*
- Addition of Canon imageFORMULA DR-M260 Scanner as a component for the ImageCast Central Count (ICC). *Submitted version: ICC software application version 5.5.32.5, DR-M260 Scanner driver version 1.1 SP2.*
- Addition of ImageCast Precinct 2 (ICP2) optical ballot counter. The ICP2 is a precinct-based optical scan ballot tabulator that is used in conjunction with ImageCast compatible ballot storage boxes. *Submitted version: ICP2 firmware version 5.5.1.8, model number PCOS-330A.*

EMS Election Event Designer

- Added support for Ballot ID creation by Precinct Portion

ICC

- Corrected drop-out of red colored ovals when using the HiPro scanner

ICP

- Added support for the new election file revision number of 0x0307 which increased the field size of the 'Number of Ballots' field in the VIF ELECTION.DVD file from an unsigned short (2 bytes) to an unsigned integer (4 bytes)

ICX

- Corrected discrepancy between Total Ballots Cast and Report Tape after results are deleted manually from the ICX
- Corrected issue where the application was not providing a warning for low paper amount on VVPAT tape

2.2.1.2 ECO Assessment

Since certification of previous versions of D-Suite systems that are relevant to the D-Suite 5.5-B configuration, DVS has implemented various Engineering Change Orders (ECOs), each of which were evaluated and determined to be De Minimis in nature. Although testing was not warranted during implementation of these ECOs, they are either included as part of the D-Suite 5.5-B system test campaign or may be applied to the D-Suite 5.5-B system. A listing of these ECOs, along with a brief description is provided below:

- ECO 100503 - Adding a COTS collapsible ballot box to AVL for use with the ICP
- ECO 100521 - Added DELL P2419H monitor as a display device for server and client workstations
- ECO 100527 - Added DELL Latitude 3490 computer with updated i3-8130U processor (Dual Core, 4MB Cache, 2.2GHz) to DVS PN 190-000061 (a client workstation)
- ECO 100543 - Update to the DR-G1130 Scanner LCD Panel User Interface
- ECO 100588 - Added new models of VVPAT printer for use with the D-Suite ICX workstation due to previous model becoming commercially unavailable
- ECO 100596 - Added DELL Latitude 3400 computer as a client workstation due to the DELL Latitude 3490 computer becoming commercially unavailable for purchase
- ECO 100597 - Added DELL PowerEdge R640 computer with new processor and RAM as an AVL to the existing R640 server computer configurations
- ECO 100602 - Added DELL Precision 3431 computer in an EMS Express Server and EMS Client Workstation configuration due to the DELL Precision 3430 computer becoming commercially unavailable for purchase
- ECO 100603 - Added DELL P2418HT monitor as a display device for ICC HiPro scanner workstation configuration due to the Lenovo 10QXPARIUS monitor becoming commercially unavailable for purchase

Note: The ECOs listed above were approved by the EAC prior to the issue date of this final test report.

2.2.2 Block Diagram

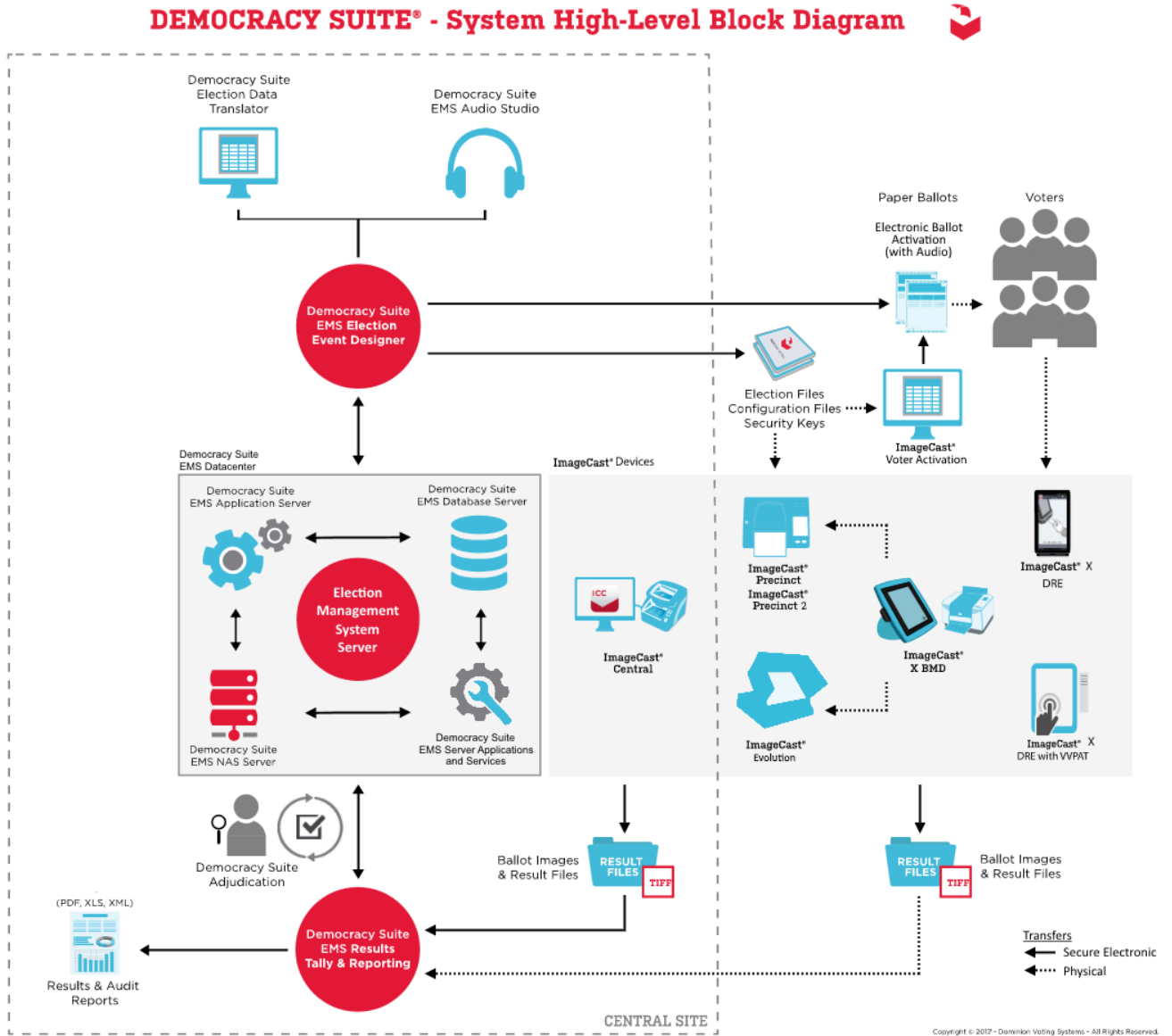


Figure 1-1. D-Suite 5.5-B System Overview

2.2.3 System Limits

The system limits verified to be supported by the D-Suite 5.5-B System during this test campaign or during testing of the baselined system are provided in the table below.

Table 2-2. D-Suite 5.5-B System Limits by Configuration

| Characteristic | Configuration Values | | Limiting Component |
|-------------------------------------|----------------------|---------|---|
| | Standard | Express | |
| Portrait Ballot Orientation | | | |
| Ballot positions | 462 | 462 | *22-inch Portrait Ballot |
| Precincts in an election | 1000 | 250 | Memory |
| Contests in an election | 1000 | 250 | Memory |
| Candidates/Counters in an election | 10000 | 2500 | Memory |
| Candidates/Counters in a precinct | 462 | 462 | *22-inch Portrait Ballot |
| Candidates/Counters in a tabulator | 10000 | 2500 | Memory |
| Ballot Styles in an election | 3000 | 750 | Memory |
| Contests in a ballot style | 156 | 156 | *22-inch Portrait Ballot |
| Candidates in a contest | 231 | 231 | *22-inch Portrait Ballot (Column Span 3) |
| Ballot styles in a precinct | 5 | 5 | Memory |
| Number of political parties | 30 | 30 | No Limitation |
| “Vote for” in a contest | 30 | 30 | No Limitation |
| Supported languages in an election | 5 | 5 | Memory |
| Number of write-ins | 462 | 462 | *22-inch Portrait Ballot |
| Landscape Ballot Orientation | | | |
| Ballot positions | 292 | 292 | *22-inch Landscape Ballot (240 candidates + 24 write-ins + 28 Yes/No choices) |
| Precincts in an election | 1000 | 250 | Memory |
| Contests in an election | 1000 | 250 | Memory |
| Candidates/Counters in an election | 10000 | 2500 | Memory |
| Candidates/Counters in a precinct | 240 | 240 | *22-inch Ballot |
| Candidates/Counters in a tabulator | 10000 | 2500 | Memory |
| Ballot Styles in an election | 3000 | 750 | Memory |
| Contests in a ballot style | 38 | 38 | *22-inch Landscape Ballot (24 candidacy contests + 14 Propositions) |

Table 2-2. D-Suite 5.5-B System Limits by Configuration *(continued)*

| Characteristic | Configuration Values | | Limiting Component |
|------------------------------------|----------------------|---------|---------------------------|
| | Standard | Express | |
| Candidates in a contest | 240 | 240 | *22-inch Ballot |
| Ballot styles in a precinct | 5 | 5 | Memory |
| Number of political parties | 30 | 30 | Memory |
| “Vote for” in a contest | 24 | 24 | *22-inch Landscape Ballot |
| Supported languages in an election | 5 | 5 | Memory |
| Number of write-ins | 24 | 24 | *22-inch Landscape Ballot |

***The 22-inch Ballot length applies only to hand-marked paper ballots.**

2.2.4 Supported Languages

Support for the following languages was verified during this test campaign or during testing of the baselined system:

Table 2-3. D-Suite 5.5-B Supported Languages

| Language | ICE | ICP | ICX |
|---------------|------------------------------|------------|-----|
| Alaska Native | Yes, if using Latin alphabet | Yes | No |
| Apache | Audio only | Audio only | No |
| Bengali | Yes | Yes | Yes |
| Chinese | Yes | Yes | Yes |
| English | Yes | Yes | Yes |
| Eskimo | Yes, if using Latin alphabet | Yes | No |
| Filipino | Yes, if using Latin alphabet | Yes | No |
| French | Yes | Yes | Yes |
| Hindi | Yes | Audio only | Yes |
| Japanese | Yes | Yes | Yes |
| Jicarilla | Audio only | Audio only | No |
| Keres | Audio only | Audio only | No |
| Khmer | Yes | Audio only | No |
| Korean | Yes | Yes | Yes |
| Navajo | Audio only | Audio only | No |
| Seminole | Audio only | Audio only | No |
| Spanish | Yes | Yes | Yes |
| Tagalog | No | No | Yes |
| Thai | Yes | Audio only | Yes |
| Towa | Audio only | Audio only | No |
| Ute | Audio only | Audio only | No |
| Vietnamese | Yes | Yes | Yes |
| Yuman | Audio only | Audio only | No |

Support for all stated languages was verified; however, 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.

For the character based language, the ballot was created by Pro V&V and voted utilizing both paper ballots and ADA voting devices along with all applicable peripherals. The Chinese Language for the ballot was created using a readily available online translation tool. The translated language text was entered into the Election Event Designer Application. A ballot preview was generated in the EED application. The Chinese characters displayed in the ballot preview were compared to the characters generated by the online translation tool, to ensure that the characters matched. The ballots were then generated and printed, and the election loaded onto the tabulators and the BMD units. The Chinese characters displayed on both the printed ballots and displayed on the BMD units were compared to the original Chinese Characters generated by the online translation tool to verify that the characters matched.

2.2.5 Supported Functionality

The D-Suite 5.5-B was verified to support the following voting variations:

- General Election
- Closed Primary
- Open Primary
- Early Voting
- Partisan/Non-Partisan Offices
- Write-In Voting
- Primary Presidential Delegation Nominations
- Split Precincts
- Vote for N of M
- Ballot Rotation
- Provisional or Challenged Ballots

2.2.6 VVSG

The D-Suite 5.5-B Voting System was evaluated against the relevant requirements contained in the EAC 2005 VVSG, Version 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 D-Suite 5.5-B Voting System was evaluated against the relevant requirements contained in the EAC 2005 VVSG, Volumes I and II. The focus of this test campaign is the addition of the ImageCast Evolution (ICE) optical ballot hybrid precinct-based scanner and BMD, the ICP2 optical ballot counter, the InoTec HiPro 821 Scanner, and the Canon imageFORMULA DR-M260 Scanner. 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, Volume & Stress Testing, and FCA), Hardware Testing, Usability & Accessibility Testing, Security Testing, and Source Code Review are detailed in the relevant sections of this report. In addition to these areas of testing, a PCA (including System Loads & Hardening), a TDP Review, and a QA & CM System Review were performed, as described below.

3.1.1 Physical Configuration Audit (PCA)

The Physical Configuration Audit (PCA) 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 D-Suite 5.5-B 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.

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 D-Suite 5.5-B TDP is provided in Table 3-1.

Table 3-1. TDP Documents

| Document Number | Description | Version |
|-------------------------------|--|----------------|
| <i>Adjudication Documents</i> | | |
| 2.05 | Democracy Suite Adjudication Software Design and Specification | 5.5-B::122 |
| 2.08 | Democracy Suite Adjudication System Operation Procedures | 5.5-B::170 |
| 2.09 | Democracy Suite Adjudication System Maintenance Manual | 5.5-B::102 |
| <i>D-Suite Documents</i> | | |
| 2.02 | Democracy Suite System Overview | 5.5-B::172 |
| 2.06 | Democracy Suite System Security Specification | 5.5-B::574 |
| 2.07 | Democracy Suite System Test and Verification | 5.5-B::196 |
| 2.10 | Democracy Suite Personnel Deployment and Training Requirements | 5.5-B::132 |

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

| Document Number | Description | Version |
|--------------------------------------|--|----------------|
| 2.11 | Democracy Suite Configuration Management Process | 5.5-B::396 |
| 2.12 | Democracy Suite Quality Assurance Program | 5.5-B::160 |
| 2.13 | Democracy Suite System Change Notes | 5.5-B::173 |
| <i>EMS Documents</i> | | |
| 2.03 | Democracy Suite EMS Functional Description | 5.5-B::383 |
| 2.05 | Democracy Suite EMS Software Design and Specification | 5.5-B::329 |
| 2.08 | Democracy Suite EMS System Operations Procedures | 5.5-B::727 |
| 2.09 | Democracy Suite EMS System Maintenance Manual | 5.5-B::148 |
| --- | Democracy Suite EMS System Installation and Configuration Procedure | 5.5-B::349 |
| <i>ImageCast Central Documents</i> | | |
| 2.03 | Democracy Suite ImageCast Central Functionality Description | 5.5-B::191 |
| 2.05 | Democracy Suite ImageCast Central Software Design and Specification | 5.5-B::125 |
| 2.08 | Democracy Suite ImageCast Central System Operation Procedures | 5.5-B::213 |
| --- | Democracy Suite ImageCast Central Installation and Configuration Procedure | 5.5-B::203 |
| <i>ImageCast Evolution Documents</i> | | |
| 2.03 | Democracy Suite ImageCast Evolution Functionality Description | 5.5-B::120 |
| 2.04 | Democracy Suite ImageCast Evolution System Hardware Specifications | 5.5-B::332 |
| 2.05 | Democracy Suite ImageCast Evolution Software Design and Specifications | 5.5-B::175 |
| 2.08 | Democracy Suite ImageCast Evolution System Operation Procedures | 5.5-B::241 |
| 2.09 | Democracy Suite ImageCast Evolution System Maintenance Manual | 5.5-B::165 |
| <i>ImageCast Precinct Documents</i> | | |
| 2.03 | Democracy Suite ImageCast Precinct Functionality Description | 5.5-B::182 |
| 2.04 | Democracy Suite ImageCast Precinct System Hardware Specification | 5.5-B::153 |
| 2.04.1 | Democracy suite ImageCast Precinct System Hardware Characteristics | 5.5-B::98 |
| 2.05 | Democracy Suite ImageCast Precinct Software Design and Specification | 5.5-B::155 |
| 2.08 | Democracy Suite ImageCast Precinct System Operation Procedures | 5.5-B::277 |
| 2.09 | Democracy Suite ImageCast Precinct System Maintenance Manual | 5.5-B::125 |
| <i>ImageCast Precinct2 Documents</i> | | |

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

| Document Number | Description | Version |
|--------------------------------|---|----------------|
| 2.03 | Democracy Suite ImageCast Precinct 2 Functionality Description | 5.5-B::10 |
| 2.04 | Democracy Suite ImageCast Precinct 2 System Hardware Specifications | 5.5-B-11 |
| 2.05 | Democracy Suite Imagecast Precinct 2 Software Design and Specifications | 5.5-B::16 |
| 2.08 | Democracy Suite Imagecast Precinct 2 System Operation Procedures | 5.5-B::10 |
| 2.09 | Democracy Suite Imagecast Precinct 2 System Maintenance Manual | 5.5-B::9 |
| <i>ImageCast X Documents</i> | | |
| 2.03 | Democracy Suite ImageCast X Functionality Description | 5.5-B::97 |
| 2.05 | Democracy Suite ImageCast X Software Design and Specification | 5.5-B::98 |
| 2.08 | Democracy Suite ImageCast X System Operation Procedures | 5.5-B::85 |
| --- | Democracy Suite ImageCast X System Installation and Configuration | 5.5-B::87 |
| 2.09 | Democracy Suite ImageCast X System Maintenance Manual | 5.5-B::76 |
| <i>User Guides</i> | | |
| --- | Democracy Suite ImageCast Adjudication User Guide | 5.5-B::141 |
| --- | Democracy Suite Election Data Translator User Guide | 5.5-B::89 |
| --- | Democracy Suite EMS Audio Studio User Guide | 5.5-B::38 |
| --- | Democracy Suite EMS Election Event Designer User Guide | 5.5-B::339 |
| --- | Democracy Suite EMS Results Tally and Reporting User Guide | 5.5-B::145 |
| --- | Democracy Suite ImageCast Central User Guide | 5.5-B::137 |
| --- | Democracy Suite ImageCast Precinct User Guide | 5.5-B::56 |
| --- | Democracy Suite ImageCast Voter Activation User Guide | 5.5-B::53 |
| --- | Democracy Suite ImageCast X User Guide | 5.5-B::252 |
| --- | Democracy Suite ImageCast Precinct 2 User Guide | 5.5-B::6 |
| --- | Canon imageFORMULA DR-M160II User Manual | --- |
| --- | Canon imageFORMULA DR-M260 User Manual | --- |
| --- | Canon imageFORMULA DR-G1130 DR-G1100 User Manual | --- |
| --- | HiPro User Manual | 1.2 |
| <i>Supplementary Documents</i> | | |
| ---- | Common Industry Format for Usability Test Report ImageCast X 5.2 with VVPAT | 5.5::1 |
| --- | Dell Latitude E7450 Owner's Manual | Rev. A00 |
| --- | SID-15V-Z37-A1R User Manual | Rev. 1.0 |

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

| Document Number | Description | Version |
|------------------------|---|----------------|
| --- | SID-21V-Z37-A1R User Manual | Rev. 1.0 |
| --- | Cyber Acoustics ACM-70B Stereo Headphones Product Sheet | --- |
| --- | Democracy Suite ImageCast C++ Coding Standard | 5.5-B::59 |
| --- | Democracy Suite C# Automated Code Review Process | 5.5-B::54 |
| --- | Dell Latitude E7450/Latitude 7450 Regulatory Compliance Sheet | Rev. A09 |
| --- | Dell OptiPlex 9020 AIO Regulatory Compliance Sheet | Rev. A09 |
| --- | Dell OptiPlex 9030 AIO Regulatory Compliance Sheet | Rev. A09 |
| --- | Dell Networking X-Series Specification Sheet | Ver. 1.9 |
| --- | Dell OptiPlex 9020 All-in-One Technical Specification Sheet | --- |
| --- | Dell OptiPlex 9030 All-in-One Technical Specification Sheet | --- |
| --- | Dell OptiPlex 3050 All-in-One Technical Specification Sheet | --- |
| --- | Google Java Style Dominion XML | --- |
| --- | Dominion Voting Systems Java Coding Standards | 1.0 |
| --- | Dominion Voting Systems JavaScript Coding Standards | 1.0 |
| --- | ICX Machine Configuration File (MCF) Parameters Settings | 5.5-B::31 |
| --- | Democracy Suite ImageCast Device Configuration Files | 5.5-B::105 |
| --- | Democracy Suite ImageCast Printing and Finishing Specification | 5.5-B::99 |
| --- | Democracy Suite ImageCast Total Results File Format | 5.5-B::62 |
| --- | Democracy Suite ImageCast Election Definition Files | 5.5-B::88 |
| --- | Democracy Suite ImageCast Precinct Extracting Firmware Contents | 5.5-B::41 |
| --- | Democracy Suite ImageCast Precinct Firmware Update Procedure | 5.5-B::68 |
| --- | Democracy Suite ImageCast Precinct Level One (L1) Maintenance Manual | 5.5-B::67 |
| --- | Democracy Suite ImageCast Precinct Technical Guide | 5.5-B::57 |
| --- | Usability Test Report of ImageCast Precinct 5.0 with 36 Participants for VVSG 1.0 | 5.0::10 |
| --- | Usability Test Report of ImageCast X 5.0 with 36 Participants for VVSG 1.0 | 5.0::13 |
| --- | YEDU.E95462 Uninterruptible Power-supply Equipment Sheet | --- |
| --- | Dell Latitude E7440 Regulatory Compliance Sheet | Rev. A09 |
| --- | Dell Latitude 3480 Regulatory Compliance Sheet | Rev. A11 |
| --- | Dell PowerEdge R630 Regulatory Compliance Sheet | Rev. A10 |
| --- | Dell Precision T1700 MT Regulatory Compliance Sheet | Rev. A09 |

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

| Document Number | Description | Version |
|------------------------|---|----------------|
| --- | Dell PowerConnect 2808 Product Safety, EMC, and Environmental Datasheet | --- |
| --- | Dell PowerConnect 2816 Product Safety, EMC, and Environmental Datasheet | --- |
| --- | Smart Pro SM1500 Datasheet | --- |
| --- | APC Smart-UPS 230V Product Information Sheet | --- |
| --- | HP M402dn Datasheet | Rev. 2 |
| --- | HP M402dne Datasheet | May 2017 |
| --- | Dell Latitude 3480 Owner's Manual | Rev. A00 |
| --- | Dell Latitude 3470 Owner's Manual | Rev. A00 |
| --- | Dell Precision T3420 Owner's Manual | Rev. A00 |
| --- | aValue HID-21V-BTX-A1R User Manual | Rev. 2.0 |
| --- | aValue SID-15V-Z37-A1R Data Sheet | --- |
| --- | aValue SID-21V-Z37-A1R Data Sheet | --- |
| --- | APC Installation and Operation Back-UPS Pro BR1000G | 10/2014 |
| --- | APC Smart-UPS SMT1500 Operation Manual | 03/2013 |
| --- | Dell OptiPlex 7440 All-In-One Owner's Manual | Rev. A01 |
| --- | Dell OptiPlex 3050 All-In-One Owner's Manual | Rev. A01 |
| --- | Dell P2417H Monitor User's Guide | Rev. A01 |
| --- | Dell PowerEdge R630 Owner Manual | Rev. A03 |
| --- | Lexar Pro USB 3 Dual Slot Reader | --- |
| --- | Usability Study of Dominion Voting Systems ImageCast Evolution Versions 4.1.1.1 and 4.6.1.1 | 1.0.0::37 |
| --- | Democracy Suite ImageCast Evolution Firmware Installation Procedure | 5.5-B::96 |
| --- | Democracy Suite ImageCast Evolution Level One (L1) Maintenance Manual | 5.5-B::134 |
| --- | Democracy Suite ImageCast Evolution Machine Behavior Settings | 5.5-B::96 |
| --- | Seiko SII RP-D10 Series User's Guide | Jan. 2018 |
| --- | Dell EMC PowerEdge R640 Installation and Service Manual | Rev. A01 |
| --- | Dell OptiPlex 7060 Small Form Factor Service Manual | Rev. A00 |
| --- | Dell Latitude E7470 Owner's Manual | Rev. A02 |
| --- | APC Operation Manual Smart-UPS 750/1000/1500/2200/3000 VA | --- |
| --- | ACR38x CCID Smart Card Reader Reference Manual | V6.05 |

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

| Document Number | Description | Version |
|------------------------|---|----------------|
| --- | ACR39 Series PC-linked Smart Card Readers Reference Manual | V1.04 |
| --- | Ablenet Single Switch Quickstart Guide | --- |
| --- | The Programing Group High-Integrity C++Coding Standard Manual | Ver. 2.2 |
| --- | HIC++ Standards Model for C++ | 9.5.4 |
| --- | Dominion Voting Voter-verified paper audit trail (VVPAT) Model: VRP3 User Manual Safety Precautions | 07 2018 |
| --- | Democracy Suite ImageCast Precinct 2 Machine Behavior Settings | 5.5-B::10 |
| --- | APC Smart-UPS 1500 Specification Sheet | --- |
| --- | Democracy Suite ImageCast Precinct 2 Extracting Firmware Contents and Verifying SHA256 Values | 5.5-B::13 |
| --- | Democracy Suite ImageCast Precinct 2 Level One (L1) Maintenance Manual | 5.5-B::9 |
| --- | APC Back-UPS BE600M1 User Manual | 09/2015 |
| --- | APC Back-UPS SMT1500C Operation Manual | 01/2017 |
| --- | Avalue HID-21V-BTX FactSheet (---) | --- |
| --- | Avalue SID 21V Quick Reference | Feb 2018 |
| --- | Dell Latitude 3490 Owners Manual | Rev. A01 |
| --- | Dell OptiPlex 3050 AIO EMC Emissions Compliance Sheet | Rev. A11 |
| --- | Dell Latitude 3400 Setup and Specification Guide | Rev. A00 |
| --- | Dell PowerEdge R640 Technical Guide | Rev. A00 |
| --- | Dell Networking X Series User Guide | Rev. A06 |
| --- | Dell P2419H Monitor User's Guide | Rev. A05 |
| --- | DisplayLink DL 125 Product Brief | --- |
| --- | HIC Coding Standard | 2.2 |
| --- | Kingston USB 3.0 High-Speed Media Reader Datasheet | --- |
| --- | Lenovo ThinkCentre TIO24Gen3Touch Monitor User Guide | May 2017 |
| --- | Dell Optiplex 7050 Tower Owners Manual (A01) | Rev. A01 |
| --- | Dell Optiplex 7060 Small Form Factor Service Manual | Rev. A00 |
| --- | Dell Optiplex 7060 Tower Setup and Specifications Guide | Rev. A01 |
| --- | Dell Precision 3430 Small Form Factor Service Manual | Rev. A00 |
| --- | Dell Precision 3430 Small Form Factor Setup and Specifications Guide | Rev. A00 |
| --- | Scamax 8x1 Scanner Brochure | --- |

Table 3-1. TDP Documents (continued)

| Document Number | Description | Version |
|------------------------|--|----------------|
| --- | Tripp Lite SmartPro SM1500RMXL2UTAA Datasheet | --- |
| <i>Build Documents</i> | | |
| --- | Democracy Suite ImageCast Evolution Firmware Build, Prerequisite Setup and Installation | 5.5-B::95 |
| --- | Democracy Suite ImageCast Precinct Firmware Build and Install | 5.5-B::90 |
| --- | Democracy Suite ImageCast X Build | 5.5-B::55 |
| --- | Democracy Suite Windows Build Document | 5.5-B::40 |
| --- | Democracy Suite ImageCast Precinct 2 Build Environment and Prerequisite Setup, Firmware Build and Installation | 5.5-B::24 |

3.1.3 QA & CM System Review

The Dominion Voting Systems 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 Dominion Voting Systems 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 Dominion Voting Systems technical documentation. The review of the Quality Assurance and Configuration Management documentation focused on the Dominion Voting Systems' 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. Prior to initiating the software review, Pro V&V verified that the submitted documentation was 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.

For the ICE software, a combination of Automated Source Code Review and Manual Source Code Review methods was used to review the source code. For all other components, the submitted source code was compared to the previously certified Democracy Suite 5.5 voting system versions to determine the changes, if any. A combination of Automated Source Code Review and Manual Source Code Review methods was used to review the changes in the source code. In addition, 10% of the source code comments were manually reviewed.

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 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 1 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 Testing and Certification 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 a previously certified version of the D-Suite System. The submitted modifications were evaluated during the source code review, security tests, and FCA.

To evaluate the integrity of the system, Pro V&V developed specifically designed test cases in an attempt to defeat the access controls and security measures documented in the system TDP as well verifying compliance to EAC RFI 2012-05. During the security testing, the system was inspected for various controls and measures that were in place to meet the objectives of the security standards which included: protection of the critical elements of the voting system; establishing and maintaining controls to minimize errors; protection from intentional manipulation, fraud and malicious mischief; identifying fraudulent or erroneous changes to the voting system; and protecting the secrecy in the voting process.

Summary Findings

As a result of the Security Testing, it was determined that the D-Suite 5.5-B 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.

System Level Testing included the evaluations of the following test areas FCA, Accuracy Testing, Volume & Stress, 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 will be conducted to insure all applicable EAC 2005 VVSG requirements are met.

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

- **FCA-VVSG Testing**: 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:

- Pre-voting Capabilities: These functional capabilities are used to prepare the voting system for voting. They include ballot preparation, the preparation of election-specific software (including firmware), the production of ballots, the installation of ballots and ballot counting software (including firmware), and system and equipment tests.
- Voting System Capabilities: These functional capabilities include all operations conducted at the polling place by voters and officials including the generation of status messages.
- Post-voting Capabilities: These functional capabilities apply after all votes have been cast. They include closing the polling place; obtaining reports by voting machine, polling place, and precinct; tabulation of paper ballots at the central location; accumulation of results from all voting methods; obtaining consolidated reports; and obtaining reports of audit trails.
- FCA-Claims Testing: 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.
- FCA-Mapping: 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.

Summary Findings

All functional tests were successfully executed. During execution of the test procedure, it was verified that the D-Suite 5.5-B System successfully completed the system level integration tests with all actual results obtained during test execution matching the expected results.

3.1.6.2 Volume & Stress

The Volume & Stress Tests are utilized to investigate the system's response to conditions that tend to overload the system's capacity to process, store, and report data.

The test parameters focused on the system's stated limits and the ballot logic for areas such as the maximum number of active voting positions, maximum number of ballot styles, maximum candidates, maximum contests, and stated limits within the EMS. This test is utilized to ensure the system could achieve the manufacturer's TDP claims of what the system can support. Testing was performed by exercising multiple election definitions and test cases developed specifically to test for volume and stress conditions of the system being tested.

Summary Findings

During the performance of the Volume and Stress Test, the ICC configured with the Canon DR-M260 scanner encountered a significant number of double feeds when casting 22” ballots. To address the issue Dominion Voting Systems provided a “T” shaped support to provide support for these long ballots, as well as advised that smaller batches of ballots were used when scanning. These changes were documented and addressed the double feed issue and the ICC configured with the Canon DR-M260 scanner successfully completed the Volume and Stress Test. Volume and stress testing was successfully performed on the D-Suite 5.5-B System.

3.1.6.3 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 accuracy requirements for the ICE, ICP2, and the ICC units were met by the execution of the standard accuracy test utilizing hand-marked ballots of each ballot length supported by the system, and ballots produced by the ICX BMD, to achieve an accuracy rate greater than 1,549,703 correct ballot positions.

The ICX BMD, ICX DRE, ICP, and the ICX DRE with VVPAT Accuracy test were reused from the Dominion 5.5 EAC Campaign.

3.1.6.4 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 D-Suite 5.5-B System successfully passed the System Integration Test. During execution of the test procedure, it was verified that the D-Suite 5.5-B 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 D-Suite 5.5-B System to the applicable requirements. Testing specifically focused on 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 D-Suite 5.5-B System was configured as per the Dominion Voting Systems 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.

Summary Findings

The D-Suite 5.5-B System successfully met the requirements of the Usability and Accessibility evaluation. Any deficiencies encountered during testing were successfully resolved.

3.1.8 Hardware Testing

The ICX BMD, ICX DRE, ICP, the ICX DRE with Report Printer, and the ICX DRE with VVPAT hardware testing were re-used from the previous certification test campaign (D-Suite 5.5). The components added to the modified system required the full suite of hardware and electrical testing as detailed in the 2005 VVSG. These tests are listed below:

Electrical Tests:

- Electrical Power Disturbance
- Electromagnetic Radiation
- Electrostatic Disruption
- Electromagnetic Susceptibility
- Electrical Fast Transient
- Lightning Surge
- Conducted RF Immunity
- Magnetic Fields Immunity
- Electrical Supply

Environmental Tests:

- Bench Handling
- Vibration
- Low Temperature
- High Temperature

- Humidity
- Temperature Power Variation
- Acoustic

Pro V&V utilized third party testing during the performance of hardware testing. All electrical hardware testing was performed at the TUV SUD Canada, Inc. facility located in Ontario, Canada. All testing at the TUV SUD Canada, Inc. facility was witnessed on-site by Pro V&V personnel. All environmental 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 in which Pro V&V qualified staff executed all testing.

Summary Findings

Electrical Testing was performed on the ICE and ICP2 components of the D-Suite 5.5-B System. The procedures and results for this testing are included in the following TUV SUD Canada, Inc. reports:

- Report File #: 7169005633E-00, presented in Attachment A-1
- Report File #: 7169006118E-00, presented in Attachment A-2

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 |
| 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 |

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

| Standard/Method | Description | Criteria | Class/Level | Result |
|-------------------------------------|-----------------------|---------------------------------|------------------------------|--------|
| 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 |

Environmental Testing was performed on the ICE and ICP2 components of the D-Suite 5.5-B System. The Canon M260 and InoTec HiPro Scanner components were subjected to Temperature-Power Variation Testing only.

The procedures and results for this testing are included in the following NTS Test reports:

- Test Report No. PR094223, presented in Attachment A-3 (*ICE*)
- Test Report No. PR097523, presented in Attachment A-4 (*InoTec HiPro Scanner and ICP2*)

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, 502.2, II-3 VVSG Vol 1 4.1.2.14, VVSG Vol 2 4.6.4 | Low Temperature - Storage | Normal Operation & No Data Loss | Pass |
| MIL-STD-810D, 501.2, I-3.2 VVSG Vol 1 4.1.2.14, VVSG Vol 2 4.6.5 | High Temperature - Storage | Normal Operation & No Data Loss | Pass |
| MIL-STD-810D, 507.2, I-3.2 VVSG Vol 1 4.1.2.14, VVSG Vol 2 4.6.5 | Humidity – Hot/Humid | 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, Temp-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 |
| VVSG Vol. 1 4.1.2.4 | Electrical Supply | Normal Operation & No Data Loss | Pass |
| VVSG Vol. 1 4.7.2 | Maintainability | Ease of Maintenance | Pass |

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. Table 3.4 details the noted deficiencies.

Table 3-4. Noted Deficiencies

| ID# | Test Category | Deficiency | Resolution |
|------------|----------------------------|---|--|
| 476 | Volume and Stress | A significant number of double feeds occurred while scanning 22" ballots on the ICC configured with the Canon DR-M260 scanner. | Dominion supplied a "T" shaped support to provide support for long ballots, as well as advised that smaller batch sizes be used when scanning. |
| 477 | System Loads and Hardening | An error occurred when restarting an ICP2 unit after installing the 5.5.1.1 firmware on the unit. Running the installation process a second time addresses the issue. | This issue was addressed in the 5.5.1.8 release of the ICP2 firmware. |
| 479 | General | Using the ATI to vote a ballot caused the ICX application ver. 5.5.13.2 to crash and restart. | This issue was caused by the incorrect build resources being supplied to the VSTL. The correct build resources were supplied and the ICX application version 5.5.13.2 was rebuilt. |

4.0 RECOMMENDATION FOR CERTIFICATION

The D-Suite 5.5-B 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 D-Suite 5.5-B functioned as a complete system during System Integration Testing. Based on the test findings, Pro V&V recommends the EAC grant the D-Suite 5.5-B System, as identified in Tables 4-1 through 4-29, certification to the EAC 2005 VVSG.

Table 4-1. Democracy Suite 5.5-B EMS Software Component Descriptions

| Software | Version | Filename | Configuration | |
|---------------------------------------|----------|--|---------------|---------|
| | | | Standard | Express |
| EMS Election Event Designer (EED) | 5.5.32.4 | setup.exe: EED_FED_CERT_Setup_x64.msi | X | X |
| EMS Results Tally and Reporting (RTR) | 5.5.32.4 | setup.exe: RTR_FED_CERT_Setup_x64.msi | X | X |
| EMS Application Server | 5.5.32.4 | setup.exe: APPS_FED_CERT_Setup_x64.msi | X | X |
| EMS File System Service (FSS) | 5.5.32.4 | setup.exe: FSSSetup.msi | X | X |
| EMS Audio Studio (AS) | 5.5.32.4 | setup.exe: EMSAudioStudioSetup.msi | X | X |
| EMS Data Center Manager (DCM) | 5.5.32.4 | DemocracySuiteEMS_DCM.exe | X | X |
| EMS Election Data Translator (EDT) | 5.5.32.4 | setup.exe: EDTSetup_x86.msi EDTSetup_x64.msi | X | X |
| ImageCast Voter Activation (ICVA) | 5.5.32.4 | setup.exe: ICVASetup.msi | X | X |
| EMS Adjudication (Adj.) | 5.5.32.1 | DVS ImageCast Adjudication Client Setup.msi | X | X |
| EMS Adjudication Service | 5.5.32.1 | DVS Adjudication Services Setup.msi | X | X |
| Smart Card Helper Service | 5.5.32.4 | setup.exe: SmartCardServiceSetup.msi | X | X |

Table 4-2. Democracy Suite 5.5-B ImageCast Precinct Software Component Descriptions

| Firmware/Software | Version | Filename |
|--|----------|---------------------|
| Election Firmware | 5.5.31.1 | cf2xx.sig |
| Firmware Updater | 5.5.31.1 | firmUp.enc |
| Firmware Extractor | 5.5.31.1 | FirmwareExtract.enc |
| Kernel (uClinux) | 5.5.31.1 | image.bin.gz |
| Boot Loader (COLILO) | 20040221 | colilo.bin |
| Asymmetric Key Generator | 5.5.31.1 | Keygen.enc |
| Asymmetric Key Exchange Utility | 5.5.31.1 | KeyExchange.enc |
| Firmware Extractor (Uses Technician Key) | 5.5.31.1 | TechExtract.enc |

Table 4-3. Democracy Suite 5.5-B ImageCast Central Software Component Descriptions

| Firmware/Software | Version | Filename |
|-------------------------------|----------------|-----------------|
| ImageCast Central Application | 5.5.32.5 | ICCSSetup.exe |

Table 4-4. Democracy Suite 5.5-B ImageCast X Software Component Descriptions

| Firmware/Software | Version | Filename |
|--------------------------|----------------|-----------------|
| ICX Application | 5.5.13.2 | ICX.apk |

Table 4-5. Democracy Suite 5.5-B ImageCast Precinct 2 Software Component Descriptions

| Firmware/Software | Version | Filename |
|--|----------------|--|
| ICP2 Application | 5.5.1.8 | dvs-release-image-icp2-5.5.1.8.vhd.7z |
| ICP2 Application (for units with 2 GB RAM) | 5.5.1.8 | dvs-release-image-icp2-2G-5.5.1.8.vhd.7z |
| ICP2 Update Card | 5.5.1.8 | icp2-update-5.5.1.8 |

Table 4-6. Democracy Suite 5.5-B ImageCast Evolution Software Component Descriptions

| Firmware/Software | Version | Filename |
|-------------------------------|-----------------|--|
| Voting Machine | 5.5.6.5 | GApplication-5.5.6.5.vhd.7z |
| Election Application | 5.5.6.5 | dvs |
| Linux Kernel | 2.6.30.9-dvs-36 | uImage |
| Linux Device File | 1.6 | mpc8347dvs.dtb |
| Root File System | 5.0.31 | rfs |
| Ram Disk | 1.0.2 | initrd.img |
| Motherboard FPGA | 1.1.5 | ice2_mc_p1.bit |
| Scanner Board FPGA | 1.1.2 | ice2_scb_p2.bit |
| Logger Controller | 2.0.2 | logger.bin |
| Power Controller | 3.0.5 | power.bin |
| Boot Loader | 1.3.4.63 | u-boot.bin |
| Integrated Printer | 4.1.6 | integratedPrinter.hex, printerFont.hex |
| Boot Startup Logo | 6.0.0 | logo_platform.bmp |
| Linux Startup Logo | 6.0.0 | logo_os.bmp |
| Application Startup Logo | 6.0.0 | application_startup_logo.bmp |
| Application Verification Logo | 6.0.0 | logo_application_verification.bmp |
| Ram Disk Verification Logo | 6.0.0 | logo_ramdisk_verification.bmp |

Table 4-6. Democracy Suite 5.5-B ImageCast Evolution Software Component Descriptions
(continued)

| Firmware/Software | Version | Filename |
|------------------------------|---------|-------------------------------|
| Linux Tree Verification Logo | 6.0.0 | logo_os_tree_verification.bmp |
| Linux Verification Logo | 6.0.0 | logo_os_verification.bmp |
| RFS Verification Logo | 6.0.0 | logo_rfs_verification.bmp |

Table 4-7. Democracy Suite 5.5-B EMS Client/Server Software Component Descriptions

| Firmware/Software | Version | Filename | Configuration | |
|---|------------------|--|---------------|---------|
| | | | Standard | Express |
| Microsoft Windows Server | 2012 R2 Standard | Physical Media from Microsoft | X | |
| Microsoft Windows | 10 Professional | Physical Media from Microsoft | X | X |
| .NET Framework | 3.5 | Physical Media from Microsoft | X | X |
| Microsoft Visual J# | 2.0 | vjredist64.exe vjredist.exe | X | X |
| Microsoft Visual C++ 2013 Redistributable | 2013 | vcredist_x64.exe vcredist_x86.exe | X | X |
| Microsoft Visual C++ 2015 Redistributable | 2015 | vc_redist.x64.exe vc_redist.x86.exe | X | X |
| Java Runtime Environment | 7u80 | jre-7u80-windows-x64.exe jre-7u80-windows-i586.exe | X | X |
| Java Runtime Environment | 8u144 | jre-8u144-windows-x64.exe jre-8u144-windows-i586.exe | X | X |
| Microsoft SQL Server 2016 Standard | 2016 Standard | Physical Media from Microsoft | X | |
| Microsoft SQL Server 2016 Service Pack 1 | 2016 SP1 | SQLServer2016SP1-KB3182545-x64-ENU.exe | X | |
| Microsoft SQL Server 2016 SP1 Express | 2016 SP1 | SQLEXPADV_x64_ENU.exe | | X |
| Cepstral Voices | 6.2.3.801 | Allison (English): Cepstral_Allison_windows_6.2.3.801.exe Alejandra (Spanish): Cepstral_Alejandra_windows_6.2.3.801.exe | X | X |
| Arial Narrow Fonts | 2.37a | ARIALN.TTF ARIALNB.TTF ARIALNBI.TTF ARIALNI.TTF | X | X |
| Maxim iButton Driver | 4.05 | install_1_wire_drivers_x86_v405.msi install_1_wire_drivers_x64_v405.msi | X | X |

Table 4-7. Democracy Suite 5.5-B EMS Client/Server Software Component Descriptions
(continued)

| Firmware/Software | Version | Filename | Configuration | |
|---------------------------------------|-----------|--|---------------|---------|
| | | | Standard | Express |
| Adobe Reader DC | AcrobatDC | AcroRdrDC1501020060_en_US.exe | X | X |
| Microsoft Access Database Engine | 2010 | AccessDatabaseEngine.exe AccessDatabaseEngine_x64.exe | X | X |
| Open XML SDK 2.0 for Microsoft Office | 2.0 | OpenXMLSDKv2.msi | X | X |

Table 4-8. Democracy Suite 5.5-B EMS Software Platform Unmodified COTS Component Descriptions

| Firmware/Software | Version | Filename |
|---|-------------------------|--|
| Infragistics NetAdvantage Win Forms 2011.1 | 2011 Vol.1 | NetAdvantage_WinForms_20111.msi |
| Infragistics NetAdvantage WPF 2012.1 | 2012 Vol.1 | NetAdvantage_WPF_20121.msi |
| TX Text Control Library for .NET | 16.0 | TXText Control.NET for Windows Forms 16.0.exe |
| SOX | 14.3.1 | sox.exe , libgomp-1.dll, pthreadgc2.dll, zlib1.dll |
| NLog | 1.0.0.505 | NLog.dll |
| iTextSharp | 5.0.5 | itextsharp.dll |
| OpenSSL | 1.0.2k & 2.0.14 FIPS | openssl.exe, libeay32.dll, ssleay32.dll |
| SQLite | 1.0.103.0 | System.Data.SQLite.DLL (32-bit and 64-bit) |
| Lame | 3.99.4 | lame.exe |
| Speex | 1.0.4 | speexdec.exe and speexenc.exe |
| Ghostscript | 9.04 | gsdll32.dll (32-bit and 64-bit) |
| One Wire API for .NET | 4.0.2.0 | OneWireAPI.NET.dll |
| Avalon-framework-cvs-20020806 | 20020806 | avalon-framework-cvs-20020806.jar |
| Batik | 0.20-5 | batik.jar |
| Fop | 0.20-5 | fop.jar |
| Microsoft Visual J# 2.0 Redistributable Package-Second Edition(x64) | 2.0 | vjc.dll , vjsjbc.dll, vjslibcw.dll, vjsnativ.dll , vjssupuilib.dll , vjsvwaux.dll |
| Entity framework | 6.1.3 | EntityFramework.dll |
| Spreadsheetlight | 3.4.3 | SpreadsheetLight.dll, SpreadsheetLight.xml |
| Open XML SDK 2.0 For Microsoft Office | 2.0.5022.0 | DocumentFormat.OpenXml.dll, DocumentFormat.OpenXml.xml |

Table 4-9. Democracy Suite 5.5-B ImageCast Precinct Unmodified COTS Component Descriptions

| Firmware/Software | Version | Filename |
|--------------------------|----------------|----------------------------|
| OpenSSL 1.0.2k | 1.0.2k | openssl-1.0.2k.tar.gz |
| OpenSSL FIPS 2.0.10 | 2.0.10 | openssl-fips-2.0.10.tar.gz |
| Zlib | 1.2.3 | Zlib-1.2.3.tar.gz |

Table 4-10. Democracy Suite 5.5-B ImageCast Precinct 2 Unmodified COTS Component Descriptions

| Firmware/Software | Version | Filename |
|--------------------------|----------------|--|
| acl | 2.2.52 | acl-2.2.52.src.tar.gz |
| attr | 2.4.47 | attr-2.4.47.src.tar.gz |
| avahi | 0.6.32 | avahi-0.6.32.tar.gz |
| bash | 4.3.30 | bash-4.3.30.tar.gz |
| bash-completion | 2.4 | bash-completion-2.4.tar.xz |
| busybox | 1.24.1 | busybox-1.24.1.tar.bz2 |
| bzip2 | 1.0.6 | bzip2-1.0.6.tar.gz |
| coreutils | 8.25 | coreutils-8.25.tar.xz |
| cryptodev-linux | 1.8 | cryptodev-linux-1.8.tar.gz |
| cups | 2.1.4 | cups-2.1.4-source.tar.gz |
| db | 6.0.35 | db-6.0.35.tar.gz |
| dbus | 1.10.10 | dbus-1.10.10.tar.gz |
| dbus-glib | 0.106 | dbus-glib-0.106.tar.gz |
| dbus-test | 1.10.10 | dbus-1.10.10.tar.gz |
| depmodwrapper-cross | 1 | morty.tar.gz |
| e2fsprogs | 1.43 | e2fsprogs.git.tar.gz |
| expat | 2.2.0 | expat-2.2.0.tar.bz2 |
| fontconfig | 2.12.1 | fontconfig-2.12.1.tar.gz |
| freetype | 2.6.5 | freetype-2.6.5.tar.bz2 |
| gawk | 4.1.3 | gawk-4.1.3.tar.gz |
| gcc-runtime | 6.2.0 | gcc-6.2.0.tar.bz2 |
| gettext | 0.19.8.1 | gettext-0.19.8.1.tar.gz |
| glib-2.0 | 2.48.2 | glib-2.48.2.tar.xz |
| glibc | 2.24 | git2_sourceware.org.git.glibc.git.tar.gz |

Table 4-10. Democracy Suite 5.5-B ImageCast Precinct 2 Unmodified COTS Component Descriptions (continued)

| Firmware/Software | Version | Filename |
|---------------------------|--------------------------|---|
| glibc-initial | 2.24 | git2_sourceware.org.git.glibc.git.tar.gz |
| glibc-locale | 2.24 | git2_sourceware.org.git.glibc.git.tar.gz |
| gmp | 6.1.1 | gmp-6.1.1.tar.bz2 |
| gnutls | 3.5.3 | gnutls-3.5.3.tar.xz |
| gobject-introspection | 1.48.0 | gobject-introspection-1.48.0.tar.xz |
| grep | 2.25 | grep-2.25.tar.xz |
| icu | 57.1 | icu4c-57_1-src.tgz |
| imx-gpu-viv | 6.2.2.p0-aarch32 | imx-gpu-viv-6.2.2.p0-aarch32.bin |
| kbd | 2.0.3 | kbd-2.0.3.tar.xz |
| kernel-module-imx-gpu-viv | 6.2.2.p0 | kernel-module-imx-gpu-viv-6.2.2.p0.tar.gz |
| kmod | 23+gitAUTOINC+65a885df5f | git2_git.kernel.org.pub.scm.utils.kernel.kmod.kmod.git.tar.gz |
| libcap | 2.25 | libcap-2.25.tar.xz |
| libcgroupp | 0.41 | libcgroupp-0.41.tar.bz2 |
| libcheck | 0.10.0 | check-0.10.0.tar.gz |
| libdaemon | 0.14 | libdaemon-0.14.tar.gz |
| libdrm | 2.4.70 | libdrm-2.4.70.tar.bz2 |
| libevdev | 1.5.2 | libevdev-1.5.2.tar.xz |
| libffi | 3.2.1 | libffi-3.2.1.tar.gz |
| libgcc | 6.2.0 | libgcc-5-dev_5.4.0-6ubuntu1~16.04.10_amd64.deb |
| libgcc-initial | 6.2.0 | libgcc-5-dev_5.4.0-6ubuntu1~16.04.10_amd64.deb |
| libidn | 1.33 | libidn-1.33.tar.gz |
| libinput | 1.8.4 | libinput-1.8.4.tar.xz |
| libjpeg-turbo | 1.5.0 | libjpeg-turbo-1.5.0.tar.gz |
| libnss-mdns | 0.1 | nss-mdns-0.10.tar.gz |
| libpcap | 1.7.4 | libpcap-1.7.4.tar.gz |
| libpciaccess | 0.13.4 | libpciaccess-0.13.4.tar.bz2 |
| libpcre | 8.39 | libpcre32-3_2%3a8.38-3.1_amd64.deb |
| libpng | 1.6.24 | libpng-1.6.24.tar.xz |
| libpthread-stubs | 0.3 | libpthread-stubs-0.3.tar.bz2 |

Table 4-10. Democracy Suite 5.5-B ImageCast Precinct 2 Unmodified COTS Component Descriptions (continued)

| Firmware/Software | Version | Filename |
|--------------------|------------------------------|---|
| libtool-cross | 2.4.6 | libtool-2.4.6.tar.gz |
| libusb1 | 1.0.20 | libusb-1.0.20.tar.bz2 |
| libusb-compat | 0.1.5 | libusb-compat-0.1.5.tar.bz2 |
| libxkbcommon | 0.6.1 | libxkbcommon-0.6.1.tar.xz |
| libxml2 | 2.9.4 | libxml2-2.9.4.tar.gz |
| linux-libc-headers | 4.9 | linux-4.9.tar.xz |
| log4cplus | 1.2.0 | log4cplus-1.2.0.tar.gz |
| m4 | 1.4.17 | m4-1.4.17.tar.gz |
| mesa | 12.0.1 | mesa-12.0.1.tar.xz |
| mtdev | 1.1.5 | mtdev-1.1.5.tar.bz2 |
| nettle | 3.2 | nettle-3.2.tar.gz |
| openssl | 1.0.2k | openssl-1.0.2k.tar.gz |
| openssl-fips | 2.0.10 | openssl-fips-2.0.10.tar.gz |
| opkg-utils | 0.3.2+gitAUTOINC+3ffece9bf1 | opkg-0.3.3.tar.gz |
| pkgconfig | 0.29.1+gitAUTOINC+87152c05be | git2_anongit.freedesktop.org.pkg-config.tar.gz |
| ppp | 2.4.7 | ppp-2.4.7.tar.gz |
| procps | 3.3.12 | procps-ng-3.3.12.tar.xz |
| qtbase | 5.9.6+gitAUTOINC+f4c2fcc052 | qtbase-5.9.6+gitAUTOINC+9c50112304.tar.gz |
| qtdeclarative | 5.9.6+gitAUTOINC+dfbe918537 | qtdeclarative-5.9.6+gitAUTOINC+283a900c4e.tar.gz |
| qtgraphicaleffects | 5.9.6+gitAUTOINC+3d317f1bb0 | qtgraphicaleffects-5.9.6+gitAUTOINC+f61dcaa5e5.tar.gz |
| qtquickcontrols2 | 5.9.6+gitAUTOINC+c51eea8870 | qtquickcontrols2-5.9.6+gitAUTOINC+c48b314ede.tar.gz |
| qtquickcontrols | 5.9.6+gitAUTOINC+f050a32a43 | qtquickcontrols-5.9.6+gitAUTOINC+ca6bba7163.tar.gz |
| qtsvg | 5.9.6+gitAUTOINC+dec74295e8 | qtsvg-5.9.6+gitAUTOINC+7a28db8f5b.tar.gz |
| qtxmlpatterns | 5.9.6+gitAUTOINC+c7c5681004 | qtxmlpatterns-5.9.6+gitAUTOINC+4dcae15a5a.tar.gz |
| quazip | 0.7.3 | quazip-0.7.3.tar.gz |
| readline | 6.3 | readline-6.3.tar.gz |
| run-postinsts | 1 | morty.tar.gz |

Table 4-10. Democracy Suite 5.5-B ImageCast Precinct 2 Unmodified COTS Component Descriptions (continued)

| Firmware/Software | Version | Filename |
|--------------------------|-----------------------------|---|
| sed | 4.2.2 | sed-4.2.2.tar.gz |
| shadow | 4.2.1 | shadow-4.2.1.tar.xz |
| shadow-securetty | 4.2.1 | shadow-4.2.1.tar.xz |
| sqlite3 | 3.14.1 | sqlite-autoconf-3140100.tar.gz |
| systemd | 230+gitAUTOINC+3a74d4fc90 | git2_github.com.systemd.systemd.git.tar.gz |
| tcl | 8.6.6 | tcl8.6.6-src.tar.gz |
| tslib | 1.1 | tslib-1.1.tar.xz |
| tzdata | 2017a | tzdata2017a.tar.gz |
| usb-modeswitch | 2.2.0 | usb-modeswitch-2.2.0.tar.bz2 |
| usb-modeswitch- data | 20140529 | usb-modeswitch-data-20140529.tar.bz2 |
| util-linux | 2.28.1 | util-linux-2.28.1.tar.xz |
| util-macros | 1.19.0 | util-macros-1.19.0.tar.gz |
| xz | 5.2.2 | xz-5.2.2.tar.gz |
| zbar | 0.1 | zbar-0.10.tar.bz2 |
| zlib | 1.2.8 | zlib-1.2.8.tar.xz |
| flac | 1.3.1 | flac-1.3.1.tar.xz |
| gst-plugins-base | 1.10.4 | gst-plugins-base-1.10.4.tar.xz |
| gst-plugins-good | 1.10.4 | gst-plugins-good-1.10.4.tar.xz |
| gstreamer | 1.10.4 | gstreamer-1.10.4.tar.xz |
| harfbuzz | 1.3.0 | harfbuzz-1.3.0.tar.bz2 |
| libgudev | 230 | libgudev-230.tar.xz |
| libical | 2.0.0 | libical-2.0.0.tar.gz |
| libogg | 1.3.2 | libogg-1.3.2.tar.xz |
| libsamplerate | 0.1.8 | libsamplerate-0.1.8.tar.gz |
| libsndfile | 1.0.27 | libsndfile-1.0.27.tar.gz |
| libvorbis | 1.3.5 | libvorbis-1.3.5.tar.xz |
| speex | 1.2rc2 | speex-1.2rc2.tar.gz |
| speexdsp | 1.2rc3 | speexdsp-1.2rc3.tar.gz |
| taglib | 1.9.1 | taglib-1.9.1.tar.gz |
| qtmultimedia | 5.9.6+gitAUTOINC+52f5785cfa | qtmultimedia-5.9.6+gitAUTOINC+52f5785cfa.tar.gz |

Table 4-11. Democracy Suite 5.5-B ImageCast Evolution Unmodified COTS Component Descriptions

| Firmware/Software | Version | Filename |
|--------------------------|----------------|---|
| BusyBox | 1.20.2 | busybox-1.20.2.tar.bz2 |
| e2fsprogs | 1.42.4 | e2fsprogs-1.42.4.tar.gz |
| Expat XML Parser | 2.1.0 | expat-2.1.0.tar.gz |
| fontconfig | 2.9.0 | fontconfig-2.9.0.tar.gz |
| Freetype | 2.4.9 | freetype-2.4.9.tar.bz2 |
| I2C Tools for Linux | 3.1.0 | i2c-tools-3.1.0.tar.bz2 |
| JPEG library | 8d | jpegsrvc.v8d.tar.gz |
| libogg | 1.3.0 | libogg-1.3.0.tar.gz |
| libPNG | 1.5.10 | libpng-1.5.10.tar.gz |
| libusb | 1.0.8 | libusb-1.0.8.tar.bz2 |
| libusb-compat | 0.1.3 | libusb-compat-0.1.3.tar.bz2 |
| log4cplus | 1.0.4.1 | log4cplus-1.0.4.1.tar.bz2 |
| openssl | 1.0.2k | openssl-1.0.2k.tar.gz |
| openssl-fips | 2.0.10 | openssl-fips-2.0.10.tar.gz |
| PPP | 2.4.5 | ppp-2.4.5.tar.gz |
| quazip | 0.5 | quazip-0.5.tar.gz |
| Qt Everywhere Linux | 4.7.3 | qt-everywhere-opensource-src-4.7.3.tar.gz |
| skell | 1.19 | skell-1.19.tar.gz |
| SoundTouch | 1.6.0 | soundtouch-1.6.0.tar.gz |
| speex | 1.2rc1 | speex-1.2rc1.tar.gz |
| SQLite | 3.7.13 | sqlite-autoconf-3071300.tar.gz |
| Sysfs Utilities | 2.1.0 | sysfsutils-2.1.0.tar.gz |
| TIFF library | 4.0.1 | tiff-4.0.1.tar.gz |
| timezone | 2012b | tzcode2012b.tar.gz |
| USB ModeSwitch | 1.2.4 | usb-modeswitch-1.2.4.tar.bz2 |
| zlib | 1.2.7 | zlib-1.2.7.tar.bz2 |

Table 4-12. Democracy Suite 5.5-B ImageCast X Unmodified COTS Component Descriptions

| Firmware/Software | Version | Filename |
|---------------------------------|----------------|--|
| Google Text-to-Speech Engine | 3.11.12 | ARM: com.google.android.tts_3.11.12-210311121_minAPI19(armeabi-v7a)(nodpi).apk x86: com.google.android.tts_3.11.12-210311123_minAPI15(x86)(nodpi).apk |
| ICX Prime Android 5.1.1 Image | 0405 | 0405_5.1.1-01.12_user_android_x86.iso |
| ICX Classic Android 4.4.4 Image | 0.0.98 | byt_t_crv2_64-ota-BCX18-V0.0.98.zip |

Table 4-13. Democracy Suite 5.5-B ImageCast Central Software Build Library Source Code (Unmodified COTS)

| Firmware/Software | Version | Filename |
|--------------------------|----------------|----------------------------|
| OpenSSL 1.0.2k | 1.0.2k | openssl-1.0.2k.tar.gz |
| OpenSSL FIPS 2.0.10 | 2.0.10 | openssl-fips-2.0.10.tar.gz |

Table 4-14. Democracy Suite 5.5-B ImageCast Central Runtime Software Components (Unmodified COTS)

| Firmware/Software | Version | Filename |
|---------------------------------------|----------------|-------------------------------------|
| 1-Wire Driver (x86) | 4.05 | install_1_wire_drivers_x86_v405.msi |
| 1-Wire Driver (x64) | 4.05 | install_1_wire_drivers_x64_v405.msi |
| Canon DR-G1130 TWAIN Driver | 1.2 SP6 | G1130_DRIT_V12SP6.exe |
| Canon DR-M160II TWAIN Driver | 1.2 SP6 | M160II_DRIT_V12SP6.exe |
| Visual C++ 2013 Redistributable (x86) | 12.0.30501 | vc redistrib_x86.exe |
| InoTec HiPro 821 TWAIN Driver | 1.2.3.17 | TwainSetup-ScamaxUSB3.exe |
| Canon DR-M260 TWAIN Driver | 1.1 SP2 | M260_DRIT_V11SP2.zip |

Table 4-15. Democracy Suite 5.5-B ImageCast Precinct Modified COTS Software Component Descriptions

| Firmware/Software | Version | Filename |
|--------------------------|----------------|------------------------------|
| uClinux | 20070130 | uClinux-dist-20070130.tar.gz |
| COLILO Bootloader | 20040221 | Colilo20040221.tar.gz |

Table 4-16. Democracy Suite 5.5-B ImageCast Precinct 2 Modified COTS Software Component Descriptions

| Firmware/Software | Version | Filename |
|--------------------------|----------------|-----------------|
| Kernel | 4.9.11 | zImage |
| U-BOOT | 2017.03 | u-boot.bin |

Table 4-17. Democracy Suite 5.5-B ImageCast Evolution Modified COTS Software Component Descriptions

| Firmware/Software | Version | Filename |
|--------------------------|----------------|-----------------|
| Kernel | 2.6.30 | uImage |
| U-BOOT | 1.3.4 | u-boot.bin |

Table 4-18. Democracy Suite 5.5-B ImageCast X Modified COTS Software Component Descriptions

| Firmware/Software | Version | Filename |
|--------------------------|----------------|-------------------------|
| Zxing Barcode Scanner | 4.7.5 | BS-4.7.5.zip |
| SoundTouch | 1.9.2 | Soundtouch-1.9.2.tar.gz |

Table 4-19. Democracy Suite 5.5-B EMS Software Build Environment Component Descriptions

| Firmware/Software | Version | Filename |
|---|-----------------|--|
| Windows 10 Professional | 10 Professional | Physical Media from Microsoft |
| .NET Framework 3.5 | 3.5 | Physical Media from Microsoft |
| Internet Information Server (IIS) | 10.0 | Physical Media from Microsoft |
| 7-Zip | 9.20 (64 Bit) | 7z920-x64.msi |
| Visual Studio 2015 Professional with Update 3 | 2015 Update 3 | en_visual_studio_professional_2015_with_update_3_x86_x64_web_installer_8922978.exe |
| .NetDiscUtils | 0.10 | DiscUtilsBin-0.10.zip |
| Infragistics NetAdvantage WinForms 2011.1 | 2011.1 | NetAdvantage_WinForms_20111.msi |
| Infragistics Net Advantage – WPF 2012.1 | 2012.1 | NetAdvantage_WPF_20121.msi |
| TX Text Control 16.0.NET | 16 | TX Text Control.NET for Windows Forms 16.0.exe |
| Speex | 1.0.4 | speex_win32_1.0.4_setup.exe |
| Microsoft Visual J# | 2.0 | vjredist64.exe |
| iTextSharp | 5.0.5 | itextsharp-5.0.5-dll.zip |

Table 4-19. Democracy Suite 5.5-B EMS Software Build Environment Component Descriptions (continued)

| Firmware/Software | Version | Filename |
|---------------------------------------|----------------|--|
| Ghostscript | 9.0.4 | gs904w32.exe, gs904w64.exe |
| Nlog | 1.0.0.505 | NLog-1.0-Refresh-bin.zip |
| OneWireAPI.NET | 4.0 | 1-wiresdkver400_beta2.zip |
| Lame | 3.99.4 | lame3.99.4-20120130.zip |
| Sox | 14.3.1 | sox-14.3.1-win32.zip |
| Avalon Framework | 20020806 | avalon-framework-cvs-20020806.jar.zip |
| Fop | 0.20-5 | fop-0.20.5.jar |
| Batik | 0.20-5 | batik-1.5-fop-0.20-5.jar |
| SQLite | 1.0.103.0 | sqlite-netFx46-setup-bundle-x64-2015-1.0.103.0.exe |
| OpenSSL 1.0.2k | 1.0.2k | openssl-1.0.2k.tar.gz |
| OpenSSL FIPS 2.0.10 | 2.0.10 | openssl-fips-2.0.10.tar.gz |
| Strawberry Perl | 5.24.1.1 | strawberry-perl-5.24.1.1-64bit.msi |
| Patch | 2.5.9-7 | patch-2.5.9-7-bin.zip |
| ISONewspaper | 30.4 | ISONewspaper30v4_gr.icc.zip |
| Ogg Vorbis Encoder | 2.88 | oggenc2.88-1.3.5-generic.zip |
| Ogg Vorbis Encoder | 1.10.1 | oggdecV1.10.1.zip |
| Prism Mvvm | 1.1.1 | prism.mvvm.1.1.1.nupkg |
| Bitmiracle.libtiff.net | 2.4.560 | Bitmiracle.libtiff.net.2.4.560.nupkg |
| Prism | 4.0.0 | prism.4.0.0.nupkg |
| Prism.UnityExtensions | 4.0.0 | prism.unityextensions.4.0.0.nupkg |
| PDF Printing | 2.9.5.2 | PDFPrinting.zip |
| Entity Framework | 6.1.3.net45 | entityframework.6.1.3.nupkg |
| WiX | 3.10 | Wix310.exe |
| Spreadsheet Light | 3.4.3 | spreadsheetlight.3.4.3.nupkg |
| Open XML SDK 2.0 for Microsoft Office | 2.0 | OpenXMLSDKv2.msi |
| Adobe Reader DC | AcrobatDC | AcroRdrDC1501020060_en_US.exe |
| Arial Narrow Fonts | 2.37a | ArialNarrowFonts.zip |
| SSH.NET | 2016.1.0 | SSH.NET-2016.1.0-bin.zip |
| SSMS | 14.0.17119.0 | SSMS-Setup-ENU.exe |
| TwainDSM | 2.3.0 | Twaindsm-2.3.0.win.bin |

Table 4-20. Democracy Suite 5.5-B ICC Software Build Environment Component Descriptions

| Firmware/Software | Version | Filename |
|--------------------------|----------------|----------------------------|
| NASM Assembler | 2.12.02 | nasm-2.12.02-win32.zip |
| OpenSSL 1.0.2k | 1.0.2k | openssl-1.0.2k.tar.gz |
| OpenSSL FIPS 2.0.10 | 2.0.10 | openssl-fips-2.0.10.tar.gz |
| CSC3-2010 | N/A | CSC3-2010.crl |
| tss-ca-g2 | N/A | tss-ca-g2.crl |

Table 4-21. Democracy Suite 5.5-B Adjudication Software Build Environment Component Descriptions

| Firmware/Software | Version | Filename |
|---|----------------|--|
| Microsoft Enterprise Library | 5.0 | Enterprise Library 5.0.msi |
| Microsoft Prism | 4.0.0 | Prism.4.0.0.nupkg |
| Microsoft Identity Foundation SDK | 4.0 | WindowsIdentityFoundation-SDK-4.0.msi |
| Toggle Switch Control Library | 1.1.1 | ToggleSwitch 1.1.1.zip |
| Infragistics NetAdvantage Ultimate 2013.1 | 2013.1 | NetAdvantage_20131_PlatformInstaller.zip |
| iTextSharp | 5.5.1 | itextsharp-all-5.5.1.zip |
| CLR Security | June 2010 | clrsecurity_june10.zip |
| OpenSSL 1.0.2k | 1.0.2k | openssl-1.0.2k.tar.gz |
| OpenSSL FIPS 2.0.10 | 2.0.10 | openssl-fips-2.0.10.tar.gz |
| Community MSI Extensions | 1.4 | msiext-1.4.zip |
| TreeViewEx | 3.0.0.0 | TreeViewEx.dll |

Table 4-22. Democracy Suite 5.5-B ImageCast Precinct Election Firmware Compiler Descriptions

| Firmware/Software | Version | Filename |
|--------------------------|-------------------|---|
| g++ (GNU C++ compiler) | gcc3.4.0-20040603 | m68k-uclinux-tools-c++-gcc3.4.0-20040603.sh |

Table 4-23. Democracy Suite 5.5-B ImageCast Precinct Firmware Build Environment Component Descriptions

| Firmware/Software | Version | Filename |
|-------------------------------|----------------|---------------------------------|
| Ubuntu 16.04.1 | 16.04.1 | ubuntu-16.04.1-desktop-i386.iso |
| Toolchain Installation Script | N/A | Toolchain.sh |

Table 4-23. Democracy Suite 5.5-B ImageCast Precinct Firmware Build Environment Component Descriptions (continued)

| Firmware/Software | Version | Filename |
|-----------------------------|----------------|--|
| m68k uClinux tools base gcc | 3.4.0-20040603 | m68k-uclinux-tools-base-gcc3.4.0-20040603.sh |
| m68k uClinux tools c++ gcc | 3.4.0-20040603 | m68k-uclinux-tools-c++-gcc3.4.0-20040603.sh |
| m68k uClinux tools gdb | 20040603 | m68k-uclinux-tools-gdb-20040603.sh |
| OpenSSL 1.0.2k | 1.0.2k | openssl-1.0.2k.tar.gz |
| OpenSSL FIPS 2.0.10 | 2.0.10 | openssl-fips-2.0.10.tar.gz |

Table 4-24. Democracy Suite 5.5-B ImageCast Precinct 2 Firmware Build Environment Component Descriptions

| Firmware/Software | Version | Filename |
|--------------------|------------------|--|
| Ubuntu | 16.04 LTS | ubuntu-16.04.5-desktop-amd64.iso |
| Yocto | imx-morty | morty.tar.gz |
| asciidoc | 8.6.9 | asciidoc_8.6.9-3_all.deb |
| autoconf | 2.69 | autoconf_2.69-9_all.deb |
| automake | 1.15 | automake_1%3a1.15-4ubuntu1_all.deb |
| p7zip- full | 9.20.1~dfsg.1 | p7zip-full_9.20.1~dfsg.1-4.2_amd64.deb |
| avr-libc | 1.8.0+Atmel3.5.0 | avr-libc_1%3a1.8.0+Atmel3.5.0-1_all.deb |
| binutils-avr_ | 2.25+Atmel3.5.0 | binutils-avr_2.25+Atmel3.5.0-2_amd64.deb |
| python-dev | 2.7.12 | python-dev_2.7.12-1~16.04_amd64.deb |
| python3 | 3.5.1 | python3-dev_3.5.1-3_amd64.deb |
| python3-pip | 8.1.1 | python3-pip_8.1.1-2ubuntu0.4_all.deb |
| python-pysqlite2 | 2.7.0 | python-pysqlite2_2.7.0-1_amd64.deb |
| chrpath | 0.16 | chrpath_0.16-1_amd64.deb |
| socat | 1.7.3.1 | socat_1.7.3.1-1_amd64.deb |
| cvs | 1.12.13 | cvs_2%3a1.12.13+real-15ubuntu0.1_amd64.deb |
| desktop-file-utils | 0.22 | desktop-file-utils_0.22-1ubuntu5.2_amd64.deb |
| psutils | 1.17.dfsg | psutils_1.17.dfsg-2_amd64.deb |
| docbook-utils | 0.6.14 | docbook-utils_0.6.14-3ubuntu1_all.deb |
| libsdl1.2-dev | 1.2.15+dfsg1 | libsdl1.2-dev_1.2.15+dfsg1-3_amd64.deb |
| help2man | 1.47.3 | help2man_1.47.3_amd64.deb |

Table 4-24. Democracy Suite 5.5-B ImageCast Precinct 2 Firmware Build Environment Component Descriptions (continued)

| Firmware/Software | Version | Filename |
|-------------------|------------------|---|
| texi2html | 1.82+dfsg1 | texi2html_1.82+dfsg1-5_all.deb |
| libgl1-mesa-dev | 18.0.5 | libgl1-mesa-dev_18.0.5-0ubuntu0~16.04.1_amd64.deb |
| libglu1-mesa-dev | 9.0.0 | libglu1-mesa-dev_9.0.0-2.1_amd64.deb |
| mercurial | 3.7.3 | mercurial_3.7.3-1ubuntu1_amd64.deb |
| g++-5 | 5.4.0 | g++-5_5.4.0-6ubuntu1~16.04.10_amd64.deb |
| gawk | 4.1.3 | gawk_1%3a4.1.3+dfsg-0.1_amd64.deb |
| lzop | 1.03 | lzop_1.03-3.2_amd64.deb |
| gcc | 5.4.0 | gcc-5_5.4.0-6ubuntu1~16.04.10_amd64.deb |
| gcc-5-multilib | 5.4.0 | gcc-5-multilib_5.4.0-6ubuntu1~16.04.10_amd64.deb |
| gcc-avr | 4.9.2+Atmel3.5.3 | gcc-avr_1%3a4.9.2+Atmel3.5.0-1_amd64.deb |
| git | 2.7.4 | git_1%3a2.7.4-0ubuntu1.4_amd64.deb |
| zlib | 1.2.8 | zlib1g-dev_1%3a1.2.8.dfsg-2ubuntu4.1_amd64.deb |
| texinfo | 6.1.0.dfsg.1 | texinfo_6.1.0.dfsg.1-5_amd64.deb |
| groff | 1.22.3 | groff_1.22.3-7_amd64.deb |

Table 4-25. Democracy Suite 5.5-B ImageCast Evolution Firmware Build Environment Component Descriptions

| Firmware/Software | Version | Filename |
|------------------------|---------------------------|---|
| Ubuntu | 10.04 LTS | ubuntu-10.04.4-desktop-i386.iso |
| LTIB | 10.1.1a | ltib-10-1-1a-sv.tar.gz |
| g++ (GNU C++ compiler) | gcc-4.5.38-eglibc-2.11.38 | freescale-powerpc-linux-gnu-2011.03-38.i686.rpm |
| autoconf | 2.57 | autoconf-2.57.tar.bz2 |
| bison | 2.3 | bison-2.3.tar.bz2 |
| ccache | 2.4 | ccache-2.4.tar.gz |
| cksum | 19990607 | cksum-19990607.tar.gz |
| cramfs | 20081121 | cramfs-20081121.tar.gz |
| distcc | 2.18.3 | distcc-2.18.3.tar.bz2 |
| dtc | 1.2.0 | dtc-1.2.0.tar.gz |
| flex | 2.5.33 | flex-2.5.33.tar.gz |
| genext2fs | 1.4.1 | genext2fs-1.4.1.tar.gz |

Table 4-25. Democracy Suite 5.5-B ImageCast Evolution Firmware Build Environment Component Descriptions (continued)

| Firmware/Software | Version | Filename |
|-------------------|------------|---------------------------------|
| gen_init_cpio | 2.6.25-rc7 | gen_init_cpio-2.6.25-rc7.tar.gz |
| genromfs | 0.5.1 | genromfs-0.5.1.tar.gz |
| git | 1.5.6.5 | git-1.5.6.5.tar.gz |
| libtool | 1.5 | libtool-1.5.tar.gz |
| lkc | 1.4 | lkc-1.4.tar.gz |
| mkspoolinks | 3.4 | mkspoolinks-3.4.tar.gz |
| mtd-utils | 20060302 | mtd-utils-20060302.tar.bz2 |
| mux_server | 1.0 | mux_server.c |
| pkg-config | 0.21 | pkg-config-0.21.tar.gz |
| sparse | 0.4 | sparse-0.4.tar.gz |
| texinfo | 4.8 | texinfo-4.8.tar.bz2 |
| tunctl | 1.5 | tunctl-1.5.tar.gz |
| u-boot-tools | 1.1.6 | u-boot-tools-1.1.6.tar.bz2 |
| unifdef | 1.0 | unifdef-1.0.tar.gz |
| wget | 1.9.1 | wget-1.9.1.tar.gz |
| yaffs_utils | 20060418 | yaffs_utils-20060418.tar.gz |
| rpm | 4.0.4 | rpm-4.0.4.tar.gz |

Table 4-26. Democracy Suite 5.5-B ImageCast X Firmware Build Environment Component Descriptions

| Firmware/Software | Version | Filename |
|-------------------|---------|----------------------------------|
| Ubuntu 14.04.4 | 14.04.4 | ubuntu-14.04.4-desktop-amd64.iso |

Table 4-27. D-Suite 5.5-B Configuration Files

| Configuration File | Version | Filename |
|---|-------------------|--|
| ICX Machine Configuration File (MCF) | 5.5.12.1_20190510 | MCF_5.5.12.1_20190510.mcf |
| ICP/ICC Device Configuration File (DCF) | 5.5.31_20190423 | DCF_5.5.31_20190423.dcf |
| ICE Machine Behavior Settings | 5.5.6.3 20190512 | behaviorsettings_ICE_5.5.6.3_EAC_20190512.mbs |
| ICP2 Machine Behavior Settings | 5.5.1.4 20190510 | behaviorsettings_ICP2_5.5.1.4_EAC_20190510.mbs |

Table 4-28. D-Suite 5.5-B Voting System Equipment

| Component | Serial Number |
|--|---|
| <i>Proprietary Hardware</i> | |
| ImageCast Precinct Optical Scanner PCOS-320C | AAFAJFM0061, AAFAJFN0030, AAFAJGI6764, AAFAJEL0352 |
| ImageCast Precinct Optical Scanner PCOS-320A | AANAGCP0347, AANAGCP0002 |
| ImageCast Precinct 2 Optical Scanner PCOS-330A | FAL18480494, FAL18480510 |
| ImageCast Evolution Optical Scanner PCOS-410A | AAFEBIK1847, AAFEBBCN0012 |
| ICP Ballot Box BOX-330A | AAUCCFX0083, AAUCCGI0011 |
| ICE Ballot Box | --- |
| ICX Inline EMI Filter | [DVS-EMIFILTER-001] thru [DVS-EMIFILTER-003] |
| ICP2 Ballot Box BOX-350A | --- |
| <i>COTS Hardware</i> | |
| ICX aValue 15" Tablet (SID-15V) | 0E14AF00014, B03G005400006, B03G005400008, 9E274118, 1D274118, Baytrail98D750C0, Baytrail12034DCC, Baytrail9A6550C8 |
| ICX aValue 21" Tablet (SID-21V) | 0E14AF00027, B03G005500019, 03G005500009, 0039BZ2D, 0039B209, Baytrail0039B22D, BaytrailF1B2587F, BaytrailF1B25983 |
| A Value 21" ICX DRE (Prime) | 1707101522, 1707101789, 1707101730, 1707101887, 1707101710, 1707101725, 1707101731, 1708100916, 1708100876, 1708100915, 1707101845, 1707101778, 1717101720, 1707101845, 1707101722, 1707202552, 1711300282, 1707100089, 1707101795, 1707101793, 17101793 |
| SII Thermal Printer | 1115271A, 1115273A, 115270A, 1115275A |
| KFI VRP3 Thermal Printer (VVPAT) | KPR000000715, KPR0000078339, KPR0000078377, KRP000000711, KPR000000712, KPR170900010119, KPR0000078337, KPR0000078364, KPR170900008115, KPR0000078339, KPR170900008116, KPR170900010347, KPR170900009733, KPR170900010120, KPR170900010119, KPR170900010337, KPR170900010338, KPR170900010348 |
| Dell OptiPlex 7440 All In One | HVNRFB2, HVNQFB2, HVNPFB2 |
| Dell PowerEdge R630 | 4Z07T52 |
| Dell PowerEdge R640 | JMP9CM2 |
| Canon imageFormula DR-G1130 Scanner | GF301092, GF304418 |
| Canon DR-M160II Scanner | GX333569, GX333573, GX324846, GX326272, GX319353 |
| Canon DR-M260 Scanner | HG306013, HG306012 |

Table 4-28. D-Suite 5.5-B Voting System Equipment (continued)

| Component | Serial Number |
|------------------------------------|--|
| InoTec HiPro 821 Scanner | 0078K28, 0080K28 |
| Dell Precision T3420 PC | HS0VFB2, HS0TFB2, HS0RFB2, HS0SFB2, 4TB3MN2, F575HH2 |
| HP LaserJet Pro Printer M402dn | PHBQF20342, PHBQF20345, PHBQC12619, PHBQC19613, PHBQC12519, PHBQD18790, PHBQC12616, PHBQG09329 |
| HP LaserJet Pro Printer M402dne | PHB5D00782, PHB5D04714, PHB5F04770, PHB5B18304, PHB5D04713 |
| Dell OptiPlex 9030 All-In-One | CF73S52 |
| Dell Ultrasharp 24" Monitor U2414H | 1PVZ152, 62VZ152 |
| Dell OptiPlex 3050 All-In-One | 19YWWK2 |
| Smart Card Reader ACR39 | RR374-010362 |

Table 4-29. D-Suite 5.5-B Voting System Support Equipment

| Component | Serial Number |
|---|---|
| Dell Monitor KM632 | FYNTY12, CKX6Y12, CN-0524N3-72461-59H-6U5U |
| Dell Monitor P2414Hb | CN-0524N3-74261-5AH-2DNU, CN-0524N3-74261-5AH-2DAU |
| Dell DVD Multi Recorder GP60NB60 | [DVS-Dell-001] |
| Dell Latitude E7450 Laptop | 30GFH72, 369FH72 |
| Dell Latitude e3480 Laptop | 1VD3NJ2 |
| Maxim iButton Programmer DS9490R# with DS1402 | [DVS-Maxim-001] thru [DVS-Maxim-006] |
| APC Smart-UPS SMT1500 | 3S1536X06436, 3S1536X06475, 3S1536X06461, 3S1536X06485, 3S1536X06484, 3S1536X06322, 3S1536X07467, 3S1536X06485, 3S1536X06272, 3S1536X06201, 3S1536X07305, 3S1504X00395, 3S1504X00396, 3S1716X02289, W51530180004, 3S171X06059 |
| Dell X1008 Network Switch | 4R8XX42, 26SXX42 |
| Dell X1018 Network Switch | 6TN7Y42, 63SXX42 |
| Enabling Devices Sip and Puff | [DVS-enabling devices-001] - [DVS-enabling devices-002] |
| Cyber Acoustics Headphones ACM-70 | [DVS-cyber acoustics-001] - [DVS-cyber acoustics-005] |
| 4-Way Joystick Controller S26 | PME QC 1550 12, [DVS-JOY-001], [DVS-JOY-002] |
| Enablemart # 88906 Rocker (Paddle) Switch | [DVS-paddle-001] |
| Dell PowerConnect 2808 Network Switch | 3S2P0Z1 |

Table 4-29. D-Suite 5.5-B Voting System Support Equipment (continued)

| Component | Serial Number |
|--|---|
| IOGEAR SDHC/microSDHC 0U51USC410 Card Reader | 8632, 8633 |
| Lexar USB 3.0 Dual-Slot Reader | 24020845007435 |
| Hoodman Steel USB 3.0 UDMA Reader 102015 | [DVS-hoodman-001] |
| ATI Handset | 98862010101-035, 98862010103-075, 00659010100- 046, 98862010100-232, 093015-1-1, 00659010100-035 |
| ATI-USB Handset | 02440010100-011, [DVS-ATIUSB-001], [DVS- ATIUSB-002], B104326-1-4-040, B104326-1-4-035 |
| ACS PC-Linked Smart Card Reader ACR39U | RR374-006272, RR374-010356, RR374-010365 |
| Lexar Professional CF Card Reader Workflow CFR1 | 24050361400108, 24050361401994, 24050361401991, 24050361401990 |
| CORCOM Filter P/N#: 15EMC1 | [DVS-CorcomEMIFilter-001] |
| Delta Filter P/N#: 16PDCG5C | [DVS-DeltaEMIFILTER-001] |
| Kingston Card Reader FCR-HS4 | 08738174208132 |

ATTACHMENT A

Attachment A-1: Report File # 7169005633E-00

Attachment A-2: Report File # 7169006118E-00

Attachment A-3: Test Report No. PR094223

Attachment A-4: Test Report No. PR097523