Dominion Voting Systems
ImageCast Remote 5.2

Remote Accessible Vote by Mail System

Staff Report

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Table of Contents

I. INTRODUCTION

1. Scope

This staff report presents the test results for the all phases of the certification test of the Dominion Voting Systems (DVS) ImageCast Remote 5.2 Remote Accessible Vote by Mail (RAVBM) system. The purpose of the testing is to test the compliance of the RAVBM system with California and Federal laws. Testing also uncovers other findings, which do not constitute non-compliance, and those findings are reported to the RAVBM system vendor to address the issues procedurally. The procedures for mitigating any additional findings are made to the documentation, specifically the ImageCast Remote 5.2 Use Procedures.

ImageCast Remote 5.2 was evaluated against the applicable portions of the California Voting Systems Standards (CVSS). The CVSS were written in such a way to be applicable to a wide variety of voting technology, therefore the relevant portions of the CVSS were reviewed as it relates to the ImageCast Remote 5.2 RAVBM system for purposes of this report. The use of "voting system" shall apply to RAVBM.

2. Summary of the Application

Dominion Voting Systems submitted an application for the ImageCast Remote 5.2 system on September 5, 2017. ImageCast Remote 5.2 is a vendor hosted application, solely for the purposes of ballot marking pursuant to Elections Code sections 303.3 and 19283.

Dominion was required to submit the following: 1) the technical documentation package (TDP); 2) hardware for functional testing (Windows and Apple OS systems), including all supported browsers, and screen readers; 3) source code; and 4) the Dominion ImageCast Remote 5.2 Use Procedures.

3. Contracting and Consulting

Upon receipt of a complete application, the Secretary of State (SOS) released a Request for Quote (RFQ) for assistance with the Source Code Review, Telecommunications and Security Review, and Usability, Accessibility and Privacy testing. The statement of work (SOW) also had the option for assistance with Functional Testing. That testing was conducted by SOS staff.

Through the formal California contracting process, the Secretary of State awarded a contract to SLI Compliance, a division of Gaming Laboratories International, LLC, to assist with testing.

II.   SUMMARY OF THE SYSTEM

Dominion's ImageCast Remote 5.2 remote accessible vote by mail application is a web-based interface. The voter can optionally use a screen reader to navigate through the ballot. After marking their ballots and reviewing their selections, the voter must print their selections. The printed paper cast record is returned to the local elections official, where it will be remade into a ballot. The printed paper cast record and the ballot are kept together for auditing purposes.

III.   TESTING INFORMATION AND RESULTS

1. Background

The ImageCast Remote 5.2 software platform is a fully hosted service provided by Dominion. The infrastructure consists of Dell servers, Cisco network equipment, Microsoft SQL Servers as well as a complete hosting platform based on Microsoft .NET technology.

Accessibility and functional testing of this system was conducted by SOS staff. The functional test was conducted at the Secretary of State's office in Sacramento, California during the month of November 2017. End user Accessibility testing was conducted in three waves. Wave I User Accessibility testing was performed by nine (9) volunteers throughout the state of California, from November 30 to December 1, 2017. Wave II took place from December 4, to December 8, 2017, concluding with Wave III from December 18 to December 22, 2017 with twenty-nine (29) volunteer testers.

The Software Review was performed by SLI, Gaming LLC, during the month of March 2018. Security and Telecommunications testing was also performed by SLI during the month of March 2018.

2. Functional Testing Summary

System Configuration:

The ImageCast Remote 5.2 Remote Accessible Vote by Mail System is supported by a fully-redundant network and application architecture protecting against a single point of failure.

For the functional test, the SOS provided Dominion with three test ballot data sets of California elections as described below:

1. State of California Primary Election – Fictional Jurisdiction
2. State of California General Election - Fictional Jurisdiction
3. Local Jurisdiction - Fictional Rank Choice Election

SOS staff used desktop, laptop and tablet computing devices to access, mark and print the paper cast vote record as described in the ImageCast Remote 5.2 Use Procedures. Each test environment exercised undervotes, overvotes, all contest marking, and write-ins. Staff also used keyboard functions, standard USB mice, and the touchpad on the laptops to mark selections.

Undervotes

The system warned of undervotes, and allowed the tester to proceed to the end of the ballot to print the paper cast record.

Overvotes

The system warned of overvotes, and allowed the tester to proceed to the end of the ballot and print the paper cast record.

Write-Ins

The system allowed the tester to make write in selections with a fifty (50) character limit.

Printed Paper Cast Record

Each paper cast record printed displays the Election Type (General Election, Primary and Rank Choice Voting), the Election Day and date (Day of the Week, Month, Day, Year). The system also produces a QR Code about mid-way on the page, which can be used for ballot duplication at the county elections office.

3. Accessibility, Usability, and Privacy Testing

For Accessibility, Usability and Privacy Testing the SOS conducted three waves of End User Usability and Accessibility testing. Additionally, SLI conducted three phases of testing for Accessibility, Usability and Privacy.

SOS End User Usability Testing

Wave I User Accessibility testing was performed by nine (9) volunteers throughout the state of California, from November 30 to December 1, 2017. Wave II took place from December 4, to December 8, 2017, concluding with Wave III from December 18 to December 22, 2017 with twenty-nine (29) volunteer testers. The testing was conducted by SOS staff. The testers were recruited through several channels including several groups within the

accessibility community. Each tester used his/her own technology, including any auxiliary peripheral devices and screen reading software to access, mark, and print their paper cast vote record.

The testers were asked to complete pre-test and post-test surveys, documenting such information as demographics, the technology used for testing, and the tester's post-test experience using the system. The survey results of each are included in **Attachment A** of this report. Please note that personally identifying information has been redacted.

The technical issues identified in all three waves as requiring mitigation or responses are listed below in **Table 3A**.

Table 3A: Tester Technical Issues	
Issue	**Response/Mitigation**
Using Internet Explorer on Windows 10 with the JAWS screen reader for Windows. When I access the link you provided and inputted the credentials everything was fine. The email that was sent to me for the pin is where the problem is at. After activating the link, I asked to type the verification code. As I am a screen reader user, I activated the audio option for the CAPTCHA. I refreshed the code four times and every single code I was given did not work. I am sure I typed the verification code that I was provided via the download correctly within a one minute time span. Error Code: The Verification Text You entered is not valid. Please try again.	Using Internet Explorer 11 with JAWS the described situation has not been encountered by Dominion's internal testers or as a result of Dominion's external accessibility testing program. Dominion Voting Systems (DVS) was unable to reproduce the error.
Testers unable to submit a write-in candidate as their voting choice because, after checking the checkbox to enter a write-in candidate, they were not able to locate the edit field in which to type	User should change modes in JAWS from JAWS Virtual Cursor mode, to JAWS Forms mode. In the experience of DVS Quality Assurance and external accessibility testers this has proven to resolve navigation issues such as the one described. The use procedures will be updated accordingly.

in the name of the write-in candidate.	
The focus of his screen reader bounced around the HTML ballot when the tester unchecked a selection to make a different selection for a particular contest. Tester encountered this problem on multiple contests.	DVS was unable to recreate.
After marking the checkbox to enter a write-in candidate, tester was unable to find the edit field where the tester could type in the name of the write-in candidate.	User should change modes in JAWS from JAWS Virtual Cursor mode, to JAWS Forms mode. In the experience of DVS Quality Assurance and external accessibility testers this has proven to resolve navigation issues such as the one described.
JAWS did not properly read the text associated with each voting option for the ballot measure near the end of the ballot. Instead it simply read "choice" for both options. Tester selected one of the voting choices for this contest; JAWS then began to properly read the text associated with each voting choice textbox.	DVS was unable to recreate.
Tester was unable to download and print the completed vote cast record. In particular, tester was able to activate the buttons used to download the vote cast record. However, tester was unable to locate the file containing the vote cast record after downloading it.	The suggestion to help make it easier to locate the downloaded ballot on the voter's device has been noted by the DVS Product team, for possible future modifications.
When using the Google Chrome browser - Tester observed that JAWS did not properly read labels for the edit fields for voter ID, first name, and last name when	User should change modes in JAWS from JAWS Virtual Cursor mode, to JAWS Forms mode. In the experience of DVS Quality Assurance and external accessibility testers this has proven to resolve navigation issues such as the one described. The use procedures will be updated accordingly.

navigation the webpage using the JAWS virtual cursor. However, JAWS correctly read the edit field labels for these three fields when using the "tab" key to navigate through them.	
JAWS did not read the control used to select the voter's birthdate.	User should change modes in JAWS from JAWS Virtual Cursor mode, to JAWS Forms mode. In the experience of DVS QA and external accessibility testers this has proven to resolve navigation issues such as the one described. The use procedures will be updated accordingly.
The "verify email address" edit field appears to be missing from the tab order. Tester found that tabbing from "email address" edit field appears to skip the "verify email address" edit field.	Using the latest Firefox with JAWS 18 the described situation has not been encountered by the internal testers or as a result of our external accessibility testing program. Dominion Voting Systems would need additional information in order to assess the issue.
After checking the checkbox to write in a candidate name, tester was unable to locate the edit field to type in the make of a write-in candidate.	To remedy this scenario, to change modes in JAWS from JAWS Virtual Cursor mode, to JAWS Forms mode. The use procedures will be updated accordingly.
Tester got to the end of the process and clicked the "Mark Your Ballot" option, and the screen processing button just kept spinning.	Tester was asked to check bottom of browser window to make certain the download package was not present. Reset user credentials, and he was able to complete the test using another browser, but the same computer.
When unchecking his first selection, the screen reader starts cycling the error message, rather than allowing the voter to proceed. When voter proceeds to make a write-in selection, the write in messages do not necessarily agree with screen reader choices. - Likes the steps to complete breadcrumb trail. Does not tell voter if they have exceed	Regarding Write-in, based on testing done on the CA RAVBM instance (https://demo.intvoting.com/UAT/California/IVApp) switching modes (between JAWS 'virtual cursor' mode and JAWS 'Forms' mode)* enables the Write-in field to have the user's content keyed into it. The use procedures will be updated accordingly. Regarding informing the screen reader user when allowed number of selections has been exceeded; this recommended enhancement is acknowledged as a significant usability improvement and has been added to the next release.

the number of choices. Tells user that a checkbox was not checked, but still lists it as a choice. When using the arrow keys on the list box it was difficult to get out of the box, on the secret question.	* The same is true for NVDA Browse Mode and Focus Mode.
On the Ballot Confirmation/Review page, the voter's selections are presented to him/her for review and possible editing. I noticed that after the sentence, "Once you have selected the "Cast Ballot" button below, your vote will be cast and you will be unable to make any further changes" there is a button that says "Preferenti". This button serves the same function as the "Go Back" button at the bottom of the page, but is supposed to say (I'm assuming) "Preferential Choices". I recommend removing this button altogether, or changing it to say "Go Back", or at least fixing this button to say "Preferential Choices".	Localization resources are able to be edited to achieve the jurisdiction's choice of verbiage in the voting application's instructions, and navigation buttons. The use procedures will be updated accordingly.
Tester had extensive issues with reordering Rank Choice selections after deciding the change mind.	To re-order RCV selections the last (most recent) ranking must be unranked, then other selections must be unranked in that order. From this feedback it may be that the instructions for completing an RCV contest are not clear enough and require enhancements to improve usability.
Still says "to make selection, click in the box containing your choice". Not useful. Still can't check write-in	Localization resources are editable in order to achieve the jurisdiction's choice of verbiage in the voting application's instructions, and navigation buttons. In addition control over contest descriptions, candidates

candidate. No findable place to write name. Could not tell if I had checked a write-in in the candidate list. Warning message tossed me back to the top of the page. When I realized I'd checked an extra write-in, could not remove it because I was told I could only remove top ranking	and voting instructions is enabled via data in the election project. Regarding selection of write-in candidates, switching between JAWS 'virtual cursor' mode and JAWS 'Forms' mode enables the Write-in field to have the user's content keyed into it. The use procedures will be updated accordingly. Regarding the re-ranking of selections, to change selection rankings, the most recently ranked choice must be un-ranked first, and so on until the ranking required to be changed has been reached. Regarding better screen reader communication of candidate ranking status, this recommended enhancement is acknowledged as a significant usability improvement and has been added to the next release.

Consultant Phase Accessibility, Usability, and Privacy Testing

SLI conducted three phases of testing for Accessibility, Usability and Privacy. Phase I was a review of the ImageCast Remote 5.2 documentation of Usability and Accessibility testing performed during system development. Phase II included all Accessibility and Usability testing. Phase III included Privacy testing.

SLI used the following tools in **Table 3B** to during testing to evaluate ImageCast Remote 5.2.

Table 3B: Consultant Tools		
Tool Name	**Tool Purpose**	**Tool Use**
Wave Web Accessibility evaluation tool	Tool to evaluate accessibility of web sites, to WCAG 2.0 and Section 508.	The vendor provided url's were run through MAUVE to help determine accessibility.
Evaluera website	Tool to evaluate web applications regarding conformance to WCAG 2.0 standards.	The vendor provided url's were run through 508 checker to help determine compliance.
Chromevox – Screen reader extension of Google Chrome.	Tool is a screen reader that is an extension of Google Chrome, to assist visually impaired users.	Screen reader used for Accessibility and Usability testing.

Phase I Documentation Review

The documentation was reviewed by SLI to verify and validate the manufacturer's documentation of usability and accessibility performed during system development. Review of the TDP validated that the requirement was satisfactorily covered.

Phase II-A Usability Testing

SLI evaluated ImageCast Remote 5.2 against Sections 3.2 (General Usability Requirements and 3.3 (Accessibility Requirements) of the CVSS. This section covers the requirements for usability of a system. SLI found that all but one of the requirements were satisfactorily met. ImageCast Remote 5.2 did not meet one (1) of the requirements.

Table 3C: Phase II-A – Usability Testing		
CVSS Requirement	**Result**	**Mitigation/Response**
CVSS (3.2.7.c.ii): No repeating keys. No key or control on a voting system shall have a repetitive effect as a result of being held in its active position.	Review of the requirement showed that navigation keys (up and down arrows, tab) did have a repetitive effect.	The use procedures will be updated accordingly.

Phase II-B Accessibility Testing

SLI evaluated ImageCast Remote 5.2 against the applicable portions of the CVSS for Accessibility Testing for compliance. The table below shows each of the applicable CVSS sections, and the result of compliance.

Table 3D: Phase II-B – Accessibility Testing	
CVSS Requirement	**Result**
CVSS (3.3.1.a.i.1): Accessibility throughout the voting session - A VEBD shall be integrated into the manufacturer's complete voting system so as to support accessibility for disabled voters throughout the voting session. Documentation of Accessibility Procedures - The manufacturer shall supply documentation describing: recommended procedures that fully implement accessibility for voters with disabilities; and CVSS (3.3.1.a.i.2): How a VEBD supports those procedures.	Review of the requirement validated that the requirement was satisfactorily covered.

CVSS (3.3.1.b) : Complete information in alternative formats - When the provision of accessibility involves an alternative format for ballot presentation, then all information presented to non-disabled voters, including instructions, warnings, error and other messages, and contest choices, shall be presented in that alternative format.	Review of the requirement validated that the requirement was satisfactorily covered.
CVSS (3.3.1.d): Secondary means of voter identification - If a voting system provides for voter identification or authentication by using biometric measures that require a voter to possess particular biological characteristics, then the system shall provide a secondary means that does not depend on those characteristics.	Review of the requirement showed that no biometric measures are required, so this requirement is not applicable.
CVSS (3.3.1.e.i): Accessibility of paper-based vote verification - If a VEBD generates a paper record (or some other durable, human-readable record) for the purpose of allowing voters to verify their votes, then the system shall provide a means to ensure that the verification record is accessible to all voters with disabilities. i. Audio read back for paper-based vote verification - If a VEBD generates a paper record (or some other durable, human-readable record) for the purpose of allowing voters to verify their votes, then the system shall provide a mechanism that can read that record and generate an audio representation of its contents.	Review of the requirement validated that the requirement was not applicable, as a voter will implement their own hardware. If a voter has equipment that utilizes either OCR technology, or a QR reader with audio playback, then they would be able to obtain an audio read back of their printed ballot.
CVSS (3.3.2.c): Distinctive buttons and controls - Buttons and controls on accessible voting stations shall be distinguishable by both shape and color. This applies to buttons and controls implemented either "on-screen" or in hardware. This requirement does not apply to sizeable groups of keys, such as a conventional 4x3 telephone keypad or a full alphabetic keyboard.	Review of the requirement validated that the requirement was not applicable, as a voter will implement their own hardware.
CVSS (3.3.2.d): Synchronized audio and video - The voting station shall provide synchronized audio output to convey the same information as that which is displayed on the screen. There shall be a means by which the voter can disable either the audio	Review of the requirement validated that the requirement was not applicable, as a voter will implement their own hardware. Synchronized audio/video, video-only, or audio only are all obtainable. If voter environment contains a screen, audio

or the video output, resulting in a video-only or audio-only presentation, respectively. The system shall allow the voter to switch among the three modes (synchronized audio/video, video-only, or audio-only) throughout the voting session while preserving the current votes.	output and a screen reader, synchronized output is available. Voter can turn off audio to have video only. Likewise voter can turn off video display to have Audio only.
CVSS (3.3.3.b.1): Audio-tactile interface - The accessible voting station shall provide an audio-tactile interface (ATI) that supports the full functionality of the visual ballot interface. Full functionality includes at a minimum: o Instructions and feedback on initial activation of the ballot (such as insertion of a smart card), if applicable; CVSS (3.3.3.b.2): Instructions and feedback to the voter on how to operate the accessible voting station, including settings and options (e.g., volume control, repetition); CVSS (3.3.3.b.3): Instructions and feedback for navigation of the ballot; CVSS (3.3.3.b.4): Instructions and feedback for contest choices, including write-in candidates; CVSS (3.3.3.b.5): Instructions and feedback on confirming and changing votes; CVSS (3.3.3.b.6): Instructions and feedback on final submission of ballot.	Review of the requirements validated that these requirements were not applicable, as voter will implement their own hardware.
CVSS (3.3.3.c.vii): Audio features and characteristics - Voting stations that provide audio presentation of the ballot shall do so in a usable way, as detailed in the following sub-requirements. iv. Intelligible audio - The audio presentation of verbal information by both recorded and synthetic speech shall be readily comprehensible by voters who have	Review of the requirements validated that these requirements were not applicable, as voter will implement their own hardware.

normal hearing and are proficient in the language. This includes such characteristics as proper enunciation, normal intonation, appropriate rate of speech, and low background noise. Candidate names shall be pronounced as the candidate intends. This requirement applies to those aspects of the audio content that are inherent to the voting system or that are generated by default.	
CVSS (3.3.3.d): Ballot activation - If the voting station supports ballot activation for nonblind voters, then it shall also provide features that enable voters who are blind to perform this activation.	Review of the requirement validated that the requirement was satisfactorily covered – blind voters are able to activate the ballot using their personal equipment.
CVSS (3.3.4.b): Support for non-manual input - The accessible voting station shall provide a mechanism to enable non-manual input that is functionally equivalent to tactile input. All the functionality of the accessible voting station (e.g., straight party voting, write-in candidates) that is available through the conventional forms of input, such as tactile, shall also be available through non-manual input mechanisms such as mouth sticks and "sip and puff" switches.	Review of the requirements validated that these requirements were not applicable, as a voter will implement their own hardware.
CVSS (3.3.6.a): Reference to audio requirements - The accessible voting station shall incorporate the features listed under the requirements for voting equipment that provides audio presentation of the ballot.	Review of the requirements validated that these requirements were not applicable, as voter will implement their own hardware.
CVSS (3.3.6.b): Visual redundancy for sound cues - If the voting system provides sound cues as a method to alert the voter, the tone shall be accompanied by a visual cue, unless the station is in audio-only mode.	Review of the requirement validated that the requirement was satisfactorily covered – sound cues have accompanying visual cues.
CVSS (3.3.7): Use of ATI- For voters who lack proficiency in reading English, the voting equipment shall provide an audio interface for instructions and ballots.	Review of the requirements validated that this requirement was not applicable, as a voter will implement their own hardware.
CVSS (3.3.8): Speech not to be required by equipment - Voting equipment shall not require voter speech for its operation.	Review of the requirement validated that the requirement was satisfactorily covered- the system does not require speech by the voter for operation.

Phase III Privacy Testing

SLI evaluated ImageCast Remote 5.2, for compliance with California Elections Code requirements for privacy within an RAVBM system, in addition to the applicable portions of the CVSS. The table below shows each of the applicable code sections and CVSS sections, and the result of compliance.

Table 3D: Phase III – Privacy Testing	
Applicable California Elections Code Section & CVSS Requirement	**Result**
EC Section 19295(a): The RAVBM shall not have the capability, including an optional capability, to use a remote server to mark a voter's selections transmitted to the server from the voter's computer via the Internet.	Review of the requirement validated that the requirement was satisfactorily covered.
EC Section 19295 (b): The RAVBM shall not have the capability, including an optional capability, to store any voter identifiable selections on any remote server.	Review of the requirement validated that the requirement was satisfactorily covered.
EC Section 19295(c): The RAVBM shall not have the capability, including the optional capability, to tabulate votes.	Review of the requirement validated that the requirement was satisfactorily covered.
CVSS (3.2.4.1.a): Visual privacy - The ballot, any other visible record containing ballot information, and any input controls shall be visible only to the voter during the voting session and ballot submission.	Review of the requirement validated that the requirement was satisfactorily covered, as the voter will utilize their own hardware in the environment of their choosing.
CVSS (3.2.4.1.b): Auditory privacy - During the voting session, the audio interface of the voting system shall be audible only to the voter.	Review of the requirement validated that the requirement was satisfactorily covered, as the voter will utilize their own hardware in the environment of their choosing.
CVSS (3.2.4.1.c): Privacy of warnings - The voting system shall issue all warnings in a way that preserves the privacy of the voter and the confidentiality of the ballot.	Review of the requirement validated that the requirement was satisfactorily covered, as the voter will utilize their own hardware in the environment of their choosing.
CVSS (3.2.4.1.d): No receipts - The voting system shall not issue a receipt to the voter that would provide proof to another of how the voter voted.	Review of the requirements validated that this requirement was not applicable, as voter will implement their own hardware, and print their own marked ballot, as a RAVBMS system.
CVSS (3.2.4.2.a): No information shall be kept within an electronic CVR that identifies any alternative language feature(s) used by a	Review of the requirement validated that the requirement was satisfactorily covered, as CVR's are not created.

voter.	
CVSS (3.2.4.2.b): No information shall be kept within an electronic CVR that identifies any accessibility feature(s) used by a voter.	Review of the requirement validated that the requirement was satisfactorily covered, as CVR's are not created.

The ImageCast Remote 5.2 system allows for voter privacy. This is achieved by removing client side storage of marked selections. A voter is able to verify and print the paper cast record for submission to a local elections official.

4. Security and Telecommunications Testing Summary

SLI Compliance performed Security and Telecommunications testing on the ImageCast Remote 5.2 RAVBMS. During the testing, SLI conducted a documentation review, functional security testing, and telecommunications and data transmission testing.   A summary of each phase and the results are listed below.

Documentation Review

SLI conducted a documentation review of the TDP provided by Dominion for the ImageCast Remote 5.2 RAVBMS. SLI evaluated the documentation for the following applicable portions of the CVSS:

Table 4A: Documentation Review	
CVSS Standard	**Result**
5.5 Vote Secrecy on DRE and EBM Systems	Review of the TDP validated that the requirement was satisfactorily covered.
6.1.2 Data Transmissions	Review of the TDP validated that the requirement was satisfactorily covered.
6.2 Design, Construction, and Maintenance Requirements	Review of the TDP validated that the requirement was satisfactorily covered.
6.2.1 Confirmation	Review of the TDP validated that the requirement was satisfactorily covered.
7.1.1 Elements of Security outside Manufacturers Control	Review of the TDP validated that the requirement was satisfactorily covered.
7.2 Access control	Review of the TDP validated that the requirement was satisfactorily covered.
7.2.1 General Access Control	Review of the TDP validated that the requirement was satisfactorily covered.
7.2.2 General Access Control	Review of the TDP validated that the requirement was satisfactorily covered.
7.4.5 Software	The documentation doesn't describe a process used to verify

Reference Information	the software distributed is the software provided by the NSRL or designated repository. The documentation doesn't provide a procedure or functionality to verify that the software is the certified software by comparison.
7.4.6 Software Setup Validation	Review of the TDP determined the documentation doesn't reference any type of digital verification on software prior to installation. No documentation on the method provided by external interface or equipment used to verify software on the system. No documentation about a mechanism for detecting unauthorized software.

Functional Security

SLI next conducted functional security testing as part of the Security and Telecommunications testing on the ImageCast Remote 5.2 RAVBMS. The testing consisted of: 1) testing the relevant software and operating security system configuration, for pertinent vulnerabilities; and 2) testing of hardware, including examination of unused hardware ports, and security measures applied to those ports. **Table 4B: Functional Security**, lists the applicable CVSS Standards, the testing performed, any vulnerabilities, along with the vendor response/mitigation when applicable.

Table 4B: Functional Security				
CVSS Standard	**Testing Performed**	**Vulnerability**	**Recommended Mitigation**	**Response**
5.5 Vote Secrecy on DRE and EBM Systems	Testing was performed to verify how the system handled a ballot being printed and the browser closed, as well as when the ballot is closed prior to being printed. Attempts were made to resume a ballot, as well as to determine if any ballot information resided in history or cache.	None	N/A	N/A

Table 4B: Functional Security				
7.2.1 General Access Control	The system uses an N-tier architecture that consists of separate client applications, application server components, database components, and a central document repository. Authentication included methods for both the voter facing application as well as the administrative application. Security was tested on the architecture pieces, client application, and administrative application, which were accessible remotely. Physical security was not about to be observed as this was hosted at a data center.	None	N/A	N/A
7.2.2 Access Control Identification	The system uses a client server system to authenticate registered voters and issue the	None	N/A	N/A

Table 4B: Functional Security				
	correct ballot for a particular voter using predefined ballot rules and voters can be imported by the jurisdiction. Role based access controls are in place for administrative login purposes.			
7.2.4 Access Control Authorization	All access to the system is controlled by Voter ID number and an associated pin number which is created during registration. All administrative access is controlled by username/pass word combinations and there is a role-based administrative access in place. The ability to assign voters to different electoral groups/electoral districts gives the ability to assign ballots to voters in accordance with specific rules.	None	N/A	N/A

Table 4B: Functional Security				
7.4.5 Software Reference Information	No methods or procedures for verification if the system is running certified unmodified code were presented. Testing was unable to successfully modify the server code to verify if a protection method was in place and viable.	For the vulnerability in question, the level of access required to take advantage of this potential vulnerability would be inclusive to the following actors: • Voter, who can attempt to modify the server code remotely. • Election official insider, who could attempt to modify the server code remotely. • Vendor Insider, who could attempt to locally modify the server code.	Addressed in Democracy Suite ImageCast Remote Identification Guide Version: 5.2-CA::313.	All code running as part of the ImageCast Remote application utilizes a trusted code signing key that ensures only Dominion-signed code is allowed to run within the application context. For anyone to modify the code, they would also need to compile and run it using this signing key which is not available outside of authorized Dominion engineering personnel.
7.4.6 Software Setup Validation	The system does not have a built in hash verification method for the system which provides a method to verify that the source code is not running modified code. Testing was	Software Setup Validation, were not able to be verified to ensure that the system is running the correct software.	Addressed in Democracy Suite ImageCast Remote Identification Guide Version: 5.2-CA::313.	Verification of ImageCast Remote hashes is obtained by following the procedures detailed in the supplied Democracy Suite ImageCast Remote Identification

Table 4B: Functional Security				
	unable to successfully modify the server code to verify if a protection method was in place and viable.			Guide Version: 5.2-CA::313. As noted in the response to the 7.4.5 item, modified code cannot be run within the same application context as the ImageCast Remote application.
7.6 Telecommunications and Data Transmission	Tests were performed to verify that if the system utilizes electrical or optical transmission, that the ballot was sent via SSL, no receipt is utilized to verify. The client generated a blank ballot which does not contain voting selections. Once the blank ballot is delivered, and until the ballot package is saved, there are no external communications between the voter and the ballot delivery system; all interactions remain local to the voter's environment.	None	N/A	N/A

Table 4B: Functional Security				
7.8 Testing – Security	Confirmed that ImageCast Remote 5.2 does not have, nor require, internet access once the ballot has been downloaded. There are no external connections from the ballot to any outside server or service. With the exception of printing or saving the ballot package there are no external calls to or from the ballot.	None	N/A	N/A

Table 4B: Functional Security				
7.8.1 Access Control	Testing was performed to confirm that the system access control was maintained. Attempted XXS attacks, SQL Injection attacks, directory listing/scans, attempted to pull directory file lists, scanned for default http login pages, scanned for robots_txt files, and pulled SSL certificate information. Review of this requirement validated that the requirement was satisfactorily covered.	None	N/A	N/A
7.8.2 Data Interception and Disruption	Verified that this system does not utilize telecommunications for the transmission of official voting data – only the delivery of a blank ballot that does not contain voter data or choice selections.	None	N/A	N/A

Telecommunications and Data Transmission Testing

Finally in conducting the Security and Telecommunications testing on the ImageCast Remote 5.2 RAVBMS, SLI performed telecommunications and data transmission testing. SLI tested the communication of the ImageCast Remote 5.2 system, including encryption of data, as well as protocols and procedures for access authorization. The following table, **Table 4C: Telecommunications and Data Transmission Testing,** outlines the testing performed, vulnerabilities, and the vendor response/mitigation when applicable.

Table 4C: Telecommunications and Data Transmission Testing			
CVSS Standard	**Testing Performed**	**Vulnerability**	**Response/Mitigation**
6.1.2 Data Transmission	After the interactive ballot application is launched, connectivity to and from the ballot were confirmed to be nonexistent, with the exception of calls to the local system for print functionality.	None	N/A
6.2. Design, Construction, and Maintenance Requirements	Verified that ImageCast Remote 5.2 system consists of a generated ballot which is typically used for absentee and mail-in ballot marking. ImageCast Remote 5.2 does not utilize specific telecommunications channels once the ballot has been downloaded and opened on the end voter's machine.	None	N/A
6.2.1 Confirmation	Testing included accessing of a ballot from the host and checking for confirmation. This requirement was determined to be not applicable, as the system only allows the voter to mark and confirm marked ballots prior to printing out a ballot summary card. There are no live	None	N/A

	connections from the application to a remote server. All selections are cleared after browser has been closed.		

Security and Telecommunications Results

SLI did identified two (2) potential high severity vulnerabilities, as listed below**.**

Table 4D: Vulnerabilities and Mitigation/Response	
Vulnerability	**Vendor Mitigation/Response**
Potential Cross Site Scripting opportunity in select components of the system.	Cross site scripting (high severity, firm confidence): The RAVBM application sanitizes all URL parameterized inputs to protect against the execution of malicious code. While the input string added to the URL "lng" parameter was reflected back in the website's response, if it contained actual code it would have been sanitized such that it could not be executed on the server. This is done by converting certain symbols such as ">" to web-safe character codes, in this case ">" to prevent execution.
Potential SQL injection vulnerabilities arise when user-controllable data is incorporated into database SQL queries in an unsafe manner.	SQL Injection (high severity, tentative confidence): The two pages referenced in the report are only available to a user with elevated permissions ("super administrator") and are not visible to or available to lower level users (regular administrator or voter). Further, the application is sanitizing all input fields so that executable code is not passed through, unmodified, to the application and/or database in a way that could exploit a SQL Injection vulnerability.

5. Software Review Testing Summary

SLI Compliance performed a review of the ImageCast Remote 5.2 software. The purpose of the review was to identify discrepancies within the software code, and compliance with the California Voting System Standards (CVSS). The results and vendor mitigation/response are listed in the following table:

Table 5A: Source Code Review Discrepancy and Mitigation/Response	
Discrepancy	**Vendor Mitigation/Response**
There were 180 source code	The Dominion Voting Systems RAVBM product,

Table 5A: Source Code Review Discrepancy and Mitigation/Response	
requirements found to be at issue within the RAVBMS source code base reviewed; as a result, 180 discrepancies were written against the code base. • 80 instances were noted where lines of source code exceeded more than • 120 characters in length • 71 instances were noted where numbers were not set to constant • 23 instances were noted where variable declarations were without comment • 10 instances were noted where no default case existed • Two instances were noted where variable names not differing by more than • one character were utilized • One instance was noted where inconsistent indentation was implemented	ImageCast Remote, utilizes credible published standards to ensure code quality in conformance with California Voting System Standards section 5.2.3. For the C# code, the Microsoft StyleCop standard and tool are used. For the JavaScript portion of the code, the ESLint standard and tool are used. Reviewing the listed discrepancies, they appear to be purely stylistic in nature and do not adversely affect the usability, security, or readability of the submitted source code.

IV. COMPLIANCE WITH STATE AND FEDERAL LAWS AND REGULATIONS

1. Elections Code Review

1) §19293 (b) Remote accessible vote by mail system standards adopted by the Secretary of State pursuant to subdivision (a) shall include, but not be limited to, all of the following requirements:

(1) The machine or device and its software shall be suitable for the purpose for which it is intended.
(2) The remote accessible vote by mail system shall preserve the secrecy of the ballot.
(3) The remote accessible vote by mail system shall be safe from fraud or manipulation.
(4) The remote accessible vote by mail system shall be accessible to voters with disabilities and to voters who require assistance in a language other than English if the language is one in which a ballot or ballot materials are required to be made available to voters.

The system meets these requirements. The system demonstrated English, Spanish and Chinese languages, however with external translation services; the system can support other languages as required.

2) §19295 A remote accessible vote by mail system or part of a remote accessible vote by mail system shall do not any of the following:

    (a) Have the capability, including an optional capability, to use a remote server to mark a voter's selections transmitted to the server from the voter's computer via the Internet.
    (b) Have the capability, including an optional capability, to store any voter identifiable selections on any remote server.
    (c) Have the capability, including the optional capability, to tabulate votes.

    The system meets these requirements.

2. **Section 508 and WCAG Compliance Review**

    ImageCast Remote 5.2 was written to WCAG 2.0 guidelines to implement accessibility features. The system also complies with the applicable portions of Section 508.

V. <u>Conclusion</u>

The Dominion ImageCast Remote 5.2 remote accessible vote by mail system, in the configuration tested and documented by the California Dominion ImageCast Remote 5.2 Use Procedures, meets applicable California and federal laws.

Attachment A

Q1 For each question, please indicate how strongly you agree or disagree with the statement.
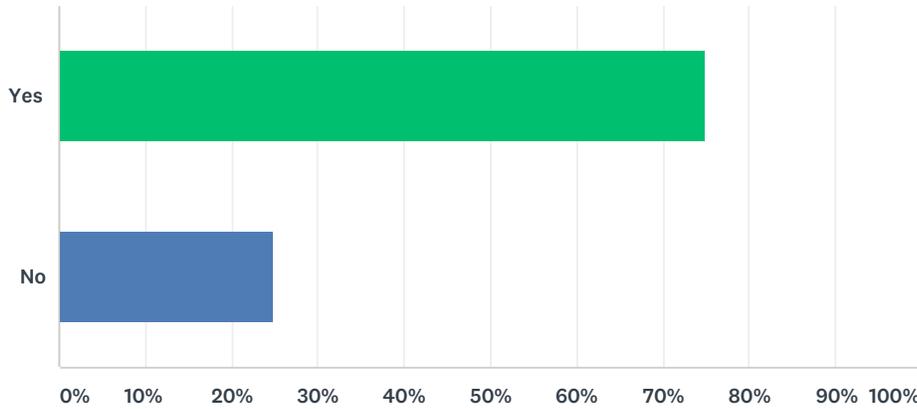
Answered: 4   Skipped: 0
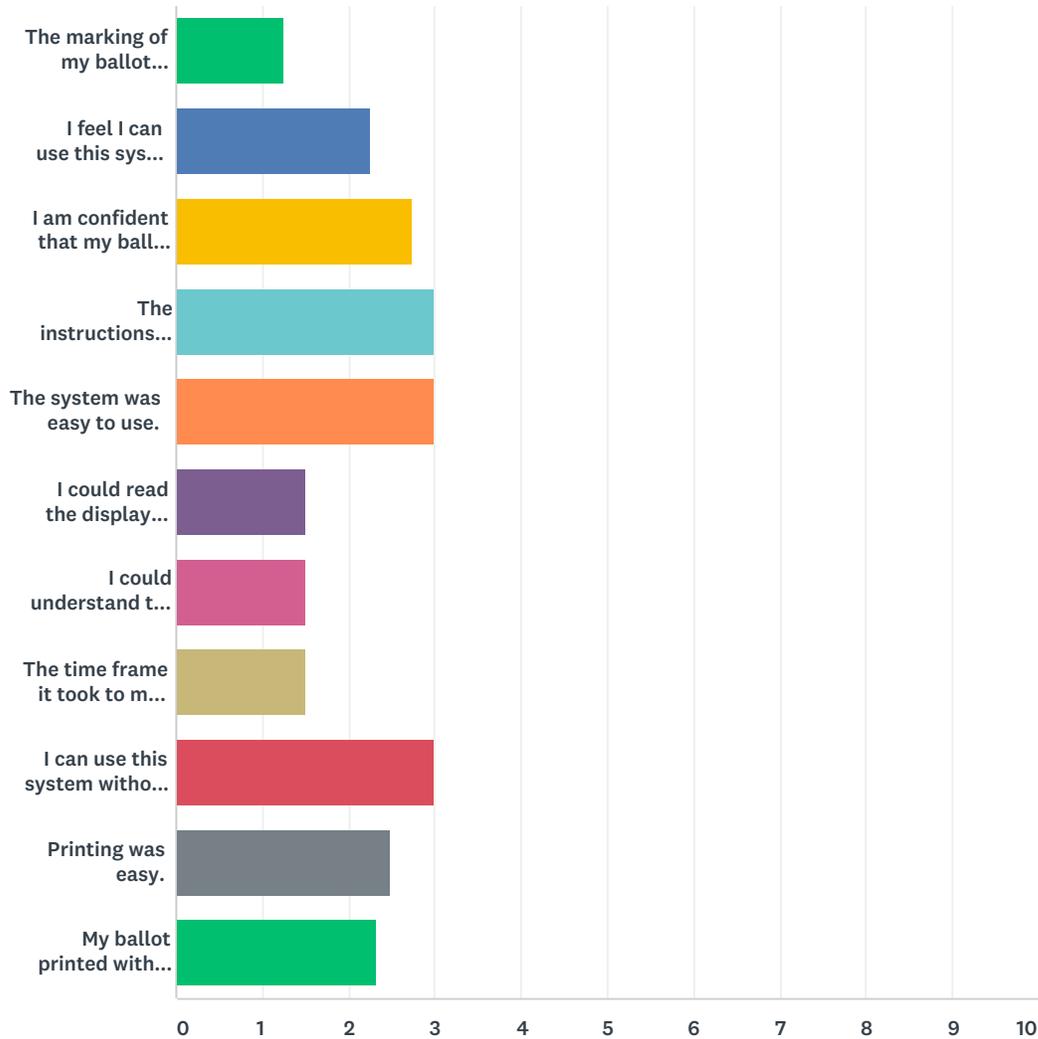
	AGREE STRONGLY	AGREE SOMEWHAT	NEUTRAL	DISAGREE SOMEWHAT	DISAGREE STRONGLY	TOTAL	WEIGHTED AVERAGE
The marking of my ballot method was private.	75.00% 3	25.00% 1	0.00% 0	0.00% 0	0.00% 0	4	1.25
I feel I can use this system to mark my ballot independently.	50.00% 2	25.00% 1	0.00% 0	0.00% 0	25.00% 1	4	2.25
I am confident that my ballot was recorded accurately.	0.00% 0	75.00% 3	0.00% 0	0.00% 0	25.00% 1	4	2.75
The instructions were clear and complete.	0.00% 0	50.00% 2	0.00% 0	50.00% 2	0.00% 0	4	3.00
The system was easy to use.	0.00% 0	25.00% 1	50.00% 2	25.00% 1	0.00% 0	4	3.00
I could read the display easily.(If applicable)	50.00% 1	50.00% 1	0.00% 0	0.00% 0	0.00% 0	2	1.50

I could understand the speech output. (If applicable)	50.00% 1	50.00% 1	0.00% 0	0.00% 0	0.00% 0	2	1.50
The time frame it took to mark my ballot was what I expected.	50.00% 2	50.00% 2	0.00% 0	0.00% 0	0.00% 0	4	1.50
I can use this system without technical help.	25.00% 1	25.00% 1	0.00% 0	25.00% 1	25.00% 1	4	3.00
Printing was easy.	25.00% 1	50.00% 2	0.00% 0	0.00% 0	25.00% 1	4	2.50
My ballot printed with the correct selections.	66.67% 2	0.00% 0	0.00% 0	0.00% 0	33.33% 1	3	2.33

I could understand the speech output. (If applicable)	50.00% 1	50.00% 1	0.00% 0	0.00% 0	0.00% 0

Q2 Would you be satisfied using this system to mark your ballot in an election?

Answered: 4   Skipped: 0

ANSWER CHOICES	RESPONSES	
Yes	75.00%	3
No	25.00%	1
TOTAL		4

Q3 Would you rather mark your ballot using another method?

Answered: 4   Skipped: 0
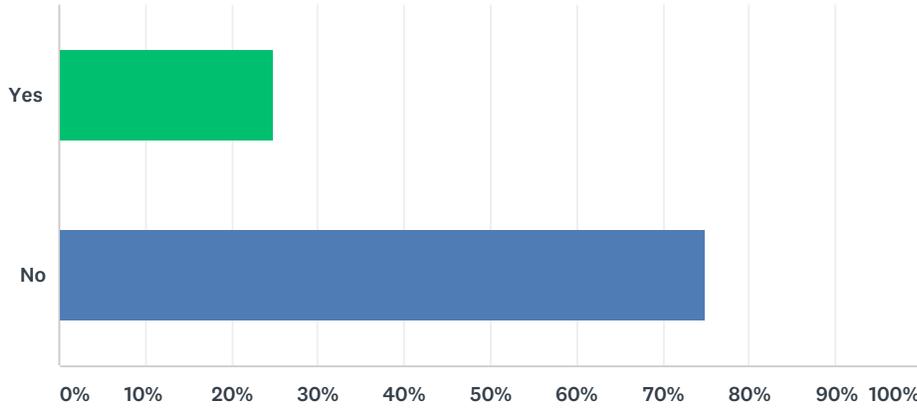
ANSWER CHOICES	RESPONSES	
Yes	25.00%	1
No	75.00%	3
TOTAL		4

Q4 If you prefer another method, what method would you prefer?

Answered: 1   Skipped: 3

#	RESPONSES	DATE
1	Electronic machine at poll or "Democracy live" mail system	12/16/2017 12:18 PM

Q5 Do you have any suggestions for changes on this system and/or any other comments you would like to provide?

Answered: 3   Skipped: 1

#	RESPONSES	DATE
1	1. "to make a selection, click in the box" not applicable or appropriate wording for screen-reader users. 2. Why say "party preference" next to choice rather than the name of the preferred party? 3. For write-in choices, I got warning that no choice had been made but could never find the edit box in which to write my choice. 4. No way to know where, or ability to write email address, date, etc. on the affidavit.	12/16/2017 12:18 PM
2	The verification failed and my ballot was not recorded.	12/16/2017 12:01 PM
3	The actual ballot was pretty easy to complete. Otherwise, I have concerns with the process of obtaining the ballot and how to return it. The registration process, waiting for the email, choosing a PIN and signing back into the site to get the ballot will confuse and frustrate most voters with disabilities. Once a PIN has been selected, will a voter be able use that PIN for every subsequent election? If getting a PIN is necessary, it may be better to have a voter who requests a RAVBM ballot register and choose a PIN at the time they make the request. I understand that, for counties that use the Dominion Imagecast voting system, the RAVBM ballot will not to be remade because the voting system will be able to read the RAVBM ballots directly. Those counties should not have to the second bullet in the affidavit because it is not necessary and will cause unnecessary confusion among voters. I found the envelope part confusing. I think it has to do with the fact that I did not have the actual envelope. I signed the printed envelope and put it in an envelope, but now think that I should have put it on the outside of the envelope.	12/15/2017 9:19 PM

Q1 Name

Answered: 5   Skipped: 0

▮	███████		██
▮	███████		████████
▮	█████		████████
▮	██████		█████████
▮	█████		████████
▮	███████		█████████

Q2 Age

Answered: 5   Skipped: 0

#	RESPONSES	DATE
1	35	12/22/2017 5:09 PM
2	66	12/22/2017 9:11 AM
3	29	12/21/2017 10:41 AM
4	47 yo	12/18/2017 11:16 AM
5	44	12/18/2017 11:03 AM

Q3 Phone

Answered: 5   Skipped: 0

	█████████		████
█	████████		████████
█	████████		████████
█	████████		█████████
█	████████		█████████
█	████████		█████████

Q4 Email

Answered: 5   Skipped: 0

|			
▮	██████		██
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▮	██████		██████
▮	███████		████████
▮	█████████████		███████
▮	████████████		████████

Q5 Please describe the disabilities or difficulties you have that may interfere with you being able to mark a ballot privately and independently.

Answered: 5   Skipped: 0

#	RESPONSES	DATE
1	Autism	12/22/2017 5:10 PM
2	When I moved from one state to another; and when I moved to a city in another county	12/22/2017 9:16 AM
3	n/a - work related testing	12/21/2017 10:42 AM
4	Lack of fine motor control due to Cerebral Palsy	12/18/2017 11:26 AM
5	Ballot boxes being at my wheelchair level.. Random marks I make on ballot due to my hands not cooperating with my brain. Small print and my eyes tracking to find my choice.	12/18/2017 11:06 AM

Q6 Which language would you prefer voting in ?
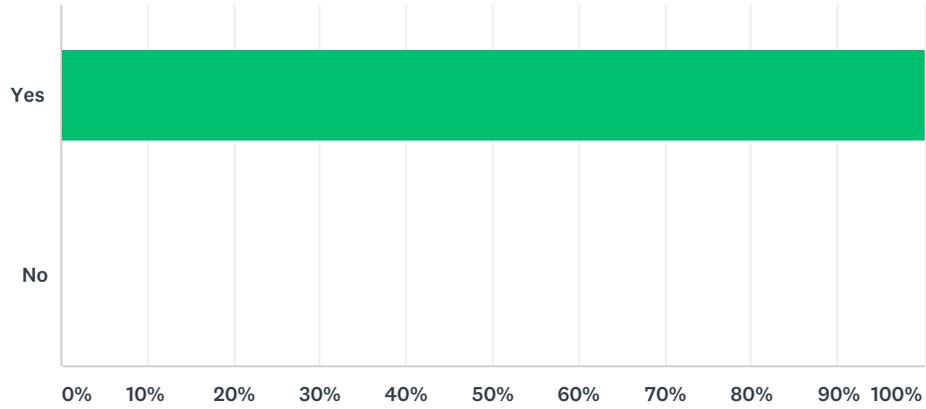
Answered: 5   Skipped: 0
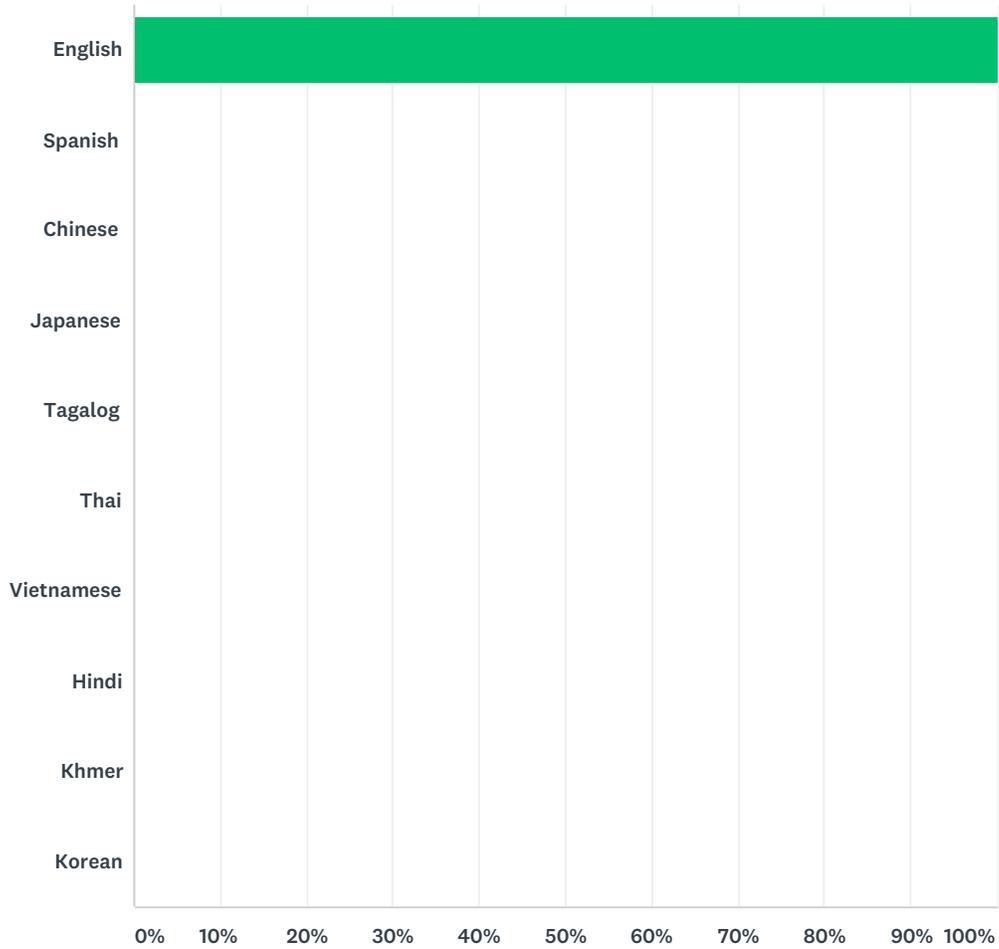
ANSWER CHOICES	RESPONSES	
English	100.00%	5
Spanish	0.00%	0
Chinese	0.00%	0
Japanese	0.00%	0
Tagalog	0.00%	0
Thai	0.00%	0
Vietnamese	0.00%	0
Hindi	0.00%	0
Khmer	0.00%	0
Korean	0.00%	0
TOTAL		5

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

#	OTHER (PLEASE SPECIFY)	DATE

Q7 Have you ever voted before?

Answered: 5   Skipped: 0

ANSWER CHOICES	RESPONSES	
Yes	100.00%	5
No	0.00%	0
TOTAL		5

Q8 If "No", what has prevented you from voting in the past?

Answered: 1   Skipped: 4

#	RESPONSES	DATE
1	n/a	12/21/2017 10:42 AM

Q9 What method of voting do you use most often?

Answered: 5   Skipped: 0
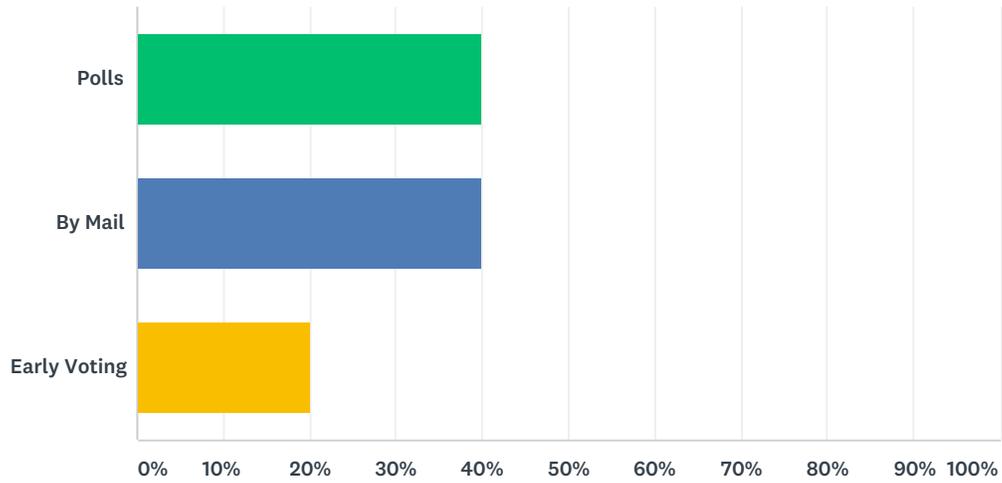
ANSWER CHOICES	RESPONSES	
Polls	40.00%	2
By Mail	40.00%	2
Early Voting	20.00%	1
TOTAL		5

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Q10 Have you ever used a voting system with any special accessibility accommodations?

Answered: 5   Skipped: 0
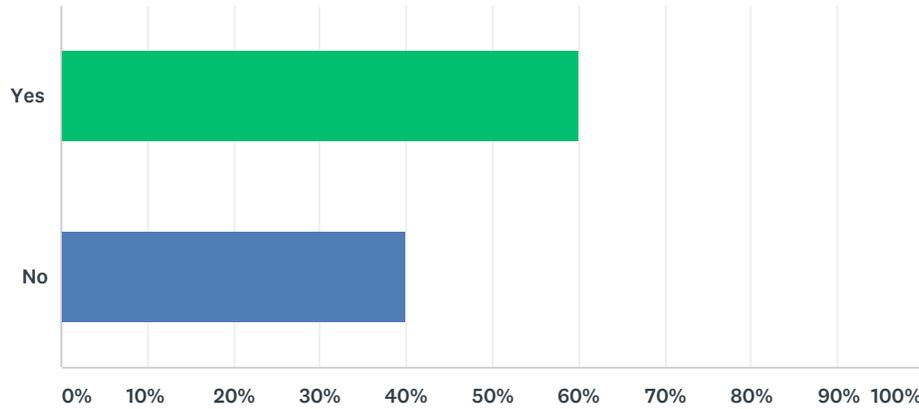
ANSWER CHOICES	RESPONSES	
Yes	60.00%	3
No	40.00%	2
TOTAL		5

Q11 If "Yes", which type of voting system?

Answered: 3   Skipped: 2
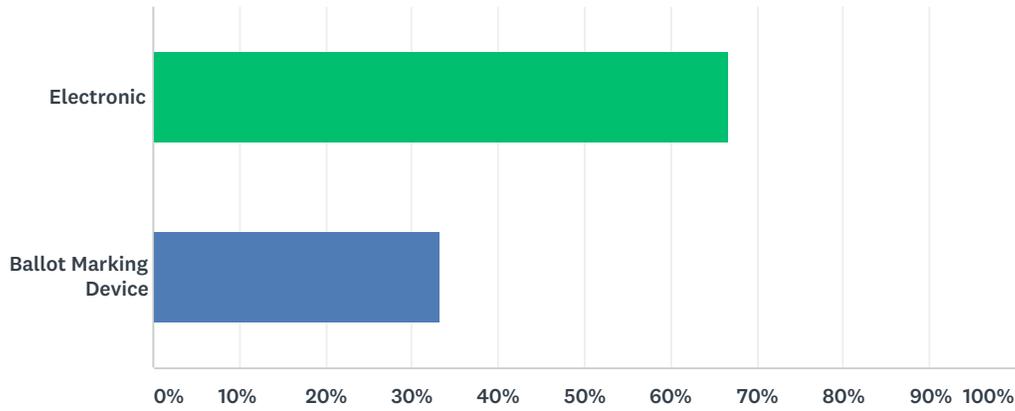
ANSWER CHOICES	RESPONSES	
Electronic	66.67%	2
Ballot Marking Device	33.33%	1
TOTAL		3

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Q12 What operating system are you using?

Answered: 3   Skipped: 2
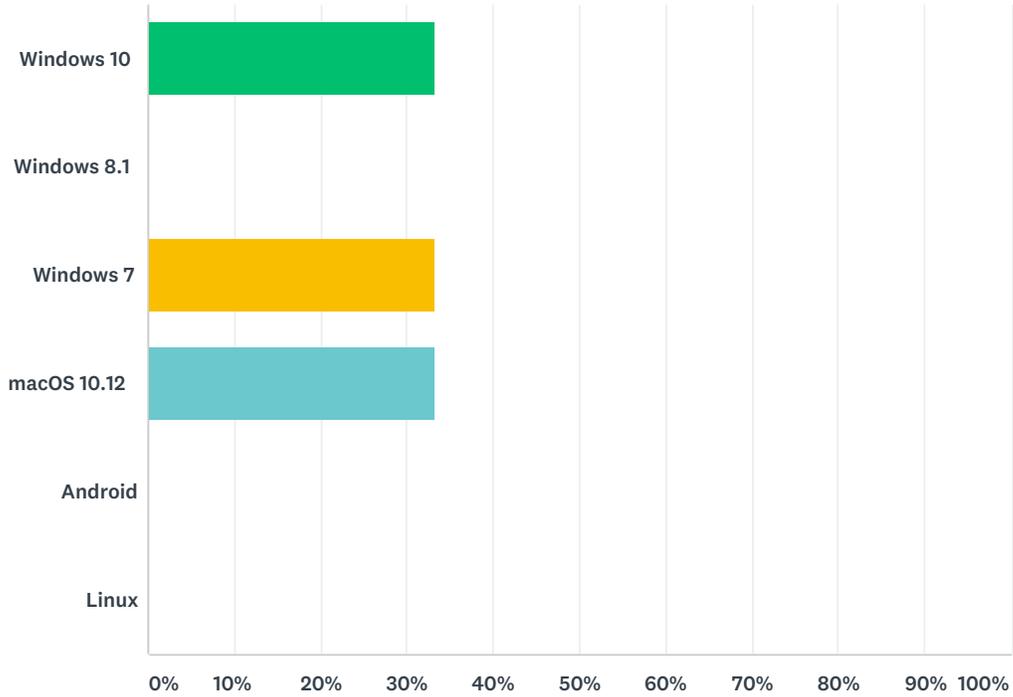
ANSWER CHOICES	RESPONSES	
Windows 10	33.33%	1
Windows 8.1	0.00%	0
Windows 7	33.33%	1
macOS 10.12	33.33%	1
Android	0.00%	0
Linux	0.00%	0
TOTAL		3

#	OTHER (PLEASE SPECIFY)	DATE
1	iOS 11.2	12/22/2017 5:12 PM

Q13 What internet browser are you using?

Answered: 4   Skipped: 1
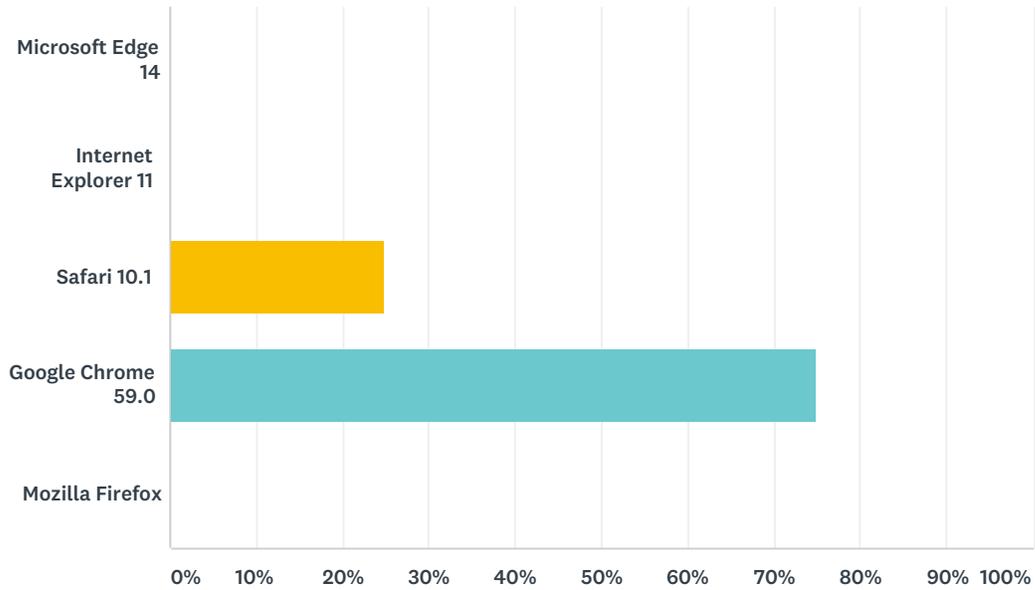
ANSWER CHOICES	RESPONSES	
Microsoft Edge 14	0.00%	0
Internet Explorer 11	0.00%	0
Safari 10.1	25.00%	1
Google Chrome 59.0	75.00%	3
Mozilla Firefox	0.00%	0
TOTAL		4

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Q14 List the auxiliary devices and/or software you are using for electronic accessibility.

Answered: 0   Skipped: 5

⚠ No matching responses.

ANSWER CHOICES	RESPONSES	
JAWS	0.00%	0
NVDA	0.00%	0
Apple Voiceover	0.00%	0
Windows Narrator	0.00%	0
TOTAL		0

#	OTHER (PLEASE SPECIFY)	DATE
1	Windows mouse keys, filter keys and slow keys	12/18/2017 12:49 PM

Q15 What is the make and model of the hardware you are using (PC, Laptop, Tablet, etc.)?

Answered: 4   Skipped: 1

#	RESPONSES	DATE
1	Apple iPad Mini	12/22/2017 5:12 PM
2	Mac Air	12/22/2017 9:22 AM
3	Dell PC	12/21/2017 10:43 AM
4	PC	12/18/2017 12:49 PM

Q16 What is the printer make and model you are using?

Answered: 3   Skipped: 2

#	RESPONSES	DATE
1	Brother	12/22/2017 5:12 PM
2	Brother DW2700	12/22/2017 9:22 AM
3	HP Laserjet 3011	12/18/2017 12:49 PM

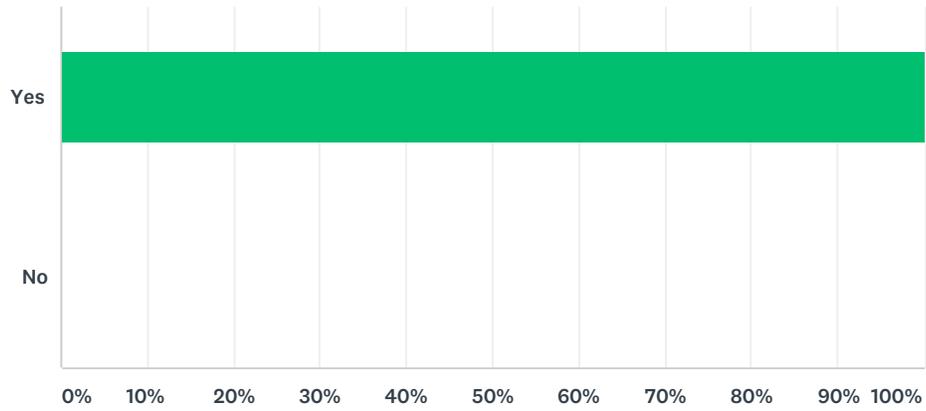# Q17 What antivirus software are you using?

Answered: 4   Skipped: 1
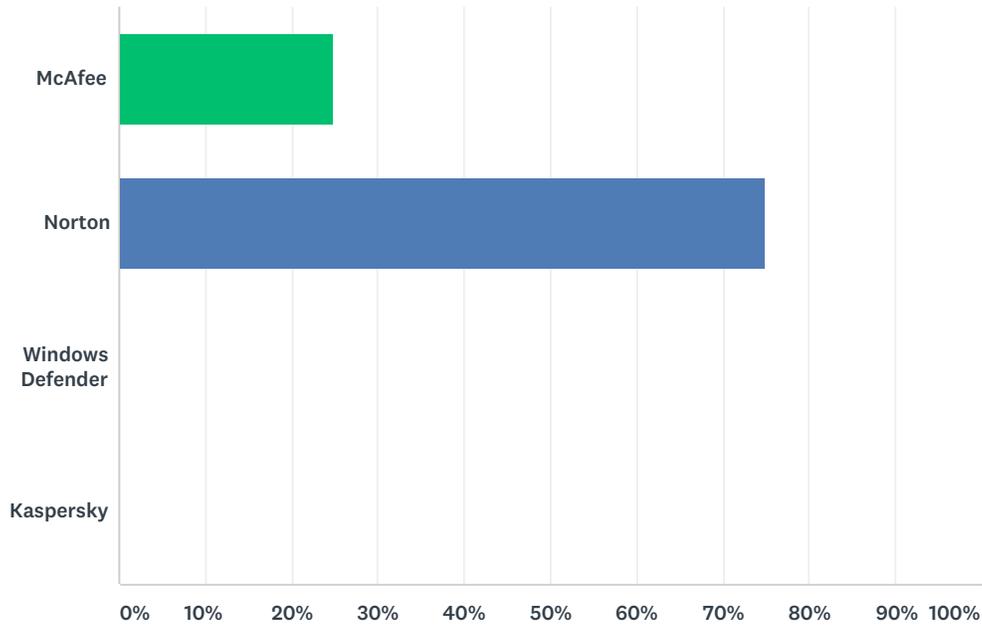
ANSWER CHOICES	RESPONSES	
McAfee	25.00%	1
Norton	75.00%	3
Windows Defender	0.00%	0
Kaspersky	0.00%	0
TOTAL		4

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

18 / 19

Q18 Is your antivirus software up to date?

Answered: 4   Skipped: 1

ANSWER CHOICES	RESPONSES	
Yes	100.00%	4
No	0.00%	0
TOTAL		4

Q1 For each question, please indicate how strongly you agree or disagree with the statement.
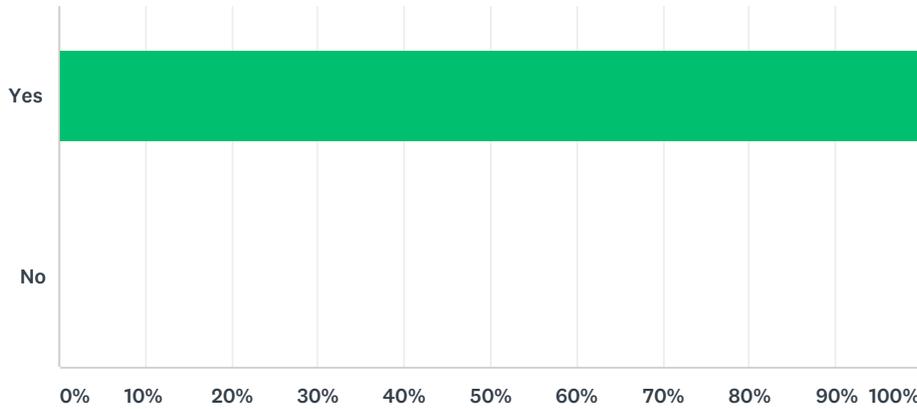
Answered: 1   Skipped: 0
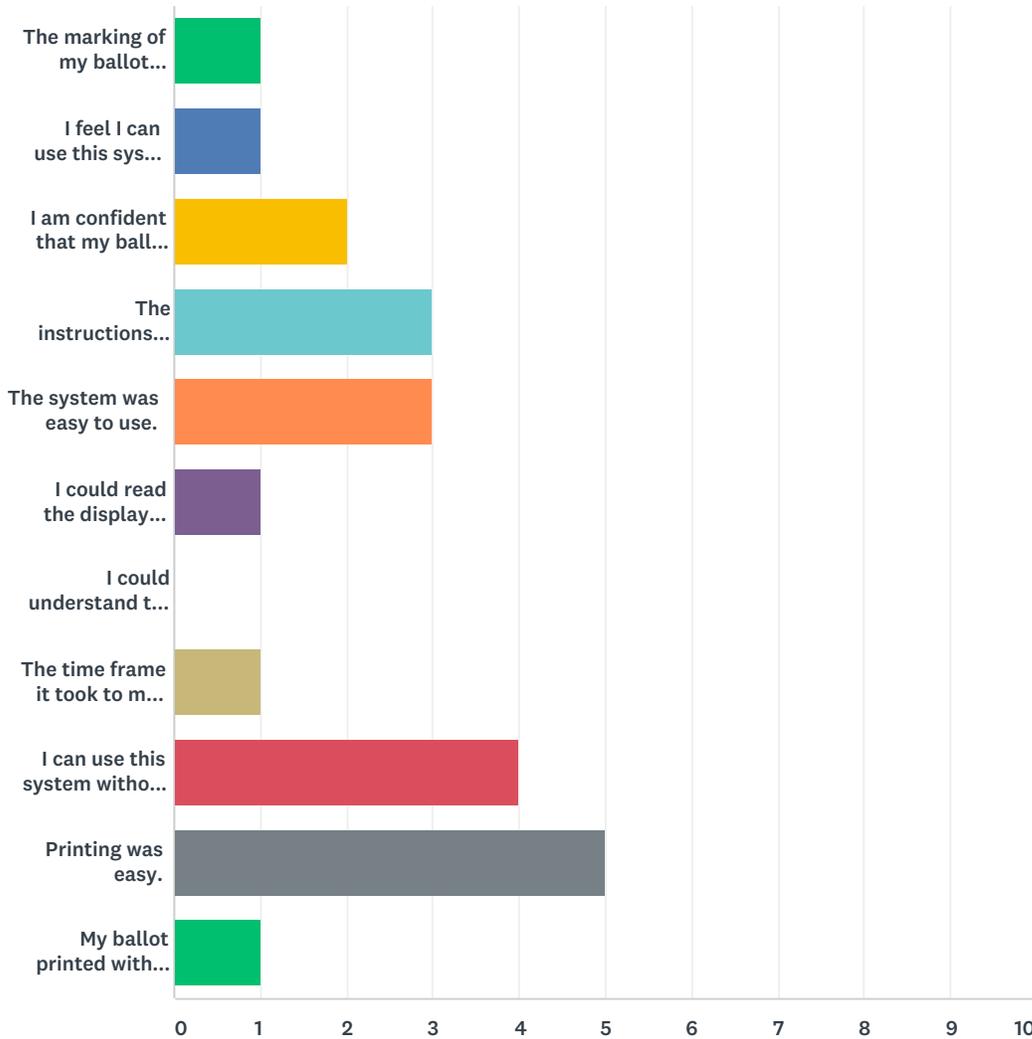
	AGREE STRONGLY	AGREE SOMEWHAT	NEUTRAL	DISAGREE SOMEWHAT	DISAGREE STRONGLY	TOTAL	WEIGHTED AVERAGE
The marking of my ballot method was private.	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1	1.00
I feel I can use this system to mark my ballot independently.	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1	1.00
I am confident that my ballot was recorded accurately.	0.00% 0	100.00% 1	0.00% 0	0.00% 0	0.00% 0	1	2.00
The instructions were clear and complete.	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1	3.00
The system was easy to use.	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1	3.00
I could read the display easily.(If applicable)	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1	1.00

I could understand the speech output. (If applicable)	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
The time frame it took to mark my ballot was what I expected.	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1	1.00
I can use this system without technical help.	0.00% 0	0.00% 0	0.00% 0	100.00% 1	0.00% 0	1	4.00
Printing was easy.	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1	5.00
My ballot printed with the correct selections.	100.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	1	1.00

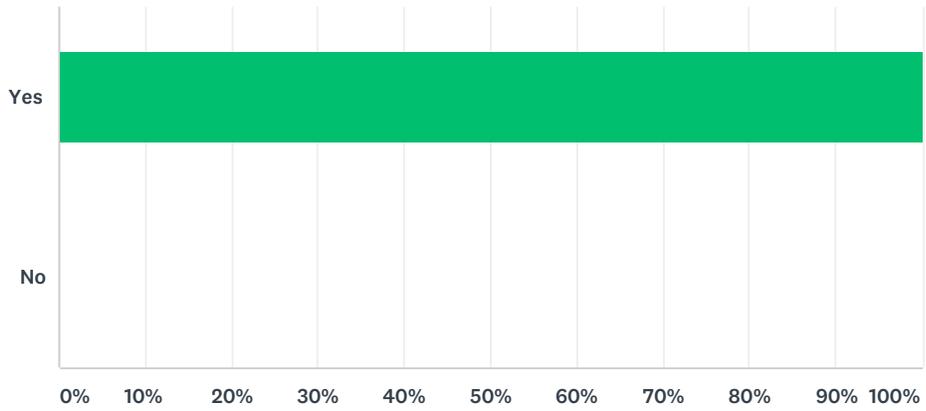# Q2 Would you be satisfied using this system to mark your ballot in an election?

Answered: 1   Skipped: 0

ANSWER CHOICES	RESPONSES	
Yes	100.00%	1
No	0.00%	0
TOTAL		1

Q3 Would you rather mark your ballot using another method?

Answered: 1   Skipped: 0

ANSWER CHOICES	RESPONSES	
Yes	100.00%	1
No	0.00%	0
TOTAL		1

Q4 If you prefer another method, what method would you prefer?

Answered: 1   Skipped: 0

#	RESPONSES	DATE
1	Having to print & mail a pain.	1/2/2018 12:02 PM

Q5 Do you have any suggestions for changes on this system and/or any other comments you would like to provide?

Answered: 1   Skipped: 0

#	RESPONSES	DATE
1	1. Get feedback immediately after test. I took notes, but have forgotten some of what I want to tell 2. There was a drop down (I think date) that was not the format on the screen, would have given up instead of trying to enter when couldn't get 01 3 Write in name. Warning looks kill you can't type in 4.Of 2 people doing the test in the same room (dif devices & emails), one did not allow to print. 5. Contest:2of7 form District 1. Ballot said vote for 1, review said vote for 3; 6. Why does my computer say ballot package modified date after I am completing? 7. There is a lot to print. Printing wasted a sheet of paper. Wastes a lot if happens to everyone 8. Printing envelop needs to be redesigned so paper print fits. 9. Positive comment: I get mixed up between my various email addresses. The test let me start process on one and then move to another.	1/2/2018 12:02 PM

Q1 Name

Answered: 8   Skipped: 0

Q2 Age

Answered: 8   Skipped: 0

#	RESPONSES	DATE
1	62	2/2/2018 6:35 PM
2	64	1/25/2018 9:47 AM
3	56	1/25/2018 2:12 AM
4	46	1/23/2018 12:05 PM
5	70	1/22/2018 4:21 PM
6	69	1/22/2018 3:14 PM
7	44	1/22/2018 10:25 AM
8	64	1/22/2018 10:15 AM

Q3 Phone

Answered: 8   Skipped: 0

▮	███████		██	
▮	███████		████████	
▮	███████		████████	
▮	███████		████████	
▮	███████		█████████	
▮	███████		████████	
▮	███████		████████	
▮	████████		█████████	
▮	███████		█████████	

Q4 Email

Answered: 8   Skipped: 0

| ▮	███████		██
▮	████████████		██████
▮	█████████████		██████
▮	█████████████		██████
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▮	█████████		██████
▮	████████████		██████
▮	███████████████		██████

Q5 Please describe the disabilities or difficulties you have that may interfere with you being able to mark a ballot privately and independently.

Answered: 8   Skipped: 0

#	RESPONSES	DATE
1	Let's say I am blind	2/2/2018 6:37 PM
2	Leg and foot injuries impair standing. Carpal Tunnel.	1/25/2018 9:48 AM
3	Blind	1/25/2018 2:14 AM
4	Totally blind. Way finding to polls can be an issue, and my arthritic left knee does not allow for climbing flights of stairs. I insist on stair-free places as a matter of principle. Have mild CP on right side, so all fine motor chores are left-handed. One-handed typist. This should not effect voting independently, but I will downgrade a polling place machine or system if an assumption of two functioning hands is present.	1/23/2018 12:19 PM
5	I cannot write with my hand.	1/22/2018 4:23 PM
6	Hands are shaky. Eyesight sometimes sees text as blurry.	1/22/2018 3:15 PM
7	vision, mobility, problem using hands,	1/22/2018 10:26 AM
8	totally blind	1/22/2018 10:16 AM

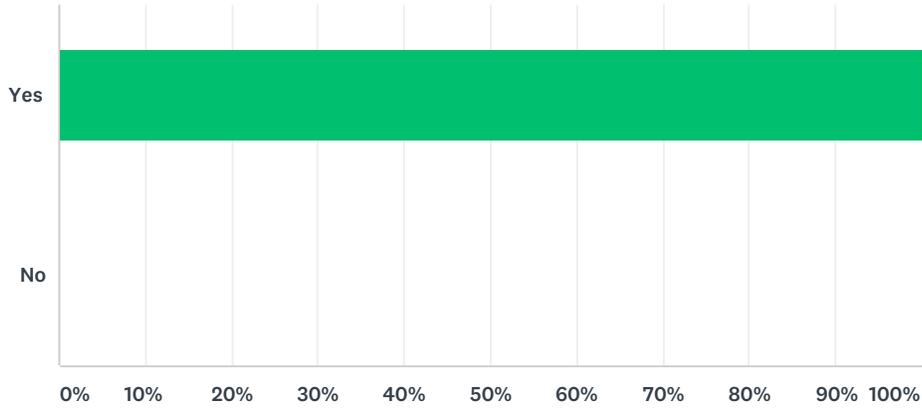# Q6 Which language would you prefer voting in ?

Answered: 8   Skipped: 0
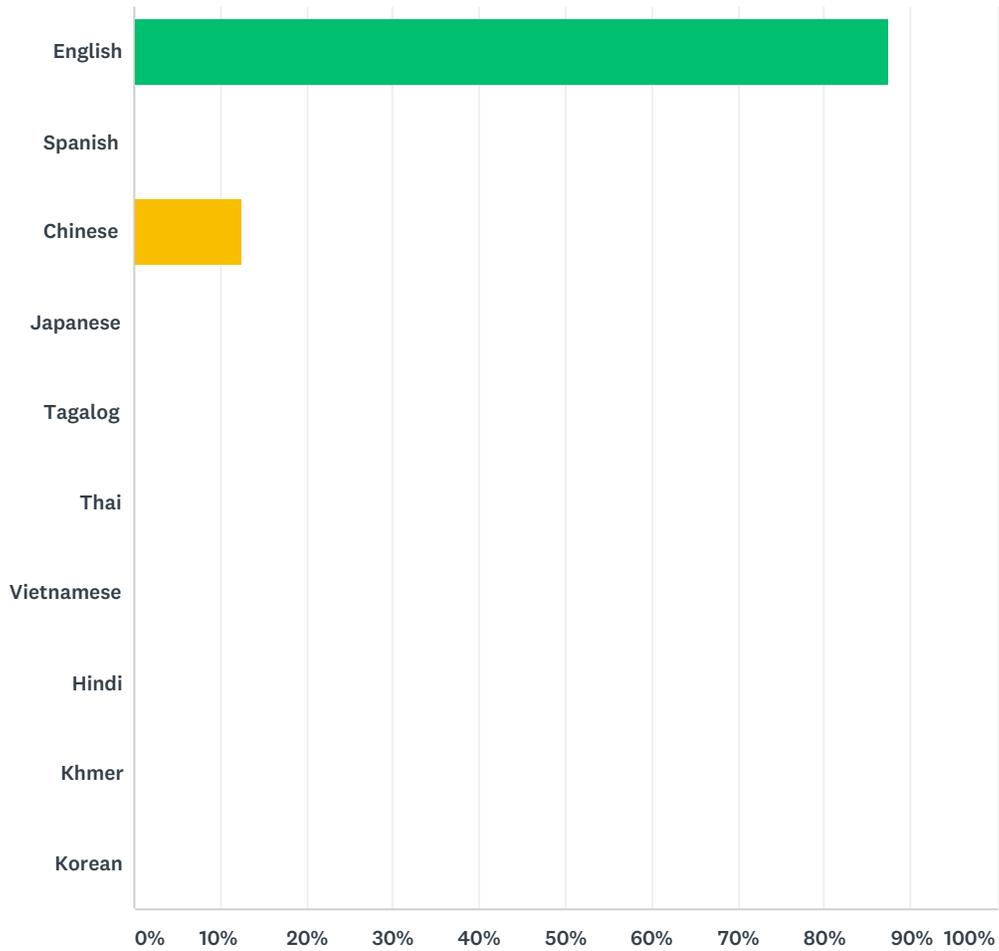
ANSWER CHOICES	RESPONSES	
English	87.50%	7
Spanish	0.00%	0
Chinese	12.50%	1
Japanese	0.00%	0
Tagalog	0.00%	0
Thai	0.00%	0
Vietnamese	0.00%	0
Hindi	0.00%	0
Khmer	0.00%	0
Korean	0.00%	0
TOTAL		8

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

#	OTHER (PLEASE SPECIFY)	DATE

Q7 Have you ever voted before?

Answered: 8   Skipped: 0

ANSWER CHOICES	RESPONSES	
Yes	100.00%	8
No	0.00%	0
TOTAL		8

Q8 If "No", what has prevented you from voting in the past?

Answered: 0   Skipped: 8

#	RESPONSES	DATE
	There are no responses.	

Q9 What method of voting do you use most often?

Answered: 8   Skipped: 0
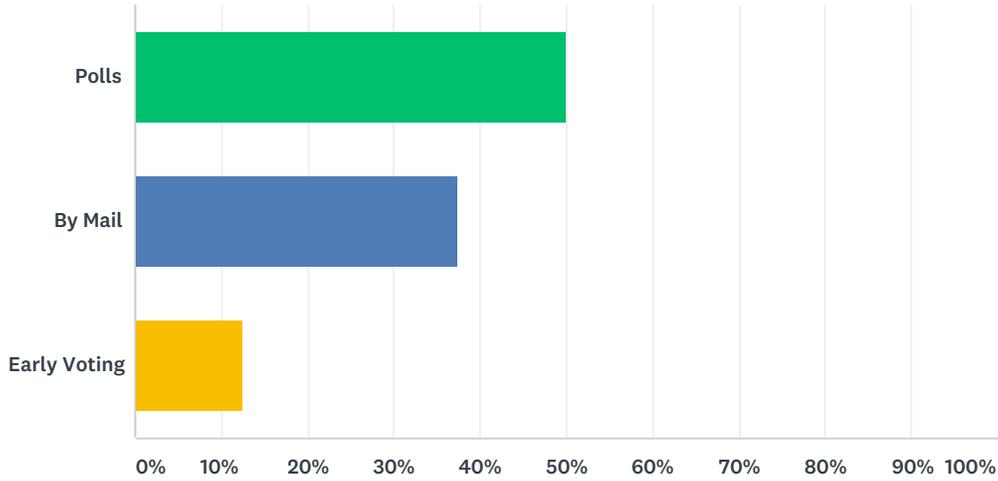
ANSWER CHOICES	RESPONSES	
Polls	50.00%	4
By Mail	37.50%	3
Early Voting	12.50%	1
TOTAL		8

#	OTHER (PLEASE SPECIFY)	DATE
1	I vote early because I do not know whether my polling place is accessible and am not sure exactly where it is. Have only had one primary and general election since coming here. Alameda County's polling info was unclear on accessibility of the place, but I knew there was an accessible one in Oakland courthouse.	1/23/2018 12:19 PM

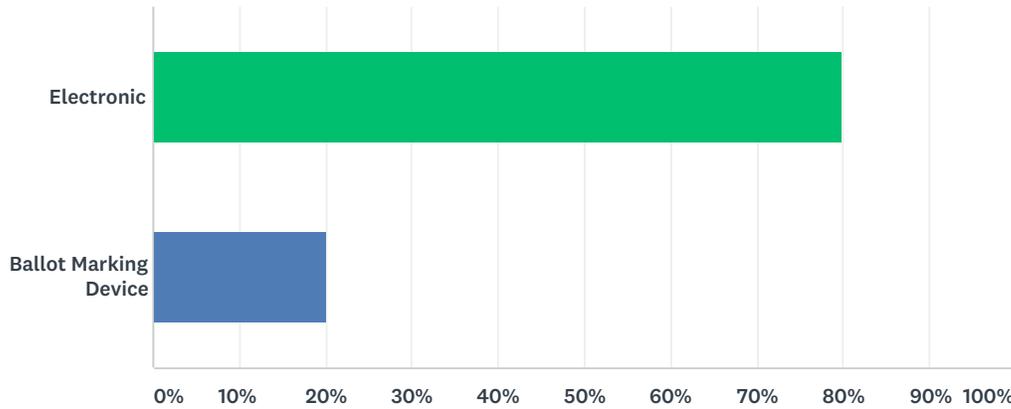# Q10 Have you ever used a voting system with any special accessibility accommodations?

Answered: 8   Skipped: 0
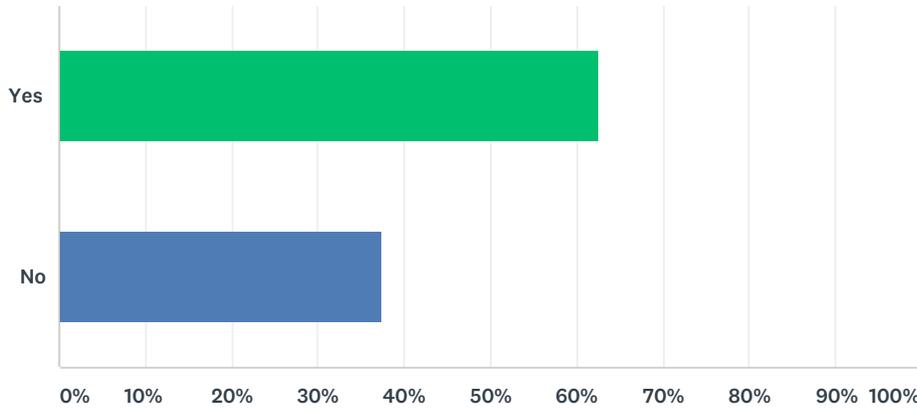
ANSWER CHOICES	RESPONSES	
Yes	62.50%	5
No	37.50%	3
TOTAL		8

Q11 If "Yes", which type of voting system?

Answered: 5   Skipped: 3

ANSWER CHOICES	RESPONSES	
Electronic	80.00%	4
Ballot Marking Device	20.00%	1
TOTAL		5

#	OTHER (PLEASE SPECIFY)	DATE
1	Voice activating machine when being trained as a poll supervisor and a poll instructor	2/2/2018 6:37 PM
2	At least two models.	1/23/2018 12:19 PM

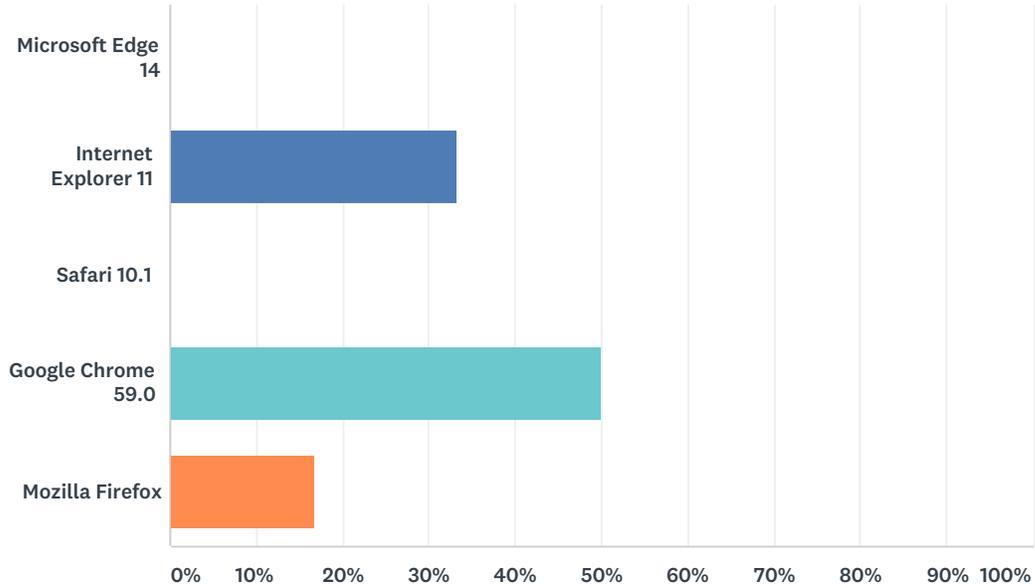# Q12 What operating system are you using?

Answered: 5   Skipped: 3
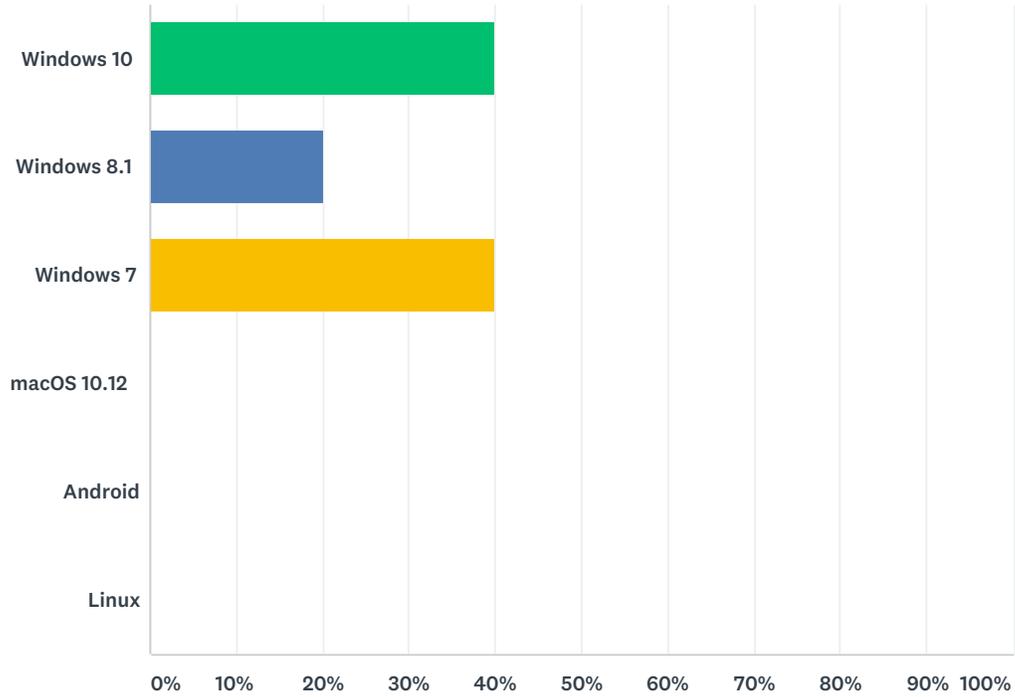
ANSWER CHOICES	RESPONSES	
Windows 10	40.00%	2
Windows 8.1	20.00%	1
Windows 7	40.00%	2
macOS 10.12	0.00%	0
Android	0.00%	0
Linux	0.00%	0
TOTAL		5

#	OTHER (PLEASE SPECIFY)	DATE
1	home prem	1/23/2018 12:46 PM
2	Mac OS X Yosemite Version 10.10	1/22/2018 10:32 AM

# Q13 What internet browser are you using?

Answered: 6   Skipped: 2

ANSWER CHOICES	RESPONSES	
Microsoft Edge 14	0.00%	0
Internet Explorer 11	33.33%	2
Safari 10.1	0.00%	0
Google Chrome 59.0	50.00%	3
Mozilla Firefox	16.67%	1
TOTAL		6

#	OTHER (PLEASE SPECIFY)	DATE
1	with latest updates and serv packs	1/23/2018 12:46 PM

Q14 List the auxiliary devices and/or software you are using for electronic accessibility.

Answered: 2   Skipped: 6
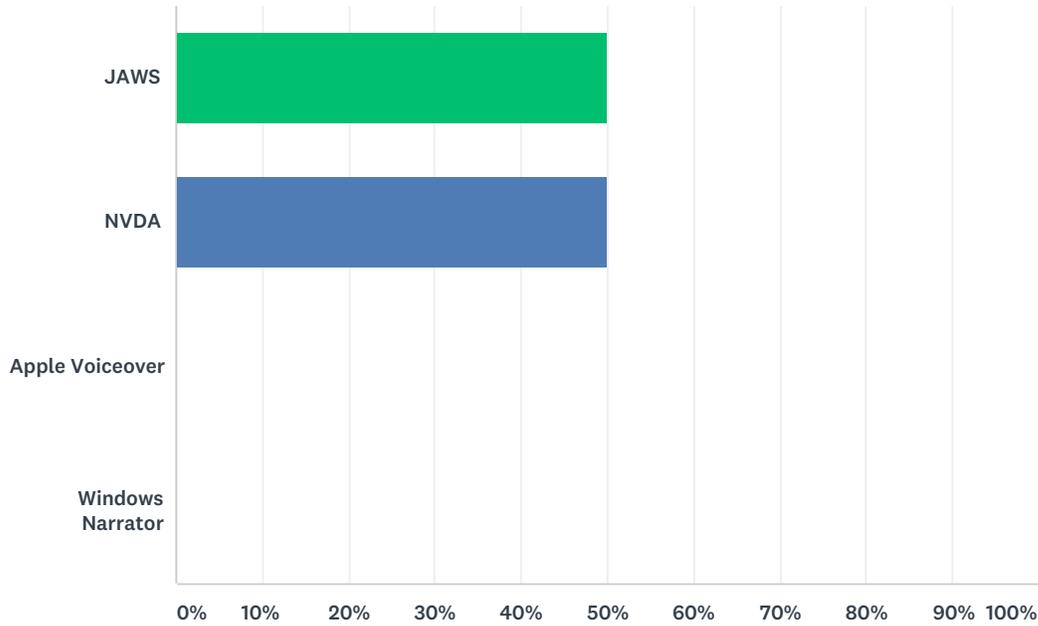
ANSWER CHOICES	RESPONSES	
JAWS	50.00%	1
NVDA	50.00%	1
Apple Voiceover	0.00%	0
Windows Narrator	0.00%	0
TOTAL		2

#	OTHER (PLEASE SPECIFY)	DATE
1	I have both JAWS and NVDA. NVDA is primary.	1/23/2018 12:46 PM
2	Dragon Naturally Speaking	1/22/2018 4:27 PM
3	None	1/22/2018 10:32 AM

Q15 What is the make and model of the hardware you are using (PC, Laptop, Tablet, etc.)?

Answered: 6   Skipped: 2

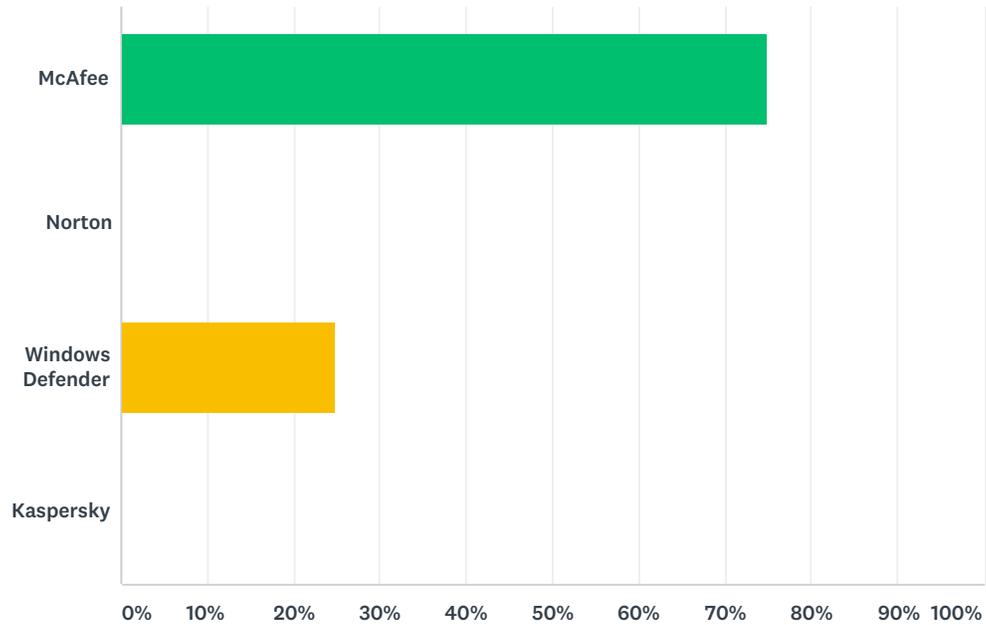| #	RESPONSES	DATE
1	All	2/2/2018 6:38 PM
2	Dell Desktop PC	1/25/2018 9:50 AM
3	Dell Opti-plex 755 PC desktop, win7 Home Premium Ed.	1/23/2018 12:46 PM
4	Dell PC, Intel (R) core (TM) I 7 – 4770 CPU at 3.40 GHz , installed memory (RAM): 12.0 GB, 64 bit operating system, X 64 based processor	1/22/2018 4:27 PM
5	MacBook Air	1/22/2018 10:32 AM
6	PC, custom	1/22/2018 10:23 AM

Q16 What is the printer make and model you are using?

Answered: 6   Skipped: 2

#	RESPONSES	DATE
1	Various	2/2/2018 6:38 PM
2	Xerox WorkCentre 5845/5855	1/25/2018 9:50 AM
3	none. Will send .tif of ballot via email.	1/23/2018 12:46 PM
4	Canon iP 1700	1/22/2018 4:27 PM
5	Canon MG8200 Series 2	1/22/2018 10:32 AM
6	HP Laserjet 2050	1/22/2018 10:23 AM

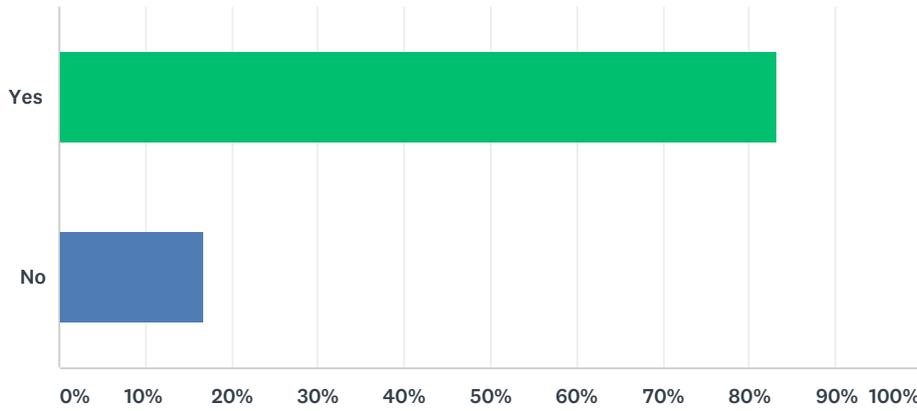# Q17 What antivirus software are you using?

Answered: 4   Skipped: 4

ANSWER CHOICES	RESPONSES	
McAfee	75.00%	3
Norton	0.00%	0
Windows Defender	25.00%	1
Kaspersky	0.00%	0
TOTAL		4

#	OTHER (PLEASE SPECIFY)	DATE
1	ESET Endpoint Antivirus	1/25/2018 9:50 AM
2	eSET NOD32	1/22/2018 10:23 AM

Q18 Is your antivirus software up to date?

Answered: 6   Skipped: 2

ANSWER CHOICES	RESPONSES	
Yes	83.33%	5
No	16.67%	1
TOTAL		6

Q1 For each question, please indicate how strongly you agree or disagree with the statement.
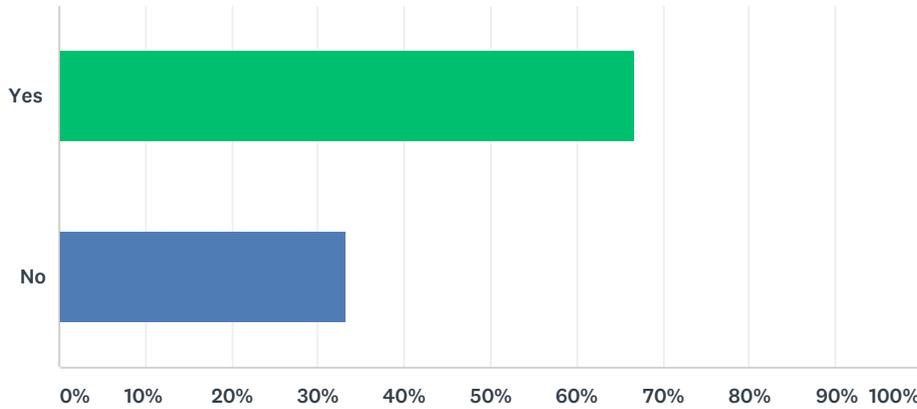
Answered: 6   Skipped: 0
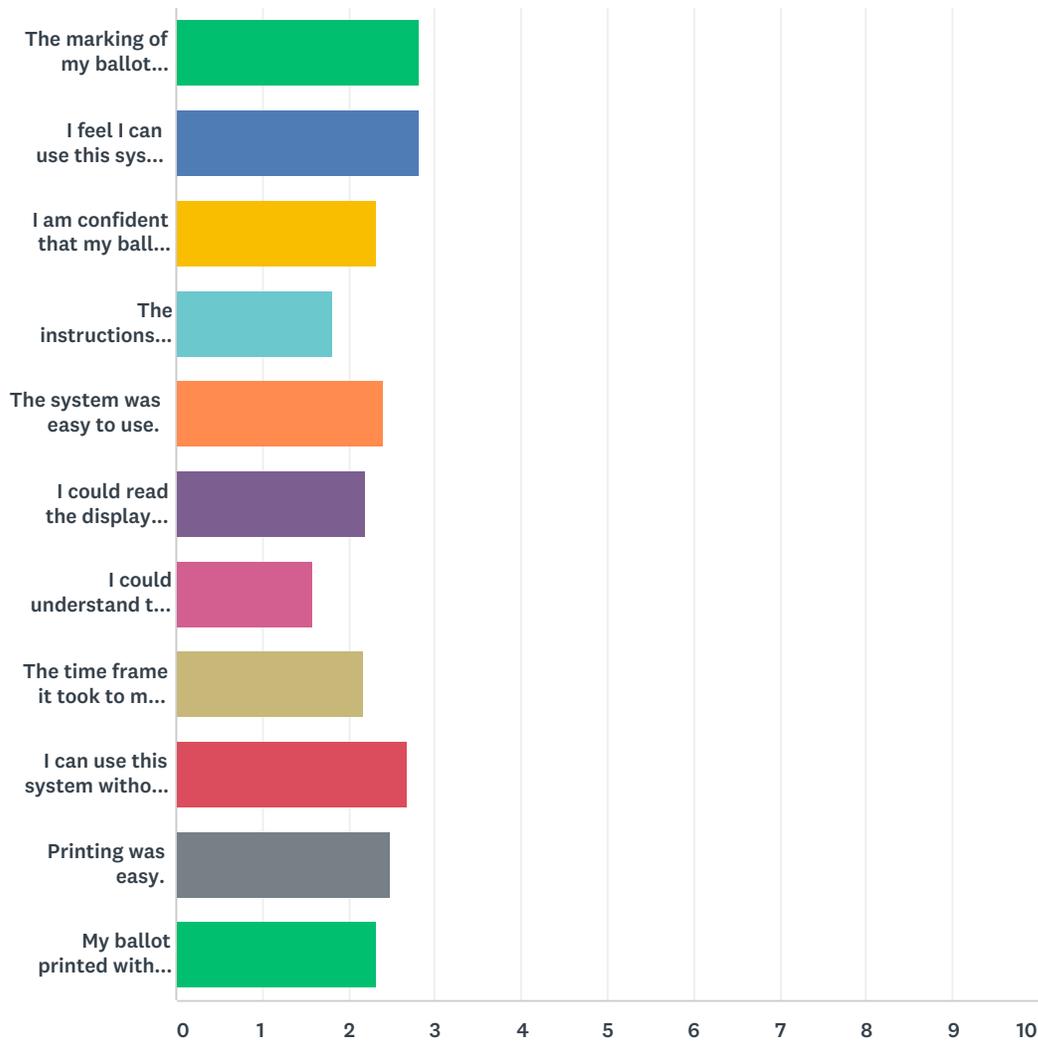
	AGREE STRONGLY	AGREE SOMEWHAT	NEUTRAL	DISAGREE SOMEWHAT	DISAGREE STRONGLY	TOTAL	WEIGHTED AVERAGE
The marking of my ballot method was private.	0.00% 0	33.33% 2	50.00% 3	16.67% 1	0.00% 0	6	2.83
I feel I can use this system to mark my ballot independently.	33.33% 2	0.00% 0	33.33% 2	16.67% 1	16.67% 1	6	2.83
I am confident that my ballot was recorded accurately.	50.00% 3	0.00% 0	33.33% 2	0.00% 0	16.67% 1	6	2.33
The instructions were clear and complete.	50.00% 3	33.33% 2	0.00% 0	16.67% 1	0.00% 0	6	1.83
The system was easy to use.	60.00% 3	0.00% 0	0.00% 0	20.00% 1	20.00% 1	5	2.40
I could read the display easily.(If applicable)	40.00% 2	0.00% 0	60.00% 3	0.00% 0	0.00% 0	5	2.20

I could understand the speech output. (If applicable)	60.00% 3	20.00% 1	20.00% 1	0.00% 0	0.00% 0	5	1.60
The time frame it took to mark my ballot was what I expected.	50.00% 3	16.67% 1	16.67% 1	0.00% 0	16.67% 1	6	2.17
I can use this system without technical help.	33.33% 2	0.00% 0	50.00% 3	0.00% 0	16.67% 1	6	2.67
Printing was easy.	50.00% 3	0.00% 0	16.67% 1	16.67% 1	16.67% 1	6	2.50
My ballot printed with the correct selections.	50.00% 3	0.00% 0	33.33% 2	0.00% 0	16.67% 1	6	2.33

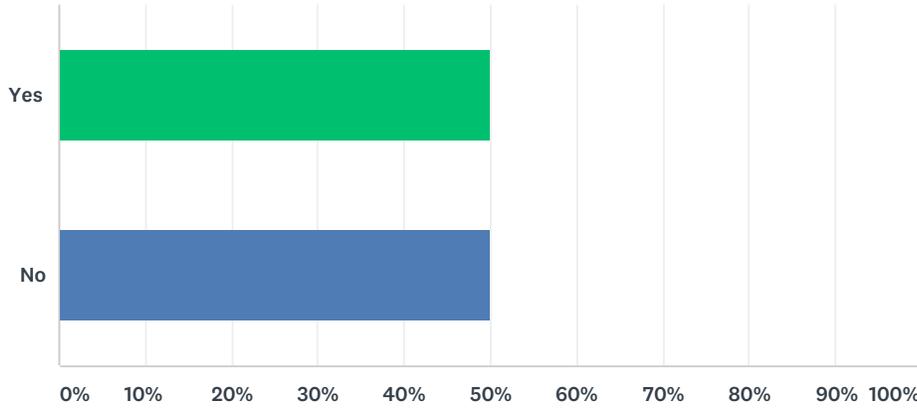# Q2 Would you be satisfied using this system to mark your ballot in an election?

Answered: 6   Skipped: 0

ANSWER CHOICES	RESPONSES	
Yes	66.67%	4
No	33.33%	2
TOTAL		6

Q3 Would you rather mark your ballot using another method?

Answered: 4   Skipped: 2

ANSWER CHOICES	RESPONSES	
Yes	50.00%	2
No	50.00%	2
TOTAL		4

4 / 7

Q4 If you prefer another method, what method would you prefer?

Answered: 3   Skipped: 3

#	RESPONSES	DATE
1	As I have said every time I have tested a vbm system, I do not think that anything that requires me to interface with print at all is independent or fully accessible. But in this case, I could not even complete the task of completely testing the system. I usually can get to the point of the printing screen, then make a .tif of the ballot. This is a picture I cannot verify, but it will make the sighted paranoid types happy. I prefer electronic voting at polls. I hope that someday we may have the ability to do it from home WITHOUT PRINT since sigs on printed envelopes are also problematic.	1/23/2018 5:35 PM
2	I found the system easy to use. Please see below my reservations about the possibility of hacking my completed ballot and associating it with my name.	1/22/2018 8:56 PM
3	Polling place, sighted help, anything else!	1/22/2018 1:14 PM

Q5 Do you have any suggestions for changes on this system and/or any other comments you would like to provide?

Answered: 4   Skipped: 2

#	RESPONSES	DATE
1	I was unable to test the Dominion voting system because the testing window was too short. On the day of the testing I had a busy day at work followed by an evening meeting, so I didn't have enough time to do the testing. I hope future testing sessions can run for at least 48 hours.	1/25/2018 2:28 AM
2	Here is a copy of the notes I took during testing. There are typos in the secret question choices and on the finish page. On the "get pin" page, the heading (lvl 2) that the important part of the page is under only says, "Something here". Spello on page after hitting submit from get pin. Also, relevant heading says "something here". 189114 1st contest: Checked 12, 4, 8 and want a write-in for 4th choice. Checked write-in as 4th choice, but cannot see a resulting edit box if present. Using NVDA. If I can't see one. Will try JAWS. I think I now have managed to make a 5th choice as a write-in that I do not want, but received a msg from system that I could only remove from top down. Damned annoying. Trying to figure out whether I have to start over. If not, how do I fix this? Copying msg here: Warning Only the highest rank can be removed. Please close this message and remove rank from the highest ranked choice. "Warning! There is one or more unused ranks for this contest!" This is to be expected and is correct. Saw this w both JAWS and NVDA. I think I saw at least one warning w NVDA that said a write-in choice had not been filled out. Can't remember. JAWS is showing me 4 warnings that write-in box is empty. It is NOT showing me ANY checkboxes unless I first tab to them. It is also not telling me what the checkbox is associated with. JAWS's accelerator keys show me no edit boxes (possible) and no checkboxes which is incorrect. Having to start over w fresh ballot. 2nd Attempt at 1st contest: Have check the 3 I checked before. I use spacebar to check. Going to try enter to see if edit box on write-in appears. Think I'll try this with JAWS. NVDA doesn't always deal with edit boxes well if not coded exactly. I could not find an edit boxe w either screen reader after hitting enter. Don't know how to force JAWS or NVDA into edit mode to see if I could type, but did not take the time to try to find out since I did not know for sure that true edit box was present. Suche extra work should NOT be required! If write-ins are not possible, they should not be available. Last Attempt, skipping write-in: Checked 3 as before. Got warning that ballot was not valid. Had to figure out that I must click review to proceed. Steps to complete voting: 1 (completed) 2 (completed) 3Review (current step) 4 (next step) As shown here (copied from review page), no step except the current one is actually labeled, so if the review was listed as a step, it is not readable ahead of being on that page, so one does not know to go there intuitively. It is also not listed in instructions for voting page. Curious text from review page pasted here. Rankings correct. Please review your selections carefully. If you are satisfied with your selections, click on the "Mark your ballot" button. If you want to change any of your selections, click on the "Go Back" button to navigate back through the contests. Once you have selected the "Cast Ballot" button below, your vote will be cast and you will be unable to make any further changes. Contest: 1 of 1. Rank no more than TEN Choices to elect 4 positions. Contest is not valid. Preferential Choices Warning!There is one or more unused ranks for this contest! You have ranked these candidates: Choice Candidate 12 Party 12 rank 1. Choice Candidate 4 Party 4 rank 2. Choice Candidate 8 Party 8 rank 3. TODO: Instructions for review visible to screen reader only. (Which instructions are visible to screen readers only? There is nothing listed as an instruction.) the next thing after this msg are the two buttons "go back" and "mark your ballot". *puzzled frown* Tried to mark ballot. No confirmation page or other change appears to have taken place. Just noticed the bit about contest not being valid. Saw that on prev page before clicking review, but don't see anything wrong here and didn't see anything wron there, either. In addition to the foregoing notes, it is clear to me that web accessibility standards were not followed in the coding of the pages of this system. 27.5 years post ADA, that is infuriating. Instructions need to be clearer (the only complete ones were those for signing up) and the step lists need to be fully labeled. One should be able to successfully write in a candidate and be able to change any one of the choices that has been made. The rigors of completing authentication concern me for folks who are not very computer literate and/or have cognative issues. There were a LOT of little details and steps to correctly complete just to be able to vote.	1/23/2018 5:35 PM

3	It seems possible that my completed ballot could be observed by an outside party, and that the ballot could be associated with me. I need significantly more assurance than I have before I would feel comfortable using this method.	1/22/2018 8:56 PM
4	22 steps before voting is cumbersum. 2. Still says "to make selection, click in the box containing your choice". Not useful. 3. Still can't check write-in candidate. No findable place to write name. 4. Could not tell if I had checked a write-in in the candidate list. Warning message tossed me back to the top of the page. When I realized I'd checked an extra write-in, could not remove it because I was told I could only remove top ranking. Very very bad design! So I just left it alone and submitted my ballot with things I didn't want. 6. Affidavit: Still can't write in my email address and date. Picked a random spot for signing. I would not vote by mail if my county used this system.	1/22/2018 1:14 PM