

Evaluation of Audio Interface Sequoia Voting Systems AVC Edge

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Introduction

On May 26, 2005, the Cook County Clerk announced that he had chosen Sequoia Voting Systems and the AVC Edge as the new election system for suburban Cook County. The next week, the Chicago Board of Elections followed with a similar announcement. On June 13, 2005, Sequoia Voting Systems President and CEO Tracey Graham met with disability leaders and the Cook County Clerk and described the company's substantial commitment to improving the accessibility of the AVC Edge. An audio recording of a voting experience was produced that day following this meeting. This recording and multiple end-user experiences between May 26 and late June form the basis of this evaluation.

The evaluation comprises three parts. The first comments upon issues found throughout the interface in multiple locations. The second part addresses issues with specific, identifiable areas of the interface, such as the orientation and write-in editor. The third and final part provides a summary of all the recommendations contained in the previous narrative. For a description of the problem, rationale of the proposed solution, and detailed examples of proposed solutions, please consult the narrative in parts one and two. This report evaluates only the audio interface in its effectiveness in offering accessibility to people with disabilities. It does not consider other elements of the machine, such as the keypad, video display, and mounting. During the June 13 meeting referenced earlier, it was announced that Sequoia Voting Systems would undertake several improvements to the audio interface and redesign the keypad. Neither the redesigned keypad nor the improved audio interface were produced in tangible form. The announcement lacked sufficient specificity for an analysis of the modified voting system. This report evaluated only the Sequoia AVC Edge unit currently available as of June 2005.

Part I: General comments on issues throughout the script

Transpose Word Order in Commands: All commands should be given with the option first followed by the key to be pressed. For example, the first prompt should be "To begin voting, press the round select button" instead of "Press the round select button to begin voting." The proposed information delivery model is consistent with the audio instructions on specialized products for people with disabilities, such as talking ATMs and cell phones, and mainstream products with audio interfaces, such as video cassette recorders from Zenith. Further, the voice mail systems of large businesses use this instruction delivery method as well. The reason that the proposed method has essentially adopted the status of a standard means of delivering audible commands is likely because people pay attention, remember, and act upon information that is relevant to them. If information is presented without context or meaning it is often not retained. Hence, presenting at all times the option first followed by the information on how to act on that choice offers a natural flow of idea followed by action.

Insert Key Commands at Every Audio Message: At every audio message, the audio interface should prompt the end user on the next step to take in order to continue the voting process. Failing to do this will likely leave a number of audio voters confused as they fail to remember the prompt necessary to continue which was given on a previous screen. On some screens if audio voters do not remember the prompt they are stuck without easily available information on how to proceed through the ballot. At these points, assistance from election judges will likely be sought. Information about proceeding to the next screen is contained in the help message, but it is buried with a lot of other information not pertinent to the current screen of the end user.

Eliminate Multiple Names for Same Key or Function: Multiple names are used to describe and refer to the triangle shaped buttons on the left side of the control pad. Sometimes they are referred to as the next and back buttons and at other times they are referred to as the up and down arrow buttons. Additionally, the words “vote” and “ballot” are used interchangeably. These words are sometimes used to mean something different from their common meanings. A vote is often thought of as occurring in a particular race or contest and a ballot generally refers to the entire list of races, contests, and propositions. The interface should have single names for these keys and concepts to avoid confusion. Another consideration as part of this analysis is that the labels “next” and “back” on the triangle-shaped buttons do not describe them physically or capture the spatial relationship that they have with other keys or the keypad as a whole. Describing them as up and down arrow keys would both capture their physical characteristics and their spatial relationship. Referring to the triangle shaped keys as up and down is congruent with Section 4.10.3 of the Americans with Disabilities Act Accessibility Guidelines, which refers to elevator hall call buttons. This section says in part, “the button designating the up direction shall be on top.”

During a June 13 meeting, Sequoia representatives described physical changes to the location of keys on the keypad to better capture the next and back idea present throughout the interface. The present placement of keys on a vertical plane obviously does not capture the notion of longitudinal progression. However, simply moving the location of the keys does not solve the interface problem. If Sequoia wishes to continue to use the next and back concept, it will need to change entirely how it presents certain scrolling lists and options. For example, when the machine presents the choices in a contest, the direction is to press the “up arrow button,” which is also labeled the next button. If audio end users were to press the down arrow button, they would hear options to review the list of choices and to skip to the next race. They would not hear the name of the first candidate on the ballot, which is why Sequoia likely instructs end users to press the up arrow rather than the next button. The up arrow key is labeled “next” in Braille on the keypad. The up arrow concept is contrary to the languages used in Cook County. Most Cook County voters speak English, Spanish, Polish, or another European languages. Writing and reading in these languages begins on the top left of a page and proceeds to the bottom right of a page. Designing a system where “next” is an up arrow button is completely counter-intuitive as all written information in multiple languages is accessed from the physical top of a document going down to the physical bottom of a document. When end users are asked to do something completely outside their experience in other parts of their life, such as proceed through a list from the bottom going toward the top, it is not surprising that confusion is the result. To resolve inconsistencies with the next and back concept in the interface, Sequoia has two options: drop the next and back concept entirely and refer to the triangle-shaped buttons by direction, such as up/down or right/left arrow keys or to change the scrolling order of items in various parts of the interface so that all lists of items are scrolled using the same arrow key, such as the right/down arrow key which is labeled the next button. If Sequoia decided to implement the second option, the audio interface should not exclusively refer to the triangle shaped keys as next and back. Blind persons

cannot read the printed labels and many cannot read Braille. The interface will still need to refer to the next and back keys as right and left arrow buttons in addition to next and back, as many blind end users will not fully understand their purpose given a single identification in the orientation.

Refer to All Buttons by Shape: Similar to the previous comment, all buttons should be referred to by shape as well as color and function. For example, the interface constantly refers to the next and back buttons without identifying whether the next or back button is up or down.

Describe Key Locations on Keypad in Early Prompts: Early prompts in the interface should identify the location on the keypad of buttons being referred to in the interface. While a keypad description is part of a high quality orientation, reiterating the location of keys allows blind users to locate the key easily without needing to tactily explore the keypad again or replay the orientation, both necessitating extra time and delay in the voting process.

Enable Interruptability: All audio prompts should be able to be interrupted. A demonstration in late May revealed that neither the orientation prompt nor the help message could be interrupted, except when the select key was pressed. When the help key is pressed, it simply replays the orientation message. Interruptability is important as it allows the end user to silence the machine and initiate the desired function. Making audio end users wait until the prompt finishes requires the end user to remember all the steps and sequences necessary to complete a task, needlessly increasing the cognitive load. Requiring end users to sit through long audio prompts often results in people being confused and needing to play the audio prompt multiple times to try to grasp the information. Interruptability of all audio prompts is a typical feature of talking ATMs, audio-enabled cell phones, and other systems and appliances used by the blind and those with disabilities.

User Time Out: The audio interface reverts to the initial language selection prompt, when no key is pressed after 20 to 30 seconds. At the initial language prompt, the audio end user has a scrolling list of English or Spanish. There is no information in this prompt on how to choose a language, such as “for English, press the round red select button.” After users make the language selection, they return to the race where they were before being bounced to the language screen. If audio end users were in the list of candidates, they would need to press the select button to return to the list. The time-out bounce should be eliminated. According to Veronica Spencer of Sequoia Voting Systems, the intent of the time-out feature is to assist audio voters who may be confused or unsure about what step to take next in the interface. Moving the focus was intended to return the voter to a logical place in the interface from where they could resume voting. The time-out bounce is based on a flawed assumption: a lack of keyboard activity is inherently a result of voter confusion with the audio interface. There are a number of circumstances besides voter confusion why a voter with a disability might take more than 25 seconds to press another key. Contemplation of choices before a voting decision might consume more than 25 seconds. Another example is that people with disabilities may have produced a list of candidates for whom they intend to vote before coming to the polling place. Cook County has the longest election ballot in the United States, according to the Cook County Clerk’s Office. A pre-prepared list of candidate choices can be quite lengthy. The number of pages of candidate choices needed to manage is significantly greater for Braille readers or those with reduced vision who compiled their list of election choices in large letters with a felt tipped marker. Braille documents are typically two and a half to three times the number of pages as printed documents. Added to these audio end users are those who access their pre-prepared ballot list with assistive technology, such as a magnifying glass, an audio recording, or through an electronic device. Braille and assistive technology require audio

end users to remove their hands from the keypad to consult their notes or a candidate list, resulting in additional time taken for many as hands are moved and orientated between two different devices. A 20 to 30 second time limit to make a selection before being bounced to an entirely different section of the interface without warning is unreasonable, particularly when the additional pages that will be handled by audio end users in Braille and large print documents are considered. Regardless of the time limit, bouncing people with disabilities without warning will likely create significantly more confusion than what might be eliminated. Given that the language screen is one of the first in the voting session, audio voters may believe they need to totally start over with all their voting choices being lost in the process. The interface provides no information to the end user as to what is happening.

Rather than bouncing audio end users to an entirely different part of the interface, a highly supportive approach would not move audio end users from their place but inform end users about the interface's navigation system and how to obtain help. This message would replay at a reasonable time interval until a key is pressed. For example: to hear choices, press the triangle shaped up and down arrow keys and then press the round, red select button to make your choice located in the lower right corner of the keypad. For help, press the square blue help button in the upper right corner of the keypad. The change addresses both needs. It aids confused users who have stopped with an additional prompt on how to continue voting, and it allows those who need extra time to consider a voting choice or consult prepared accessible materials the time they need without removing them from their place in the ballot and forcing them to return to their place. If the time-out feature cannot be eliminated and a more supportive approach introduced for the next election, an interim measure would be to describe this machine function in the orientation. The enhanced orientation would include information about the length of the time out, the integrity of current ballot selections, and how audio end users can return to their previous place in the ballot.

Provide Context Sensitive Help. The help key simply replays the orientation provided at the beginning of the voting session. Help information is most effective when it addresses the users concerns to the specific situation rather than offering generic information, little of which may be needed or wanted. In some areas of the interface, such as with write-in voting, many users would find specific, detailed help highly useful. Of course, if the script was better written and the interface better designed, few would find a need to access help.

Simplify Commands at Each Prompt: There should be only one command given which should be for the next task. Multiple commands for the subsequent and following screens are confusing and generally not remembered by audio end users. Similarly, messages that precede important commands, such as "when this recording is finished," interfere with simple, direct communication to audio end users. Eliminating such commands and revising the prompt will do much to reduce confusion associated with these messages.

Enable Scrolling by Contest: The voting interface requires audio end users to go through each contest, listen to all the options in a contest, scroll through all the options and proceed to the next contest. Therefore, those using the audio ballot must listen to every candidate in every race before completing voting. The interface does not allow the audio end user to scroll through the ballot by contest or to skip contests in which the voter chooses not to vote, unlike the interface for sighted voters on the Sequoia system. Voters with disabilities using the audio ballot should have the same level of access available to sighted, non-disabled voters, including the ability to scroll through the ballot by contest, quickly stop voting and cast a ballot.

Part II: Area Specific Discussion

Opening Audio Prompt

Currently, audio end users don't know from the script if they are at the beginning of the voting process or in the middle. Beginning messages on audio interfaces considered highly accessible and usable by people with disabilities have an audio prompt that informs audio end users that this is the start of the voting process and how to begin the voting process with the machine. An example of the revised opening message might be: "Welcome to the Sequoia Edge. To begin voting, choose a language by pressing the round, red button on the lower right of the keypad." The word "select" was intentionally not used as it introduces a new concept that isn't needed at this time and will be explained in the orientation a few screens later.

Language Selection Screen

No prompt is provided on how to exit the language selection screen. This leaves audio end users in an endless loop of options with no information on how to escape from the loop. This screen is based on the assumption that end users will remember the instructional prompt given in the previous screen, an unlikely prospect given that this is only the second prompt of the entire audio interface. An effective revised script would inform end users how to make their language choice. For example, "for English, press the red, round button on the lower right corner of the keypad. For another language, press the triangle shaped up and down arrow buttons on the right side of the keypad."

Orientation

A high quality orientation would start with the basic machine design. It would introduce the machine and identify that it as a touch screen machine with a connecting keypad. If a visual/audio ballot is provided, the audio orientation should inform the end user about whether selections could be made using the touch screen, from the keypad only, or both. Some users with visual impairments may employ a multisensory approach in using the machine, listening to candidate choices but making their selections on the touch screen. Others with visual impairments who do not intend to use the touch screen should also know if touching the screen activates selections, as people can avoid unintentional ballot selections. If a blank screen is employed, audio end users should be informed of this. Blind users concerned with privacy will not know that the screen is dark and cannot be viewed. Those with disabilities who were intending to use the audio ballot in conjunction with the visual ballot, such as those with learning disabilities and mild vision impairments, should be informed that the blank screen is a feature of the machine and is non-adjustable.

The audio end user would next learn that the keypad will be described with the keys facing up and toward the ceiling and the connection cable to the machine facing away from the user and the headphone jack facing the end user. Audio users would then discover through the orientation that the keypad has four keys. They next would be told that the round, red button on the bottom right of the machine is the select button. The current orientation does not describe the location of buttons on the keypad. The revised orientation next then would describe how the select button will be used during balloting. This explanation would state that the select button will be used to choose contests, candidates or selections in a contest, and to perform machine functions, such as reviewing ballot selections and casting ballots.

The revised orientation would next identify the two triangle-shaped buttons, which are located near the select button. Rather than issuing a command on the use of these or other buttons as in the current script, a highly effective orientation would describe their use and how the up and down buttons work in conjunction with the select button. Currently, the orientation mentions some elements on the keypad and states commands. It really doesn't

offer a big picture understanding of the audio interface or the machine controls in relation to each other.

It would be helpful then to explain that audio end users will be presented with various menus, such as a list of political contests or candidates. End users will find it helpful to know that the triangle shaped up and down arrow keys will be used to move through the choices in the list and the round red select key will be used to make a choice.

Missing from the orientation is information about adjusting the volume of the audio interface. Audio users likely will want to be informed that a volume control slide switch is on the side of the unit facing the user near the headset jack and that volume can be adjusted by sliding the control right for more volume and to the left for less volume.

Voting Process

After pressing the select button, the end user is placed at the highest contest on the ballot, such as president. Once the name of the contest is read, there is no prompt as to the next step. Audio end users should know what button to press to continue voting. For example, "to vote in this contest, press the round red select button."

Once the select button is pressed, the prompt that follows next has too much verbiage. This results in important information being buried after a meaningless first sentence. A simplified version of the prompt that communicates effectively to the blind end user might read: "After the list of choices is read, use the triangle shaped up arrow button to hear the first choice. Keep pressing this button to hear all choices. When you reach the choice you want, press the round, red button to select it."

As the list is scrolled, there is no prompt following the name of the candidate informing the audio end user on how to select the candidate. For example, about five seconds after Abraham Lincoln has been spoken, the machine might speak, "to select this choice, press the round, red select button located at the lower right corner of the keypad." The prompt following the candidate's name ensures that those who forgot or didn't fully follow or comprehend the instructions in the previous prompt know how to cast their vote and proceed to the next race.

After the candidate is selected, the proceeding prompt contains too much information and could be simplified to better communicate essential information. For example, the prompt could say, "to exit this contest and hear choices for the next contest, press the round, red select button." The revision eliminates the "when this recording is finished phrase" and comports to the general comments about direct, efficient, and effective communication above.

Multiple Candidate races

When an audio voter makes a selection in a multiple candidate contest, there is no information on how many selections are remaining. Audio end users likely will want to know the remaining votes left to cast in a contest after the machine announces each selection. Sighted users viewing the visual ballot can refer to this information at all times. Currently, blind voters need to remember how many candidates to vote for in a particular contest and how many votes already were cast. Further, the interface does not advance to the next contest until the contest is fully voted. If audio end users did not listen carefully and fully to the entire previous audio prompt, many may not realize why the machine is not advancing to the next race, causing confusion and likely requests for assistance from election judges. A revised prompt might be similar to: "John Quincy Adams selected. There is one more selection remaining in this contest. Please make another selection."

Changing a Vote

When voters choose a different option in a contest already voted, the audio ballot interface generates an error message and does not offer information describing how to perform the action described in the message. The error message refers to the help button but the help message is generic and the description is buried in the middle of much information not pertinent to the problem currently being faced. A better approach would parallel existing approaches used in Microsoft Windows, the most popular computer operating system, and Job Access With Speech for Windows, the most popular screen reader for the blind used by the vast majority of blind computer users. In Windows when users attempt to replace a file with another with the same name, they are presented with a dialogue box that asks if they want to replace the file. Users are provided with the file name, the file size, and when the file was created, allowing them to know the significant differences between each file apart from opening each file and inspecting it. If the user agrees to replace the file, Windows deletes the old file and copies the new one, all of which happens in the background. Similarly, when an audio voter wishes to replace one choice with another, the interface could present a dialogue informing the voter that the contest is fully voted and if they wish to cancel choice X and replace it with choice Y. In contests where multiple votes are cast, a second screen could appear with only the selected choices and asking voters which choice they wish to cancel. This change would be in addition to the current process where audio end users can select and deselect choices by pressing the round, red select button. However, this interface should be changed as well to match the approach used by the world's most popular piece of assistive technology for the blind, the JAWS screen reader. In a list of files or folders, JAWS speaks "selected" or "not selected" before the item rather than following the item, as the Sequoia machine does. This approach was adopted to create ease of use and efficiency in handling information and interacting with one's machine. The approach is efficient because audio users wishing to scan a list for selected items can scroll through a list quickly by interrupting an audio message and moving on to another selection when "selected is not heard. Currently, it is necessary for the blind voter to listen entirely to each candidate's name and their political party, if applicable, before they know if that item was selected. This can be a quite tedious and time-consuming task. In contrast, sighted users can quickly scan the ballot on the screen and easily identify a previously selected choice. Many would argue that blind voters should have a similar level of efficiency and effectiveness in identifying a selected item.

At the very least if such changes are not possible in the short term, an effective revised prompt would describe how to locate a selected option and deselect it. For example, a revised prompt might be similar to: "This contest is fully voted. To select this choice, you must first deselect the choice you have already made. Use the up and down arrows on the left side of the keypad to scroll through the list of choices. The selected choice will say selected after the item. To deselect the choice, press the round, red select button."

Write-in Editor

No information is provided on how to use the write-in editor to cast a write in vote. End users are not provided with so much as basic guidance to press the square, blue help button to learn how to use this section. Inside the help section, this information is buried with much other information. Audio end users will likely want a brief explanation about the write-in voting screen, informing them to utilize the up and down arrow keys to find letters, numbers, and punctuation to spell out their choice and to locate machine functions. They would want to know that they should use the round, red select button to make their choice like they do in the rest of the interface. They may also want to be informed that through the up and down arrow keys they can select options to have their write in choice read back to them and to finish writing and return to the candidate selection screen to make their choice.

Finish Voting

There is no audio prompt that informs the audio end user that he has reached the end of the ballot, although this is apparent to sighted users of the Sequoia machine because they can see when the ballot ends. This full view of the ballot is not available to blind audio ballot users so the fact they are at the end of the ballot is not apparent to them.

Further, the “review your selections” option does not indicate that this provides a full ballot review rather than a review of choices in the last contest. This name should be re-titled so it is clear that the option enables a full review of the entire ballot.

The casting selection actually informs users “voting is completed.” However, if this option is selected, the ballot is cast, permanently recording the votes on the ballot. Sighted voters have a two-step process of casting their ballot. After users press a touch screen selection to cast their ballot, another screen appears with a large button labeled “vote” with other smaller buttons to go back or review. Audio end users, many of whom will be blind, do not have a second chance in the event they have pressed the select button accidentally or did not realize that pressing this selection would permanently cast their ballot. The current wording might lead some to believe that a ballot review might be available before their ballot was recorded.

One simple remedy to eliminate any confusion would move the announcement that voting has completed to the “review selections” option and placing the option in context, so users understand they are reviewing ballot selections as described earlier. Further. Additional language should be created on the vote/cast ballot option that informs audio end users that they are permanently casting their ballot and no changes can be made. A final solution would include these changes and A confirm screen to ensure that if the select button is bumped while on this option a person can recover from this error to review the ballot or make changes without actually casting their vote. For example, the review prompt might say: “Voting is completed, to review all ballot choices, press the round, red select button. The select button is located on the lower right side of the keypad.” The cast ballot button might say: “To permanently cast this ballot and record your votes, press the round, red select button on the right side of the keypad. When this choice is selected, no more selections or changes can be made.”

Review Screen

The review screen of the audio ballot for blind persons and others with disabilities is significantly inferior to the one offered sighted voters. The audio review screen reads the entire ballot by contest and selection without stopping in one long audio file. If any buttons are pressed, the review is stopped. The review interface should be redesigned so that the audio voter can review contests and make changes at the same level of immediacy, flexibility, and ease of use as the touch screen voter. In general, the audio end user would be able to scroll the ballot by contest and have the contest and the selection read to him with the ability to change a vote in that contest. The concern of efficiency regarding placement in the audio string of the selected item is not relevant in this presentation as the audio end user needs to listen to the entire audio message (both candidate name and name of contest) to evaluate if the intended choice was selected.

Under Vote Screen

When an audio voter who has not voted fully in one or more contests presses the cast vote button, which submits one’s entire ballot for recording, an audio message is presented that informs the voter they have not voted in one or more contests. The message does not say in which contests the voter has under voted, however. Audio end users are then asked if they wish to make selections in these contests. If the user chooses no, the vote will be recorded, which the message makes clear. If the audio user chooses yes, the entire ballot

is presented. The audio end user need to scroll down a list of contests, press the red, round select button, listen to all the selections in full to determine if any has been selected and if none have to press the round, red select button to make a choice. Another option for the user with the current interface would be to review the ballot in the review screen. However, the audio voter has the burden of taking extremely careful notes rather quickly, as the audio from the review screen cannot be stopped without starting the entire reading all over again. From the notes, if they could actually and accurately be taken, audio end users would then need to scroll down the ballot and listen to each contest to locate those on the list and vote in those contests. By contrast, sighted voters have the advantage of scanning the ballot for under votes. In the review screen, for example, voted contests have the typical presentation of black letters on a white background. Contests with no votes cast are highlighted in red, with the whole area appearing as a bright red rectangle. Within seconds of looking at the screen, sighted voters can identify in which contests they have not voted. Blind audio voters who cannot read the screen do not have such ease of use, efficiency, and an effective means of identifying under voted contests in the current interface, as sighted voters have. This problem can be remedied by identifying and listing the under voted contests to the audio voter. This could be accomplished by changing what happens when the audio voter chooses to make selections in under voted contests from the under vote confirmation screen. Instead of taking the voter back to the list of all contests, the interface would place the audio voter in a list of only under voted contests, allowing the audio voter to quickly identify all the under voted contests without the burden of needing to listen to the entire list of contests and selections to determine which races do not have a vote.

Final Prompts

When the audio voters press the select button to cast their ballots, the machine announces, "Your vote is being recorded." The next and final prompt says "thank you for voting." The machine never says that the votes or the ballot has been successfully recorded. Further, the blind voter cannot see the machine activity, including the scrolling paper roll, indicating the finality of the voting session. The conclusion of the voting session may not be apparent to a number of blind voters so an audio prompt explicitly stating that the ballot has been successfully recorded and the voting session has finished would enable blind voters to fully understand that they have successfully completed voting. If voters should remove the authorization card from the card slot and return it to the poll worker, this could be included on the final prompt as well.

Part III: Summary of Recommendations

1. Construct all commands with the option first followed by action.
2. Identify by function, shape, color, and location which key to press to continue with the voting process at every prompt.
3. Eliminate multiple names for the same key or function.
4. Refer to all buttons by shape. When a particular button is mentioned in the interface, it should be identified by shape at all times to aid blind voters.
5. Describe key locations on keypad in prompts.
6. Enable every audio message to be interrupted by any key.
7. Extend the time out period between keypad presses.

8. Eliminate the time-out bounce to another part of the interface that occurs when there has been no keyboard activity for a while.

9. Replace the interface bounce with a navigational message that plays when no keypad activity has occurred for a specified period.

10. If extending the time-out period and eliminating and replacing the time-out bounce with another solution is not possible by the next election, enhance the orientation to identify the time-out function and describe its operation.

11. Provide context sensitive help.

12. Use only one instruction, direction, or command at each prompt, whenever possible.

13. Eliminate introductory phrases and clauses that provide no actionable information or instruction.

14. Enable scrolling by contest instead of audio end users needing to listen to every selection in every race to vote.

15. Change the opening prompt so that it informs the audio end user explicitly that this is the beginning of the voting process and how to initiate the voting process, including identifying the specific key by color, shape, and keypad location.

16. In the language selection screen, provide information on how to select and choose a language.

17. In the orientation screen, inform audio end users when a combined visual audio ballot is used whether selections can be made using the touch screen, from the keypad only, or both.

18. In the orientation of a machine that automatically darkens, inform audio end users that the screen will be darkened throughout the voting session and this feature cannot be adjusted.

19. In the orientation, describe the layout of the keypad and identify all controls by shape, color and location.

20. In the orientation, identify the availability of volume control functionality, the location of the volume control and describe how to adjust volume.

21. In the orientation, describe how the interface works overall. For example, lists of choices are presented in a list that will be accessed using the triangle-shaped up/down arrow keys to move through the list and the red, round select button will be used to make a selection from each list.

22. When presented in the list of contests, provide information on how to open that contest and vote, such as "to vote in this contest, press the round, red select button located on the lower right of the keypad."

23. In the contest screen, simplify the initial audio prompt by eliminating unnecessary information.

24. In the contest screen, describe after each candidate is read how to select that candidate, such as “to select this choice press the round, red select button located on the lower right of the keypad.”

25. Revise the prompt that follows the selection of choices in a contest so that an excess phrase is eliminated and that it clearly and directly communicates with the audio end user.

26. In contests with multiple selections, announce how many selections remain to be selected before the contest is fully voted after each selection is made.

27. Change the order of when the word “selected” is spoken when scrolling through a list of contest choices, such as a list of candidates. The revision would speak “selected” before a selected choice, such as a candidate’s name, rather than after a selected choice.

28. Eliminate the over vote error message when an audio voter attempts to make an additional selected in a fully voted contest and replace it with a dialogue that asks the voter if they wish to cancel their vote for the previous selection and cast it for the new selection.

29. If creating a replace vote dialogue is not possible before the next election, describe how to locate a selected option and deselect it.

30. Describe how to use the write-in editor when the audio end user enters this area of the interface.

31. Inform audio end users when they are at the end of the ballot and no more contests remain.

32. Retitle the “review your selections” option so it is clear that the option enables a full review of the entire ballot.

33. Create a confirmation screen to confirm that audio end users wish to permanently cast their ballot and allow them the opportunity to make changes or review their ballot selections, in the event they did not wish to cast their ballot.

34. If a cast ballot confirmation screen cannot be developed before the next election, move the voting is completed statement to the revised review selections prompt.

35. Redesign the review screen so that audio end users can read the ballot by contest and have the contest and the selection read to them with the ability to change a vote in that contest without needing to listen to a non-stop reading of the entire ballot.

36. Change the under vote interface so that when audio voters choose to cast votes in under voted contests from the under vote confirmation screen, only the under voted contests appear rather than all the contests on the entire ballot.

37. Enhance the “thank you for voting” message to inform blind end users that their ballot has been successfully recorded and the voting session has concluded. For example: “Your ballot has been successfully recorded. Voting is now finished. Please remove the voting card from the card slot located at [provide location using clockface orientation and distance from a fixed object on the machine]. Thank you for voting.”