

Collection of my Electronic Voting Experiences on the Sequoia Edge II in Actual Elections

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This is a collection of all my attempts to vote on the Sequoia Edge voting systems used in Santa Clara County, from March 2004 through the present.

1: March 2004 Election

(Taken from a letter to Dawn Wilcox, then president of the Silicon Valley Council of the Blind (SVCB), in response to her request for the blind community's voting experiences.)

I did have a problem trying to vote on the touch screen Sequoia systems. Although the folks that ran the polling place, at Hazelwood Elementary School, were very pleasant and helpful, the accessibility feature would not work. They tried plugging the keypad unit into more than one of the systems and called the tech support desk for help. The "support desk" just asked if they had checked to make sure the cable was plugged in and then said to give up and have someone assist me in voting. Since the keypads were not connected with USB cables, I suspect that the systems were supposed to be turned off, before the keypads were plugged in, and then rebooted. Our poll workers did not feel that they should reset or turn off the units. After I found the reset button, I was sorely tempted to just go ahead and force a reset myself. Judging by the shoddy design of the systems, I was worried that I might end up erasing other voters' ballots if I pushed the reset.

They never did get the "accessible keypad" working while I was there. Therefore, I don't currently have much to say about the function of the access software.

There were a few other points I should mention. Originally, they tried to plug the access keypad unit into a voting machine that was right under a very noisy ceiling fan. I think we need to make sure that poll workers are sensitive to environmental distractions, such as noise and sun glare.

Second, the keypad on the Sequoia machine had terrible braille labeling. Not only were the dots too shallow, they were about one and a half times further apart than standard braille dots. Thirdly, the labels were jammed so close to the top edge of some of the buttons that you could not feel the dots.

The keypad cable was looped back and restrained by a cheap cable tie. This looks and feels shoddy, like a flimsy afterthought (as I imagine it was). The wide Velcro restraining strap on the bottom of the keypad makes it awkward to hold it in your hand and also makes it unstable to rest on a flat surface for operation.

I noticed several other general design problems. Some were as simple as the Velcro claw patches on the inside of the security panels, right at sleeve level, where they could

grab voters' sweaters. This might seem trivial, but not after a few units are accidentally jerked onto the floor, as voters back away from the machines. It would have been a simple design change to reverse the Velcro patches, to have the soft cloth patch portion exposed on the inside of the panels.

Another problem was the overall depth (front-to-back) of the units. Traditional polling booths and stands are not very deep. The Sequoia systems sprawled back so far that the poll workers had to get separate tables to hold the units. At our polling place, the tables were too big to fit in the areas where they previously put the voting booths. This meant that they had to use tables in the cafeteria/gym. When I arrived to vote, there were kids yelling and pounding on the piano, right next to the voting booths. Maybe these kids were just being creative about making sure the polling would not crowd into their lunch and play areas next time.

Certainly, the sprawling design of these voting machines can be accommodated, but why should taxpayers be wasting money on such poorly designed and inflexible voting machines.

I am particularly bothered that Sequoia seems to have ignored the suggestions that we and several others gave them, when we reviewed and tested their systems at PCBVI and the SVCB meetings, several years ago, when they were "seeking design input".

I am glad to hear that some visually impaired folks were able to vote successfully with some of the touch screen systems.

From hearing the stories of others, it is obvious that the touch screen, when in audio mode, should have a message to poll workers or assistants. This message should inform them that they shouldn't worry that the screen will not be reflecting any changes. Even my computer savvy wife was confused by the total lack of screen response to keypad button presses. The screen message could also give a brief summary of other helpful tips, such as where the volume control is located, how it works, etc.

Yes, the poll workers should be trained better, and the audio module should be set up at the start of the polling day and tested. However, appropriate help screens would help to augment the training of the poll workers or make up for their lack of training or poor memories.

Frankly, I think the Sequoia voting machines are so poorly designed and hard to access that the counties should not buy any more of this version. In addition, the government should refuse to buy any more systems, unless they are completely redesigned and made reasonably useable. I don't think that the answer is to try to just train poll workers better! Clearly, Sequoia ignored our recommendations, when we were asked to evaluate their design in the past. I don't mean to sound negative, but I really don't expect Sequoia to change their design or their poor excuse for tech support, unless the local and countrywide governments refuse to buy their current product.

SVCB is in a unique position to influence accessible voting machines for the whole country. We have a responsibility to stand up now and demand truly accessible voting machines. If we don't, more of these farcical "accessible voting machines" will be pushed onto counties and visually impaired folks all across the country.

2: November 2004 Election

My own voting experience started, at 7 in the morning, with a one-hour wait in the cold, outside our Sunnyoaks fire station.

I had to keep my braille reading fingers in my pocket to make sure they would be warm enough for reading my braille notes. Even so, the polling place was so cold that my cold-numbered fingers were having a lot of trouble reading braille near the end of my time at the voting machine.

After signing in, and getting my voter smart card, I had to wait 8 minutes for them to reboot the audio voting machine. They had been using it for touch screen voting, as there was a very long line and just 5 voting machines for our combined 2-precinct site.

I had my braille notes in a hard-back notebook, so I could read my notes with the notebook on my lap. Thankfully, someone found me a chair to sit on while voting. Otherwise, I would have had to tilt the display down flat and put my notes and keypad on top of the back side of the display. Since we were in very tight quarters, it was a good thing that the audio terminal was in a corner, at the end of the line of machines. This meant that I didn't have to worry about my chair blocking traffic in the very tight aisle.

I decided to use paper braille notes, rather than my talking laptop computer or a paperless braille notetaker, because I had heard that people would not be allowed to use computers and other electronic equipment in the polling place. For the next election, we need to address the issue of an exception for accessible note taking devices.

The volume control on the front of the key pad was not working well, and was resulting in scratchy and intermittent sound. By the time I got the volume set to where I could understand it, the introduction message had already finished the English instructions and was off into other languages. I was not sure what I should do, so I finally gave up and pressed the select button. This eventually took me to the language menu, where I was able to select English and get started with my ballot.

The first major problem I had was that the ballot on the machine was not in the same order as the printed sample ballot. When my wife pointed this out to the chief poll worker, she was surprised to see the difference, and said maybe that would explain why it was taking all the sighted voters longer than expected to vote. Because my notes were done in the order of the sample ballot, I had to do a lot of hopping around in my notes and more thorough and careful listening to the machine.

In contrast to what we had been told, the list of candidate names was spoken in alphabetical order.

It took me 30 minutes to work my way through the ballot and make my selections. After that, I had quite a bit of trouble getting into the review mode, to get a full list of all my

selections. When I did, it went on and on, for 23 minutes, like a long uncontrolled drink from a fire hose. The review function read each item, and then, at the very end, said what my selection was for that item. It even threw in the details of what the fiscal impact would be, and took forever. This is completely backwards. It should announce the name of the item, then state my selection, and then read the rest of the information for that item. In addition, I should have the control to press the arrow key to move forward or backward through the items, without having to listen to all the text about an item. When I did find that I had made a mistake in my selections, I had to wait until the end of the whole review process to correct it, instead of being able to stop, make the change, and then continue with the review where I left off.

I did not want to abort the ballot verification review, to make a correction, and then have to start the 23-minute review all over again. When I later attempted to change one of my selections from "no" to "yes", the machine would not let me just select "yes", until I had first gone to the "no" entry and deselected it. This was very awkward and confusing. My wife said that she also had the problem when she was voting visually on her Sequoia DRE touch screen machine.

At one point, as I was nearing the end of the ballot, I was dumped back into the language selection menu. I was being very careful to not push the "help" button, so I don't know why this language menu popped up. For a scary minute, I was afraid I had just lost my ballot and would have to start all over. I re-selected "English" and fortunately was returned to my previous location in the ballot.

An additional frustration was that the volume on some of the messages was so much lower than the rest of the messages that I had to fiddle with turning up the volume, repeating the message, and then turning the volume back down before proceeding. The volume on all the messages should be normalized to make them the same. This is easy to do and should be done for all messages.

From the time I signed in and got my voter smart card, it took 8 minutes to reboot the machine as an audio voting machine, 30 minutes to make my choices, 23 minutes to review and verify, and another 4 minutes to make a correction and cast my vote. Not counting the hour waiting in line, it took me about 65 minutes to mark and record my ballot.

It would have taken even longer if I had been willing to wait, as prompted, until the end of each message to push the "select" button. The messages mislead some folks because they say something like, "...at the end of this message, you can press the ...". This implies that you are supposed to wait until the speech message finishes.

Because the polling place was extremely small, the voting machines were too close together and not positioned to optimize privacy. While my wife was standing around, waiting for me to finish voting, she noticed that she could easily glance around and eavesdrop on the screens and ballots of several other voters in the area. She feels that, for privacy reasons, the poll workers really should not have allowed her to hang around in the voting booth area, while waiting for me to finish my voting.

When I was finally done voting, I took a portable radio out of my pocket and turned it on, with its earphone in my ear. The Sequoia voting machine was broadcasting a lot of

radio noise on the AM band. This RF noise emission represents a possible electronic eavesdropping threat to privacy. In addition, I noted that none of the poll workers seemed to notice or ask what kind of electronic device I was using and for what purpose. The polling place seemed to be too lax about letting people use cell phones, palmtops, or other electronic equipment in the polling place. There should have been but were not any announcements (audible or visual) warning voters to not use cell phones, cameras, palmtops, or other electronic devices in the polling place.

There were two times when I would like to have asked for help from the poll workers. One was during the confusion I encountered because of the difference between the printed sample ballot and the DRE ballot. The other time was near the end of my ballot marking, when I had a lot of trouble getting the review started and then was trying to find and change a mistake I found during the review. Unfortunately, because the poll workers would not be able to look at a working visual display on my system, and didn't have any way to join me in listening to the audio output of the machine, I figured that I couldn't get much help from a poll worker (even though our head polling officer seemed very knowledgeable and helpful).

3: November 2005 Election

As it was Election Day, I went over to the Campbell American Legion Hall yesterday afternoon, to vote on the Sequoia machines. It was midafternoon, and there was no line. However, as the polling officers (who were actually very pleasant), didn't know how to reboot the Sequoia Edge II DRE into audio mode, it took us about 18 minutes to get it started talking. Thankfully, my wife read their manual and figured out the audio boot up process for them. After the DRE finally started talking, it took me about 6 minutes to fill out the ballot, 7 minutes to review my vote, and another minute to push it into printing my ballot paper trail and finish. Total time in front of the machine was 32 minutes. Luckily, it was only a short ballot with 8 easy choices.

At the end, the Sequoia prompts with a menu that says something like "Finished voting" and a second option to "Review your ballot choices". Instead of the "Finished voting" message, which will cause some folks to walk away, it should prompt you with something more like "If you are done making your choices, press select...to record your vote."

It was very difficult to understand the locally recorded messages for the ballot choices, since they were read by someone who had a very thick foreign accent!

One good change for this election, the American Legion Hall was actually roomy enough that I had a nice corner machine, with walls beside and behind me, to block eavesdropping.

4: June 6, 2006 Election

The June 6, 2006 primary in Santa Clara County was my fourth opportunity to attempt to vote on the Sequoia Edge II electronic voting systems. For 12 minutes, the poll workers struggled with trying to get the system talking. By watching the screen for them, my wife was able to tell them it wasn't setting up correctly. The poll workers tried repeatedly to program the voter ID card properly, so it would cause my voting machine to come up talking. Fortunately, I remembered that at the last Voter Access Advisory Committee meeting, a member of the ROV staff told me that the Sequoia ID card encoder did not show a menu choice for the audio voting mode. Our poll workers did not know that just before the final step of encoding the ID card, they were supposed to issue a special menu command, to bring up a hidden menu for selecting audio access mode.

After I explained this procedure for properly using the card encoder, they were eventually convinced to try it and were finally able to make me an ID card that actually worked and brought the machine up in the audio voting mode.

What will happen for all the folks who were not told or did not remember enough to convincingly tell their poll workers how to encode their cards properly for audio access mode?

One of the plaintiffs in the California voter action, Bernice, had to wait, after getting her voter ID card encoded, for the person in front of her to finish voting on the audio access Sequoia machine. When it was her turn, the Sequoia DRE rejected her voter ID card, as it had exceeded their 30-minute time out limit. She had to have her card encoded several times more, before the poll workers could finally manage to get it properly set up to put the Sequoia voting machine in audio access mode.

After 12 minutes waiting for my Sequoia machine to be configured in audio mode, it took an additional 31 minutes for me to successfully navigate my way through the ballot marking procedure.

It then took 8 more minutes for it to play out the ballot review.

At this point, I decided that I needed to change one of my votes to a write-in and that procedure took another 7 minutes.

By the time the system printed the paper trail and then spit out my voter ID card, I had spent a total of 59 and a half minutes, nearly an hour, trying to vote privately.

There were several other problems I encountered while trying to vote on this Sequoia Edge II voting system.

The voter ID card slot was hard to find, as it was located so low on the front bottom of the Edge unit and lacked a good tactile guide bezel around its opening.

The locally recorded audio messages were distorted and had puffing from the reader blowing directly into the microphone.

Although the assistant ROV told us (at the last Voter Access Advisory Committee meeting) that we would have the new tactile keypads for this election, the systems still had the old four button keypads.

At least three times, while I was voting, the Sequoia Edge II timed out and put me back in the language selection menu, where it required that I press the select key twice to exit the language menu and return to my previous position in the ballot.

The VeriVote printer was hung on the side of the machine, so the privacy shield panels did not adequately enclose the much wider combined area of the printer window and touch screen.

I've heard from other voters, that in some precincts of Santa Clara County, they were using the old cardboard privacy panels from the old punch card booths, in hopes that would be a better privacy shield than the flimsy little panels that normally are attached to the sides of the Sequoia Edge units.

Because of the excessive width of the combined printer and Edge touch screen unit, the printer would have to be disconnected and removed, before the main touch screen portion of the voting system could be placed in a wheelchair voter's lap. In addition, a motor impaired friend who tried this found that he had to have a poll worker stand behind the Edge II touch screen unit and hold up the back end of the unit, to keep it from falling off his lap while he voted. The Sequoia Edge II is clearly not designed to work in the lap of someone in a wheelchair.

The legs of the Sequoia Edge II stand appeared to be only about 16 inches apart, too narrow for wheelchairs.

When the system printed my vote on the VVPAT roll-to-roll printer, I asked my wife to take a look at it, to verify my vote for me. It turns out that, if I am using the audio access feature and have a multi-page ballot, the printer prints out the whole ballot in one shot, and then immediately clears it out of the viewing window, without any break to stop and permit me to have a sighted friend read and verify the paper trail for me. When sighted folks are printing their ballot on the VVPAT, (without audio) it only prints a single printer page's worth at one time and then pauses for the user to press a button to make it print the next page, when the voter is ready.

Since the manufacturers of the Sequoia system "know" that blind voters will not be able to read and verify the paper trail themselves, the manufacturer incorrectly assumes that all audio voters want the whole ballot printed out without any pauses for viewing by anyone.

One of the Sequoia voting machines in our polling place was broken and taken out of service. Luckily, it was not the audio access voting machine!

In summary, the setup of the Sequoia Edge in audio access mode is still too complicated for the average poll worker. Marking and reviewing the ballot takes a very long time for the audio voter. The physical privacy shielding is even worse than it used to be, and audio voters do not have any way of verifying the paper audit trail privately or otherwise.

5: November 2006 Election

This was the fifth election in which I attempted to vote on a Sequoia Edge II. It took an hour and 17 minutes at the machine, not counting the time in line. This time the poll workers actually knew how to set up the audio mode properly. They told me that they asked for special training on the audio setup in their poll worker training class, because they knew that "a blind engineer" (trouble maker?) was going to be trying to vote there again. This makes only two out of five times that the poll workers have been able to successfully set up the audio voting mode by themselves.

It took about 8 minutes for the system to load the audio mode, all without any audible beeps or status indicators until it was up. I've heard it took 15 minutes for some to load the audio.

There was no loud publicly audible sound to alert the poll workers that the machine was reloading or finished booting up. For security reasons, there ought to be loud public sounds at reboot and whenever a vote is cast.

This time the systems had the newer V5 keypad with rate and volume control buttons. I was disappointed to find that the navigation controls were just as bad as on the previous keypad. There is not an up and down arrow pair, just left and right arrow keys. Thus, the Select key must be used multi-modally...sometimes selecting candidate choices, and other times to navigate out of or into races. It is not clear to the user exactly when the Select key is changing its mode either.

The speech quality actually seems to be worse than before. When switched to the higher speed, it does a chipmunk distortion, rather than using VSC (Variable Speed Compression) to properly increase the speech rate.

The video screen is still blanked during audio mode and does not support simultaneous audio/video display.

There was a VVPAT with a privacy cover flap but no audio access for me.

The time out bug that bounces back into the language selection dialog was still there, as well as all the cognitive complexity and problems I found in the primary.

Because there is no place to park the earphones and keypad when you are done, and I had my hands full with my braille notes, I put my voter ID card in my pocket as I was packing up. Consequently, I actually walked out the door with it still in my pocket and had to go back to turn in the card, which no poll worker had asked for to make sure that I didn't walk off with it. I wonder how many cards they lose.

An additional problem with the cards was that they timed out on my wife and others who were waiting for a turn at the voting machines. The 10 or 15-minute time out on the cards is much too short.

From what I've heard, it was taking most sighted folks who knew what they were doing 10 to 15 minutes to vote. So much for the claimed 300 voters per day capacity for these machines.

Notes:

A fabric flap with Velcro fasteners covered the printer on the left side of the booth.

The keypad braille dots were not as tall as they should be.

The keypad has a pair of buttons on top left for volume control and another pair on the top right for speech rate control.

There seemed to be only three speed settings and the faster speed did have chipmunk frequency distortion. The speed increase range was not enough to really speed up my vote casting time.

I had to remove the Velcro strap on the back of the keypad to be able to hold the keypad properly.

In addition to the volume and rate buttons, the keypad had buttons for Back, Next, Help, and Select.

There were no Up and Down navigation control keys, unlike what some people have claimed.

The prompts referred to the keys by color and shape, but did not reference them by position on the keypad.

The earphones for the audio were of extremely poor quality. Not only was the sound reproduction quality poor, the mechanical fit and adjustment range was terrible. I never could manage to get the headphones to fit for both of my ears at once.

When I asked our poll workers about sanitary covers for the headphones, they said that they were not supplied with any. A friend who was voting on Sequoia Edge II systems in Santa Cruz County said that they did have sanitary covers for their headphones. However, the covers they had were so smooth that the headphones kept slipping off her head. She said that she ended up with a pain in her neck, from holding her head at an angle that kept them from sliding off as much.

Because so many folks were crowded into the polling place while they waited, their conversations made for a lot of background noise that interfered with my trying to hear the audio messages. Next time I go to vote, I think I'm going to have to take along my own sound canceling headphones. That way I should have headphones that fit mechanically, have good sound production quality, and cut down on the background noise.

I found that the audio messages seemed to be more distorted and noisier this time, compared to the previous time I voted on the Sequoia Edge II. I even had my wife listen to the audio to confirm that the audio quality was poor.

An example of the system's poor message wording is "Press the round red Select button to exit this recording." The use of "exit recording" is quite poor from a human

factors perspective, as the user does not think in terms of exiting anything they did not physically enter and they are pretty sure that they are not doing any recording.

6: February 5, 2008 Election

If my own experience is any indication, the California Secretary of State's conditions for use are not being met and Sequoia voting systems are failing again.

The following are some notes about my February 5th Primary election experience in Santa Clara County, trying to vote on Sequoia Edge II DRE voting machines.

I arrived at the polling place sign-in desk at 2:27, and was told that the voting machine was broken.

Martin was the tech for the Sequoia Edge II voting machine. He said that the machine would not start up when the polls opened, because the printer was low on paper. A field representative helped them to replace the printer, but they still could not get the system working. By 2:49, when I left, the machine had been dysfunctional all day and had not been fixed or replaced.

Upon my offer to help, Martin set the voting system back up, and I confirmed that the keypad and printer were plugged in properly. I noted that there was no cover cap or seal over the built-in RJ-45 plug that is sometimes mistakenly assumed to be the keypad cable plug.

When rebooted, the system came up and hung after displaying the message:

"Printing zero proof report. Please wait. February 5, 2008"

According to Martin, it had been doing this same thing all day. After waiting 10 minutes, we gave up on the system.

I also noticed that the system was not positioned properly to minimize exposure to potential eavesdroppers. Foot traffic was going in and out the door next to the voting machine, as well as behind me, when I was positioned at the front of the unit. When I mentioned this problem to the poll workers, they were surprised and seemed to have never heard that eavesdropping was a concern they should address by proper machine positioning.

Because of the failure of the Sequoia machine, the poll workers suggested that I might be able to go to some other polling place and vote provisionally, but they did not know whether the voting machines were working at the other polling places.

In the end, I was not able to vote privately and had to have someone else mark my ballot for me.

It was 2:49 when I was finished voting and dropped my paper ballot in a flimsy cardboard ballot box. Apparently, our polling place was making no attempt to provide over vote checking with precinct optical scanners.

I did try calling up the other polling place our poll workers recommended and was initially told that they did not have any voting machines in their polling place. When I persisted patiently and asked to speak with an actual polling official, eventually, a pleasant and helpful polling official named Terry came to the phone and said that their Sequoia voting machine had not been working, but that they had switched to a new card activator. She thought that their machine was then ready to vote on, but said that it had not been tested by anyone actually trying to vote on it. They were apparently unaware of the Secretary of State's conditional certification requirement that at least five voters should vote on the Sequoia DRE before the close of the polls.

Unfortunately, this election marks the sixth opportunity I've had to vote on the Sequoia DRE voting machine in a real election and it was the fourth time the poll workers were not able to get the machines working, despite their being nice folks who were making a sincere effort to get the machines to function properly. I cannot fault the poll workers for the failures of these Sequoia voting systems.

This frequent and repeated failure of the Sequoia voting systems to provide accessible voting should be considered completely unacceptable!

This would seem to be a clear demonstration of the inequities that can come along with segregated ballot systems.

If any California counties are not going to cooperate and assure that the conditional certification requirements for their voting systems are met effectively, I hope the California Secretary of State will move rapidly to force those counties to acquire proper voting systems.

7: June 3, 2008 Election

I just finished my 7th attempt to vote on Sequoia Edge II voting machines in actual elections in Santa Clara County. Once again, the complexities of the voting system overwhelmed the poll workers and they were not able to get the voting machine working by themselves.

I signed in at 2 o'clock in the afternoon, at our local firehouse polling place. It was disconcerting to hear the poll workers literally shouting from one end of the sign-in tables to the other to ask and announce out loud what political party I was voting for. They were not being discrete at all about it and not even using a party code number, instead of the actual party name. They were also literally shouting, because there was someone using a noisy leaf blower just outside the large open doors of the firehouse. My party affiliation may be a matter of public record, but I do not feel it is right for the poll workers to be telling all my neighbors and others in the polling place what party I'm voting for. I understand that other counties are more discrete and use a quietly exchanged code number to communicate the party affiliation between poll workers.

When I asked to use the accessible voting machine, they told me that I would have to wait 20 minutes while they booted the system. They had actually set up the machine

before poll opening, but had not left it turned on. In addition, they admitted that the system had not been tested to make sure that the audio access was working.

The machine was set up a few steps away from the sign-in line and facing the line of people waiting to sign-in. When I mentioned the eavesdropping privacy exposure problem, the poll workers agreed to turn the machine around so it did not face the sign-in line.

After inserting my voter ID card in the Sequoia machine, there was a long wait while the machine powered up, and the poll workers kept saying that it was doing what it was supposed to do.

Eventually my wife finished marking and casting her paper ballot, so she came over to the Sequoia machine and looked at the screen. Because of her past experience with the system, she identified that it was offering the language selection menu on the visual display, a sign that the system was not in the audio mode. When we told the poll workers about this, they said that we just had to wait for it to start talking. I explained that I had some experience encoding the voter ID cards and asked the poll worker who was nicely trying to help me if they had selected the audio option from the hidden menu on the card encoder. He assured me that they had done it correctly.

Because the machine was clearly not in audio voting mode, my wife went over to the worker who actually did the card encoding and asked him about the procedure he had used to encode the card. He was shocked to realize that he had completely forgotten about having to do the audio access selection step in the card encoding process for my card. He soon had a new card ready for me.

At this point, there was a new problem; they did not know how to get the Sequoia Edge machine to eject my first voter card. After pressing several buttons and checking their manuals, one of the poll workers decided that he should just go ahead and submit my un-voted ballot, using the touch screen and display. Fortunately, my wife stopped him by pointing out that I would not be allowed to vote two ballots.

Next, the poll worker went behind the machine and started pushing buttons again. He said that he had "pressed the eject button" but it had no effect. By "eject" button, he meant the yellow reset button. When the poll worker went off to read the manuals some more, I suggested to my wife that the poll worker might not have been holding the reset button down long enough. At this point, my wife went to the back of the machine and pressed the reset button, keeping it down long enough that it finally worked, the system reset, and ejected my original voter card.

As I was about to insert my second voter card in the Sequoia Edge, another poll worker asked me for the card and took it away to try encoding the card again. He said that the card had probably timed out, as there is a timing system used to disable cards that are not used shortly after the poll workers encode them.

Finally, after inserting my third voter card and waiting for the system to reload with the audio interface, the system started talking and was ready for me to start voting, 13 minutes after I originally signed in.

As I began listening to the choices on the ballot, I was surprised to find that the quality of the local recordings was terrible, distorted and scratchy, with lots of popping and chopping. Although the factory-recorded vendor's messages did not have the problem, the locally recorded names of races and candidates were so noisy and amateurish that I stopped voting for a minute and a half to record samples of the poor quality audio recordings.

When I returned to voting, I had a brief panic, as the system said, "finished voting." My panic stopped as soon as I realized that I had pressed the Back arrow key on the keypad and caused the system to wrap around to the end menu that gives a choice between reviewing your ballot and casting it. Unfortunately, the "finished voting" message sounds like a final prompt, rather than a menu choice asking you if you are done and ready to cast your ballot.

I managed to get out of that end menu and back into the ballot selection process, only to have to stop because the weed blower was back just outside the door again and so loud that it was totally swamping out the audio in my headphones. It was so loud that most voters would not have even been able to think. I gave up and requested that the poll workers ask the gardener to wait until later to do the weed blowing.

After a total of 28 minutes at the voting machine, I was finished making my vote choices and began the ballot review, an unpausable five minute read out of the whole ballot, fiscal impact statements and all.

From start to finish, it took me 34 minutes to vote what is, by California standards, a very short and simple ballot.

In contrast to our February Primary election, when we never managed to get the Sequoia Edge machine to work for my voting, this June election went better, as we did finally get the machine working. However, if my wife and I were not computer scientists with special insider knowledge and experience with Sequoia Edge voting machines, I once again would not have been able to vote privately and independently.

Sadly, despite having six previous elections under its belt, this county's learning curve seems to be flat and the reliability of accessible voting in the polling place has not improved.

8: November 2, 2008 Election—an Early Voting Experience

Because my wife and I were going to be busy as poll workers on Election Day, we decided to vote early, on the Sunday before Election Day. I was looking forward to learning how voting was handled at our early voting sites.

Just as the polls opened at 9 AM, we were at the Santa Clara County early voting center located in the ROV offices in San Jose, California.

The procedures for handling the waiting voters seemed well organized and efficient. We were given a serially numbered strip of paper just after we entered the building. This

allowed us to sit down and wait until our number was called, rather than having to spend the 45-minute wait standing up in a long line.

It took poll workers about five minutes to get the Sequoia voting machine ready before I was given a voter card and directed to the single voting machine.

As I was sitting down at the voting machine, the poll workers were explaining to another voter who wanted to use the voting machine that she would have to vote on paper because "The voting machine was only for voters with disabilities." I felt a bit guilty about this, but I am glad that she didn't have to stand around for 51 minutes waiting for me to complete voting the long audio ballot.

After 12 minutes of silently loading up the audio ballot without any audible beeps or other indicators to indicate status or life in the machine, it finally started talking. During that loading process, poll workers kept coming over and checking the screen of the voting machine every 3 or 4 minutes to see why it wasn't talking yet.

The audio for the locally recorded messages was scratchy; its volume was too low and not normalized to match the volume of the fixed factory messages; and the reader for the local messages was difficult to understand, as she was not a native English speaker. (For example, she pronounced "Democrat" as "Dem-Ohhh-crat".

The room noise level was sometimes so high that I had to stop my voting, turn up the volume substantially and then back up in the ballot, and play the previous message again. Just a couple of steps away from the audio voting machine, voting officials actually had to shout to be heard above the noise. In the adjacent booth, some unfortunate mother's baby was screaming away at full volume. On the other side of me, a voter and poll worker were having a noisy and heated argument about why the voter was not allowed to vote with a regular ballot. It was all quite distracting for anyone trying to think, much less hear and understand the audio output of the voting machine.

Apparently, the audio keypad cable was not plugged in cleanly. This was evident because the audio occasionally made the loud, angry-squirrel chittering noise we noticed at random times during the California TTB access review testing. In the TTBR, we tracked the problem down to poor connections in the audio keypad cable connector.

This time, I eventually felt around behind the voting machine's screen and found the jack for the audio keypad, and I wiggled it in firmly to get it seated and connected properly. The poll workers were not paying enough attention to ask me what I was doing messing around at the back of the voting machine, right next to the infamous yellow reset button of the Sequoia Edge machines.

Similarly, the poll workers were not (according to my wife) paying enough attention to have prevented me from accidentally or purposely walking out of the polling place without returning the voter access card to them.

Summary of my voting times:

55 minutes waiting to vote in the long and short queues;

12 minutes waiting for the voting machine to boot up in audio ballot mode;

22 minutes for my vote selection;

16 minutes for audio ballot review;

1 minute to print the VVPAT, record the electronic ballot, and eject the voter card.

My total time sitting at the voting machine "voting" was 51 minutes.

The 16-minute review is like a drink from a fire hose, with no pause/resume function. You just have to sit and listen to it read all the information, even the fiscal impact report for each of the propositions!

If there is a next time having to vote on the Sequoia Edge machine, I will completely skip the review mode. Instead, I'll go back, re-navigate the ballot selection process, and try to skip through quicker to review that way (hopefully without accidentally flipping any of my choices).

As I was putting away the headphones and keypad after I finished voting, my wife turned in my voter card to the Assistant ROV. The AROV grinned broadly and told my wife, "There now, that wasn't so bad, was it?" Perhaps she meant it wasn't bad because the machine wasn't completely broken down, as I've had happen several times before.

Now my subsequent poll worker experience is a more disturbing story (documented separately)...

9: May 20, 2009 Election

This May's special election was the 9th opportunity I've had to try to vote on the Sequoia Edge II electronic voting machine in actual elections.

When my wife and I arrived at the polling place, in a local church, we were warmly greeted by very pleasant poll workers with nice attitudes.

After signing in, I asked to vote on the electronic voting machine. As my wife watched the poll workers set up my voter ID card on the card encoder, she felt that they were not doing it correctly, so I asked the poll workers if they were encoding the card for audio output and they said that they did.

At 6:39 PM, I was given a comfortable chair and I sat down to insert my voter card in the voting machine. I noticed that the privacy on the machine was not very good, as the screen and my back were facing toward the other voters as they stood in line, signed in and turned in their ballots. Additionally, there was a large mirror on the wall next to the machine. Later, when I pointed this eavesdropping exposure out to the chief elections officer, she apologized and explained that the mirrored wall was the only one with an electrical outlet for plugging in the voting machine.

Given those restrictions, the machine should have at least been turned around to face in the opposite direction, with the screen and the voter's back away from people in line and at the sign in tables.

After about six minutes, my wife was finished marking her paper ballot, and she came over to see how I was doing with the electronic voting machine. I had not been able to

get any speech output from the voting machine. By the time my wife came to check on my progress, I had already discovered that the awkward design of the case around the audio jack for the headphone plug had prevented the poll workers from properly inserting the headphone plug all the way. I managed to get the plug inserted properly, but still had no speech output from the voting machine.

Because of her experience with the messages that should have been displayed on the voting machine, my wife recognized that the voting machine was not even trying to load the audio ballot.

When we pointed this out to the poll workers, they agreed that they may not have set up the voter card correctly on the card encoder and would have to make another card. However, they did not know how to get my first card out of the voting machine.

I thought it might have been interesting to see how long it would take for the poll workers to figure out how to remove the card by themselves (if they could), but I've been through that process on so many of my other seven voting attempts and I decided to be as helpful as I could.

I explained that they should be able to get the card out by pressing the reset button on the back of the machine and then had to describe what color the button was and where it was located. One of the poll workers said, "Okay, I pressed it.", but the voter card did not eject from the machine. I then explained that they had to hold the reset button in for a while, until it would take effect. The poll worker complained, "How are we expected to know that!"

The poll worker then patiently kept the reset button in and held her breath until the Sequoia machine reluctantly ejected the card.

At 6:47, several of the poll workers started trying to encode another voter card for me. After I explained that they had to bring up the hidden menu for selecting audio ballot mode, the poll workers were able to get the card encoded correctly.

In this same election, another blind friend who lives in Santa Clara County had a similar problem with his poll workers not knowing how to properly encode the voter card with the audio ballot enabled. As this blind friend also sits with me on our county's Voter Access Advisory Committee, we have discussed this voter card encoding issue several times before, and he was able to coach his poll workers through the proper procedure to finally get his voter card set up for an audio ballot. From the stories we've heard from other voters over the last several years, as well as from our own experiences, I would estimate that failure of the voting machines to work properly for audio ballot voting is usually due to this annoying card encoder design flaw in the Sequoia system that makes it so difficult for poll workers to get the machines properly set up in audio ballot mode.

At 6:50, I finally had a properly encoded voter card, inserted it in the voting machine, and eventually began voting. There were only six Yes/No propositions, so it only took until 6:58 to make my vote selections.

In previous elections, I found that the ballot review procedure on the Sequoia Edge II machines was extremely tedious and awkward, as the machine insisted on reading all

the races nonstop, with way too much information (even reading the detailed fiscal report for each proposition). There is no way to pause and continue the review, and if I discovered a selection error during the review, I would have to wait until the review was through to correct the error.

This time, I decided to skip the Sequoia machine's regular review process. I reviewed my ballot by going back through the entire vote selection process, which allowed me to eventually hear my selections and make any changes I might need. When reviewing the ballot by going back through the vote selection procedure, there is the risk of accidentally deselecting a selection you had already made and had intended to keep. In any case, this approach to review appeared to work somewhat better than listening to the ballot in the machine's regular review mode. It was still a fairly tedious and time-consuming process, but a little less frustrating, as it made it easier to shut up the speech and make changes if I found any errors. My ballot "review" process took about seven minutes.

There have been times when I would have liked to check the machine's accuracy by letting my wife check over my ballot printout on the VVPAT printer. However, the Sequoia machine makes the incorrect assumption that, if the voter is using the audio output or the keypad (instead of the touch screen), then the voter won't want to check the VVPAT printout. Therefore, it skips the process for reviewing the printout and allowing corrections and reprinting. This also means that voters who cannot use the machine's touch screen because of manual dexterity impairments are forced to use the machine as if they were also blind and are similarly not given the ability to review the printout and then make changes to their ballot.

At 7:05 the machine returned the voter card for me to turn back in to the poll workers, and I was done voting.

The total time I spent at the machine, trying to vote, was 26 minutes, one of my shortest times I've ever had trying to vote on the Sequoia voting machine. Luckily, this election had an extremely simple and short ballot!

In addition, luckily, I had my very helpful computer scientist wife along to help the poll workers get the voting machine working properly. Once again, if my wife and I hadn't had more than the ordinary experience with, and technical knowledge of how to get the Sequoia voting machine working properly, I don't believe that I would have been able to vote privately and independently this year.

I don't fault the poll workers for the problems with the voting system, it is just clearly too complex and poorly designed for them to operate properly and reliably. The poll workers were trying hard to be helpful and were very pleasant (even gave out little candy bars to every voter).

Our poll workers had carefully followed procedures and managed to have the voting machine unpacked, set up, and powered up when I arrived at the polling place. In some other polling sites, the machines were not even set up when blind voters showed up to use them. In Santa Cruz, one of the poll workers at the sign in table started out by telling a blind friend of mine that they had no voting machine. When my friend pointed out that they were required by law to have an accessible voting machine, one of the

other poll workers admitted that they did have an electronic voting machine, but it was not set up. After some encouragement, the poll workers agreed to set up the machine. My friend had to sit patiently while the poll workers went through the whole process of slowly reading the manual, setting up the Sequoia Edge II machine, printing the initialization tapes, and getting it ready for audio voting. After that, my friend was able to successfully vote on the machine. Clearly, her poll workers had some attitude and training issues.

Why should voters with disabilities continue to be forced to vote on segregated ballot systems that are far too complicated for the poll workers to operate and that make us vulnerable to disenfranchisement because of poor machine reliability and inadequate training and/or poor attitudes on the part of the poll workers?

California needs to move aggressively toward a unified voting system that does not force voters with disabilities to continue to use conditionally certified voting machines that were shown, in the State's own Top-To-Bottom review testing to be unreliable and substantially not compliant with federal and state accessibility requirements.

10: June 2010 Election

This June's primary election was the 10th opportunity I've had to try to vote on the Sequoia Edge II electronic voting machine in actual elections.

It seems that my polling place changes for every election, and this year's polling place, in the Campbell Middle School computer resource room, was a new site again.

There was no line when we arrived, so I signed in at 2:22 PM and was soon shown the way back into a fairly private nook among the stacks. In fact, for security reasons, it was too private and did not meet the polling place rule that the back of the voting machine should be clearly visible to the poll workers sitting at the sign in tables.

Although it was midafternoon and the Sequoia Edge II voting machine was "set up" no one had actually tried to use or test the system.

When the poll worker, who was pleasant and helpful, handed me the headphones and the control keypad, the headphone plug fell out of its jack. I found the jack on the bottom left of the keypad unit and plugged it in, only to have it fall out again a minute later. I then made a concentrated effort to make sure the headphone plug was inserted and seated firmly in its jack. The headphone jack is buried down inside a recess or cowl that makes it very difficult to cleanly insert the right angle headphone plug.

When I inserted the voter ID card in the Sequoia machine, it loaded up and displayed the language selection menu on the screen, instead of loading the audio voting software. The poll workers began running around checking all the plugs on the machine. I suggested to them that it appeared that they had not encoded the voter card properly, so they decided that they should try another card. Unfortunately, they could not get the system to eject the first card.

At this time (2:39 PM), my sighted wife finished marking and casting her own ballot, so she came over to my booth, to check on my progress. With one quick glance at the Sequoia's video screen, she surmised that the poll workers had not encoded my voter card correctly with the audio voting mode selection.

As the poll workers began trying to get the county's voting tech support help desk on the phone, my wife had to leave and go back to work, leaving me to wait at the machine, in hopes that the poll workers could eventually get it working for me.

At 2:45, with the help of the county's telephone support staff, one of our poll workers managed to get the voting machine to eject the voter card, and he began trying to encode a new voter card with the real time prompting of the tech on the support line.

However, they forgot to put the card encoder unit in its hidden menu and select audio ballot mode, so this second card also failed to bring my voting machine up in an audio ballot when we inserted this second card.

I pointed out, and then the support tech confirmed, that the presence of the language selection menu screen on the Sequoia video start up screen meant that the poll worker had not set the card encoder to select audio ballot mode.

Once again, the support tech walked my poll worker through the procedure for ejecting the voter card and returning to the encoder to try to set up another voter card. Although the card encoder unit was across the room, I managed to hear enough of the conversation and procedure they used and was able to figure that they again did not encode the card properly. When the poll worker returned with the third voter card, I told him that I didn't think it would work, because the support tech had walked him through the incorrect procedure. When the Sequoia voting machine refused to accept my third voter card, the poll worker was willing to listen to my explanation of the correct card encoding process for an audio ballot card.

The problem is due to a flaw in Sequoia's card encoder software. In primary elections, the card encoder must first have the party affiliation selected, before the hidden (unprompted) menu is brought up to specify the audio ballot selection. If these steps are done in the opposite order, the card encoder appears to accept the steps, but generates a card that will not properly load the audio ballot option in the Sequoia voting machine. This bug in the Sequoia card encoder appears to be the most common reason for Sequoia voting machines failing to work properly for audio ballot voting.

With my prompting, the poll worker was finally able, on the fourth attempt, to properly encode a voter card that eventually brought up the Sequoia voting machine in audio ballot mode (8 minutes after the fourth card was inserted).

At 2:54, more than a half an hour after we started, the voting machine was at last talking and ready for me to start making my audio ballot selections.

At 3:19, I was finished making my selections and ready to review my ballot.

At 3:36, I finished reviewing my ballot and chose to cast the ballot.

After two minutes of printing the paper trail, the system indicated that I was done, but it refused to eject and return the voter card. I had to get my poll worker to press the power

reset button on the back of the machine, before it would eject and return the voter card. Just before the poll worker pressed the reset button, I was told that the video screen had a message that said that the voter card was invalid.

I had to assume that the machine had correctly cast and recorded my vote, but there was no way to be sure. I just have to hope that the machine's unwillingness to eject my voter card properly was not a definite indication that my ballot was lost. The poll workers could not tell me if the machine had counted my ballot as valid. I still do not know whether my ballot was counted or not.

When I asked the poll worker if they had a sip and puff or any other dual switch input control accessory for voters with severe dexterity impairments, he said that they were not supplied with one for the Sequoia machine. At our Santa Clara County's previous VAAC (Voter Access Advisory Committee) meeting, I advised the assistant ROV (Register of Voters) that, at a minimum, the County should be providing dual-switch input controls at every precinct, to accommodate voters with severe motor impairments on the voting machines.

11: November 2, 2010 Election

When we arrived at our polling place in our local middle school, my wife and I encountered no line at the sign-in desk, which was staffed by several friendly poll workers.

At 1:42, I signed in and asked to vote on their electronic voting machine. The poll workers had considerable trouble trying to get the voter card encoder to properly set up my voter card. After they replaced the first voter card with a second and it also refused to be programmed, the poll workers were unable to remove the card from the encoder unit. Luckily, I had my ever-helpful wife with me, and she was able to assist and get the card out of the encoder for them.

Because they could not get the encoder to work properly, our poll workers gave up and called the county's voting tech support service. The head poll worker inserted a third voter card in the encoder, when the support tech asked if they had tried another card. While waiting for the support tech to think of something else for them to try, our head poll worker decided to turn the unit off. Because she couldn't see the power switch, she ended up unplugging and then plugging back in the power to the encoder unit.

When the encoder powered back up, it accepted the card, and they were finally able to encode a card for me.

Sitting down in front of the Sequoia Edge II voting machine, I realized that its screen was exposed to almost everyone in the polling place. Poll workers are supposed to set up the machines with the screens facing a wall, to guard against eavesdropping and to expose the reset button in back, so the poll workers can see it.

At 1:50, I inserted my voter card in the Sequoia Edge II DRE machine. Because the card had no tactile indicator for proper orientation, I managed to insert the card backwards. However, the machine appeared to physically accept the card, and I sat down to find the earphones and the control keypad, both of which were hiding somewhere behind the machine. The earphones were not plugged in, and it was quite a challenge trying to get them plugged into the base of the keypad, as there is a narrow and deep hole or cowling around the earphone jack, making it very difficult for anyone to get the phone jack inserted.

My wife was waiting to make sure my machine started loading my audio ballot properly, and she realized that my card must not have been inserted properly. After a few more tries, I managed to get the card inserted properly and heard the system beep to confirm that it was able to read my voter card.

The machine promptly displayed the language menu on the screen, an indication that it was trying to present a visual, rather than an audio ballot. When my wife pointed out that the screen was displaying a visual ballot, I asked for help from the poll workers and pointed out that the machine was not loading an audio ballot.

Without my wife to spot that the system was not loading an audio ballot, I probably would have had to wait the eight minutes or so that it usually takes to load the audio ballot, before anyone realized that it was not loading properly.

In this case, the head poll worker immediately called the county tech support line and was walked through ejecting my voter card, putting it back in the card encoder, bringing up the hidden menu, selecting audio voting, and finally producing a properly encoded card.

At 1:56, I inserted the properly encoded voter card in the voting machine.

At 2:01, the voting machine finished loading all the languages of the audio ballot and started talking, presenting the initial instructions and language selection menu in audio, rather than on the screen.

Once again, the non-factory messages were difficult to understand, because of poor fidelity and because they were read by a non-native speaker who seriously mangled the pronunciation of names and words such as "Democrat" and "Equalization".

In addition, in the first several races of the ballot, when I selected a candidate, the machine announced that the race was fully voted and gave the name of the race incorrectly. It mistakenly gave the name of the next race, instead of the race I was still in and had not yet exited. Needless to say, this was confusing!

At 2:20, while I was in the midst of making my vote selections, the machine automatically jumped back into the language selection menu. Luckily, my previous experiences with this bug in the Sequoia voting machine prepared me for this problem, and I was able to reselect the English language option and return to where I was interrupted in my ballot selections.

At 2:33, I finished making all my selections for my ballot, and I began to attempt to hurry through its review. I skipped the machine's standard routine for ballot review, as it is

extremely tedious, does not permit corrections while reviewing, and reads out all the possible text for each candidate or choice (including the fiscal report on each proposition).

Instead of using the machine's standard review routine, I went back through the whole ballot marking procedure, being careful not to accidentally change any of my selections as I "reviewed" them.

At 2:46, I finished reviewing my ballot, and I started the machine printing on the VVPAT, which took about a minute to complete. Of course, there was no way for me to check the "voter verified" printout of the VVPAT, not even to have my wife check it for me.

This year, my total voting time was an hour and five minutes, which appears to be typical for audio voting on these machines with long California ballots. Thankfully, my wife was also voting at the same time and was able to assist the poll workers and me, so I could vote "independently".

While she was chatting with the poll workers and waiting for me to finish voting, my wife found out that they were completely unaware that they are supposed to make sure that at least five voters use the electronic voting machine, if anyone at all uses it during the voting day. This voting privacy measure, like so many of the other mitigation procedures required for the conditional certification of these voting systems, is not being followed or implemented responsibly.

Additionally, year by year, I've observed more and more erosion in the quality of training of poll workers, regarding the "accessible" voting machines, and respect for privacy and good security procedures continues to diminish.

In our county, the electronic voting systems have become a segregated, second-class balloting system with sadly waning support and reliability. Who can be expected to go to all the trouble of finding their way to a polling place where the "accessible" voting system is not reliable and is not likely to be working?

12: June 5, 2012 Election

For this June's election, our neighborhood precinct was located in our nearby fire station.

Because of the light turnout, there was no line at the sign-in table, staffed by the typically friendly poll workers we usually encounter at our polling places.

At 2:09, we signed in at our polling place.

I was given my voter identification card, and we were politely escorted to the Sequoia Edge II voting machine, where we were left on our own to find the keypad and earphones.

While my wife waited to see if the machine came up properly, I had to dig around behind the machine to drag out the earphones and keypad control.

The fire station dispatcher radio was blaring so loudly that I knew I wouldn't be able to understand the speech of the voting machine. I asked a poll worker if he could do anything about lowering the volume level of the dispatch radio, but he wasn't inclined to do anything. Finally, my wife found one of the firemen to ask, and he nicely accommodated by turning off the speaker.

When the machine finished loading my voting session, the video screen displayed the starting menu, which, unfortunately was proof that the poll worker had not programmed the voter card properly.

I asked the poll worker to take a look at the screen, which he did. He said that it was showing that it was working fine and ready for me to vote. My wife and I explained that the menu showing on the screen meant that the machine was not in audio ballot mode, probably because the voter card had not been programmed properly with the card encoder unit at the sign-in table.

The poll worker apologized that he did not know the procedure for the voting machine very well. He added that it was his second year working the precinct, but no one used the voting machine during the previous election he had worked.

My wife offered to show him the proper procedure for selecting audio ballot mode on the voter card encoder. To reprogram the card he needed to start by removing my voter card from the voting machine, so he set to work pushing on the card slot and checking the screen for a "Return Card" touch button.

I explained that he would have to reset the machine, so he went behind the machine and announced that he guessed that he would have to pull out the power cord, which I quickly recommended he should not do. I told him that the reset was supposed to be a yellow button on the back. That helped him find the reset, which he proceeded to push.

Because the machine did not then start resetting or returning the card, and because I had overheard the poll worker mumbling that he "popped the reset", I suggested that the reset had to be held in for several seconds before it would activate. The poll worker went back behind the machine and held in the reset button for several seconds, until the machine beeped. Finally, he was able to get the card from the machine. I briefly coached my wife and the poll worker on the correct voter card encoding procedure, and the two of them returned to the sign-in table, where my wife walked him through a successful encoding of a card with the audio ballot mode enabled, using the hidden menu. When the newly encoded card was placed back in the voting machine, the machine soon displayed the correct video screen message, indicating that it was beginning the audio ballot loading process.

My wife found me a chair, and I sat down in front of the machine to wait out the long time required for the machine to load all the languages of the audio ballot. Unfortunately, the machine has to load all the audio ballot files for all the supported languages, before it offers the language selection menu. It would have been much better if the machine had been designed to initially load only enough audio to present the language selection menu, and then load only the audio ballot files for that selected language. It would save the extra 8 minutes or so we typically have to wait while the machine loads all the unnecessary language files, during which time it never gives any

audio indication that it is alive and working on loading the files, not even a welcome "Please wait."

At 2:23, the voting machine finally started talking, giving the language selection menu.

After remembering that I had to select and then re-select to get my chosen language and exit the language menu, I expected the machine to announce the header for the Presidential race. Instead, the machine dove into reading a very long complicated disclaimer and explanation of the effects of the new "partially-open primary" and ballot. By the time I managed to get past that message, the machine started reading the heading for the second race and appeared to have skipped the Presidential race. After too much frustrating arrow keying around the rest of the ballot, including a scary message that said, "Your vote selection is finished", and having to listen to that long-winded message at the start, I eventually found the Presidential race heading. As it turned out, the Presidential race header was hidden at the very end of the long-winded message. In addition, that same long message was placed at the start of more than one of the other race headers.

The second race on the ballot was for committee members and was limited to "Choose 6 or less" candidates from a long list.

It was shocking that the volume level was drastically different for some candidates--blasting for some, then suddenly dropping down and much quieter for others. I checked to confirm that these volume changes were the result of sloppy recording procedures, rather than from a loose earphone connection or some other hardware problem.

In the past, our county has done a poor job of normalizing the volume level of the local audio tracks for races and candidate names, often requiring us to stop and adjust the volume whenever we switched between the built-in factory message prompts and the variable local race header and candidate name recordings. However, this was the first election I can remember in which the audio volume levels were so poorly controlled that the levels of choices within a race varied so dramatically from choice to choice.

The volume shifting was so severe that it could have contributed a strong voting bias for or against certain of the candidates. On visual ballots, candidates would not tolerate having their own name printed in small weak ink, while other candidate names were printed in large letters. This sloppiness in the audio menus is unfair to candidates and hard on the audio voters.

After making my original selections in the multi-seat committee race, I went back to the race to check my choices. Unfortunately, the menu only had a list of the candidate names and the write-in choice; there was no "Exit This Race" option, and the Sequoia Edge II has no Escape function on its control keypad. I went through the long list of candidate names several times, trying to find a way out. Finally, I had to find one of my selected candidate's names, deselect it, and then reselect the name again; all to fake the machine into thinking I had just finished making selections in the race. At that point, it was finally willing to let me out of its endless loop.

Just to make things a little more complicated, in the middle of trying to get out of that multi-seat race, the machine burped into one of its well-known bugs, bouncing me into

the startup language selection menu. I reselected the English option, selected to exit the language, and was luckily bounced back to the same point where I had been in the multi-seat menu endless loop.

At 2:42, I was done with my vote selection, and I started reviewing the ballot.

During my ballot review, I was twice bounced into the startup language selection menu. Luckily, I managed to figure out what happened and managed to reselect the English language and return to my ballot reviewing.

At 2:54, I finished reviewing my ballot and told the machine to cast my ballot, so the VVPAT began printing.

At 2:55, the voter card ejected from the machine, I returned it to the poll workers, and my "accessible" voting experience was done.

Considering our poll workers' inability to set up the voting machine and my voting session properly, and considering that the average voter who needs to vote with an audio ballot wouldn't be a Sequoia-savvy engineer with a very skilled computer scientist wife assistant, would that voter have been able to vote privately and independently in my precinct?

Sadly, my informal survey of several friends who also need to use the Sequoia Edge voting systems found that their experiences are similarly frustrating. One of my blind friends had to give up on the broken Sequoia Edge voting machine in his neighborhood polling place, travel to his county's central voting center, only to find that the voting machine at that site was similarly broken. He had to return to his county's central site late in the day, before the county was able to supply him with a working Sequoia voting machine.

Over 8 years ago, when Santa Clara County began using the Sequoia Edge voting systems and I began attempting to vote with the audio ballot systems, I was told that the rash of voting system accessibility failures would go away "in just a few years", as soon as our county elections staff had a chance to get up their learning curve and figure out how to properly set up and maintain the systems and to develop proper training for the poll workers. This June's primary election was my 11th attempt at voting on these supposedly "accessible" Sequoia Edge voting machines. It is clear that we do not have accessible voting systems that are reliable!

The Sequoia voting machines remain far too complicated for poll workers to set up and support, especially given the extremely limited or non-existent training the poll workers receive for handling the voting machines. My wife and I experienced just how limited and inadequate our county's poll worker training has been when we both took the full poll worker training course and served as poll workers in the November 2008 election.

In addition to the design problems of the voting machines, matters are unnecessarily made worse by the sloppy and unprofessional production of the recordings for the audio ballot's candidate names and other spoken messages.

County election officials should not be surprised that more voters with disabilities are not showing up at the polling places and asking to use the "accessible" voting

machines. How can voters with disabilities be expected to go through their many mobility and travel impairments to get to a polling place to attempt to vote a machine that is not reliably accessible?

Given that the tight budgets of the current economy are unlikely to let counties like mine replace their current voting systems, it seems that it would be appropriate to concentrate more on areas such as appropriate poll worker training, training materials, professional quality audio ballot recording, improved audio ballot layout, better (or at least some) testing of the audio ballot systems, and other improvements that do not require major purchases of new equipment.

As a specific example, one of the simplest and inexpensive improvements I can imagine is for all counties using voter card encoders to attach to each card encoder a simple "crib sheet" with the basic steps for correctly encoding a voter card for an audio ballot. Over the last 8 years, we've found that improperly setup voter cards is the single most common access failure problem for the Sequoia machines.

For a second example of a major step to improving accessibility reliability is to develop a procedure for testing the audio ballot on every voting machine in every precinct, before the polls open for the day. By "testing the audio ballot", I mean that someone should listen with the audio earphones and actually fully mark a ballot. Obviously, this type of test, with listening and actual manual button pushing, should be done centrally, by the county, on the audio ballot for each style of audio ballot, and well before election day.

These examples I've suggested do not require big equipment purchases, mostly they require a sincere commitment to improving the reliability for truly accessible voting systems.

13: November 6, 2012 Election

For the second election in a row, my neighborhood precinct was located in the nearby fire station, and there was almost no line when we arrived.

At 8:00, we signed in and I could hear one of the poll workers scrambling around to plug in the voter card encoder. This poll worker recognized me from the June primary, so he knew I would want to use the machine, which unfortunately had its screen facing out for anyone who wanted to eavesdrop to do so.

When he started to encode my voter card on the card encoder, he said, "I remember there was something tricky about this encoder and you had to tell me how to do it right last time." Initially he couldn't get the encoder working properly, but eventually, with help from the chief polling officer, he figured out that he had to turn on the encoder and then insert a blank card. He remembered that the tricky part included bringing up the encoder's hidden menu, from which he could select the audio option. Unfortunately, he did not remember that the selection of audio ballot option had to be done as the last

action in the encoding process. I intervened before he improperly encoded the card, and he was happy to do as I prompted him.

When I placed the card in the voting machine, the poll worker smiled and said that everything was fine and would just take a few minutes. My wife pointed out that the screen of the machine came up with the standard visual ballot, so the card was not set up properly for loading an audio ballot. Evidently, all of his attempts to insert the card in the encoder with and without it being powered up resulted in an incorrectly encoded card.

The next problem was how to get the voting machine to eject the card. The poll worker remembered that we had to eject the card during the June election, so he went behind the machine to try to find the right button. After he searched for a bit mumbling, "Where is the Eject button?" I reminded him that he needed to press the bright yellow reset button at the bottom left corner of the machine. When he spotted and pressed the Reset, he proudly said, "Okay, I just poked the Reset." As I feared, his "poke" meant a brief press, so I had to remind him that the Reset had to be held in for several seconds. After the card was ejected, he quickly ran it back to the card encoder, where he managed to produce a properly encoded audio ballot card.

This time, the inserted voter card started up the voting machine with a visual message that it was loading the audio ballot, and my wife finally felt free to go mark and vote her own paper ballot.

After hunting around the machine some, I eventually managed to find the audio control keypad and the headphones, with the headphones all tied up in the keypad cable. While waiting for the audio ballot to load, I managed to unsnarl the headphones cable and confirm that they were plugged in properly. When I tried reading the braille labels above the keys on the keypad, I found the braille to be very shallow, maybe less than half the standard height of braille dots. Trying to read these braille labels was something similar to sighted folks trying to read faded print labels that are missing half the ink.

When my wife returned from casting her ballot, she noted that the machine seemed to be stuck in verify mode. As the machine was still not talking, after taking more than the normal 7 or 8 minute audio ballot startup time, I decided it must have a problem requiring poll worker assistance.

At 8:15, we managed to flag down the chief poll worker and convince her that the machine was not coming up in audio mode. She said that earlier she noticed that the VVPAT printer paper was low on this machine's printer, as well as low on both of the backup VVPAT printers. She concluded that they couldn't do anything about that and I was just going to have to have someone mark a paper ballot for me.

I suggested that it appeared to be time to call the County's voting help hot line, which she reluctantly agreed to do without much hope that they could help. After being passed through three different techs at the help desk, she eventually found someone who was familiar with the audio voting machine. While waiting for tech support to figure out the problem, I suddenly remembered that the keypad plug on the back of the voting machine had been the source of trouble for audio ballot voters in the past. I asked my

wife to check the plug in back of the machine, and she reached it just as the help desk asked the poll worker to do the same. Yup! It wasn't plugged in properly!

At 8:23, the machine finished verifying and began to speak, and I could begin to make my ballot selections. The screen now displays a message about audio voting, rather than being blank as before.

Immediately I encountered the recurring problem that the County's local-recorded messages were much quieter than the factory-recorded audio prompts, with no apparent attempt to normalize the volume levels. I had to turn up the volume to be able to understand the locally-recorded messages and put up with being blasted by the much louder factory recordings.

However, there was a much more frustrating barrier caused by the presence of a long winded independent-party-voting disclaimer message at the beginning of some of the contests. Interrupting and skipping past that message resulted in hearing it repeated several times. When I finally heard the title for a contest, it was for one of the contests further down the ballot. It skipped me past the President and several other contests. The only way I could figure out where I was in the ballot turned out to be by sitting back and being patient while the system plodded through the long winded disclaimers and finally announced the contest name.

This audio ballot design is absolutely ridiculous and will cause horrific confusion for most audio ballot voters! Any non-essential information such as these disclaimer announcements should be placed at the end of a contest title, not at the beginning (if included at all).

At 8:38, I reached the end of the ballot, knowing that I had to go back into the ballot selections and make a correction.

At 8:39, I was done making my ballot selections and the correction. Because it was getting late and my ride home was waiting, I decided to skip the time consuming ballot review process, having to trust that I was careful enough in double checking my selections as I made them in the first place.

When I selected to cast my ballot, it was difficult getting through the VVPAT printing and final casting confirmation, especially when one of the fire trucks pulled up next to me, in its preparation for going out on a call. Alarms and PA announcements were blaring, and it was getting hard to hear anything, much less the sound of the VVPAT printer or the voting machine's final prompts. I had to just sit with my hand over the voter card slot, waiting and hoping for the card to be ejected.

At 8:41, my voter card popped out and I was done! The poll worker was a bit too excited about giving me my "I voted" sticker and she forgot to ask me for my voter card, which is about the fourth time I could have simply walked away with one of the smart cards. I wonder how many of the smart cards go missing during an election. Maybe they ought to include on each smart card one of the anti-theft strips used by retail stores to prevent shoplifting.

In this election experience, as in most of the rest of my DRE voting experiences, the poll workers reached a point at which they gave up. I would not have been able to get the

machine working and vote on it if my technically talented wife and I had not persevered and helped them get it working. This really does not represent an accessible voting solution for typical voters with disabilities.

In almost every one of my 12 election experiences with Santa Clara County's Sequoia Edge II DRE voting systems, the most common and frustrating hassles have been with the voter card encoders. At our last county VAAC (Voter Access Advisory Committee) meeting we recommended that the county tape to each card encoder a small printed note with a step-by-step summary for encoding a card for an audio ballot. Our county seems not to have bothered with that improvement, maybe because it was too simple?

Once again, our poll workers seemed to be very friendly and helpful folks, so I don't want anything I've said here to sound as though I'm blaming them.

On the other hand, I do not feel so generous about the Santa Clara County election officials or the voting system vendors, both of whom could have easily and inexpensively done so much more to make our voting systems more reliable and accessible.

14. November 5, 2013 Election

For the 3rd election in a row, my neighborhood precinct was located in the nearby fire station. Because there was only one item on the ballot, and it attracted little attention, there was no line when we arrived.

At 5:19, I was met by the familiar and very friendly poll workers and signed in.

I asked to vote on the voting machine, and they accompanied me to where it was already set up. When I asked for my voter ID card, to initialize my voting session on the Sequoia Edge II voting machine, the poll worker apologized for forgetting that one was needed, and she returned to the check-in desk, to fetch me a voter ID card.

Just behind the voting machine, there was a radio blaring out loud rock music that would interfere with listening to the voting machine's voice. While the poll worker went to find me a voter ID card, my wife discretely slipped behind the machine and turned the radio off. In previous elections, the fire station's PA system was blaring away, and another time there was a leaf blower roaring just outside the door next to the voting machine. Luckily, with the radio turned off, the area around the voting machine was relatively quiet, with just the normal babble of voices one can expect in a polling place.

Soon after that, the poll worker returned with a voter ID card. Although I've done it several times before, I still had trouble finding just where on the lower, left-hand, front area of the machine the card should be inserted.

Once I successfully inserted the card in the slot, the machine beeped and displayed the startup language selection menu.

At this point, the poll worker said, "There you go!", and she turned to leave. My wife, who hadn't yet gone to mark her own ballot took one quick look at the screen and

explained to the poll worker that it was the screen for the visual ballot, rather than an audio ballot.

I suggested that she might not have set up my card properly on the voter card encoder at the front table.

The poll worker then popped behind the machine and "hit" the button to make the voting machine return my voter ID card for reprogramming. However, the machine did not return the card and the poll worker went back behind the machine to search for the "right button". At this point she told me that her poll worker training for this election did not include any training on the "audio machine".

I asked her if she was pushing the yellow button on the bottom, left-hand side of the back of the machine, and she said, "Yes, that's what I just hit".

I pointed out that, in the past, this yellow reset button had to be held in for several seconds. The poll worker very cooperatively held the button in for several seconds, but the machine still didn't return the card.

At this point, my wife returned from marking her ballot, took a closer look at the display screen, and explained to the stymied poll worker that the screen now offered a "Cancel Session" option. This was evidently a new option, one for which the poll worker hadn't been briefed. When she found and selected that option, the machine finally returned my card.

After more carefully programming my card with the voter card encoder, the poll worker returned to my machine and re-inserted the card. This time the machine showed the screen that let us know that it was starting to load the audio menu system.

At 5:30, the machine finished loading the audio system and began talking its way through the startup language selection menu, and it was ready to let me start voting.

After the machine announced the name of the first contest (a school funding measure), I pressed the Next arrow key, expecting to hear my choices of "Yes" or "No". However, it gave me a "Review your selections" message, and then gave "Finished Voting" when I pressed the Next key again. At this point, some voters might have been ready to walk away from the machine thinking that had just "Finished voting".

It was then that I remembered that I was supposed to press the Select key, not the Next key, when the machine read out the contest name.

After navigating back into the contest correctly, I was able to finally make my desired selection for the contest, review my selection to check it, navigate to the "finished voting" menu, and choose to have the machine print my choice on the VVPAT (which gave me no method for verification), and cast the ballot.

At 5:36, I removed the released ID card from the machine and went back to the front table, where we were given our "I voted" stickers, chatted with the poll workers, and waited for them to ask for me to return the voter ID card. I was curious to see if they were going to let me walk out without returning the voter ID card (although I knew my wife would never let me get away with actually keeping the card). After a few minutes of waiting, I showed the card to a poll worker as he walked past behind me. Seeing the

card in my open hand, he asked, "Are we supposed to keep the voter ID cards or let you take them?" Of course, I happily surrendered the voter ID card. In a previous election, I actually walked out of the polling place, before I realized that I still had the ID card in my shirt pocket and had to go back to return it.

Once again, if my technically savvy wife and I were not very experienced with these voting machines, how long would it have taken the poll workers to have figured out the correct setup on their own? Could a typical inexperienced voter who was not assisted as I was by a computer scientist spouse have been able to successfully vote privately and independently on the "accessible" voting machine in our polling place?

15. June 3, 2014 Election

For the 4th election in a row, my neighborhood precinct was located in the nearby fire station. Although all of this year's poll workers at our precinct were new, they were all friendly and tried to be very helpful. Turnout was low this year, and I was only the 30th voter of the day.

3:41 - I signed my name in the register and asked for electronic voting. I was offered a voter card that hadn't yet been encoded in the voter card encoder unit. I explained that I wanted the machine to talk, so I needed the card to be encoded. After several minutes of trying to encode the card, the poll workers realized that the encoder was not turned on.

3:46 - After I inserted the encoded voter card in the Sequoia voting machine, my wife pointed out that the screen wasn't showing that the audio ballot was loading, an indication that the voter card had not been encoded for an audio ballot. We explained that they needed to use the card encoder to enable the voter card with the audio choice on the card encoder's hidden menu, the menu that doesn't show up unless the poll worker knows the trick for causing the encoder to display the menu with the audio ballot choice.

While one poll worker went to encode a new voter card, another began searching the menus on the screen, to try to get the voting machine to eject the voter card that was still trapped in the voting machine. When the overwhelmed poll worker gave up and started off "to call the tech support hot line", my wife checked the screen and explained to the poll workers that they would need to do a hard reset on the machine. After they couldn't manage to find the reset button, I explained that it was the yellow button in the bottom left corner of the back of the machine. A poll worker then managed to find and press the reset button, but only momentarily. After we explained that the reset had to be held in for a while, they held it in longer and the machine reset and offered them a screen with an option that finally ejected and returned the voter card.

3:50 - By this time, one of the other poll workers had managed to successfully encode another voter card with the audio ballot option enabled.

When I put the new voter card in the machine, my wife showed the poll workers that the screen was starting to show the proper audio ballot loading messages, indicating that they had encoded the card properly.

3:53 - The audio languages finished loading and the machine was ready for me to start voting with an audio ballot.

For the first time in over a dozen elections, the English audio ballot was recorded by someone who sounded like a native English speaker. However, the volume levels were not normalized at all and varied from way too loud to barely audible, even amongst the choices in a single contest. The volume fluctuations were so bad that I asked my wife to witness it by listening to a couple of the candidate names in a contest, and she confirmed that the volume variations were unacceptable and also likely to introduce a bias for certain candidates.

4:10 - I finished making all my ballot selections.

4:12 - I tried to review the ballot, but gave up and decided to just go ahead and cast the ballot without going through the lengthy and frustrating ballot review process. Part of the reason I gave up on trying to review my ballot choices was that a large and noisy compressor unit automatically cycled on near me in the firehouse, making it hard to think or hear the audio of the machine, even when I turned up the voting machine's volume.

Because I was voting with audio, the presumptuous voting machine did not offer me the opportunity to review and accept or reject the resulting printed ballot paper trail. It just printed out the ballot paper trail and immediately scrolled it out of the viewing window and ejected my voter card. I wasn't given the opportunity to have my wife read and verify the supposedly verifiable paper trail for me.

When I asked the poll workers if they were going to have anyone else vote on that Sequoia voting machine, they said they were pretty sure that nobody else would use the machine today. Since I was the first and probably the only voter to use the machine, there is no assurance that my vote will be secret. Any election official who looks at the paper trail printout for the machine in our precinct will be able to tell exactly how I voted. This flawed paper trail system offers me no way to verify the correct casting of my vote, and it also does not assure my voting privacy.

This election is the twelfth time that the poll workers could not manage to properly set up an audio ballot for me by themselves. Once again, it required my own technical experience with Sequoia voting systems, as well as help from my tech-savvy wife, to accomplish voting on these overly complex and unreliable Sequoia voting systems. For voters who cannot bring their own tech-savvy family members or friends along to the polls to help get the voting systems working properly, these Sequoia voting machines clearly do not represent accessible voting systems.

16. November 4, 2014 Election

At 12:15, we entered our local firehouse and were immediately greeted warmly by the friendly poll workers who remembered us from the previous June election.

Unfortunately, the poll workers were distraught and sad to inform me that the Sequoia voting machine was not working. They explained that, when they went to set up the voting machine just before the polls opened, they couldn't find any of the voter ID cards that are used to enable the voting machine for each voter using it. After searching through all of their polling supplies, they concluded that the county had neglected to include the cards. They placed their first call to the county at 8:15, to ask for cards to be delivered ASAP. They told me that they had explained to the officials at the county central facilities that they were sure that they needed the voting machine to be working, because they knew from past experience that I would be coming to vote there, as I always do.

Before I originally arrived shortly after noon, they had already called the county elections support staff twice more, asking again for them to send out the needed voter ID cards.

Because there was no other way to get the voting machine working for me, the poll workers suggested that I have someone else fill out a paper ballot for me, that I go to a different polling site and vote provisionally, or that I come back later when they hoped to have the voter cards and a working voting machine. I gave them my phone number and they agreed to call me to notify me when the cards arrived, which they were pretty sure should be before 4:00 that afternoon.

My wife and I returned home and waited patiently all afternoon, without ever getting a phone call from our poll workers. Finally, we gave up and returned to the polling place at 6:25, where the poll workers happily told us that the needed voter ID cards had been finally delivered just a few minutes before we showed up, (only 10 hours after the lack of cards was originally reported to the Santa Clara County elections staff).

At 6:30, after I had inserted my voter ID card in the voting machine, and the poll worker left me with the observation that, "The machine is up and ready", my wife took one quick look at the screen and told me that it was not loading the audio ballot system.

I invited the poll workers back over to take a better look at the screen and explained to them that it was the visual voting startup screen, which meant that they had not properly encoded the voter ID card for the audio ballot mode.

Since they remembered the similar situation from our attempt to use the voting machine during the previous June election, the poll workers were eventually able to figure out, without too much more prompting from my wife or me, the correct procedure for resetting the machine and making it eject the improperly encoded card. I did have to explain the proper procedure for bringing up the hidden menu on the card encoder unit and selecting the audio ballot, before they could program a new voter ID card.

At 6:36, the new voter ID card was loaded into the voting machine and it was finally loading up with the proper audio ballot mode.

At the beginning of the ballot selections process, the system read out the long party disclaimer message, which I believe is only supposed to be presented for our primary elections. Evidently, elections officials had not tested the system to make sure that the audio ballot matched the printed ballots, which did not include the improper disclaimer message.

I managed to stop the machine's reading of the disclaimer message, but that meant that the system skipped over the start of the ballot, which it was supposed to read aloud to me.

In the past, there have been seriously large differences between the volume level of the machine's built-in factory messages and the county's recordings of contest and candidate names. This year, the volume levels were better normalized. However, the county's messages had a lot of annoying AC hum and the messages were once again sometimes difficult to understand because they were not read by a competent native speaker.

As I made my way through the ballot, there were a couple of times when I was confused by the system announcing the name of an office other than the one I thought I was trying to select. The problem was that, because the lack of proper reading inflection and other context separators, the announcement of a candidate's current occupation or position would sometimes be spoken in a manner that made it seem to be the title of the current race. This should at least be improved by adding a context clarifier such as "currently" before the candidate's title or position.

Three different times, while I was working my way through the ballot selections, the system burped and bounced me back to the startup language selection menu. There it forced me to go through the whole process of reselecting the English language mode and then exiting out of the language selection menu. For me, this was mostly an annoying waste of time and patience, but for some others, it might thoroughly confuse them and cause them to give up on the whole machine voting process.

At 7:02, I finally managed to finish making my vote selections. Because the ballot review process on the Sequoia Edge voting machine is like a long non-pausable drink from a fire hose, I did not want to keep my wife waiting for all the extra time that would require. Since I was not very confident that the system had properly recorded my intended selections on many of the down-ballot propositions with Yes/No choices, I chose to return to the ballot selections process and revisit the down-ballot choices individually. This was not easy or quick, but it went much faster than sitting through the whole tedious Sequoia ballot review process.

Even "rushing" through my "review" by using the ballot selection process was slow and painful, as there are long pregnant delays after each selection, through which the voter must patiently wait to hear whether or not the machine is going to say, "Selected".

At 7:11, I finished "reviewing" or checking my down-ballot choices and selected the ballot printing/casting process. The machine said nothing for a full minute, and then it finally said, "Please wait".

At 7:12, the machine finally ejected my voter ID card and I was done, after a total of 46 minutes at the machine (and not counting the six hours of waiting for a working machine).

17. June 7, 2016

Once again, we were voting in the near-by fire station and were greeted by friendly poll workers as soon as we walked in at 8:30 AM.

The Sequoia Edge voting machine was helpfully set up on a table, rather than on the manufacturer's supplied leg stand. In addition, there was already a chair considerably set up in front of the machine for me to sit on while voting, with my braille notes and the keypad balanced on my lap. As a help in correctly orienting the voter card in the voting machine, the left back corner of the card had been cut off. Considering how hard we are having to push Alameda County to supply accommodations such as the corner cut cards and chairs at the voting machine, I certainly appreciated the fact that Santa Clara County elections officials made those accommodations.

However, one change that we have not been able to convince either Santa Clara or Alameda counties to make is to stop using the voter card encoder and voter smart cards to configure the voting machines. By configuring the voting machine directly on the touch screen of the voting machines in what is called "manual mode", the poll workers could completely avoid the use of the voter card encoders and the pervasive and all-to-common errors in configuration that cause the machines to fail to work in the audio ballot mode.

As has happened in almost every one of the 16 times I've tried to vote with the Sequoia machine in Santa Clara County, the poll workers didn't encode my voter card properly for the audio ballot. After he saw the voting machine read my voter card and start loading, the poll worker left, but my wife stopped by my voting machine, took one quick glance, and confirmed that the audio ballot was not being loaded. We called the poll worker back over and pointed out that the screen was indicating that it was loading the visual ballot, rather than the audio ballot. The poll worker did not know how to cause the machine to eject the voter card so they could try to encode it again. When he asked the head poll worker, she remembered that the machine needed to be reset by "pressing the yellow button on the back", so he pressed it right away. However, the machine did not eject the card. I had to explain to the poll workers that pushing the yellow button was the right thing to do, but the button had to be held in for five seconds to cause a reset. Soon after that, the poll worker returned with a freshly encoded card, but that card was also encoded improperly and failed to load the audio ballot. On the head poll worker's third attempt to encode my voter card for the audio ballot, I carefully described the correct steps for encoding the card correctly. If all the encoding steps are not followed in the right order, the audio ballot will not be properly encoded. On this version of the HAAT card encoder, the party affiliation choice must be done before the audio ballot selection is made. Apparently, the version of HAAT card encoders used in Alameda

County do not have this idiosyncrasy. I don't blame the poll workers for not being able to remember how to encode the cards correctly. However, it is clear that Santa Clara County should attach a step-by-step encoding instructions crib sheet on the card encoder, as is done in Alameda County.

The voting machine was finally able to start talking with the audio ballot. The first major problem I encountered was that the races for federal offices all had a long notice about cross-over voting rights before it spoke the actual title of the race, and there was no way to skip over the notice and hear the title of the contest. This was very confusing and made it very difficult to figure out which contest was being selected.

After I finished making all my contest selections, the machine offered to review all my selections, but I declined to use the review function, having learned that it would only lock me up in a tedious and time consuming read back of all the contest selections with no controls for navigating through the review, not even a pause/continue control.

After fighting my way through the ballot, I encountered another problem at the end of the ballot, where I was prompted to press Select to cast my ballot or press the yellow Back button to return to the contest selections. When I pressed the Select key, the machine kept repeating the same message. Somehow, I managed to finally get the machine to cast my ballot.

Because I skipped the ballot review process, I finished this voting in 24 minutes, definitely one of my shortest in-booth voting times ever.

Later in the day, I traveled up to Berkeley, to observe a friend who is blind as he attempted to vote on the same kind of Sequoia Edge voting machine. After a false start in which we had to return to his house to search for his VBM ballot, he was finally able to vote on the Sequoia voting machine. The Alameda poll workers managed to encode his voter card correctly for audio on their first attempt! However, he had a lot of trouble using the machine, especially because of the cross-party voting notices that blocked the names of federal contests. It took him a full ten minutes to find the US Senate race and reselect the candidate, which he had earlier selected and then accidentally deselected.

My friend also ran into the same confusing "trap" I was stuck in at the end of the session, trying vainly to press Select to finish casting his ballot.

His total in-booth voting time was 49 minutes.

It should be clear, from both of our experiences, that it takes serious commitment to be able to struggle through voting on these Sequoia voting machines, and it almost requires that a voter who is blind either have a lot of experience with the machine or else brings along a tech savvy assistant.

18. June 5, 2018

At 2:01 PM, I signed in at the polling place in our near-by fire station.

Because these poll workers were all new to our polling place, none of them recognized that I am totally blind. When I had my wife point to where I should sign the book, one of the poll workers nicely offered me the use of a magnifying glass. They then handed me a written paper ballot, and I explained that I needed to use the voting machine instead.

My wife carefully watched the hands of the poll worker who was responsible for operating the HAAT card encoder, and she realized that he had not taken enough steps to properly encode the card to enable an audio ballot. As he handed me the encoded card, my wife asked, "Are you sure that you did that right?" This got the attention of the head poll worker, who asked him, "Did you enable it as an audio ballot?" The head poll worker opened up a binder and handed it to him. He then quickly brought up the hidden menu, and selected the audio ballot option. If not for my computer scientist wife and our accumulated experience with the Sequoia voting systems, I would have had to endure the frustration and confusion of waiting in front of the machine for 5 to 10 minutes, until somebody figured out that it was not loading the audio ballot.

Another poll worker then walked me over to the Sequoia voting machine, and my wife tagged along, to make sure that the startup screen showed that the machine was loading the audio ballot after I inserted the smart card in the machine.

Satisfied that the machine was loading properly, my wife went off to start hand marking her paper ballot.

Thankfully, the Sequoia machine was not set up on the vendor-supplied stand; rather, it was set up on a table and a chair was supplied in front of the machine.

At 2:05, the machine finished the long silent loading of the audio ballot and was ready to start talking.

At 2:06, the machine was ready to start talking me through the ballot; however, I again had to wait patiently, as the machine painstakingly plodded through a slow reading of a legal party disclaimer notification that was prefixed to the name of the first race on the ballot. Many audio ballot voters eventually tire of listening to this notification and press the Next control key, to skip past the message. However, they do not realize that that causes them to completely skip the first race. Although we have repeatedly reported this problem to the Santa Clara County and other counties using the Sequoia voting machines, our county still refuses to fix this problem. This notification prefix problem has caused reported "missing race" problems by many audio ballot voters, even problems that resulted in trouble hot line reports and actual voter disenfranchisement. I was glad to hear that there is a better run county, about an hour south of ours, which avoids the problem by leaving the notification prefix message off the audio ballot completely.

Because our polling place is in a firehouse garage, there are often many distracting noises, such as fire truck engines starting up, and the noise made it necessary for me to often back up and repeat messages.

This year, the voting machine was placed next to the front door, so there was a chilly wind blowing on my hands, as I tried to balance my braille notes on my left leg and balance the control keypad on the other. Several times, I had to stop and warm up my hands enough that I could manage to read my braille notes.

At 2:27, I finished with the last race in the ballot. Because the audio ballot review process takes so long and is nearly useless, I again skipped it this year. Instead, I navigated back through the vote selection process, as a faster and more efficient method of checking my selections. It was a good thing that I took the time to do that alternate form of review, since I did discover and correct a mistake I made on one of the down-ballot propositions.

When I tried to cast my ballot, pressing the Select key did not seem to be causing the machine to complete the ballot casting, but eventually, the speech stopped talking for quite a while and I could finally hear the VVPAT printer beginning to print my ballot. Since I was using the audio ballot, the machine did not present my VVPAT printout in the display window. It presumes that I should not be allowed the opportunity to attempt verification with my smart phone OCR reader or with a sighted assistant.

At 2:30, the ballot casting was done and the voting machine finally ejected my voter card.

This is the 18th time I have voted on the Sequoia voting machine in Santa Clara County, and, as evidenced by the poll workers repeatedly making audio encoding errors, the elections officials have not improved the reliability of the proper set up process for the voting machines. At a minimum, they ought to incorporate a simple printed step-by-step card encoding instruction sheet, which they could attach at the back edge of the HAAT voter card encoder unit, as Alameda County is now doing and which appears to have greatly improved the odds of the machine's being configured properly for an audio ballot.

Santa Clara and other counties that use the Sequoia Edge voting systems could also improve their voting system reliability by covering up the troublesome RJ jack on the back of the unit. This is an inoperative jack that sits next to the same kind of jack that is supposed to be used for the key pad. Putting a dust cover cap on that unused jack is an inexpensive way to prevent the problems from the jack's accidental use.