A protocol for usable accessibility testing for voting systems

Center for Civic Design

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Summary

This document is a protocol for testing voting systems for accessibility, with a focus on the voter experience. That is, it provides a test of usability and accessibility functions *in use,* including how well the ballot presents voters with options and allows them to confirm their choices while marking and verify their ballot before casting.

It was originally developed as part of a state certification program where systems must first be certified by the Election Assistance Commission (EAC) to the Voluntary Voting System Guidelines (VVSG). The state relied on federal certification for the technical and hardware requirements, as well as assurance that all of the required features were present.

The method in this protocol combines an expert review of the accessibility features with usability testing with voters and poll workers. The ballot and test activities can be adjusted to local election administration rules, such as straight-party voting, fusion nominations, and voting methods including vote-for-N or ranked choice voting.

- Voters with a broad range of disabilities are asked to complete a full voting session, with scenarios that covered tasks during the process of marking, reviewing, and casting a ballot.

- Teams of poll workers who work together on Election Day were given brief training before running through a series of scenarios designed to test the interaction poll workers have with the accessible features of the systems.

This test protocol is adapted from the **Handbook for VVSG 2.0 Usability and Accessibility Test Strategies** (NIST Voting Technology Series VTS 400-5). The Handbook provides a test approach for all of the VVSG technical requirements in Principles 5 through 8.

The goal of the protocol is for a test that is both practical and effective. It tests how effective the voting system design is in supporting private and independent voting for voters with disabilities. It is also intended to provide information for jurisdictions purchasing a system to consider in deciding which system to purchase and what they need to ensure a smooth rollout.

What's inside

Overview of the testing approach

Goals, selecting examiners, and introduction to the protocol

Testing voting systems for usable accessibility

This document defines a method of usability testing a voting system with people with disabilities and the qualifications for the people running the test.

The goal of this testing is to ensure that voting systems purchased and used enable people with disabilities to vote independently and privately as required by the Help America Vote Act. It can be used as part of a state certification examination or as a way to better understand how voters with disabilities would interact with the system to write voter education and poll worker procedures and training.

The primary outcome of this test is a report on how the voting system can be effectively deployed in polling places to serve voters with disabilities better. However, it is possible that flaws in the implementation of accessibility features might be discovered, even in systems that are certified to VVSG 1.0 or better.

The protocol for the accessibility examination includes four parts:
- A review by expert accessibility and usability examiners
- Usability testing the system with a sample ballot by volunteer voters with disabilities
- Review of the setup of accessibility features by election staff and poll workers
- Consolidation of the findings into a report and recommendations

Relationship to VVSG 2.0 certification

Many states require that voting systems used in the state be certified to federal Voluntary Voting Systems Guidelines (VVSG). Federal certification includes examination by an accredited test lab and approval by the Election Assistance Commission (EAC).

States may also conduct their own testing to ensure that the voting system meets state-level requirements. Requirements included in VVSG do not need to be repeated in the state exam, allowing this test to focus on aspects of the voting system not covered in the VVSG.

State certification testing is also as a chance to consider the behavior of actual voters or how the system can be set up in a realistic polling place. Even a system meeting the VVSG may include situations where how it is deployed by a local jurisdiction can make a difference.

This protocol uses an approach to usability testing from **Handbook for VVSG 2.0 Usability and Accessibility Test Strategies** (NIST Voting Technology Series VTS 400-5), but does not duplicate testing to technical requirements in VVSG 2.0.

In addition, usability and accessibility are relatively new parts of testing products to a standard, and expectations for accessibility are constantly evolving. It is state and local elections offices that are required to provide a private and independent voting experience to voters with disabilities.

Purchasing an accessible voting system is just the first step in meeting the real-world challenges of that goal.

What the VVSG 2.0 certification covers

In VVSG 2.0, Principles 2.2 and 5-8 provide a good basis for usability and accessibility. They are based on HAVA requirements, usability best practice, and federal laws and regulations including the Voting Rights Act and "Section 508" accessibility regulations. They cover:

- Ability to vote independently and privately in a similar manner to other voters
- Ability to change text size and adjust color and contrast for visual preferences
- Audio ballot format with requirements for controlling the audio
- Tactilely discernable controls suitable for use non-visually or with limited
- Ability to reach all controls from a wheelchair
- Information in plain language for instructions and other information
- Clear navigation within and between contest, including feedback for errors
- Privacy both while the voting system is being used and for voter preferences, including language or interaction preferences

In addition, the voting system manufacturer is required to conduct usability testing with a range of voters and report on that testing using a standard format (the CIF, or Common Industry Format) for comparability.

What VVSG certification does not cover

The VVSG is a technical standard, so it is focused on qualities of the system, rather than the system *in use.* In fact, considerations for what happens when a system is deployed by a local election jurisdiction has been ruled specifically out of scope for the VVSG.

This leaves an important gap that state certification can fill, providing better information for jurisdictions purchasing a system about how well it will work to meet the goals of HAVA:

- Better information about the usability of the system for voters with disabilities
- Guidance on ways to use the system more effectively in polling places, making it easier for poll workers to assist voters in how they set up and interact with the system.

Accessibility testing examiners

The accessibility examination is coordinated and reported by a two-person team providing dual expertise[1]. The team consists of:

- **Disability expert** – experience working with multiple disabilities including physical/motor, visual, and cognitive, and expertise beyond the individuals who help test the system.

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[1] It is possible that a dual-expert can be found who can oversee the entire protocol, but many of the activities will need two people, so having complementary expertise is desirable.

- **Usability expert** – experience designing technical systems observing behavior, and an ability to draw general insights from individual interactions.

These two will work together to ensure that the examination is as robust as possible within the protocol and time constraints. They will also collaborate on the final report, summarizing both their review of the system and the input from the people who participate in the usability testing.

The goal in selecting examiners is to ensure that the final report includes a broad view of the needs of voters with disabilities and contains useful information to improve the accessibility of elections.

Table 1: Combining strengths of accessibility and usability

Expertise	Expected Strengths	Possible Weaknesses
Accessibility	Experience and practical knowledge of: Variety of disabilities and their impact on daily activities Range and use of assistive technologies	Usually little experience or knowledge of: Design principles Digital technology Usability testing (vs. individual assessment)
Usability	Experience and practical knowledge of: Design principles for usability Running usability tests Finding insights through observation Running and analyzing surveys	Usually little experience or knowledge of: The full range of disabilities, including motor and dexterity Assistive technologies Working directly with people with disabilities
Elections	At least one of the examiners must have strong experience in elections and in voting system standards. If this is not possible, a third team member can fill this role and act as a note-taker.	

➔ **For qualification details, see Appendix 1: Qualifications for examiners**

Protocol for the accessibility testing

Objectives and activities

Objectives for the examination protocol

Unlike most certification examinations, this protocol is aimed at understanding the accessibility of a system in addition to passing or failing it, based on the certification requirements.

The objectives are to consider the following questions and make recommendations that will help county election officials make decisions about which system will work best in their county and how to use it effectively.

- How well does the system provide an accessible voting experience?
- What issues should election officials be aware of that can be addressed through voter education?
- What issues should election officials be aware of that can be addressed through polling place setup and procedures for poll workers?
- Are there any accessibility problems or bugs that should be reported to the vendor for remediation?
- Are there any accessibility problems severe enough that the system should not be certified for use in the state?

Activities in the examination

The examination is in four parts, each described in detail below:

- **Expert review** by the examiners, using scenarios based on personas of PWD from NIST and their professional experience.
- **Voters with disabilities use the** system voting a reasonable length ballot and filling in a questionnaire about their experience.
- **Election officials and poll workers test the accessibility features** how they are activated during an election. They comment on the system based on their experience.
- The examiners consolidate the findings into a report.

➡ **Details: Appendix 2: Overall examination schedule**

Activity 1: Expert review by examiners

The examination begins with an expert review of the system. This demonstration and review gives the examiners a chance to make sure they understand how the system and accessibility features works and to note anything they want to watch for during other testing.

This portion of the examination is expected to take 2-4 hours, depending on the way the accessibility features are implemented.

A representative of the manufacturer will be present for this review to answer any questions and ensure that the examiners understand how the system is intended to work.

Manufacturer's demonstration

The review starts with the manufacturer's demonstration of voting system, including:

- All accessibility features of the voting system including
  - Settings for visual display preferences
  - Audio format preferences
  - Tactile controls
  - Controls for use by voters with low or no use of 1 or both hands
  - Language selection
- Any controls or actions used by poll workers to enable accessibility features
- Any accessibility hardware (such as tactile keypads or headsets) included with the voting system or expected to be provided at the polling place
- Any features that enable the use of personal assistive technology
- Any features to adjust the position of the voting system, such as the height of the overall system, or angle of the screen

Independent accessibility review

The examiners will then use the voting system themselves, giving them a closer look at each of the accessibility features. To help ensure focus on the needs of the wide range of voters with disabilities, they will use 4 voter profiles, developed by NIST and the EAC-funded Accessible Voting Technology Initiative:

➡ **Profiles: Appendix 3: Voter profiles**

- The review will use the same ballot and instructions used in usability testing to ensure that they have exercised the system and variations in the interactions needed to mark the ballot.

- Reviewers will run through the ballot for each of the profiles, using appropriate accessibility features for each.
- They will run through the ballot additional times as needed, to review the use of all accessibility features.
- Their notes will identify any areas of concern and a severity level

➡ **Notetaker: Appendix 4: Facilitator Scripts and Forms**

Activity 2: Testing with voters with disabilities

This is the center of the testing: voters with disabilities using the voting system in a structured activity. They will be observed by the examiners, and will also fill out a questionnaire about their experience.

➡ **Session guide: Appendix 4: Facilitator Scripts and Forms**

➡ **Additional notes: Appendix 5: Guidelines for prompting participants**

We have an information sheet for any members of the public who are observing the test

➡ **Handout: Appendix 6: Guidelines for observers**

Goals

The goals of this portion of the accessibility certification testing is to gather:

- Quantitative data on how accurately people can use the system to mark the ballot (objective/quantitative)
- Qualitative feedback on how well the system supports people in finding and using the accessibility features they need or prefer.
- Other comments and suggestions from the testers on their experience using the system
- Other qualitative observations about how well the system works

In addition, the demographics and elections experience data will allow the examination report to consider whether voters with different election experience or different disabilities might have needs for using the system.

Roles for the examiners and others

- The usability-focused examiner also serves as **facilitator** or the person reading the instructions in this document. As facilitator, the usability-focused examiner also plays the poll worker when necessary. They also take notes over the course of the test using the attached data collector.
- The disability-focused examiner also serves as the **primary note taker**. Although the facilitator also takes notes, the disability-focused examiner looks for subtle cues the facilitator may miss while they're busy leading the test.

Other people in the room may include:

- Members of the public
- Other staff from the elections office
- Vendor staff supporting the machine

Participants

We will invite people with disabilities to come test the voting system. Although all are welcome, ideally, the goal is to include at least 2-3 people with each of the following disabilities, or combinations of disabilities:

- limited mobility (using either a wheelchair or other mobility aid)
- limited dexterity (including age-related tremor)
- low vision or age-related vision loss
- blind
- mild cognitive disabilities or low literacy
- hearing loss (such as age-related hearing loss)

Location setup

Set up a room that is accessible and quiet. Although polling places can be crowded and noisy, the space should be comfortable for both testers and examiners.

- Pick a room that's accessible. The room should meet the same ADA requirements as a polling place. See the Department of Justice checklist at **https://www.ada.gov/votingchecklist.htm**
- The room should be quiet enough not to be disruptive.
- Make sure you can rearrange the room so that people using wheelchairs can access the voting machines. Rooms with moveable tables and chairs are usually better than ones with fixed desks.
- Arrange the furniture so there's at least a 3' path between the door and the voting machine.
- Have a chair for the participant that you can easily move out of the way if they don't need it
- Set up chairs for observers within ear and eyeshot of the machine, but far enough away that they don't obstruct the path or crowd the participant.
- Also set up chairs for any members of the public that might want to observe the system testing. Put them close enough they can see and hear what's going on, but a bit farther away than the examiners.
- Have a water bowl for service animals.

Materials to prepare

Copies of all materials, one set for each expected participant

- Ballots (from examination staff)
- Facilitator's guide
- Consent form
- Note-taking forms for the examiners
- Questions for the end of the session

➡ **Session guide: Appendix 4: Facilitator Scripts and Forms**

➡ **Consent form: Appendix 8: Consent form**

Test activities

The examiners will facilitate the session and take notes on their observations. One of them (or a volunteer) will act as a poll worker if a participant needs assistance.

Participants will sign the consent form after they are introduced to the session and informed of their rights.

➡ **Consent form: Appendix 8: Consent form**

The participants will mark, verify, and cast a ballot. They will follow directions for both marking and correcting their selections with both specific ("vote for this candidate") and general ("vote for all candidates in the Orange Party") so that we can assess any issues in accuracy, and ensure that the full range of issues in marking a ballot are considered. These instructions may be provided on a large-print card, or be read to the participant step-by-step.

The facilitator will not suggest possible accessibility features, but instead let the participant either finds them on their own or ask for them.

For consistency, the facilitator will:

- Read the script word-for-word
- Use pre-written prompts and answers to questions for the person acting as a poll worker to read to be sure each participant receives the same information.
- Not interfere with how the participant uses the voting system except to answer questions or help the voter as a poll worker would.

After the participant casts the ballot, the examiners will ask them a few questions about the experience, including following up on any issues that occurred during the mock voting session.

The participants' sessions will end with a questionnaire about their persona background and the experience using the voting system.

Interaction with the ballot

The interaction with the voting system will include completing an entire voting session:

- Any activation required by the system such as entering a code or inserting a blank ballot.
- Selecting and setting up access features, with any assistance from a poll worker normally needed (for example, providing hardware).
- Marking a ballot, following instructions provided
- Verifying the ballot
- Casting the ballot

The ballot will be a standard ballot for all examinations based on the NIST "medium complexity ballot," as adapted for the examination to cover all contest types used in Pennsylvania.

➡ **Ballot specifications: Appendix 7: Test ballot and instructions**

➡ **Instructions for voters: Appendix 4: Facilitator Scripts and Forms**

Voters will be instructed how to vote to ensure that they exercise the full range of ballot marking activities. Some instructions will be very specific (such as naming a candidate). Some will be more general (vote for the candidate from X Party). Others will allow the voter some choice. The ballot interactions include:

- Selecting a candidate at different places within the list
- Writing in a candidate name
- Changing a selection within a contest
- Trying to vote for too many candidates
- Making a change from a review screen or once the ballot is marked
- Using straight-party voting
- Voting on a ballot question/measure

➡ **Notetaker: Appendix 4: Facilitator Scripts and Forms**

Feedback Questionnaire

The final activity for voters will be filling in a short questionnaire, either by themselves, or assisted by the examiners. The questions include:

- Demographic questions
- Questions about assistive technologies used

- Reactions to the voting system
- Open-ended questions for comments and suggestions

➡ **Final questions: Appendix 9: Voter post-test questionnaire**

Activity 3: Reviewing the system with poll workers

This part of the test is based on the VVSG test method for "poll worker usability." This part of the test will include two groups of poll workers and officials, with 2-4 people in each group. The examiners will collect information about election experience (for example, roles, years as a poll worker, systems they have used in the past).

➡️ **Session guide: Appendix 4: Facilitator Scripts**

Goals

Instead of focusing on the basic set up and shut-down of the system, the activities will include setting up the system for different access needs.

Participants

The reviewers for this part of the test will be local election officials (specifically those in charge of polling places and poll worker training) and possibly people who work as poll workers.

Invite people in **pairs** (or teams of 2 poll workers (including those with a range of experience) so they can work as a team to figure out the new system features, like they often would in a polling place.

Materials to prepare

Copies of all materials, one set for each expected participant

- Ballots (from examination staff)
- Facilitator's guide
- Consent form
- Note-taking forms for the examiners

➡️ **Session guide: Appendix 4: Facilitator Scripts and Forms**

➡️ **Consent form: Appendix 8: Consent form**

Test activities

The testing tasks will include completing any actions a poll worker will be expected to do on a routine basis or at the request of a voter, including:

- Activating the controls for the audio ballot format including the headset and any volume or speed controls.
- Activating or setting up the tactile keypad controls.
- Adjusting the screen display
- Changing language to any language used in Pennsylvania and supported by the system
- Setting up any other access features documented for the voting system.

Manufacturers will be asked to bring their instructions for poll workers and voter education as part of the package, so they can be used in this part of the accessibility examination.

During the session the poll workers/election officials will be given a short set of scenarios that require them to help a voter customize the voting system.

- We will have instructions with the scenarios and a place to take notes that they can use.
- The examiners will act as the "voter" for any scenario where this is helpful.
- The examiners will also observe and take notes.

After the team completes the scenarios, they will discuss their experience with the examiners. The questions for this discussion will include both a review of how the scenarios went and open-ended questions about any ideas they may have for making the voting system work well in the polling place.

➡️ **Session guide: Appendix 4: Facilitator Scripts and Forms**

Activity 4: Creating the report on the testing

The final step is the collection of all notes into the report.

➡ **Report Template: Appendix 4: Facilitator Scripts**

The main section of the repot is a summary of the issues identified, who is affected, and any recommendations for deploying the voting system effectively.   The final recommendations be phrases as suggestions for deployment, including:

- Any suggested procedures, instructions, or other remediation for any issues,
- An assessment of the severity of the issue, based on either the number of people affected or how likely it is to interfere with a voter's ability to mark, verify and cast their ballot independently and privately.
- Suggestions for poll worker training
- Suggestions for voter education

If any accessibility issues serious enough to cause it to fail the examination, the rationale for this recommendation will be carefully documented:

- It must cause a failure to be able to vote accurately and cast a ballot privately.
- It must affect more than one person during the test, or be easily replicated, suggesting that it might affect many voters.
- It must not have an acceptable accommodation that preserves privacy and independence.

Part of this report is the collection of the details of the testing and all quantitative data.

- The system and specific devices tested
- Information about the voter and poll worker participant numbers and demographics
- Results of the voter post-session questionnaire.
- Complete list of issues identified during the testing

Severity scale

Problems from all parts of the examination are assigned a severity rating, based on their impact on a voter's ability to vote independently and privately.

Severity rating

Rating	Given for…
Positives	Things that voters mentioned as meeting or exceeding their expectations
Annoyances	Things voters mentioned as problems, but which did not significantly slow their progress in marking their ballot

Problem Solving	Instances where voters hesitated and had to figure out how to complete an action or task, but were able to do so on their own, by exploring the system or relying on past experience with technology
Needs assistance	Problems that could only be solved with help, such as instructions or assistance from a poll worker
Likely to prevent independent voting for voters with some disabilities	Problems that could prevent successful independent and private voting, even with good knowledge about how to use the system and accessibility features

Appendix
Forms and resources

Qualifications for examiners, overall schedule, voter profiles, scripts and forms, instructions for observers, ballot contents, questionnaire

Appendix 1: Qualifications for examiners

This list of qualifications is intended to help a jurisdiction or voting system vendor select examiners with the necessary qualifications.

Accessibility and usability experts can demonstrate that they have sufficient expertise to act as an examiner for this accessibility testing through a combination of academic degrees, work experience, and industry certifications.

Voting systems are stand-alone products used in a single context: marking and casting a ballot and related activities. Unlike web or desktop applications, they run on a specific, closed platform. It is important that the examiners have expertise that goes beyond web accessibility. The accessibility examiner should also have experience with a range of perceptual and physical disabilities and the experience with assistive technologies and strategies voters with disabilities might have.

In addition to the criteria listed below, the examiners must not have worked (currently or within 2 years) for a voting system manufacturer, elections service provider, or have other conflicts of interest that could bias their judgement.

At least one examiner must have experience working in elections, whether on elections staff or as an election worker in a voting location, or some other professional knowledge of the voting experience.

Accessibility examiner qualifications

The world of accessibility and disability support includes several formal qualifications, but the type of work experience also matters.

Professional titles (and related degrees) include:

- Rehabilitation engineer
- Occupational therapist
- Vocational rehabilitation therapist

Industry certifications include:

- RESNA Assistive technology professional (ATP)
- RESNA Seating and mobility specialist
- IAAP Certified professional in accessibility core competencies (CPACC)
- IAAP Web accessibility specialist (WAS)
- IAAP Certified professional in web accessibility (CPWA)
- ATIA CEU program

They must have at least 5 years of work experience that includes at least two of:

- Assessment of needs and identifying appropriate interventions or assistive technology
- Work with people with a range of disabilities, including motor, perception, and cognitive

- Research on assistive technology for people with a range of disabilities

Usability examiner qualifications

Combining professional experience, academic degrees, and industry qualifications provides a way to identify people with the right combination of skills in usability.

Usability experts may have post-graduate degrees in:

- Human factors and ergonomics
- Human Computer Interaction (HCI), user experience, or similar terms
- Social research methods
- Cognitive psychology

They may have industry qualifications including

- Board of Certification in Professional Ergonomics (BCPE) (**http://www.bcpe.org/**)
- Certified Professional Ergonomist (CPE)
- Certified Human Factors Professional (CHFP)

They must have at least 5 years professional experience that includes:

- Conducting summative, quantitative, performance-based usability tests
- Working on public systems for a general audience
- Experience with digital (web and application) accessibility and universal design
- Work on kiosks, service design or similar products that include both digital and physical characteristics

Appendix 2: Overall examination schedule

The overall examination, including completing the report is expected to take 4 – 5 days for the two examiners working together.

Estimated time required

Activity	Hours	Notes
Expert review	2 hours	Initial orientation and review of the system
Usability testing	10-16 hours	Based on up to 1 hour per test for 6-8 participants, plus time to set up before and assemble notes at the end of the test
Poll worker review	2-6 hours	Based on 1 hour per session, plus time to assemble notes
Create final report	1-2 days	Can be completed off-site after the examination
Total time on site		2.5 days on site, plus 1 – 2 days to write the report.

Appendix 3: Voter profiles

The profiles emphasize the different display format and interaction style options covered by the accessibility requirements of the VVSG.

They are used for the expert review and as characters for the poll worker testing.

We have given these profiles names to humanize them. They are not intended to determine the demographics or personal characteristics of the test participants beyond the disability profile.

Tasha: No usable vision. Uses audio format and tactile controls
Tasha has been blind since birth. She works in a business and employs a "reader" who reads some print materials to her. However, she uses a computer proficiently and prefers to work independently. She also has a mobile app that can scan and read text.

Michael: Very low vision. Large print + audio
Mike has very low vision and uses a variety of strategies, including using a white cane to signal his vision loss. He uses audio when it's available to help him read and navigate. He also puts his face very close to what he's reading.

Tyler: Limited dexterity and some tremor and uses the touch screen with his knuckles
Tyler has a condition that has resulted in mobility and fine motor issues that resemble arthritis. He can operate controls and buttons if they aren't too small or too stiff.

Angela: Minimal use of her hands so uses the dual switch. Uses a wheelchair
Angela has a spinal cord injury. She can move her arms somewhat, but is not able to grip items or point. She uses a typing stick, held on with a splint, when she wants to hit keys on a keyboard. Angela uses a motorized wheelchair and has a service dog.

Minjun: Mild visual perception issues and limited English proficiency
Minjun has some vision loss, including being color blind. As a recent immigrant to the U.S., English is Minjun's second language. Because he doesn't read English well, he likes larger text to make each letter easier to see. Higher contrast also helps him focus.

Janine: Cognitive attention disability
Janine reads well, but can get confused when there are too many options available to her or when the text is too complicated. She is a strong self-advocate and does not hesitate to ask for help when she needs it – sometimes phrasing it as a problem "some people" might have.

Appendix 4: Facilitator scripts and forms

Some forms used in the testing are included as separate files so they can be easily adapted

CCD-A11yTesting -Script-voter-testing.docx
Facilitation guide and note-taking form for poll workers testing

CCD-A11yTesting Script-poll-worker-testing.docx Facilitation guide and note-taking form for poll workers testing

CCD-A11yTesting Form-Note-taking.docx
A form for note-takers

CCD-A11yTesting Report-Template.docx
An outline for the final report

Appendix 5: Guidelines for prompting participants

In usability testing, the goal is to allow the voters or poll workers to interact with the system as naturally as possible. That means encouraging them to figure things out by themselves rather than relying on the test facilitator to show them what to do.

The exception to this is that if the participant says that they would ask for help from a poll worker, election official, or a companion, the facilitator will switch to using prepared instructions to help them.

The facilitator's scripts have these prepared prompts. These are general guidelines to use to ensure that each participant has a similar experience no matter what voting system is being tested.

General prompts and responses

When this happens	Say this
The participant is trying to get you to give them a clue. ("Should I use the _____?")	"What would you do if you were at the polling place?" (Wait for answer.) "Then why don't you go ahead and try that?"
	"What would you do if I wasn't here?"
	"I'd like you to do whatever you'd normally do."
The participant makes a comment, and you're not sure what triggered it.	"Was there something in particular that made you think that?"
The participant asks you to explain how something works or is supposed to work?	"What do you think?"
	"How do you think it would work?"
The participant seems to have wandered away from the task.	"What are you trying to do now?"

Appendix 6: Guidelines for observers

Print this notice to place in the room or hand to observers

If you are observing the accessibility testing

Hello and thank you for coming today's test of how easy the accessibility features on this voting system are for voters to use or for poll workers to set up and use to support voters.

Your job is to observe carefully and quietly.

At the end of the test, I'll ask whether observers have questions and pass them along.

A few other things to keep in mind:

- Be patient. Maintain open body language (arms and legs uncrossed, neutral expression). Remember that the voters or poll workers want to finish as quickly as we want them to.
- Don't give any hints or instructions. Calling out something they're supposed to do disrupts the test and makes it hard for us to figure out what's really easy or hard.
- Wait to join the conversation until the facilitator asks you. We're trying to get through a number of tasks quickly and we want to hear as much as we can from our participants.

Any questions?

Appendix 7: Test ballot and instructions

The ballot used for the accessibility test will be a separate precinct so that it will not interfere with the main examiner's test scripts.

To exercise all the ways voters might interact with the ballot and ensure that the accessibility features support them, the instructions will include selecting specific candidates, selecting candidates by party, finding candidates in different positions on long and short lists in a contest, and correcting selections both initially and from the review screen feature.

#	Contest Title	Vote for..	Options	Interaction elements
1	President/ Vice President	Vote for a pair	Kimberly Jones/Tom McDermott - R Thomas Miller/Doug White – D John Brown/Louis Table – G Don Quizote/David Hero - L	Understanding that a single vote chooses two people and making an appropriate selection.
	Instructions	You want to vote for the Green party candidate		
2	US Senator	Vote for 1	James Collins – R Colby Jones – D Timothy Noah – G Julie Berger - L	Reading a short list of candidates Changing the selection.
	Instructions	You want to vote for Timothy Noah *Pause, then say I'm sorry, you want to vote for Julie Berger*		
3	Attorney General	Vote for 1	Morgan West Sr – R Mary Shapiro – D Raymond Wright - G	Reading the list of candidates Choose a candidate near the middle of the list. Identifying a candidate by party
	Instructions	You want to vote for the Democratic candidate		
4	Rep. in Congress, 5th District	Vote for 1	Otto Perry – R Bruce Arndt – D Jeff Stiller – G Miriam Webster - L	Choosing a candidate
	Instructions	Choose any candidate you would like		

#	Contest Title	Vote for..	Options	Interaction elements
5	School Director, 4-year term	Vote for up to 3 (medium list)	Gregg Ortiz – R Adam Billiard – R Sandy Woods – D Lee Miller – D Lauren Sweet - D	Undervoting Finding a candidate by name in the list. Possibly deselecting candidates
	Instructions	The only person you know running for School director is Lauren Sweet, so just vote for her		
7	School Director, 2- year term	Vote for 1	Richard Freer – R John Fedor – R Kate Billiard - R/D Ron Anderson – D Irene Noah - D	Deselecting a selected candidate
	Instructions	The only person you know running for School director is Kate Billiard and she is the only one you want to vote for because she was endorsed by both parties. Just vote for her.		
8	County Commissioner	Vote for up to 5 (long list)	R – 5 candidates D – 5 candidates 5 – 5 candidates L – 5 candidates, including Stephen Miller	Navigating multiple screens Choose a large number of candidates from a long list
	Instructions	Choose any candidates you want to vote for, but be sure to include Stephen Miller, because you heard him talk and like him. *[Note how many they select]*		
9	Borough Council	Vote for no more than 3	Alissa Schultz – R Zachary Wills – R Tanya Cult – R Tina Brady – D Russell Nixon - D	Overvoting
	Instructions	You want to vote for all the Republicans and also Russel Nixon *[Note how many they select and how they react to the overvote message]]*		
10	Election Judge	Vote for 1	No candidates	Write-in only
	Instructions	Write in Chris Smith		

#	Contest Title	Vote for..	Options	Interaction elements
11	Recorder of Deeds	Vote for 1	Tim Lee – R Gary Wells – D George Fiosk - G	Skip – don't vote for anyone
	Instructions	Skip this contest without changing anything		
12	Judicial retention	Yes/No	Debra Sykes	Change of voting method to Yes/No
	Instructions	Your choice how to vote		
13	Referendum question	Yes/No		Long text to read
	Instructions	You think you like this proposal, but you aren't sure. Read it and decide how to vote. Tell me what you decide and then mark your choice *[Note what they choose]*		
14	Review screen			Correcting a vote
	Instructions	Go back and make sure that you voted for Gary Wells for Recorder of Deeds You change your mind about the referendum question. Go change your vote. If there are any other changes you want to make, you can go ahead and make them now.		

At this point, the participant can go ahead and print and cast their ballot. There are no instructions for this section, but note what they do.

Appendix 8: Consent form

Print this form to review with the participant and then have them sign.

You should have a signature guide, or be prepared to sign for the participant noting their oral acceptance.

For groups of poll workers, you can have a single signature sheet with spaces for each of them to sign

Purpose

Before we begin, I have some information for you about what we're doing today.

We want to make sure voting systems it approves are easy for everyone to use.

We've asked you here to try using the system to do a few different things and talk about you find easy and difficult.

Test logistics and instructions

A few things to know before we get started:

- The session should take about an hour.
- Just to be clear, this is not a real ballot or election. We may ask you to vote for particular people just to see how various parts of the system work.
- We're testing the system, not you. You can't do anything wrong here.
- Please don't worry that you're going to hurt our feelings. We really want to know how it's easy or hard to use.
- If you have any questions as we go along, just ask them. I may not be able to answer them right away. We want to know what people do when they don't have someone sitting next to them to help.
- If you need to take a break at any point, just let me know.

Consent

I agree to participate in this voting system test.
Please sign in the box:

X

Date

Appendix 9: Voter post-test questionnaire

This questionnaire should be delivered orally rather than asking participants to fill it out on paper. This is so that everyone is asked the questions in the same way, whatever their ability. Use this form to collect answers.

About you

1. What is your age?
   ☐ 18-21   ☐ 22-34   ☐ 35-60   ☐ 61-70   ☐ 71 or over

2. What county in Pennsylvania do you live in? _____

3. Do you use any assistive technology in your daily life

   ☐ Screen reader   ☐ Braille   ☐ Screen magnifiers   ☐ Large print
   ☐ Color or contrast adjustments   ☐ Special keyboard or switches
   ☐ Sip and puff   ☐ Wheelchair or other mobility aids _____
   ☐ Other _____

4. How long have you been a voter?

   ☐ Never voted   ☐ Less than 2 years   ☐ 2-5 years
   ☐ 5-10 years   ☐ 10-20 years   ☐ More than 20 years

5. In how many elections did you vote in the last 2 years?
   ☐ None   ☐ 1-2   ☐ 3-5   ☐ 6 or more

6. What voting system did you use the last time you voted
   ☐ I have never voted
   ☐ Paper ballot
   ☐ Vote by absentee ballot/alternative ballot/by mail
   ☐ Ballot marking device such as the Automark
   ☐ Electronic voting system with my vote cast electronically

7. Did you use any accessibility features or preference options on the voting system you last voted on? (If yes, list what you used)
   ☐ No   ☐ Yes
   ☐ Set the text size.   ☐ Changed the colors
   ☐ Used the audio   ☐ Used the tactile input buttons
   ☐ Used a personal device _____
   ☐ Other _____

Your experience with this voting system

Answers: Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree

8. I am confident that my ballot was cast as I intended.   ☐ SA   ☐ A ☐ N ☐ D ☐ SD

9. The instructions for voting were easy to follow.   ☐ SA   ☐ A ☐ N ☐ D ☐ SD

10. The voting process involved too many steps.   ☐ SA   ☐ A ☐ N ☐ D ☐ SD

11. It was easy to move around the ballot.   ☐ SA   ☐ A ☐ N ☐ D ☐ SD

12. The buttons or the touchscreen were easy to use.   ☐ SA   ☐ A ☐ N ☐ D ☐ SD

13. I was never confused while I was voting.   ☐ SA   ☐ A ☐ N ☐ D ☐ SD

14. Writing in a candidate was easy.   ☐ SA   ☐ A ☐ N ☐ D ☐ SD

15. I could verify my ballot and correct errors.   ☐ SA   ☐ A ☐ N ☐ D ☐ SD

16. I feel that I had enough privacy while voting.   ☐ SA   ☐ A ☐ N ☐ D ☐ SD

Your reactions and comments

17. What did you like **most** about the voting system you used today?

18. What did you like **least** about the voting system you used today?

19. Did you have any **problems** using the voting system?

20. What i**mprovements** do you suggest to the voting system that would make it easier for you to vote?

21. Is there anything else you would like to tell us about using this voting system?

22. Do you have any comments for us about your experience helping test this voting system?