Jim Dickson, AAPD Vice President Government Affairs

Comments on

Voting Systems Testing Laboratory Roundtable

March 27, 2008

I am Jim Dickson, Vice President of Government Affairs for the American Association of People with Disabilities (AAPD). AAPD is the largest cross-disability membership organization in the US. Thank you for allowing me to testify this morning.

1. Are there emerging broad themes in the accessibility and usability community that should be discussed as an overview for this discussion? For example new research, new methods, new technology.

   The length of time that it takes to vote on accessible equipment needs to be studied and tracked. There are substantial differences in the length of time it takes to vote on specific pieces of equipment. With long multi-pages of ballots the AutoMark can take 40 minutes to vote and this is unacceptable. When testing voting equipment, real ballots must be used. The sample or test ballots commonly used do not reflect the complexity of the actual ballot particularly for those states who have long ballots. All testing must be done with actual ballots from some previous elections. Short ballots like many short cuts lead to a dead end - a voting machine that does not get used because it takes too long for the person to vote.

   We expect that some disabilities will take a longer period of time to vote but it should not be a factor of 8. A factor of 2 or 3 should be achievable. Many people with disabilities should be able to vote as fast as the able-bodied.

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2. What are the overarching usability concerns in voting systems? What are the overarching accessibility concerns in voting systems? Is there an intersection of these concerns?

   On Election Day we get lots of reports of poll workers who do not know how to set up the accessible equipment. The equipment standards needs to be one switch turns on everything. In addition poll worker training needs to be improved. Some poll workers resist use of accessible equipment and in fact try to steer voters to vote with assistance.

3. Do the accessibility requirements in the Draft TGDC VVSG (ex. Software Independence) document allow individuals with disabilities the opportunity to participate independently? If not, what requirements should be added/removed to the standards document?

   First I want to endorse the position taken by Dr. Diane Golden. I vigorously support all of her recommendations.

   Organization of Guidelines

   Perhaps the most pervasive concern is that the current organization of the guidelines is extremely complex and difficult to follow when trying to determine which standards make up the minimum access requirements for the one required "accessible" voting machine per polling place. The Chapter 3, Section 3 access standards do not include all the required access features for a HAVA mandated "accessible" voting system. Some access features are required by usability standards and other requirements are part of the overall typology structure. AAPD strongly urges the Election Assistance Commission to organize the VVSG in a way that either provides a central location for the "access standards" or a way of readily identifying all the "access" features that must be available for the accessible voting systems required by Section 301 (a)(3) of the Help America Vote Act (HAVA).

   Accessibility Across Processes and Formats

   It is imperative that access must be provided for all forms of official ballots (any ballot of record) -- both paper and electronic. In addition access features must also provide for access across all voting processes including generating, verifying and casting an official ballot. It is not acceptable to have a lesser level of accessibility available for paper ballots as compared to electronic ballots or to

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have a lesser level of accessibility for ballot verification or ballot casting than for ballot generation. The law is crystal clear on this issue. The EAC does not have the authority to weaken the law. Software independence does not meet the accessibility requirements of HAVA. A single agent independence as recommended by Professor Selker conforms with the law and is a less proscriptive standard.

Limited Access

HAVA requires that all voters, including individuals with disabilities, be able to privately and independently verify and cast their ballots. However, this standard begins with the caveat: "[i]f the voting station supports ballot submission or vote verification for non-blind or non-disabled voters . . ." AAPD asserts that accessible ballot verification and ballot casting should not be contingent on what the voting station supports for other voters.

Software Independence and Voter Verification

This version of the VVSG requires voting systems to be "software independent." This means that the system can be audited through the use of Independent Voter-Verified Records (IVVR). The voting systems today that meet the requirements for software independence and provide accessible options include ballot-marking devices and electronic systems with a voter verified paper audit trail (VVPAT). However, the current guidelines do not adequately address the accessibility challenges related to a paper-based ballot. As an example - for voters with disabilities, comparison of the print and electronic ballots may be more challenging, as the task will not be a straightforward visual comparison.

This same difficulty is applicable to the case of voters with disabilities using a ballot-marking device. A secondary verification process dependent on software is required. This verification is similar to the comparison of electronic and paper ballot contents except the comparison is between the electronic display prior to generating the print ballot and the actual marked ballot.

AAPD supports VVSG guidelines that are a model of what appropriate and equitable access shall be. It is the EAC's Congressionally-appointed responsibility to protect the integrity of HAVA to ensure that Americans with disabilities have full and independent access to this nation's democratic process. We are confident that with input from people with disabilities and organizations that represent people with disabilities, the EAC will have the information necessary to create guidelines that will help facilitate voter accessibility and voter usability for all voters both with and without disabilities.

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3.1 Overview

The current organization is extremely complex and difficult to follow when trying to determine which standards make up the minimum access requirements for the one required "accessible" voting machine per polling place. The Chapter 3, Section 3 access standards do not include all the required access features for a HAVA mandated "accessible" voting system. Some access features are required by usability standards and other requirements are part of the overall typology structure. Specifically, the typology structure indicates that the accessible voting system (Acc-VS) must have an electronic interface or be a VEBD in the schema used by the VVSG. However, that fact is only implied via the typology system, never explicitly stated in Chapter 3. If an election official, advocacy group or any other reader just looked at the Chapter 3 access standards, it would be difficult to impossible to understand comprehensively what is required of an "accessible" voting system.

The VVSG should be organized either in a way that provides a central location for the "access standards" or a way of readily identifying all the "access" features that must be available on the one legally mandated "accessible" system. If one location is not feasible, the organization should at least provide a way to identify and pull out the required access features so that election officials and others can use the standards as the benchmark for determining what meets the legal requirement for "accessible".

3.1.3. Interaction of usability and accessibility requirements

This section should make it clear that an accessible voting system as mandated by HAVA MUST have a voter editable interface. Simply saying an Acc-VS is classified as a Voter –Editable Ballot Device does not make it clear that manually-marked paper ballot systems will not conform to the requirements for the legally mandated accessible voting system.

3.2.2 Functional capabilities

This section should include a statement that an accessible voting system, as mandated by HAVA, MUST have a voter editable interface.

3.2.5-E Available font sizes

The wording of this standard is confusing and can lead readers to the erroneous conclusion that a voting system claiming to be "accessible" that does not have an "electronic image display" does not need to provide two text sizes to meet the needs of individuals with low vision. The words "that uses an electronic image display" should be deleted as the application notation to VEBD-V covers this

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issue. This would be consistent with the wording of 3.2.5-I A for High Contrast as that standard does not include application restriction wording in the standard. A note should also be added that clarifies that ALL accessible voting systems must have an electronic image display and must conform to this provision.

3.3 Accessibility requirements

This section should also add a statement that the Acc-VS must be a VEBD, both VEBD-A and VEBD-V. A statement should also be added to this section clarifying that access must be provided for ALL forms of official ballots (any ballot of record) -- both paper and electronic. Access features must also provide for access across all voting processes including generating, verifying and casting an official ballot. It is not acceptable to have a lesser level of accessibility available for paper ballots as compared to electronic ballots or to have a lesser level of accessibility for ballot verification or ballot casting than for ballot generation.

3.3.1-E Accessibility of paper-based vote verification

This standard must be reworded to ensure that accessible vote verification is available for ALL paper ballots that are or can be a determinative ballot of record. The standard cannot be restricted in application to only DREs with Voter Verified Paper Audit Trails (VVPAT). The current standard requires an accessibility feature be provided only when the purpose of the paper ballot is for "allowing voters to verify their votes". Some will interpret this to mean that ballot marking devices and other paper based voting systems that use paper as the core countable ballot (whose primary purpose is not for verification) do not have to provide access to that paper record even though it is the ballot of record. The wording of this standard should be revised to read follows to make it clear that paper ballot based systems designated as the accessible system are covered by the provision, regardless of the main purpose the paper serves.

3.3.1-E Accessibility of Paper-based Vote Verification

If the Acc-VS uses or generates a voter verifiable paper record that can be the official ballot or determinative vote record, then the system shall provide a means to ensure that the paper verification record is accessible to all voters with disabilities, as identified in [XREF 3.3].

The wording of the discussion section should be revised to align with the revised standard wording and the reference to 3.2.5-G "Legibility of Paper Ballots and Verification Records" should be deleted as those standards do NOT provide an acceptable level of access for individuals with low vision. The wording of 3.2.5-G expressly sanctions a significantly lesser level of access for vote verification for the Acc-VS than is required for vote generation for individuals with low vision.

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The standard only requires the voting system "provide features that assist in reading a paper ballot" instead of requiring delivery of a specific access feature designed to ensure access. Further, this deficient standard then allows for "optical devices for magnification". This wording authorizes an individual accommodation approach to enlarging print text, rather than requiring such access to be built into the voting system, which is simply unacceptable. It is impractical, and perhaps impossible, to have on hand at every polling place the variety of individual magnification devices necessary to accommodate differing types and degrees of vision loss exhibited by voters. It is also impracticable to expect poll workers to appropriately match magnifying devices to individual visual limitations and have expertise in the use of such devices to support voters who need them. Voters with low vision, just like those who are blind, should have the same access features available to support both generation and verification a paper ballot. As a result, the discussion section should be revised as follows:

DISCUSSION -- While paper records generally provide a simple and effective means for technology-independent vote verification, their use can present difficulties for voters with certain types of disabilities. The purpose of this requirement is to ensure that all voters have a similar opportunity for vote verification of any paper record that is or can be an official or determinative vote. Note that this requirement addresses the special difficulties that may arise with the use of paper. Verification is part of the voting process, and all the other general requirements apply to verification, in particular those dealing with dexterity (e.g. 3.3.4-C "Ballot Submission and Vote Verification") and blindness (e.g. 3.3.3-E "Ballot Submission and Vote Verification)*

3.3.1-E.1. Audio readback for paper-based vote verification

This standard needs two significant revisions. First, it should be revised to clarify that the read-back or re-display of ALL ballot content, including write-in text, is required for verification purposes. Many current ballot-marking devices do not provide access to write-in text. The system simply notifies the voter that a write-in has been done (e.g. says "write-in"). This leaves voters with disabilities unable to verify their write-in votes. The standard should be revised to read as follows:

3.3.1-E.1 Audio Readback for Paper-based Vote Verification.

If the Acc-VS uses or generates a voter-verified paper record that can be the official ballot or determinative vote record, then the system shall provide a mechanism that can read that record and generate an audio representation of its entire vote contents, including write-in votes.

Second, this standard only provides for audio readback for blind individuals. It does not provide individuals with low vision an equal level of accessibility.

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Individuals who are blind are ensured the same level of access for both vote generation and verification of a paper ballot through a required audio-tactile interface. A comparable standard is not in place that ensures that individuals who are visually impaired can generate and verify their paper ballots through enhanced visual display, i.e., large text size. While two text sizes ARE required for individuals with low vision to *generate* their vote (3.2.5-E), that same level of access is NOT required for *verification* of a paper ballot and should be added.

It is perplexing to understand why the standards would require manufacturers to deliver two text sizes for vote generation (per 3.2.5-E), but then not require the same two text sizes for vote verification. Requiring two sizes of text output merely ensures the Acc-VS provides an equal level of access for both vote generation and verification for individuals with low vision – it does not prescribe how that output be delivered by the Acc-VS. To ensure individuals with low vision have equal access to vote generation and verification, an additional standard should be added as follows:

3.3.1-E.2 Enhanced visual display for paper-based vote verification.
If the Acc-VS uses or generates a voter verified paper record (or some other durable, human-readable record) that can be the official ballot or determinative vote record, then the system shall provide a mechanism that can read that record and generate a visual display or other output representation of its entire vote contents, including write-in votes, in at least two font sizes (a) 3.0-4.0 mm and (b) 6.3-9.0 mm.

3.3.3-E Ballot submission and vote verification

This standard must be clarified to ensure private and independent ballot submission and vote verification is provided by the Acc-VS for individuals who are visually impaired (not just those who are blind) and those with dexterity disabilities. HAVA requires that all voters, including individuals with disabilities, be able to privately and independently verify and cast their ballots. However, this standard begins with the caveat: "[i]f the voting station supports ballot submission or vote verification for non-blind or non-disabled voters . . ." To conform with HAVA, an accessible voting station must offer a voter with a disability the opportunity to verify their ballot--whether it is paper or electronic—and the ability to cast that ballot privately and independently. Accessible ballot verification and ballot casting should not be contingent on what the voting station supports for other voters. The wording of this standard should be revised to read:

3.3.3-E Ballot Submission and Vote Verification
The Acc-VS shall provide features that enable voters who have vision impairments to verify and submit their ballots privately and independently.

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3.3.4-B Support for non-manual input

This requirement is unclear. The discussion section of the standard indicates that use of a mouth stick satisfies the requirement. An individual with good fine control of a mouth stick might be able to operate a voting system with the normal touch screen interface. However, this input option would not at all meet the needs of most individuals with motor limitations. To meet the needs of a reasonable range of individuals with motor disabilities, switch input should be required and specific minimum standards should be developed to ensure the usability of that switch input. The audio-tactile interface has many specific requirements designed to ensure the voting process is efficient and effective for voters who are blind. Similarly, using switch input with auditory or visual scanning that has adjustable features are necessary to make the voting process efficient and effective. Those ATI features that are appropriate for switch input scanning should be referenced in this standard. For example, the 3.3.3-C features for audio output are appropriate for auditory scanning. New standards should be developed that apply to both auditory or visual scanning based on the 3.3.3-B features for the ATI. For example, the requirement that the ATI allow the voter to skip to next contest or return to previous contests is an excellent requirement for switch input scanning. If a voting system only allows for forward navigation -- the only way to return to a contest is to scan through the entire ballot again. Adjustable scanning speed is another critical requirement.

3.3.4-C Ballot submission and vote verification

This standard must be clarified to ensure private and independent ballot submission and vote verification is provided by the Acc-VS for individuals who have dexterity disabilities. HAVA requires that all voters, including individuals with disabilities, be able to privately and independently verify and cast their ballots. However, this standard begins with the caveat: "[i]f the voting station supports ballot submission or vote verification for non-blind or non-disabled voters . . ." To conform with HAVA, an accessible voting station must offer a voter with a disability the opportunity to verify their ballot--whether it is paper or electronic—and the ability to cast that ballot privately and independently. Accessible ballot verification and ballot casting should not be contingent on what the voting station supports for other voters. The wording of this standard should be revised to read:

3.3.4-C Ballot Submission and Vote Verification

The Acc-VS shall provide features that enable voters who lack fine motor control or the use of their hands to verify and submit their ballots privately and independently.

4.4 Independent Voter Verifiable Records

This version of the VVSG requires voting systems to be "software independent." This means that the system can be audited through the use of Independent Voter-

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Verified Records (IVVR). The voting systems today that meet the requirements for software independence and provide accessible options include ballot-marking devices and electronic systems with a voter verified paper audit trail (VVPAT). However, this section does not adequately address the accessibility challenges related to a paper-based ballot. In particular there are a number of standards that simply cannot be met when the VVPAT is rendered in an accessible media. (See 4.4.2.3. A and B for examples.) It is also unclear what if any software independence standards apply to ballot-marking devices as related to generating versus verify ballot contents for voters with disabilities. (See 4.4.3 for more issues.)

For both VVPATs and ballot marking devices, the standards are unclear regarding hardware options. Voters with disabilities should be able to use the same hardware output device (headset and/or visual display screen) to receive information from two distinct software sources without violating software independence requirements – but this is not clear in the current standards. In a system that produces a VVPAT or in a ballot-marking device the software that generates the print on the ballot and the software that scans the content of the print vote selections can be kept separate without requiring physically separate output hardware. Language should be added to the standards to clarify that duplicative output devices for either DREs with a VVPAT or ballot marking devices are not required to ensure software independence.

4.4.2.3 A VVPAT prints and displays a paper record

This standard requires a VVPAT to print a ballot that can be easily compared with the electronic ballot in similar format and presentation. This clearly describes the visual comparison process that will be used by non-disabled voters. For voters with disabilities, comparison of the print and electronic ballots will be more challenging, as the task will not be a straightforward visual comparison. This standard needs to address how non-standard print format material comparison can be accomplished or allow for alternative comparison.

4.4.2.3 B Title

This standard requires rapid and accurate comparison of a print and electronic ballot. This clearly describes the visual comparison process that will be used by non-disabled voters. For voters with disabilities, comparison of the print and electronic ballots will be more challenging, as the task will not be a straightforward visual comparison. This standard needs to address how non-standard print format material comparison can be accomplished or allow for alternative comparison.

4.4.3 PCOS Systems

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The standards applicable to systems using a base paper ballot seem to assume that voters will be completing those ballots directly, thus there is no need for verification standards that ensure software independence. However, in the case of voters with disabilities using a ballot-marking device, a secondary verification process dependent on software is required. This verification is somewhat similar to the comparison of electronic and paper ballot contents except the comparison is between the electronic display prior to generating the print ballot and the actual marked ballot. Voters who use a ballot-marking device must be able to verify that the marked paper ballot is in fact printed with the vote selections made via electronic interface which requires a software assisted verification process.

It is unclear what if any standards apply to the software of a ballot-marking device pursuant to the software independence requirement. Is it acceptable for the same software to generate and verify ballot contents? Or do ballot marking devices need to have software that generates the marked ballot and separate OCR software that will "read" the contents (including write-in text) and render it in alternative forms (audio and large print) for voters with disabilities? The standards should address these critical issues.

4. Accessibility/usability testing is always a concern, and particularly so because, to our knowledge, there are no certification programs which would allow lab personnel to become experts in this field. Do any of you have ideas or suggestions on how we obtain qualified testers?

   There are a number of major corporations who have already addressed this problem. In particular IBM, Microsoft and SAP have departments that work full-time on making their products fully accessible. AAPD has strong working relationships with these corporations and we would be willing to assist in setting an initial meeting to discuss this problem.

   In the communities where test labs are located, there are a number of disability organizations that could provide testers. It is essential that the testers reflect a range of disabilities and within each disability category, there be testers with a range of capacity. It is dysfunctional to select one blind person and ask that individual to evaluate a piece of equipment for all blind people. In the local phone book there will be a listing for a center for independent living. These organizations will be able to provide contact information for other organizations. There are a number of national organizations who could be contacted to find testers who live close to the testing labs. You can contact: AAPD and we can assist the test labs.

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5. Would component testing and certification assist in bringing new and better assistive technology to voting systems? What technologies have you seen that would be useful for voting?

   Disability access is a continuum in all fields, not just voting. Voting systems should be designed so that the disability package is a module that can be removed and replaced easily and inexpensively with a more accessible module. Sequoia has done this for one of their voting systems. The Prime 3 Voting Machine under development at Auburn University is a very encouraging approach for both disability access and security. AAPD recommends strongly that the innovation class be structured in such a way that certification of innovative solutions be thorough, efficient and timely.

6. Are cognitive disabilities addressable in the standard? If so how could they be better addressed?

   One of the world's foremost authorities on making written materials accessible to people with cognitive disabilities is Elbert Johns. He would welcome the opportunity to work with the EAC. He can be reached at 812-327-2955 or ejohns@thearclink.org.

   Generally speaking for all disabilities you should use the Web Content Accessibility Standards (WCAS). The 2.0 version will soon be released (www.w3.org/TR/WCAG20).

   Web Content Accessibility Guidelines 2.0 (WCAG 2.0) covers a wide range of recommendations for making Web content more accessible. Following these guidelines will make content accessible to a wider range of people with disabilities, including blindness and low vision, deafness and hearing loss, learning disabilities, cognitive limitations, limited movement, speech difficulties, photosensitivity and combinations of these. Following these guidelines will also often make the ballot more usable to voters in general.

   WCAG 2.0 Success Criteria are written as testable statements that are not technology-specific. Guidance about satisfying the Success Criteria in specific technologies as well as general information about interpreting the Success Criteria are provided in separate documents. An Overview of Web Content Accessibility Guidelines (WCAG) 2.0 Last Call Documents is also available.

   Until WCAG 2.0 advances to W3C Recommendation, the current and referenceable document is Web Content Accessibility Guidelines 1.0 [WCAG10], published as a W3C Recommendation May 1999.

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7. Are existing interfaces between vendors and the usability and accessibility communities sufficient for proper design and testing of systems? If not how could this be improved?

   At this time the interfaces between vendors and usability and disability communities are inadequate. Perhaps the EAC could convene an extended conversation amongst the three entities.

8. What is your professional assessment of the usability benchmarks in Chapter 3 of the proposed VVSG? Where are the benchmarks strong? Where can the benchmarks be improved?

   Answer provided in Question 3.

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