EPIC Recommendations
2007 Voluntary Voting System Guidelines to the
Election Assistance Commission
May 5, 2008

Chapter 1

1.1 Purpose

In addition to the points outlined in the draft, this document also makes more transparent to the public the work of the agency as it relates to the development of new voting system standards.

1.3 Audience

The 2007 VVSG will also serve a secondary audience, which may include:

- Researchers of voting system technology;
- Election Reform Advocacy Organizations;
- Media;
- Policy makers;
- Contestants

Chapter 2: Introduction to New and Expanded Material

The VVSG draft recommendations are a great improvement over the 1990, 2002, and 2005 versions of the document. The organization and presentation of the material in the 2007 VVSG draft is clearer and better organized. The presentation of the material in the 2007 draft better serves the purpose of the document as guidance for the foundational requirements of voting systems by promoting precision, reducing ambiguity, and elimination of repeated requirements.

An appendix document that explains the purpose and function of VVSG topic areas might increase usability of the document for secondary audiences.

2.1 The New Structure of the VVSG.....2-3

In support of the structure as outlined in the draft 2007 VVSG.

2.2 Usability Performance Requirements.....2-7

We strongly support the language and objectives of the Usability Performance Requirements outlined in this section and the establishment of "summative usability testing" as the standard for voting system usability testing.

Usability of ballot design is cited as a contributing factor in 2000 and 2006 when election

margin of victories have fallen within the margin of error. It is important, as this section states, to test ballot usability based on the "tasks to be performed, and demographic characteristics of the test participants." We would further add that the typical voting population of the jurisdiction to be served by the voting system or device should be reflected in summative usability testing.

Definitions of what usability means in voting environments should be fully investigated and appropriate measures developed for those systems that seek adoption under this standard.

This section promotes voter privacy and ballot secrecy by establishing a goal of eliminating constraints to voter intent that may be present in the ballot design. The section also raises the bar on the rigorous testing of ballot design to serve the particular needs of a jurisdiction's voting population.

We are in strong support for the expanded section on Usability and Accessibility Coverage.

We are in agreement with the goals of "software independence." This provision of the standards goes to the heart of the challenges to security, reliability, and accuracy of electronic voting systems. Further, this definition is not closed because it may encompass other types of electronic voting system designs as well as ballot marking configurations so long as they meet the standard of "software independence." This may allow the development and testing of future generations of voting systems under a uniform standard.

We are in support of this section because it establishes a standard that support options that may produce physical ballots or audit records that allow for voter verification. A key provision of privacy protection is that the creator of a record not be forced to disclose personally identifiable information to others. For this reason, voting systems should incorporate features that will optimize privacy for the broadest range of voters.

Usability and accessibility of IVVRs and CVRs SHALL facilitate the voters' option for final review.

The innovation class can be an important support for advancing voting system design as outlined by the underlying standards document. It may also increase the options for voters with a wide range of abilities or disabilities to effectively exercise their rights to

secret ballot and voter privacy.

However, the innovation class may also present temptation to define voting systems or components under this designation should the path to approval appear to be less rigorous. There should be a separate and through investigation of the standard for the innovation class, which should include the definition of hardware and software components or voting systems that might be considered.

Treatments of upgrades in firmware and software must be addressed under a unique standard topic area.

2.7 Treatment of COTS in Voting System Testing

Addition: Documentation regarding the reliability of COTS products for inclusion in systems that require a measurable degree of precision such as vote recording, aggregation of ballot totals, and reporting of results SHALL also be included in the review. Should the manufacturer of a voting system or component be aware of a COTS manufacturer's specific warnings regarding the use of their product in applications or processes which require precession, this information SHALL be provided at the time the system is submitted for testing under this standard. In addition, the manufacturer should provide information on how a particular problem is addressed in the product submitted for testing.

2.8 End-to-End Testing

We strongly support this provision of the 2007 VVSG draft document and recommend that it be included in the final draft of the document.

2.9 Reliability

Getting elections right the first time is of critical importance to public elections. Developing methods that accurately measure the demands placed on voting system is of critical importance.

Reliability shall be defined in such as way that a single failure or series of failures will not prevent the successful completion of the ballot casting process for an individual voter or the successful conclusion of the election administration process.

Transparency on the diminished or malfunctioning states of key vote casting, retention, tabulation, and reporting functions should be readily apparent when each of the following are involved:

- Voter;
- Poll Worker;
- Election Administrator

The history of the VVSG and the resulting testing and certification administration processes are important and should be part of the finished document. This section as drafted meets this consideration and should remain part of the final document as currently written.

VVSG Recommendations to the EAC Part 1: Equipment Requirements

Chapter 2: Conformance Clause

2.6 Extensions

Addition:
2.6-B Extensions shall be reported to the EAC. Reports of extensions to voting systems shall include the following information:

- Purpose of the extension(s)
- What benefit is intended by the addition of the extension
- Risks to the election environment that the extension might pose if any
- Tests performed and their results
- Reports on use of extension in election environments
- Feedback from election administrators on their willingness to deploy extension in their election jurisdictions
- Disclosure of all information regarding the applicability of the extension to 2007 VVSG standards

Discussion: The topic of software and firmware upgrades may be efficiently dealt with under this topic, but care should be taken to assure that it is not used when the change in question affects key voting system functions such as vote recording, tabulation, retention, and reporting. Application for extensions should be managed in such a way that limits the number and type that a single approved voting system can acquire without the system being subjected to a full standards review process.

2.7 Software Independence

We strongly support the language of this section—"voting systems shall be software independent, that is an undetected error or fault in the voting system shall not be capable of causing and undetectable change in election results."

2.7.1 Achieving software independence via independent voter-verifiable records

We strongly support the language of this section as written. It provides for the current state of technology as it relates to software independence and the development of new offerings that will meet this objective.

2.7.2 Innovation class submissions

Addition:
A review panel process <in consultation with the TGDC and NIST>, separate from the VVSG conformance process, will review innovation class submissions and make recommendations as to eventual conformance to the VVSG.

Chapter 3: Usability, Accessibility, and Privacy Requirements

Caution: Access to ATMs for banking purposes is not universal because affordable banking options are not available to all communities. Penetration of telephone services, although not universal is much more widespread than ready access to ATM machines for a broad spectrum of the voting age public.

3.1.2 Special terminology

Caution: Bullet item 5 "Voter-Editable Ballot Device (VEBD) "…(As opposed to manually- marked paper ballots) allowing them easily to change their votes prior to casting of ballot." This may be a subjective conclusion and not a measurable fact. The options for correcting ballots that are physically marked and those that are marked with the assistance of DREs and EBMs should be further studied to assist in making more clear the benefits or shortcomings of each as they related to this point.

3.2 General Usability Requirements

Support: The section in general is very good.

Addition: 1. In general
B. iii. Establish a usability review process for ballot design that screens for identified usability problems

Discussion: Experience with usability and ballot design should be to the degree possible in consideration of new voting systems or review of ballot development process.

3.2.1.1-D.2 Voting Session Time

Support: We are in support of this requirement because it serves the purpose of transparency on an important area of voting system's performance. There may be statutory limits on the amount of time each voter may spend casting a ballot.

For example: PA Title 25 §3057. Time allowed elector in voting booth or voting machine compartment. No elector shall remain in a voting compartment or voting machine booth an unreasonable length of time, and in no event, for more than three minutes, and if he shall refuse to leave after said period, he shall be removed by the election officers: Provided, however, that they may grant him a longer time if other

electors are not waiting to vote.
1937, June 3 P.L. 1333, art. XLL, § 1217.

3.2.2.1-C Independent correction of ballot

Support: We are in support of this subsection because it protects voter privacy and ballot secrecy.

Usability and accessibility of IVVRs and CVRs for final review by voter must be made clear by instructions provided by ballot marking interface and the physical design of the voting device.

- Instructions and physical directions should allow voters to access IVVR and CVR
- Poll worker assistance should not be required
- Allow a voter to discard the ballot as spoiled and re-engage the voting process
- If limits exists on the number of times that a voter may discard spoiled ballots or engage in voting this should be communicated
- Removal of ballot access device, token, or card should remove IVVR and CVR from display mode
- Initialization of voting device to service another voter should clear the ballot review facility of the ballot and deposit it in the tabulation pool.

3.2.2.2-E Handling of marginal marks

Support: This subsection provides greater transparency to voters who cast ballots using optical scan precinct count systems. Precinct count systems should also provide access voters who are minority language speakers or persons with disabilities.

3.2.2.1-F Notification of ballot casting failure (DRE)

Support: This subsection is important and should be strengthened.

Addition:
"…the DRE SHALL so notify the voter…" [STRIKE] "and" [INSERT] "by visual and audible means and only then "provide clear instructions as to the steps the voter should take to cast the ballot."

Discussion: Care should be taken to selecting an appropriate time interval to allow voters to review their ballot. The goal is to inform the voter that they have not completed the process so that they may do so.

3.2.3.1 Physical Privacy tilt range of the voting system may aid in the maintenance of privacy space for voters casting ballots on DRE systems.

3.2.3.1 Visual privacy

Addition Discussion: Options for privacy on DRE displays may include a dimmer option, which should also suspend input until viewing is initiated by a simple action of the voter.

3.2.3.1 Auditory Privacy:

3.2.3.1 Overall Performance Measure for Privacy of Ballot Casting Process

- Voter's ability to navigate the ballot casting process without assistance

3.2.3.1 F Privacy of Warnings

Support: Communication between the voter and the ballot marking interface or the ballot casting process should be private. Care should be taken to weight the need for voter privacy with their right to successfully complete the ballot casting process.

Issue of voter education and clear instruction on the use of the technology or appropriately designed human machine interfaces can be of great benefit.

3.2.3.2 No recording of alternative format usage

Support: This provision of the standard is important to voter privacy and ballot secrecy.

3.2.3.1-A4 No record of ballot selection

Discussion: "No receipt" may be too broad. The goal is not to issue to a voter physical evidence of how they cast a ballot in an election. Many jurisdictions provide "I voted" stickers to voters as they leave voting locations. These are not considered a threat to the secrecy of the ballot or voter privacy. If a digital equivalent of the "I voted" sticker is provided they should not be prohibited by the standard.

This "I voted" equivalent should provide no more or no less than this information to preserve voter privacy and ballot secrecy.

3.2.4-G Icons and Language

Discussion: Party symbols have been and continue to be used by some states and jurisdictions. See Beyond the Butterfly: The Complexity of U.S. Ballots by Richard G. Niemi and Paul S. Herrnson in Perspectives on Politics, Vol. 1, No. 2 (Jun., 2003), pp. 317-326 (article consists of 10 pages Published by: American Political Science Association
http://www.jstor.org/pss/3688903

3.2.5 Perceptual issues

3.2.5-C Ability to reset to default values

Support: This subsection also serves the purpose of privacy and voter autonomy.

3.2.6 Interaction issues

3.2.6.1-E Voter inactivity time

Discussion: Voters should be queried on whether they need additional time to complete the voting casting process and provided an opportunity to indicate they do or do not need additional time. The time that it may take individual voters to complete the ballot casting process may vary. The opportunity to engage assistive voting features should be end-to-end for the IVVR and CVR process. The features should be engaged or disengaged at the sole preference of the voter. Voter privacy should be respected at all times.

3.2.6.1-F Alert time

The voter should be informed of the consequences of not taking a specific action and a countdown clock of the time left to take such action. Action should be specific. Remaining time for a voter to take action should be halted should a voter select an assistive technology feature, see 3.2.7-A-1. Other actions that may halt the altering of the voting session should be communicated to voters through the voter interface feature(s) provided.

3.2.7 Alternative languages

Support: We strongly support this subsection of this standard. Independent casting of ballots is a core principle of free and fair elections.

3.2.8 Usability for poll workers

Support: We are in strong support of including usability language in the standards that support the indispensable key function of poll workers.

Addition: 3.2.8.1 Operation
Polling functions that may use automated voting system technology can include

- Assisting voters to cast regular ballots because voters waiting to vote exceeded the time allotted for polling hours.

Addition: Shutdown
The shutdown process may impact the vote casting process when it exceeds regular polling hours. This can put extra demands on poll workers at the end of an election when DRE systems require an affirmative action by poll workers to be entered on each voting system prior to the actual voting session commencing for each voter awaiting service.

The pre-programming of end of election shutdown is also of value in the security and integrity of elections. Balancing the reality that elections with great public interest may rarely end with the last voter who is eligible to cast a ballot being processed within the regular polling location's operational time constraints.

3.2.8.1-B Usability testing by manufacturers for poll workers

Support: This standard will contribute to the overall usability of election systems by voters. The better poll workers are able to master the technology the greater the objectives of usability and accessibility will serve voters.

3.2.8.1-C.1 Poll Worker as target audience

Support: Remembering that poll workers' ability to set up, operate and close polling locations are key to the proper functioning of public elections.

Addition: 3.2.8.1-4 Election Administrator as customer

Election officials should not have to rely solely upon the expertise of manufactures beyond training periods to properly program, repair, or maintain voting systems. The decentralized nature of election administration services as a check on the centralization of control of elections in the hands of a very few. Independence of election officials to administer elections can also serve to improve understanding of election systems and raise public confidence that the end-to-end administration process is made more transparent. Accountability is also served by making administrators more responsible for the conduct of elections.

Support: Accessibility requirements serve the important goal of voter privacy and ballot secrecy. HAVA's mandate that each polling location SHALL have at a minimum one accessible voting system available to minority language speakers and persons with disabilities is an important civil rights advancement.

Addition: 3.3.1-D Secondary means of voter identification

We strongly recommend that election components identified as responsive to this section should be evaluated under subsection Part 1:2.6 Extensions. These systems should also conform to software independence under the strict definitions established for review of systems or components under this standard.

Systems of identification adopted for use by voting systems SHALL consider the nature of voter records obtained and retained by local and state government. These records may be open to public inspection, and may be purchased by third parties for non-election

related purposes.

Finally, the simplest methods for authenticating the identity of voters as a rule may be the best. The need for two parties wishing to authenticate that the other is in fact who they claim to be requires a shared secret. The secret should be something that only the two would know, but that each can readily identify. There are claims that signatures are not easily discernable without expert investigation. Fingerprints and retinal eye scans are even less legible to a layperson.

The need for authentication in voting environments should be simple and easy to use for both the voter and poll worker.

Addition:

3.3.1-D.1 Voter Identification Pin Access

Voter identification systems that use pin numbers and voter IDs.

Discussion: The pin should not be a combination in whole or part of the voter ID number, birth date, address, zip code, or other information associated with public voter registration records.

Support: 3.3.1-E.1 Audio read back for paper-based voter verification

The provisions set forth in this update of the standards makes clear the need to provide accessibility to paper records or other human-readable records. Assistive technology's use in voting systems should strive for comparable voting experiences for voters who use them and those who do not.

Assistive technology SHALL communicate to users their right to seek assistance from an individual of their choosing. This person may be a relative, friend, and neighbor regardless of age. This right of voters should in no way abdicate the obligation of poll workers or election technology to provide technological means to accomplish independent verification of Acc-VS generated paper records.

Addition 3.3.1-E.2 IVVR and Acc-VS systems SHALL support voters' ease of access to durable paper record (or durable human readable ballots)

3.3.3 Blindness

3.3.3-E Ballot submission and vote verification

Support: This provision supports ballot secrecy and voter privacy. Sufficient documentation to support manufacturers claim that the objectives of this section have been met shall be provided.

4.2.1 Pollbook audit

Addition: The purpose of the pollbook is to verify that

- Voters are registered as they enter the vote casting process
- The total number of voters approved to receive non-provisional ballots are issued ballots
- Register the number of voters to receive provisional ballots
- Form(s) are produced that voters may be asked to endorse
- The administration of pollbook registrations and ballots issued are recorded by polling location runs smoothly
- Pollbook failures are registered
- Voter privacy and ballot secrecy is maintained

Addition Discussion: The pollbook may serve a critical gatekeeper for registered voters to receive and cast regular ballots. The pollbook registration process may also be used to remove voters from active voter rolls. Errors caused by electronic pollbooks and their interaction with voter registration databases may disqualify registered voters who have not yet cast ballots in a public election. The failure rates for pollbooks should be considered along with backup measures to assure that legitimate voters are not prohibited from participating in elections.

4.2.1-A.1 Records and reports for pollbook audit

Modify Discussion: Voter privacy and ballot secrecy SHALL be maintained at all times. The pollbook audit is only practical when data is collected by the voting process that reflect the total number of voters attempting to register to receive ballots, the number of ballots issued, and each distinct type of ballot is available from both the pollbooks and the tabulators.

4.2.2 Hand audit of IVVR record

Edit: The hand audit [strike] of [end strike] verifies…

Addition: Ballot secrecy and voter privacy SHALL be maintained throughout hand count audits of cast ballots.

4.2.2-A Support for hand audit

Addition: The IVVR SHALL be a durable paper record (or some other durable, human-readable record) for the purpose of allowing voters to verify their votes and meet the requirements of hand audits.

4.2.3 Ballot count and vote total audit

Addition: Voter privacy and ballot secrecy SHALL be maintained at all times. Vote-

capture devices, tabulators, pollbook registration technology, and activation devices will produce records that support ballot count and vote totals.

4.2.4 Additional behavior to support auditing for accessible IVVR voting systems

Additional Bullet:

- Ensure voter privacy and ballot secrecy

4.3 Electronic Records

4.3.1 Records produced by voting devices

Addition: Voter privacy and ballot secrecy SHALL be maintained at all times.

The aggregate export of electronic records ballot totals, summaries of votes cast by race, etc SHALL be reflected in event logs.

4.3.1-B All records capable of being printed

a. Voter privacy and ballot secrecy SHALL be maintained at all times.
b. The printed record may be produced directly from the voting device;
c. Log files should reflect production of printed records produced by voting devices
d. Software independent SHALL apply

4.3.2 Records produced by tabulators

Addition: Voter privacy and ballot secrecy SHALL be maintained at all times.

Addition: c. The following shall be reported by precinct:

- Number of accepted ballots
- Number of rejected electronic CVRs, which shall reflect 8.1 Process Model figure 8.3 information Spoiled ballot abandoned ballot or try again

Addition: VI Number of spoiled ballots per the definition of 8.1 Process Model figure 8.3 Spoiled ballot abandoned ballot or try again
VII Number of challenge ballots
VIII Number of provisional ballots

Discussion: Transparency is served when records accurately reflect the number of voters served by each polling location. This information should also collect data on the number of voters sent to other polling locations. The inclusion of provisional and challenge ballot records should clearly indicate that these figures are not reflect in total votes cast.

4.2.2-C.1 DRE, collection of ballot images record

Voter privacy and ballot secrecy SHALL be maintained at all times.

3. Fore each contest:

Addition: Spoiled ballot by date, and machine code

4.3.3 Records produced by the EMS

4.3.3-B EMS, precinct summary count records

Additional: The EMS SHALL is capable of combining precinct reports to protect the privacy in cases where precincts have few voters.

Edit: "4" under 4.3.3-B e. should be replaced by i, ii, iii, iv

Addition: 4.3.3-B e v Number of spoiled ballots as defined by 8.1 Process Model Figure 8-3

4.3.3-C EMS, precinct adjustment record

Additional: [End of the first paragraph] The report SHALL provide summaries and final disposition of challenge and provisional ballots.

4.3.5 Ballot counter

4.3.5-C Ballot counter audit

- Total number of ballots processed
- Warnings of over votes
- Warnings of under votes
- Malfunctions

4.4 Independent Voter-Verifiable Records

Discussion: The term Voter Verifiable Records reflects that voters may verify their final IVVR or CVR prior to it being deposited within the ballot casting process. The option may be a Voter Verified Record, which removes the choice from the voter to review or not review the final ballot IVVR or CVR to a mandatory function of the ballot casting process. It may be useful, so long as voter privacy and ballot secrecy is not threatened, to record aggregate number on voters electing to verify their IVVR.

The usability and accessibility sections should outline standards that facilitate the ease by which voters may exercise their right to review the final IVVR or CVR record prior to its retention in the voting process.

Addition:

- Paper records (or some other durable, human-readable record) SHALL be of such quality that the purpose intended at production is supported

4.4.1 General requirements

4.4.1-A.7 IVVR vote capture devices, IVVR support for privacy
Discussion: Currency is durable and promotes the privacy of users. Lessons from this area may be of use in the development of ballots that are durable and anonymous.

4.4.2 VVPAT

Voter privacy and ballot secrecy SHALL be maintained at all times.

Edit consistency in topic heading either "VVPAT components and definitions" or "VVPAT, definition and components"

4.4.2.1 VVPAT components and definitions
Addition: A view of the printed VVPAT SHALL is available to voter while care is taken to protect voter privacy.

See Discussion see 3.3.1-E

Edit: 4.4.2.2-C c Suspend voting [STRIKE] "operations" [INSERT] "session"

Addition: e. Suspend voting device until error is resolved

4.4.2.2-C.1 VVPAT, general recovery from misuse or voter error

Addition: Poll Worker actions SHALL not be capable of causing a discrepancy between the VVPR and its corresponding electronic CVR.

A4.4.2.3 Protocol of operation

4.4.2.3-B VVPAT, ease of record comparison

See Addition 3.3.1-E.2 IVVR and Acc-VS systems SHALL support voters' ease of access to durable paper record (or durable human readable ballots)

Addition: 4.4.2.4-B VVPAT, paper-roll, required human-readable content per roll
e. Sequential order of rolls used

Addition 4.4 Independent Voter-Verifiable Records

j. The number paper roll that produced the cast ballot or abandoned ballot

4.4.2.5-A VVPAT, identification of electronic CVR correspondence

Addition: Voter privacy and ballot secrecy SHALL be maintained at all times.

4.4.2.6-A Paper-roll VVPAT privacy and audit support

Support: We are in strong support of the goals outlined by this substandard. Voter privacy and ballot secrecy SHALL be maintained at all times.

4.4.3 PCOS systems

Addition: 4.4.3-A-1 Optical scanner, optional marking restrictions

d. Markings that would violate voter privacy

Chapter 5: General Security Requirements

5.6 Communication Security

5.6.1-A Prohibiting wireless technology

Support: We are in strong support of the prohibition of wireless technology's inclusion in any component of the voting system. This is a prudent security and voter privacy measure that should remain part of the final 2007 VVSG.

5.6.1 Physical communication security

5.6.1-B.3 Air gap for pollbook between the token, ballots access card or device and the IVVR or CVR generating device.

Discussion: Voter privacy and ballot secrecy must be maintained at all times. The prohibition of direct communication between the pollbook book devices, which may be in direct communication with voter registration records, should not communicate with the vote-recording device. This standard recommendation is to protect voter privacy and ballot secrecy.

5.6.2 Data transmission security

Support: We are generally in support of the transparency goals outlined in this section.

5.7 System Event Logging

Addition 5.7.1-E.1

Table 5-5 Minimum events to log 5..7 System Event Logging

System Event	Description	Applies to
Vote Totals	Summary of vote totals, numbers of ballots process, number of registered voters served	Programmed Device

Addition Part 1: Equipment Requirements Chapter 5
General Security Requirements
5.7 System Event Logging

System Event	Description	Applies to
Vote Totals	Summary of vote totals, numbers of ballots process, number of registered voters served	Programmed Device/Election Management System

5.7.2 System event log management

Edit: The voting device SHALL be capable of only allowing the administrator to [INSERT] “digital transfer, printer”

Addition: 5.7.2-P Event log privacy requirement

The voting device SHALL preserve voter privacy and ballot secrecy.

Addition: 5.7.2-Q Event log data storage requirement

In the event of multiple storage devices for IVVR or CVR that election of storing individual ballots SHALL be random and not pre-determined by polling operations or staff. Storage of IVVRs or CVRs when multiple options exist SHALL not be manipulated by human intervention.

Chapter 7: Requirements by Voting Activity

7.5.1 Issuance of voting credentials and ballot activation

Voter Privacy and Ballot secrecy is of great importance to the vote casting process. After which time the provisional ballot is accepted the identity of the voter SHALL be removed from the cast ballot.