Meeting Minutes
United States Election Assistance Commission
Technical Guidelines Development Committee; "Voluntary Voting Systems Guidelines and Technical Requirements"
September 19-20, 2019

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The following are the Minutes of the Technical Guidelines Development Committee (TGDC); "Voluntary Voting Systems Guidelines and Technical Requirements" (VVSG) Meeting. The meeting convened on Thursday, September 19, 2019 at 9:12 a.m. and adjourned on Friday, September 20, at 12:13 p.m.

Thursday, September 19

Welcome

Chairman Dr. Walter G. Copan, Under Secretary of Commerce for Standards and Technology and NIST Director welcomed everyone to the proceedings and expressed that in accordance with the Help America Vote Act he was honored to serve as Chairman of the TGDC.

Pledge of Allegiance

Chairman Copan led all present in the recitation of the Pledge of Allegiance.

Introductions

Chairman Copan expressed his thanks to the EAC and to Commissioner Ben Hovland, who serves as the Designated Federal Officer for the TGDC, for hosting the meeting. Dr. Copan introduced the outline of the VVSG 2.0 Requirements and talked about the tasks and goals of the Committee to adopt the VVSG recommendations.

Goals and Expectations

Ben Hovland, Vice Chairman of the EAC gave a brief overview of the TGDC and it's relationship to the Election Assistance Commission (EAC) and the National Institute of Standards and Technology (NIST). Commissioner Hovland also offered thanks to the Committee on behalf of

EAC Chairwoman McCormick, Commissioner Hicks and Commissioner Palmer.

Roll Call

DFO Hovland called roll and found present:

- Neal Kelley, Registrar of Voters, Orange County, California.
- Paul Lux, Supervisor of Elections from Okaloosa County, Florida.
- David Wagner, Professor, University of California, Berkeley.
- Mary Saunders, Vice President of Government Relations, American National Standards Institute. (ANSI)
- Geoff Hale, Director of the Cybersecurity and Infrastructure Security Agencies. U.S.Department of Homeland Security.
- Diane Golden, Association of Assistive Technology Act Programs.
- Mary Brady, Manager of the NIST Voting Program.
- Dan Wallach, Professor, Rice University.
- McDermot Coutts, Unisyn Voting Solutions.
- Lori Augino, Washington State, Director of Elections.
- Judd Choate, State Elections Director, Colorado.
- Bob Giles, Director, New Jersey Division of Elections.
- Marc Guthrie, U.S. Access Board, Ohio.
- Sachin Pavithran, U.S. Access Board, Utah.

NIST Update (Mary Brady, NIST)

Mary Brady, NIST Voting Program Manager, began her presentation with a history of the initial development of VVSG 2.0 undertaken by NIST, the National Association of State Election Directors, the EAC, the Federal Voting Assistance Program and the common data format work at IEEE and continued with public working groups in the development of these Principles and Guidelines, and the Requirements that were sent to the Standards Board and Board of Advisors for their feedback and ended up with 15 principles as follows: high-quality design; high-quality implementation; transparency; interoperability; equivalent and consistent voter access; voter privacy; marked, verified, and cast as intended; robust, safe, usable and accessible; auditability; ballot secrecy; access control; physical security; data protection; system integrity; and detection and monitoring. The Presidential Commission on Election Administration report, the National Academies report on securing the vote, the Senate Intelligence Committee report on election security, and various DHS products were also taken into consideration. Ms. Brady reported some of the changes are: systems now need to be auditable, and there's support for risk-limiting audits and ballot-level audits. The Requirements make software independence mandatory, ie paper, but there is room for

innovative solutions such as E2E. She talked about data protection, both artifacts and transmitted data, improved system integrity, supply chain activities, system hardening, authenticated updates, secure configurations, accessibility standards, voter interface requirements, high-quality design, implementation, transparency, and interoperability reorganized as phases of an election, common data formats, and the new guidelines streamline electrical requirements.

Ms. Brady noted the process after adoption by the TGDC is review by the Standards Board and Board of Advisors and a public comment period before final adoption by the EAC.

Linda Lamone, Administrator for Elections, Maryland joined the meeting.

VVSG Comment Resolution (Jerome Lovato, Director, Testing and Certification, EAC)

Jerome Lovato opened his testimony by stating that 2,800 comments were received from a wide variety of stakeholders; and that the most feedback was on Principle 13, data protection; banned wireless, require hand-marked paper ballots. He added that comments were in support of and opposed to the VVSG being two separate documents; also some rewording of the Principles and Guidelines and a recommendation to add a glossary and defining terms. Mr. Lovato noted that a change that was made; Principle 14, system integrity, 14.1, "voting system uses multiple areas of controls to provide... ", redundancy was changed to resiliency. There was discussion on comments and recommendations. Ms. Brady indicated that the changes to the principles and guidelines resulted in improved readability, so there weren't substantive changes in the principles and guidelines that would have changed the requirements and the technical requirements would stand as they are.

[The Board recessed at 10:50 a.m. and reconvened at 11:10 a.m]

VVSG 2.0 Human Factors: Usability and Accessibility (Dr. Sharon Laskowski, NIST)

Dr. Sharon Laskowski stated that VVSG 1.1 and the 2007 recommendations were used as a baseline for the usability and accessibility requirements, and also mentioned the Accessible Voting Technology Initiative. She reviewed Principles 5 through 8, the human factors requirements: equivalent and consistent voter access; voter privacy; marked, verified, and cast as intended; and robust, safe, usable, and accessible; plus user-centered design under high-quality implementation; and she discussed current Federal accessibility requirements such as Section 508 and the web content accessibility

guidelines, the ADA guidelines. And in the accessibility community, they developed the notion of P-O-U-R, perceivable, operable, understandable, and robust. Modes of interaction as in enhanced visual, like enlarged text, audio, tactile, non-manual, and limited dexterity control to be consistent throughout the voting process. Any sound and visual cues must be coordinated so that if there's a sound cue, it's accompanied by visual cues unless you're in audio-only mode. . There was discussion on a change of the term mode to method and the need for consistency. Principle 6, Voter Privacy refers to the property of a voting system that's designed and deployed to enable voters to obtain a ballot, mark, verify, and cast it without revealing their ballot selections or selections of language display and interaction modes to anyone else, independent voting. There was discussion on the use of the term 'without discrimination'.

Principle 7, Ballots and vote selections are presented in a perceivable, operable, and understandable way and can be marked, verified, and cast by all voters. There are 50 requirements under this principle, the core requirements of the voting interface. Scrolling through the electronic ballot has been updated. Included are updates to font/text size, zooming is new, audio, interaction control and navigation, scrolling, ballot selection review, the use of audio and touch controls and simple gestures and the need for space for accessibility. A document comparison of VVSG 1.1 and 2.2 will be provided. There was a discussion on gestural controls on making them as simple as possible. Dr. Laskowski introduced Principle 8, The voting system and voting processes provide a robust, safe, usable, and accessible experience. There was discussion on 8.3 and 8.4, observing the workers and the users. She finished with the comment that the onus is on the manufacturer to follow, as they develop their system, what's called a user-centered design method and report on that so that you do some iterative testing. So by the time you do your usability tests, the major flaws are out.

[The Committee recessed at 12:15 a.m. and reconvened at 1:15 p.m.]

VVSG 2.0 Core (Benjamin Long & John Wack, NIST)

Ben Long opened the discussion by giving an overview of the basic core requirements for conducting an election. Principle 1: High-quality Design - the voting system is designed to accurately, completely, and robustly carryout election processes, with 3 guidelines: ~what's necessary for a good specification of those processes, ~ensuring that they're accurate, that they handle realistic volumes and well- high-quality defined limits as per the manufacturer limit declarations, and that they're testable. John Wack continued the testimony stating in this draft we have organized the requirements in 1.0 so that they're mainly in one place and so that the standard itself is going to be more usable as a result. He stated that changes were made, accuracy and reliability are no longer just specific

tests, but they apply as well to the entire test campaign and test process. Mr. Long added that trying to keep the VVSG 2.0 focused on the system itself and moving testing-specific guidance to the EAC manuals was the intent. Principle 1 is stating what is it that I'm building, the essence of it, and Principle 2 saying to build these things using best practices is an intent to stay technology-relevant but also technology-neutral in the sense of being able to provide to manufacturers the guidance necessary to keep pace with technology, the best and state-of-the-art. There was discussion on reproducible builds. Mr. Wack noted a big change in 2.7 by simplifying the electrical requirements, requiring common standards, FCC, class A, class B. Another change is in stress testing. There was a discussion on conforming to particular standards and being able to update on a more frequent basis. Mr. Wack moved on to the topic of transparency, stating that you have to completely document the voting system in a way using clear language that it can be easily read and understood. Next he talked about interoperability using common data formats and then to cast vote records. Mr. Wack closed with expressing his thanks to Herb Deutsch. There was a discussion on requirements to make barcode encoding public.

[The Committee recessed at 2:48 p.m. and reconvened at 3:10 p.m.]

VVSG 2.0 Cybersecurity (Gema Howell, NIST)

Gema Howell began her presentation saying that they referenced the VVSG 1.1, as well as the recommendations from the 2007 VVSG and collaborated with the cybersecurity public working group. Ms. Howell started with Principle 9, Auditable, a section dedicated and focused to machine support for post-election audits, with 9.1 having the most requirements out of all sections, specifically focused on software independence and listing the paper-based option and the cryptographic end-to-end verifiable option. Then she moved to 9.2, the general post-election audit procedures and the generation of CVRs and the number of ballots; onto 9.3, protecting the audit records and points to the data protection guidelines 13.1 and 13.2. Then 9.4, having the necessary material and information available to perform certain types of audits like risk-limiting audits, having unique ballot identifiers available to find a ballot that you may be looking for and support to handle multipage ballots as well. At this point there was a discussion about unique ballot identifiers and also about the technical issue related to presentation attacks on ballot-marking devices. Ms. Howell went on to Principle 10, 10.2, preventing the association of a voter to their ballot selections and wanting to highlight the indirect voter association requirement that is written specifically for paperless systems, how a paperless system would handle

a provisional ballot. Another highlight she addressed was specific to an end-to-end verifiable system so the voter receives some type of information that they can use later to verify their selections after they cast, ensuring that those sheets don't contain any voter-identifying information, as well as does not allow a voter to prove how they voted. There was discussion on 10.2.2-E followed by a proposal to ask NIST to revise 10.2.2-B for clarification on unique identifiers. Next, Principle 11, Access Control, and to highlight in 11.1-C, that the logging cannot be disabled and in 11.2.1-C access control may be maintained or a provision based on the voting stage, so pre-voting, activated state, suspended state, or post-voting, different capabilities may be allowed at different times. There was a discussion on logging activities. Then Ms. Howell indicated that she wanted to draw attention to 11.3.1-B and C, the multifactor authentication requirements, which highlight that multifactor authentication is required for critical operations and a discussion on multifactor authentication occurred followed by a brief discussion on password complexity. On to Principle 12, Physical Security, focusing on the external tamper-evident as well as the physical ports on the voting system, with Ms. Howell highlighting the logging of physical connections or disconnections to the voting system, physical evidence of any unauthorized access to the containers storing voting system records, backup power and notification of when the power went off and a logging of that event. Next, Principle 13, Data Protection, a highlight that was recommended in the 2007 VVSG, hardware security requirements are not mandatory. 13 includes preventing unauthorized access to voting system data, digitally signing election records, tabulation reports, cryptographically verifying signatures, checking integrity, no unauthorized modification of data, requiring FIPS 140-2 validated cryptographic modules with the exception of E2E, protection of transmitted data, mutual authentication, ensuring authentication at both ends of the transmission. Principle 14, System Integrity, is new, includes strategies and techniques for protecting the voting system as a whole, applying security controls to limit the attack surface, preventing extraneous processes or services from being installed, providing documentation for secure configuration and system hardening, removal of unused code, and restricting access to physical ports. 14.3 covers maintaining and verifying the integrity of hardware, software, and other critical components, working with the NIST supply chain team, and attending their supply chain forum to develop the requirements. the last section here, 14.4 states that any updates must be authorized by an administrator, including operating system, application, and firmware updates. Principle 15, Detection and Monitoring. This was moderately updated, adding event log types and including updated and configurable detection and monitoring systems and a full chart that shows all the event types to be logged.

Ms. Howell then followed with the open areas, including indirect voter associations; barcodes and encoding schemes; wireless, in particular WiFi, Bluetooth, near-field communications or NFC, and potentially

cellular; Internet connectivity; and cryptographic end-to-end verifiable systems.

DFO Hovland thanked the NIST team for all their effort and looked forward to seeing them tomorrow at 9 am.

[The Committee recessed at 5:05 p.m.]

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Friday, September 20

Welcome

Chairman Copan opened the meeting at 9 a.m. and welcomed everyone to day two, turning it over to Commissioner Hovland for a synopsis of yesterday's proceedings.

Discussion of Issues, Resolution(s), Vote on VVSG 2.0 Requirements

Commissioner Hovland expressed that a number of issues were identified that warranted additional conversation, so part of today's agenda should be altered in favor of continuing that productive direction. Judd Choate presented three Resolutions that were drafted. After some discussion, the Commitee voted to accept, as modified:

Resolution # 1 - We recommend EAC Commissioners formally adopt a yearly VVSG review process where proposed changes and/or additions are considered by the TGDC and determinations are sent to the EAC Executive Director or a person operating in that capacity to begin the adoption process and that, whenever possible, review processes such as Board of Advisor review, Standards Board review, and public comment periods run concurrently to ensure timely adoption of changes and/or additions.

Resolution # 2 - We recommend EAC Commissioners permit the EAC professional staff, in consultation with NIST staff, to make minor technical changes to the Requirements in a timely manner. This should include the development of an appeals process for these minor technical changes.

Resolution # 3 - EAC Commissioners should ratify a provisional requirements review and approval process for the EAC professional staff to update VVSG requirements in the circumstance where there is no quorum of EAC Commissioners. The TGDC will provide a process recommendation within 30 days.

The Committee then went on to a discussion, working through the issues that were raised yesterday starting with Principle 5, 'without discrimination. Commissioner Hovland offered to discuss creating a potential working

group with input from NASED and the Access Board and other disability advocacy groups. Discussion continued on 5.1, 'modes', the revised text of that section then will define 'method' at the higher level and then the mode or combination of modes in the context of that definition.
There was a recommendation to document the comparison between version 1.1 of the VVSG and 2.0.
The next topic was about going beyond simple gestures, ie touch to scroll.
Principle 6.2, E2E Considerations, If you're doing an end-to-end system that accessibility requirement applies and you're going to have to figure out how to make that end receipt accessible. There was discussion on wording in Guideline 8.3/8.4. The next set of comments were on the core, Guideline 2.1, the guideline used to apply to systems, and after the redline change in voting system software, the requirements actually apply to systems.

[The Committee recessed at 10:26 a.m. and reconvened at 10:43 a.m.]

Discussion moved to the open areas, starting with whether to prohibit wireless and whether to prohibit internet connectivity and telephony and also cryptographic E2E systems.
Five additional areas yet to be discussed are; ballot IDs with respect to risk-limiting audits and overlaps; ballot secrecy; preserving logs; multifactor authentication; defining strong passwords.
The Committee discussed having a follow-up conference call to to review the subsequent changes to ratify version 2.0 of the VVSG. Chairman Copan indicated they will defer going to a vote until the document is advanced to the point that the group agrees as the TGDC.

[The Committee discussed proposed dates from 12:09 p.m. to 12:12 p.m.]

The Committee agreed to set a deadline to work towards a final product, share emails and set up a conference call.
Chairman Copan thanked everyone for your participation.

ADJOURNMENT

[The Technical Guidelines Development Committee Meeting of the United States

Election Assistance Commission adjourned at 12:13 p.m. on September 20,

2019.]