Standards Board Report
TGDC Activities
July 27, 2010 Meeting

Submitted by: Don Palmer
Russ Ragsdale

Since the end of 2008, there has been a significant change of membership on the TGDC. Below is list of current members and their respective affiliations.

Designated Federal Officer
The Honorable Donetta Davidson
Commissioner, U.S. Election Assistance Commission
Washington, DC

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At the December, 2009 meeting, the TGDC was given several tasks by the EAC. The tasks were prioritized and working groups were formed to address the highest priority items. The working groups were organized into the following four areas.

- Marginal Marks
- Accessibility and Usability
- Auditability
- UOCAVA.

Generally speaking, these tasks were spurred by feedback received from the Standards Board, Board of Advisors, and public comments, regarding the VVSG. In the case of UOCAVA, the impetus was the passage of the Federal MOVE Act.

The working groups held multiple teleconferences following the December, 2009 meeting and provided progress reports at the July, 2010 meeting. Highlights from those reports follow.

MARGINAL MARKS

The working group members were:

David Flater – NIST Facilitator
David Wagner
Don Palmer
Doug Jones
Ron Gardner
Russ Ragsdale

The purpose of this group is to investigate the development of a standard reference set of ballot markings representative of the types of marks that voters make on each common type of optical scan/marksense ballot. Their goal is to enable Voting Systems Testing Laboratories and acceptance testers to test and document the responses of scanners.

The working group drew on two previous bodies of work; the "Ballot Marks from the Humboldt County (CA) 2008 General Election" report and an informal review of ballots retained from previous human factors work at NIST.

It was determined that the most frequent anomaly was the misuse of write-in lines. Often, voters were found to write in names but not fill in the target or they wrote a candidate's name in even though that candidate's name appeared on the ballot and they had previously marked that target. In addition, voters would make "corrections" on ballots thinking that each ballot would be read by a human.

Because NIST is currently involved in the acquisitions process of a formal data collection and analysis of ballot marks, discussion of this issue was necessarily limited. Nevertheless, the group was able to share its experiences and create a list of typical marks.

ACCESSIBILITY AND USABILITY

The working group members were:

Sharon Laskowski – NIST Facilitator
Diane Golden
Phil Jenkins
Ron Gardner

The goals of this working group are to identify and prioritize issues related to improving the accessibility and usability (AU) of voting systems. By addressing these issues through research to be performed by NIST and others (e.g., EAC grant programs, academia), the desired results are improved VVSG requirements and test methods recommended to the EAC. To accomplish these goals, the working group has collaborated with the other working groups and with NIST in their ongoing research.

NIST had been previously requested by the TGDC to examine AU requirements in the VVSG 2.0 and to provide a report on AU considerations for UOCAVA remote voting. Because of this, the working group was able to draw on work currently underway.

Considerable focus has been applied to testing and the testers of VVSG AU requirements. Test methods and the qualifications of testers are two particular areas where draft recommendations are being developed.

Some specific recommendations that are being drafted by the group are:

- Requirements/allocations for the use of Personal Assistive Technologies (PAT) in the VVSG 2.0
    - Allow voters to use their own PAT
    - Standard scanning of ballots to support the use of switches
    - Inclusion of new approaches such as sound activation rather than physical switches;
- Approaches to accommodate low vision
    - Magnification
    - Audio read back.

A significant challenge that the group is confronted with is that paper (VVPAT and optical scan ballots) is problematic both from a dexterity and visual aspect. VVSG 1.0 requirement 3.2.3.e was revised by the EAC to state "to make the capability to submit the ballot mandatory for voters with dexterity limitations." In addition, VVSG 1.0 requirement 7.9.7.b was significantly revised by the EAC "to make it clear that if the paper record either is treated as the official ballot or could be the controlling record used for recount, then visually disabled voters must be able to verify the paper record itself."

The working group is fully aware that automatic paper handling mechanisms and systems to allow verification of print in alternative formats have yet to be commercially available and deployed to meet these requirements.

<u>UOCAVA</u>

John Wack – NIST Facilitator
Don Palmer
Linda Lamone
Helen Purcell
David Wagner
Phil Jenkins
Doug Jones
Ron Gardner

The goal of this TGDC working group is to arrive at testable guidelines for remote voting systems to serve the needs of overseas military and other overseas citizens. The group

has to keep in mind that while guidelines for using personal computing devices for UOCAVA voting may take years to develop, there are a variety of intermediate steps and approaches that should be considered in the near future. After the recent July 7-8, 2010 meeting, it was noted that the *UOCAVA roadmap* required TGDC to provide EAC input on high-level non-testable guidelines prior to the deadline given to the EAC (Spring 2011). The TGDC working group will work with NIST to provide these high-level non-testable guidelines for consideration by the TGDC and EAC in late 2010 or early 2011, prior to recommendation to FVAP.

UOCAVA Resolution:

The TDGC requests that NIST develop testable guidelines for UOCAVA. NIST should consider identifying the maximum amount of accessibility, privacy, security, and usability possible within these guidelines, while still achieving the goals set forth by Congress regarding remote electronic voting.

The TGDC requests that NIST address accessibility, privacy, security, and usability issues in all UOCAVA pilot projects as well as in investigative work pertaining to remote voting systems. These four issues must be addressed together from the beginning to avoid the need to retrofit capabilities later on. Specifically the TGDC requests that NIST commission a short term (several months) research study, similar to the 2nd quarter expected release of the research document on "Security Considerations for Remote Electronic UOCAVA voting," on accessibility and usability considerations for remote electronic UOCAVA voting. This should be done in coordination with the TGDC's Accessibility and Usability Research update to the VVSG 2.0.

In addition, NIST should develop a framework for UOCAVA that considers the following:

- Definite accessibility, privacy, security, and usability objectives for remote electronic voting

- Collect an inventory of existing and applicable standards on accessibility, privacy, security, and usability

- Identify perceived accessibility, privacy, security, and usability issues that can or cannot be solved with existing technology

- Identify issues that can or cannot be solved between conflicting accessibility, privacy, security, and usability requirements (e.g., voting on paper ballots while accommodating voters with limited dexterity/hand use)

- Identify trends and outlooks regarding when possible technologies may improve or solve accessibility, privacy, security, or usability issues

- Identify trends and outlooks regarding when future main stream technologies may be employed in remote electronic voting that will need new accessibility, privacy, security, and usability requirements and standards

- In addition, the TGDC requests that any guidelines developed by NIST regarding assisting election officials in providing print ballots to overseas and military voters include accessibility standards for the file format of those ballots.

UOCAVA Roadmap Background (Timeline is Attached)

The 2009 Move Act set forth by Congress directed the EAC to either provide best practices and standards for electronic voting guidelines. And if that was not possible within the stated statutory deadlines, they were to produce a detailed timeline for the establishment of such guidelines. In response to that Congressional directive, NIST, FVAP, and the EAC have produced a "roadmap" that meets that requirement. While the roadmap lays out a timeframe for developing and implementing guidelines, this working group has been directed to draft recommendations for what those guidelines should be.

- UOCAVA Roadmap created by EAC, NIST and FVAP
    - EAC and NIST to provide "best practices or standards in accordance with electronic absentee voting guidelines…"
    - If not possible to supply these within 180 days of enactment, then a "detailed timeline for the establishment of such guidelines."
    - The Roadmap lays out a series of steps and deliverables, including pilots, with the ultimate goal of testable requirements for voting systems to serve UOCAVA voting population

Pursuant to the EAC UOCAVA Roadmap, the TGDC working group has several near-term activities in which it is engaged:

- *December, 2010* – the EAC, with input from the TGDC and technical support from NIST, will update its UOCAVA best practices.
- *Spring 2011* – the EAC, again with input from the TGDC and technical support from NIST and input from FVAP, will identify **high-level, non-testable guidelines for remote electronic absentee voting systems**. This effort will focus on the desirable characteristics of such systems and serve as a needs analysis for future pilots and research; and for the purposes of driving industry to implement solutions.
- *Spring 2011* – the EAC, coordinating with the TGDC, **the Standards Board**, the Board of Advisors, NIST, the Department of Defense, and the National Intelligence Community will apply the NIST Risk Management Framework and other methods in identifying security controls and technologies to mitigate security concerns.
- *Fall 2011* - the TGDC and NIST will develop common data format specifications for ballots and ballot definition that can be used by FVAP and the states.

Of note, Spring 2011 is the deadline for input *on high-level, non-testable guidelines* for remote electronic absentee voting systems and the identification of Security Controls. The TGDC requested receipt from NIST of draft high level guidelines in late

2010 to begin revisions or additions to the draft to provide such input to EAC. NIST noted that it will also receive valuable input on high level non-testable guidelines from the *UOCAVA Remote Voting Systems Workshop* to be held August 6-7, 2010 sponsored by NIST, EAC, and FVAP. The workshop is intended to explore the technical issues associated with remote electronic absentee voting systems for military and overseas voters. In particular, the goal for the workshop is to establish a comparative threshold for an acceptable level of risk by identifying accepted risks of the current UOCAVA voting process, and developing measures and/or criteria for comparing risks of remote electronic absentee systems to those of the current system. The workshop program includes invited presentations, a panel discussion, and breakout sessions to achieve the goals of the workshop.

TGDC/NIST Plan over next year:

- Best practices guide is important for 2012 elections; lessons learned from 2010 elections will be incorporated
- Plans to address the high-level guidelines and risk management discussed
- CDF work being coordinated with IEEE, plans to coordinate with FVAP with regard to electronic ballot distribution

July 8-9, 2010 TGDC Meeting

The TGDC received input from Director Carey, Federal Voting Assistance Program on 2008 finding with regards to problems with the current absentee voting system and received a report on the 2010 Election Related Activities**.**

According to the FVAP, the absentee ballot return rate is 67% for UOCAVA voters compared with 91% of regular absentee voters and the largest percentage of failure (74%) for UOCAVA absentee mail voters is on the return transmittal of the ballot.

FVAP wants to expand assistance for election officials by providing voter tools that states will use to include: registration wizard, full ballot wizard, back-up FWAB ballot wizard. FVAP will also increasing UOCAVA voter outreach through social media including MeetUp, Facebook, Twitter, and LinkedIn, digital online media (online gaming) and new TV spots.

FVAP discussed GAO guidance on how Electronic Standards should be framed by FVAP and EAC establishing detailed results-oriented action plan with goals, tasks, milestones, timeframes, and contingencies; FVAP-EAC Memorandum of Understanding; EAC-NIST Interagency Agreement; and MOVE Act requires EAC to develop detailed timelines for development of electronic absentee ballot guidelines.

FVAP states *acceptable risk* policies in remote absentee voting have already been made with current voting system with acceptance that over 1/3 of absentee ballots never

returned under baseline postal mail system. FVAP believes an equivalent risk analysis (with different probability or impact, mitigating steps) should be conducted for the new UOCAVA systems – the goal is to keep risk level at least same, if not better.

FVAP requests what are the properties necessary for an electronic absentee voting system at the same level of risk as current system. FVAP believes the EAC Risk Assessment Tool and the NIST IT Risk Assessment Tools will help define the risk.

TGDC received a report on the Security Considerations for Remote Electronic UOCAVA voting by Andrew Regenscheid, NIST; a report of the UOCAVA working group from John Wack, NIST; a draft whitepaper on the Accessibility and Usability Considerations of Remote Voting Systems; a draft report on the Security Best Practices for the Electronic Transmission of UOCAVA election materials. The TGDC also received an update on Kiosk Pilot Program Requirements, Testing, and Certification by Brian Hancock, EAC, and a report on NIST Risk Methodology for Voting Systems from Matt Scholl and Sharon Laskowski, NIST.

NIST documents on UOCAVA - see NIST website – http://vote.nist.gov

AUDITABILITY

David Flater – NIST Facilitator
Ann McGeehan
Diane Golden
David Wagner
Ed Smith
Russ Ragsdale

The goal of this working group was to develop draft requirements for voting system audit methods to achieve the goal of Software Independence (SI) without requiring a specific technology. Voting system audit methods, as alternatives to SI were to be proposed.

The group encountered various challenges that stifled progress. There was little to no unanimity or consensus on several key issues.

Five alternatives were considered. However, each method either:

- did not meet the goal of SI as we currently understand it;
- could not be delivered as requirements that would go into the VVSG or;
- did not have a commercially available examples, making it unclear if the method was a viable alternative.

The group accepts as plausible that electronic records could be compromised. This could occur through a malicious attack or the result of a software bug. The probability of this happening, thus the level of risk, is debatable. Establishing the probability would be a subjective effort.

The mitigation of this risk can be accomplished with independent voter-verifiable records. Independent records enable a meaningful audit. Voter-verification establishes independent validity. This is set forth in the draft VVSG 2.0 through the requirement for independent voter-verified records (IVVR). The term IVVR was introduced specifically to avoid mandating paper. As a side note, the VVSG 2.0 also allows for an "innovation class" submission to meet this requirement.

The five proposed alternatives, along with their particular challenges, follow.

1. Electronic Independent Verification Devices (e.g. VoteGuard).
   - At best, an incomplete response to malicious software attacks.
2. Parallel testing.
   - Cannot be required in the VVSG as it is a procedural requirement.
3. Software assurance.
   - Would require invasive, expensive changes to the development process.
4. End-to-End cryptographic systems.
   - Still in the research phase; no commercially available examples.
5. Unknown unknowns, or the "innovation class."
   - No commercially available examples to assure viability.

While paper may meet the SI goal, paper is problematic when it comes to accessibility. If voter-verification becomes a requirement, vision-impaired voters, without some form of audio readback, are prevented from verifying their ballots.

How and when the VVSG 2.0 will be adopted are unknown factors with potentially significant impacts. If states require that voting systems meet the latest EAC guidelines, implementation of 2.0 could obsolete existing systems. However, even if this is the case, the expected adoption of 2.0 is several years away. The VVSG 2.0 is intended to be a "forward-looking" set of guidelines, establishing the standards for future systems development.

Reaching an impasse, the working group offered three options to the TGDC.

1. Endorse one or more of the existing paperless alternatives.
   - Accept that different alternatives have different implications and consequences.
   - Implied policy decisions:
     - paperless independent verification device; reject the malicious attack threat or accept an incomplete mitigation;
     - parallel testing; accept procedural mitigation outside of VVSG scope;
     - software assurance; commit to invasive, expensive changes to the development process.
2. Conclude that it was all a big misunderstanding.
   - SI was a goal and not a mandate for paper.

- Accept that no conforming system needs to exist currently and that the VVSG 2.0 is not a mandate to retrofit or replace.
- Refocus on communication of the intent.

3. Conclude that it was no misunderstanding.
   - Accept the SI argument; accept the SI conclusion.
   - Accept that the market is shifting to optical scan ballots.
   - Manufacturers are responding to paper handling and readback requirements.

At the July 8 – 9 meeting, the TGDC did not select any of these three options. Rather, a resolution was passed to clarify the working group's charge.

- The TGDC charges the Auditability Working Group with the responsibility of drafting a definition of auditability, and what characteristics an auditable system would possess. This definition, and these characteristics, should be developed independently of specific technology and even a consideration of whether or not the technology exists.
- The Auditability Working Group should also prepare a report that evaluates SI, and alternative technology, and their strengths and weaknesses for meeting the auditability objectives.

In addition, two new members were added to the group, Paul Miller and Patrick McDaniel.

Conclusion

As is obvious from the reports of the working groups, the work of the TGDC goes on. The next meeting of the entire committee will be in January of 2011. Because of the upcoming November election season, time for some working group members will be restricted. However, NIST research will continue.

Complete presentations along with the video of the July 8- 9 meeting are available at: http://www.nist.gov/itl/vote/tgdc-announce-july10.cfm