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Subject:	Comment on Pilot Project Testing and Certification
Date:	04/30/2010 04:16 PM
Attachments:	COMMENT - PILOT PROGRAM.pdf

Please see attached comment.

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Comments to U.S. Election Assistance Commission
on Proposed Guidelines for Pilot Project Testing and Certification

I teach election law and voting rights at the University of Miami School of Law. I have been doing research for a law review article on the Okaloosa Distance Balloting Pilot Project (ODBP) of 2008. Although my research is still in progress, this comment explains my findings to date and applies them to sections of the guidelines.

Without evaluation, a pilot project is more like a sales demonstration than a test used to gain knowledge, and serious problems may go unnoticed. The ODBP made plans for evaluation by scholars, but seventeen months after the election, no source has produced a report. The ODBP and the Scytl system were omitted from mandatory state post-election reports. When Florida updated its HAVA plan in 2009, the Secretary of State omitted Scytl and the ODBP. Full evaluation must confirm successes and identify problems to avoid before any pilot project can be treated as a national model.

In addition to the importance of evaluation and reporting, thee areas of the Okaloosa pilot are particularly significant for the Pilot Project guidelines. 1) Auditing must include accounting for the number of voters and ballots as well as comparison of paper records with electronic ballots; gaps and discrepancies must be explained and documented. 2) There were three serious problems with ballot secrecy in the Scytl system used in the Okaloosa project, two of which are incorporated into the proposed testing and certification guidelines. 3) The Scytl voting system used in the Okaloosa project did not permit auditing of the version of the voting software used in the kiosks. EAC guidelines must require that software permit auditing of the version used in the election. In general, the pilot project guidelines and manual require additional guidance from the EAC that is not included yet in the drafts for pilot projects.

I. Auditing

Auditing must begin by reconciling the number of voters who signed in with the number of ballots counted, because electronic ballots may not record properly, may be deleted, or may not be downloaded. In the ODBP, 95 voters signed voter certificates (34 in Germany, 21 in Japan, and 40 in England). There were 93 ballots cast, and 92 voter choice records in the audit. Operation Bravo did not explain the gaps in these numbers. An Operation Bravo PowerPoint stated "94 voters participated, 93 ballots cast," [1] , and the website described a voter who removed a smartcard before completing the ballot and decided not to try again,[2] a description consistent with the incident report by a voter at the German kiosk, "Halfway through the process, I changed my mind." Seven voters from precinct 46 signed in at the kiosks, including two voters in Japan, but only six ballots from that precinct were counted, only one from Japan.[3] A handwritten note from the project manager stated that a kiosk worker from Japan "will prepare incident report" on two voters: an unnamed voter who had an incident involving a Voter Choice Record, and a named

voter who was one of those from precinct 46. However, there is no incident report on that voter and no explanation of why a second ballot was not counted from that precinct.

The project manager from the Operation Bravo Foundation did the ODBP audit with witnesses from the League of Women Voters. The audit was recorded on a worksheet without comments or notes. In the column "Precinct totals," the audit shows 68 votes for McCain, 24 for Obama, and 1 write-in. In the column "VCRs," the audit shows 67 for McCain, 24 for Obama, and 1 write-in. The handwritten note in the records from Japan mention a voter who "left wrong paper & came back w/ VCR & also deposited that." Because that VCR had been outside the custody of kiosk workers, there should have been an incident report and an explanation of whether it was "deposited" with other VCRs as part of the audit record; if it was omitted from the audit because of the custody problems, the audit should have explained in a note.

Operation Bravo should have explained the variations in numbers of voters, ballots, and VCRs, but they did not. The press release after the election stated, "The Okaloosa County Canvassing Board decrypted and tabulated the 93 ballots cast. *A manual count of 100% of the races for all the paper records and comparison of the result with the electronic tabulation validated the system's performance. All records matched*." The website stated, "The electronic tabulation was verified against the results of a manual count of the paper records returned from the kiosks. There were no discrepancies in the precinct totals." Those statements are not supported by the audit worksheet.

Auditing the number of voters will identify any problems that develop in interaction with the voter registration database. Florida law requires supervisors of elections to make available a daily update that lists indivdual voters who have cast ballots in early voting. The early voting system in Okaloosa County reported the overseas kiosks as early voting locations, but six of the voters from the kiosk in Germany were not included in the early voting reports, including one voter from October 27 and five from the last day of kiosk voting on November 2. The voters on the last day in England cast ballots after the voters in Germany, and all of them were included in the early voting report.

Voters can look online each day to see if their names appear on the list for having voted early. Okaloosa used the *absentee model* (as identified in Section 1.2 of the proposed guidelines), which provides an opportunity to check whether other ballots were recorded and to update voter history. It seems possible that a failure to update the voter registration database could create a threat in a jurisdiction that uses an *early voting* model in which the ballots at the kiosks go directly into the tabulation system. A final report on the ODBP could have examined why some voters were omitted and determined possible consequences and defenses, directly addressing the question of whether a problem existed in the interaction of the kiosk voting system with the voter registration database.

Lessons for pilot projects: Auditing must include the number of voters as well as confirmation of the choices on ballots that have been counted; discrepancies must be investigated and explained. The interaction of the voting system with the voter registration database must be part of post-election review.

II. Ballot Secrecy Problems

To coerce a voter, the attacker does not actually need to identify the ballot with the person who cast it. If a voter reasonably believes an attacker will be able to identify her particular ballot, that belief makes coercion possible. A system permits coercion if it gives the *voter* information that the *attacker* could use to identify her ballot, because the attacker can coerce the voter to give up the identifying information that will confirm the vote choice. In the same way, vote-selling is possible if the voter can sell information that identifies the ballot.

In Florida, ballots are public records; anyone can inspect the electronic ballots and paper Voter Choice Records from the Okaloosa Distance Balloting Project or obtain copies by upon request. In California, the Humboldt Transparency Project made scanned images of all scanned ballots from an election available online. In close elections such as the 2008 Minnesota recount, ballots are seen by recount participants and images of ballots are published and scrutinized in the press. Even where ballots are less public, identification marks can be seen by election administration insiders and staff.

Three serious ballot secrecy problems affected the ODBP, two of which are part of the Testing and Certification Guidelines: the paper record identifier and, depending on how this requirement is implemented, the requirement in 2.6.3.7 that the paper record identify whether the record represents the ballot that was cast. The paper record identifier facilitates auditing but compromises ballot secrecy.

The Voter Choice Record with a paper record identifier (called a unique session identifier in the ODBP) should not have been approved for certification under Florida law. Fla. Stat. 101.5606 states: "No electronic or electromechanical voting system shall be approved by the Department of State unless it is so constructed that: (1) It permits and requires voting in secrecy." The system did not *require* voting in secret because it marked each ballot and Voter Choice Record with an identification number. Voters can remember and write down enough digits to identify the ballot, especially when combined with information about precinct or ballot style. (For example, "I'm in precinct 20, and my ballot number starts with ABC and ends with 2345.")

Furthermore, in the ODBP, an egregious design error on the Voter Choice Record forced voters to reveal the paper record identifier to kiosk workers before leaving the polls. The error was obvious on the VCRs reproduced in the report of the SAIT team and in the certification report on the Scytl system by the Florida Secretary of State's Division of Elections. The Voter Choice Record placed the identification number ***above*** the line instructing the voter: ***"Show only this part to the kiosk worker."*** The kiosk worker will be able to identify that voter's ballot by its first or last 4 digits (the letters RyKg or mnemonic device such as "Rye Kilogram"). If the number had been placed more sensibly ***below*** the fold, the voter could have memorized or written the entire number or first and last digits sufficient to sell proof of her vote; an attacker could demand those digits as part of coercion. (See illustration on next page.)

Voter's Choice Record

A Okaloosa County – General Election – November 4th, 2008

gAFt–A4bc–RyKg–A
Show only this part to Kiosk official

This part must be kept hidden

Instructions

Review that the printed options match your selections on the screen and press "Cast Ballot".
If these printed options do not match your selections, or if you change your mind, please, press the "Review" button.

Selected Options:

President McCain	**Amendment 3** YES
Congress 1 Miller	**Amendment 4** YES
Public Defender Owens	**Amendment 6** YES
FL House 1 Evers	**Amendment 8** YES
County Comm 1 Harris	
Sup Court – Wells YES	
CRT APP – Benton YES	
CRT APP – Davis YES	
CRT APP – Lewis YES	
CRT APP – Polston YES	
CRT APP – Roberts YES	
CRT APP – Van Nortwick YES	
Amendment 1 YES	
Amendment 2 NO	

The third secrecy problem came from the version numbers (A, B, C) that appear on both the Voter Choice Record and the so-called "Counted as Cast" receipt. The version numbers are not directly associated with voter choices. They are designed to show kiosk workers how many versions of the VCR should be received from that voter. But version numbers also mark ballots in

ways that may permit vote-selling. Of the 93 ballots counted,only two went to version "B" and none to version "C." The two voters who used version "B" were exceptional and would be easy for kiosk workers to remember. These VCRs illustrate another danger: *Neither voter made any changes in the second version.* The effect of version "B" was to distinguish that Voter Choice Record from others at the same location. Obviously, version C would have had a similar effect.

The ballot secrecy problems of version identifiers are similar to the secrecy problems presented by reel-to-reel Voter Verified Paper Audit Trails on DREs. Some jurisdictions separate the paper audit records before auditing. That solution is not available for the different versions of VCRs from the ODBP because earlier records are not marked as spoiled, and any hand-marking of spoiled records would place other identifiable marks on the paper. The only indication that version "A" is not authoritative for auditing appears in the existence of version "B," so the versions must be kept together.

Lessons for guidelines for pilot projects: The forced disclosure of the paper record identifier should have been easy to remedy. The fact that computer scientists and the Division of Elections overlooked this obviously flawed design may be more significant in some ways than the error itself. The SAIT team had not been given procedures for use of the Voter Choice Record, so they may not have studied it closely, but they noticed the identifier and called for more attention to issues it might present. The Division of Elections conducted seven mock elections and must have examined the Voter Choice Records. When working quickly with a pilot project, even experts may misunderstand components or overlook flaws

The paper record identifier has been incorporated into many sections of the proposed guidelines, beginning at section 2.4.2.2. For the hand audit in section 2.6.1.a, there are alternative methods of matching printed Voter Choice Records with electronic ballots. For example, tracking the model of traditional absentee ballots, VCRs can be placed in secrecy envelopes inside envelopes marked with the names of the voters. That structure would facilitate the identification of VCRs that correspond with rejected ballots. However, the random sampling in 2.6.1.b depends on the identifier in both the paper and electronic records. Because this identifier facilitates sale or coercion of votes, that audit method must be changed or abandoned. The requirement that the record show whether it was consistent with the ballot that was cast must not be allowed to violate ballot secrecy.

III. Software Must Be Auditable

Section 6.4 of the proposed Manual for Pilot Projects mandates conformance audits of pilot programs. In the Software Analysis of the Scytl system in Okaloosa, Florida organized by the SAIT laboratory, Finding 4.1.2.1 found that the voting program relied on software that was downloaded across the network at run-time and stored in volatile memory.[4] Therefore, it was not possible to audit the version of the software except during the time it was actually in use. Internet voting will take place at different hours in different locations. Once an audit process begins anywhere, it would create a warning that all the next downloads must be in conformity with specifications, shifting the conditions for the audit.

If the software cannot be audited, it will not be possible to prove that the same version ran at all kiosks. Demand to audit the software, and demand for assurance that all kiosks had the same software, may arise if there are unusual variations in voting patterns at different locations. Anomalies in voting system operation can also create a demand for assurance that the same software was in operation at all locations.

The ODBP had marked variation in voting patterns at different kiosks. In Okaloosa County as a whole, John McCain got 72% of the vote, and Barack Obama got 27.% of the vote. (The lowest percentage of votes for Obama in any Okaloosa precinct was 15%.). In the United Kingdom, McCain got 70% (28 votes) and Obama 30% (12 votes); in Germany, McCain 60% (20 votes), Obama 36% (12 votes), and Ron Paul got 3% (1 write-in vote). In Japan, however, the numbers were different: McCain 100% (20 votes); Obama 0. Obama received at least 15% of the votes in every precinct in Okaloosa County. The kiosk in Japan was the only voting location with a unanimous outcome. Where Voter Choice Records are available and good custody has been maintained (19 of the 20 VCRs from the kiosk in Japan), the manual audit can confirm that the votes counted were consistent with the voter's choices. But the existence of an auditable record does not answer the question about whether the same version of the software was in use.

Software requirements for pilot projects must include a requirement that the version of the software be auditable beyond the time the software is actually being used to collect votes.

IV. Project Evaluation and Inclusion in HAVA Reporting on Voting Systems and Funds

Reporting on Pilot Projects and Pilot Voting Systems

The ODBP planned for a post-election report but did not produce the report. The task of administering and evaluating elections is uniquely governmental. Even if independent consultants also produce reports, government cannot delegate these tasks to other parties. EAC guidelines should require that any state or county planning a pilot project must include plans for its own post-election review, which in turn should include evidence to support the conclusions reached in the evaluation. The requirement is particularly important because the Okaloosa pilot project was omitted from the mandatory report by the county to the state on the conduct of the election. That report included questions about machine problems and fleeing voters. The voter who left with the VCR should have been reported as a fleeing voter, and machine freeze-ups on the Scytl system should have been included. The Scytl system did not appear in the mandatory report by the Secretary of State to the legislature on over- and undervotes and problems with ballot design. Scytl had no over- or undervotes in the top contest, but the design problem of the Voter Choice Record, if anyone noticed it, should have been included as part of ballot design.

The Florida Division of Elections omitted the Scytl system and the Okaloosa pilot project from its HAVA plan update and list of certified voting systems in 2009. This omission was deliberate, because I personally sent a message to the HAVA planning committee urging them to include Scytl in the 2009 HAVA update. Whether or not pilot systems remain certified or are adopted for further use outside the pilot project, they must be included among the systems certified and used in the state in HAVA reporting. If other states take the Florida approach of

omitting these systems, it would make it possible to certify a system for a single election and decertify it without ever reporting to the EAC. In addition, the EAC should clarify the relationship between pilot projects and material changes that require updates to HAVA plans before implementation.

Reporting on Funding and Financial Reporting

Many people gave time and money generously to the Okaloosa Distance Balloting Project. The kiosk workers were not paid, and some did not seek reimbursement. The scientists on the SAIT team were not paid for their review of the software. Operation Bravo, the project manager, is a nonprofit corporation. However, some aspects of the ODBP require clarification with regard to reporting under the Help America Vote Act.

In the ODBP, the only contract with the voting system vendor was signed by Operation Bravo, not by Okaloosa County. That is an extraordinary arrangement. In a report to the Okaloosa County Commission in May 2009, Pat Hollarn stated that Scytl had spent about 500,000 on the Okaloosa pilot project. Because fundraising by Operation Bravo was not successful, Okaloosa County paid Scytl two payments of $50,000 each in 2008 to keep the work on the project moving forward. When vendors pay the cost of pilot projects, even by shouldering costs for projects of non-profit organizations, they make contributions to the administration of elections. This development raises legal questions beyond the scope of this comment letter. As the EAC develops its guidelines for pilot projects, it must also demand accurate reporting of the cost of pilot projects as part of post-election review.

NOTES

1. http://www.operationbravo.org/documents/NASED%20Briefing.pdf

2.http://www.operationbravo.org/pilot_projects.html

3.The VCRs do not have precinct information; therefore, to determine whether ballots from precinct 46 were counted, it is necessary to review all counted ballots and VCRs that might have come from that precinct. The contest for "FD North Bay" 1 through 5 appeared on the ballot only in precincts 46 and 26. There was only one voter from precinct 26 at any kiosk; he voted in England, as did one voter from Precinct 46, and two VCRs from England included the North Bay contests. The kiosk in Germany had 4 voters from precinct 46 and 4 VCRs with the North Bay contest. Two voters from precinct 46 signed voter certificates at the Japan kiosk, but there is only one VCR with the North Bay contest, and five of the six ballots counted from precinct 46 were counted at other precincts. Therefore, one of the voters from precinct 46 did not have a ballot counted in the election.

4.See Software Analysis and Security Review of Scytl Remote Voting Software, http://election.dos.state.fl.us/voting-systems/pdf/FinalReportSept19.pdf, at 23.