



# **VOTER VERIFIED PAPER AUDIT TRAIL Pilot Project Summary Report**

## **EXECUTIVE SUMMARY**

**SB500**

**2006 Georgia Accuracy in Elections Act**

**Office of the Secretary of State  
Elections Division**

**April 2007**

## Introduction

Senate Bill 500, “The 2006 Georgia Accuracy in Elections Act,” was enacted by the Georgia General Assembly in March 2006, and signed into law by Governor Sonny Perdue in April 2006. The purpose of SB500 was to set parameters for a pilot program to evaluate the use and subsequent audit feasibility of a voter verified paper audit trail (VVPAT) to be used in conjunction with touch screen voting machines. The legislation stipulated that one specific precinct in the counties of Bibb, Camden and Cobb would serve as the pilot precincts and set specific machine requirements. In addition, the legislation required that the pilot evaluations be conducted during the November 7, 2006, General Election and the December 5, 2006, Runoff Election.

### The legislation further specified that:

- Voting machines used in the pilot program must be of the same general type from the same vendor or manufacturer as the direct-recording electronic (DRE) machines currently used in Georgia.
- Voters have the opportunity to review a permanent paper record before casting his or her vote on the touch screen voting machine.
- Voters have the ability to change his or her vote on the touch screen after review of the paper record prior to actually casting such votes.
- A manual audit must be conducted to compare the results of the permanent paper records with the electronic record of each DRE unit.
- A summary of the findings, as well as the comments received, be submitted to the General Assembly and made available to the general public.
- Such Act is to be repealed on February 1, 2007.

## Equipment Selection

- The Diebold AccuVote TSX with AccuView Printer Module was selected for the pilot program based on the specific criteria set forth in the legislation. This model is the only touch screen voting equipment manufactured by Diebold that is capable of producing a voter verified paper audit trail.
- Currently, Georgia conducts its election on the Diebold R6 and the Diebold TSX. These units are not equipped with a VVPAT printer attachment, and Diebold does not currently manufacture a VVPAT printer attachment for these particular models.



**Figure 1: Diebold AccuVote TSX  
with AccuView Printer Module Attached**

## **Equipment Training and Testing**

- Poll workers, technicians and officials from Bibb, Camden and Cobb counties attended training on the use of the VVPAT voting unit at Kennesaw State University Center for Elections Systems.
- The counties independently conducted simulated poll worker training, including “open & close” procedures, to further familiarize their personnel with the administration of the voting unit.
- All County Elections Officials conducted “logic & accuracy” testing at their elections offices with every VVPAT voting unit used in the pilot.

## **Election Day Evaluation**

The three designated pilot program precincts were equipped with only VVPAT voting units. A total of 2,038 voters cast their votes in the November 7, 2006 General Election using the pilot equipment -- 592 in Bibb, 470 in Camden and 976 in Cobb.

The University of Georgia (UGA) was retained to conduct exit interviews with voters at each of the pilot precincts. UGA exit pollsters interviewed 459 voters (23.7% of the total number of pilot precinct voters). The distribution of voters interviewed reflects the demographic characteristics of each precinct. Overall, voters reported positive experiences with the VVPAT voting unit, as well as with the non-VVPAT units they had used in previous elections.

### **Voter Experience Exit Interviews**

- 95.6% of voters reported that the paper trail voting system was easy to use.
- 51.3% of voters reported no increase in time to vote with the VVPAT pilot equipment, while 29.3% reported a noticeable increase in time to vote.
- 3.5% of voters reported having problems printing the paper trail.
- 79.1% of voters reported actually reviewing their paper trail.
- 99.8% of voters reported that the paper trail record they reviewed accurately reflected their votes.

## **Voter Confidence Exit Interviews**

- 87.7% of voters described their overall experience voting on Election Day as good.
- 86.9% of voters reported being either very confident or somewhat confident in the accuracy and security of the Georgia non-VVPAT unit.
- 89.4% reported being very confident or somewhat confident in the VVPAT pilot unit.
- 82.4% of voters favored adding a reviewable paper trail.

## **Manual Audit of Paper Trail**

A complete manual audit of all votes cast during the General and Runoff Elections was required and conducted in each of the pilot precincts. The audit time for the General Election was significant, while the audit time for the Runoff Election was minimal because there was only one race to evaluate per ballot.

## **Manual Audit Objectives:**

- Compare the results of the permanent paper record trail created by the VVPAT Pilot Units with the electronic records of the units using manual audit procedures as defined by the Secretary of State.
- Evaluate the feasibility of a physical audit utilizing a paper audit trail.

## **Manual Audit Statistics - General Election 2006**

<b>County</b>	<b>Number of Auditors</b>	<b>Number of Ballots Audited</b>	<b>Number of Races per Ballot</b>	<b>Man Hours</b>	<b>Average Audit Time per Ballot</b>
Bibb	8	592	39	208 hours	21 minutes
Camden	6	470	34	87 hours	11 minutes
Cobb	18	976	42	408 hours	5 minutes

## Projected Costs of a Manual Audit

County	Pilot Votes Cast	Projected Pilot Audit Cost*	County Wide Votes Cast**	Projected Pilot Cost
Bibb	592	\$1,782	37,686	\$113,435
Camden	470	\$1,414	7,991	\$24,053
Cobb	976	\$2,938	179,652	\$540,753

**Note:** The formula for this projection is the number of votes cast x \$3.01, which is the cost to audit a ballot based upon a detailed cost itemization provided by Cobb County. Detailed reports can be found in the County Observation Reports located in Appendix B of the Official VVPAT report.

\*Votes Cast in the November 2006 General Election.

## Manual Audit Observations

The following is a summary of the pilot precinct detailed reports. Observations in quotations are directly from the detailed reports.

### Bibb County Elections Officials

- The audit of the single precinct took 3-1/2 days to complete.
- The manual audit results confirmed the electronic vote results.
- Audit teams noted the need to revise the ballot design and VVPAT print-out design, particularly relating to cancelled ballots, should manual audits ever become required.
- “The overall experience was very stressful and very time consuming.”
- “A county wide audit of VVPAT units is not feasible or cost efficient.”

### Camden County Election Officials

- While audit teams verified that the VVPAT tape results matched the electronic vote totals, the successful completion required multiple restarts of the audit due to human error. New procedures would be needed to minimize these counting discrepancies should manual audits become required.
- When there were discrepancies between the VVPAT tape and the electronic results, the main cause was cancelled ballots.

- VVPAT print-out design needs to be revised, so that cancelled ballots are not printed on the paper trail, thereby eliminating the auditors' ability to mistakenly tally these ballots.
- Procedures are in order to specify the steps to audit both cancelled ballots and paper jam ballots.
- Procedures need to be adopted for the audit of both cancelled and paper jam ballots.

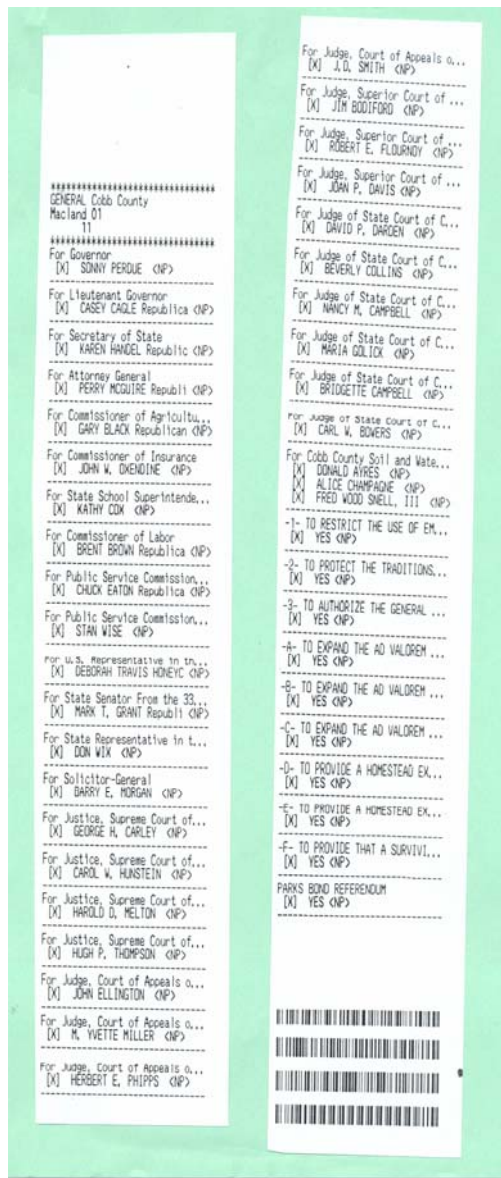
## **Cobb County Elections Officials**

- Cobb's audit process was successful with all manual tallies matching the machine counts. "However, it has also proven that having humans count by hand is not an efficient method of counting."
- Each voter's VVPAT tape was 1.5 feet long. With 976 voters in the pilot precinct, 1,464 feet of tape was produced.
- "It was impossible for any of the employees to get all the way through one canister without making some errors in tallying some races." This caused multiple "restarts" of the counting process.
- If VVPAT were to be required, significant changes in the design of the paper ballot would be needed, including having a clear marking for "cancelled" ballots and better delineation of the races.
- If VVPAT were to be required, a strategy for voting unit allocation needs to be established.

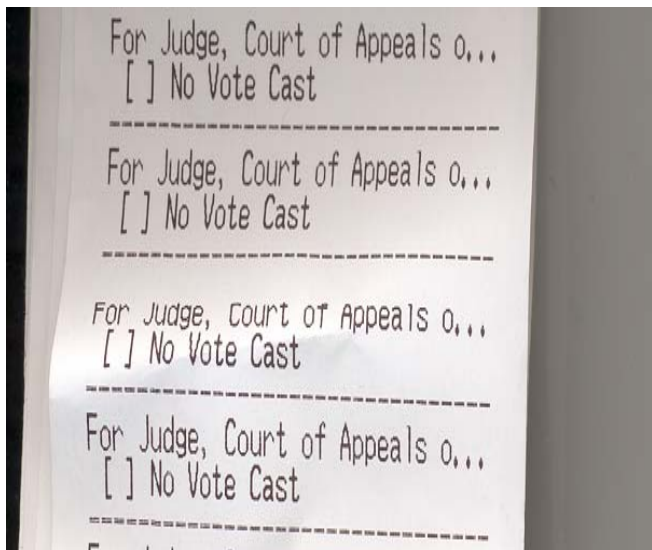
## VVPAT PILOT PHOTOS



One complete VVPAT tape placed along the Cobb County Election office floor. Approximately 194 feet long (95 ballots).



An example of a paper trail ballot from Cobb County VVPAT polling location. 42 races resulted in approximately 1 ½ feet of paper tape.



An example of a race on a VVPAT ballot. Space limitations hinder the full display of the ballot choice.



## VVPAT Public Hearings

In December, 2006, the Elections Division of the Secretary of State's office conducted three public hearings -- one in each of the pilot counties of Bibb, Camden and Cobb. Official transcripts of the public hearings are available upon request. Each hearing followed the same format. Respective county elections officials gave an overview of their pilot experiences. This was followed by public comment. Comments specific to the VVPAT Pilot Project were very limited with 4 speakers in Bibb, 5 speakers in Camden, and 11 speakers in Cobb.

Note that a second public hearing regarding "electronic voting machine security" was held in conjunction with the VVPAT Public Hearings. A summary of these comments is available from the Secretary of State's office upon request.

## VVPAT PILOT PROJECT – Findings

**Finding 1:** There is significant public acceptance and support for VVPAT among voters participating in the pilot project. However, it is important to note that pilot voters were not informed of the significant cost to upgrade to the pilot units.

**Finding 2:** Among the pilot project voters, confidence is extremely high in Georgia's current system of non-VVPAT voting units, and the addition of VVPAT increases voter confidence from 86.9% to 89.4%.

**Finding 3:** The manual audit conducted in the three pilot precincts successfully verified that the electronic votes cast matched the votes reported on the VVPAT tape in every precinct and for every race.

**Finding 4:** Analysis by Elections Officials from the participating pilot counties and the Secretary of State’s office revealed numerous and significant issues with the VVPAT voting units technology. Specifically:

- Papers jams
- Inefficient and confusing VVPAT tape layout
- The sequential printing of the paper ballots does not guarantee voter anonymity and vote secrecy as required by Georgia Law.
- Voting time with the VVPAT voting units increased significantly, indicating the need for a greater number of VVPAT voting units as well as a voting unit allocation strategy, were Georgia to move to this platform.

**Finding 5:** Each pilot voter produced approximately 1.5 feet of paper tape for the November 2006 election. A total of 2,038 voters used the VVPAT Pilot Units – creating over 3,000 feet of paper. If the VVPAT Pilot Units were adopted statewide, approximately 2.5 million feet of paper would be placed in storage for two years for each General Election.

**Finding 6:** The manual audit provided a strong indication of the challenges associated with an official and complete recount of an election. As noted in Finding 3, the audit proved that the electronic votes matched the VVPAT votes. However, the audit process was costly, inefficient, time-consuming and highly susceptible to human error. Cobb County estimates that a county-wide manual audit of its 191 precincts would take 120 days at a cost of \$520,000. With 3,012 precincts in Georgia, a similar complete manual audit would cost millions, require hundreds of additional elections staff, and delay elections certification for weeks if not months.

## CONCLUSIONS

The pilot provided several important and valuable insights into our elections and VVPAT technology. Voters expressed a high degree of confidence in our current election systems, while also supporting the possible use of VVPAT technology. Individual voters using VVPAT reviewed a paper record of their votes before they were officially cast. Exit polling showed that, overall, the individual voting experience in the pilot program was positive for most of the voters in the three precincts. Further, the manual audit of the votes cast in the three demonstration precincts matched 100% the results that were recorded by the electronic voting machines.

The manual audit of votes cast was particularly challenging for the local election officials managing the audit process. Even with significant training and defined processes and procedures, the audit process proved to be very time-consuming and costly. Local elections officials reported technical problems with the printers (such as paper jams). Additionally, local elections officials noted particular concern about the increased opportunity for human errors in the hand-counting of the individual votes on the paper roll.

As Georgia's policy makers move forward in the dialogue concerning the use of VVPAT technology, it is important that we utilize the lessons and observations from the pilot program. Voters are confident in our current system. Voters also support VVPAT, although there are important considerations to consider before moving forward with implementation. First, a compatible VVPAT printer attachment for Georgia's existing voting machines does not exist. This means that a complete replacement of our current system would be necessary. Second, there are numerous procedural, technical and practical questions and observations that must be addressed during the selection of a new voting system. Finally, there are several bills pending in the United States Congress that would established new national standards for the technology and process of federal elections, including specific paper trail requirements.

Given these issues, Georgia should continue to evaluate new voting technology. At the same time, we must also continue our efforts to further increase voter confidence. To that end, the Secretary of State's Elections Division has proposed an independent, outside audit of Georgia's elections system. This audit will review the touch screen machine's hardware and software, as well as the existing policies and procedures that govern the conduct of elections. This independent audit will provide additional, unbiased data regarding the security of Georgia's current equipment and offer recommendations for procedural improvements and election audit policies.

This summary report is being provided as a supplement to “The Voter Verified Paper Audit Trail Pilot Project Report.” That report and supporting documents are available upon request to:

Office of the Secretary of State of Georgia  
State Elections Division  
2 MLK Jr. Drive, S.E.  
Suite 1104, West Tower  
Atlanta, Georgia 30334  
(404) 656-2871