ACCOUNTABILITY OF ELECTRONIC VOTING SYSTEMS IN FLORIDA:
An Analysis of Policy Options

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Glenda Hood  
Florida Secretary of State  
Tallahassee, Florida

Dear Secretary Hood:

I am pleased to submit, for your review and consideration, *Accountability of Electronic Voting Systems in Florida: An Analysis of Policy Options*. This report is the product of extensive research and policy analysis during the spring of 2005. In consideration of the concern for more accountability in the election administration process stemming from the past three election cycles, it was created to provide an analysis of DRE voting machine functions and a policy recommendation.

Currently, the state does not require an independent voter verifiable audit trail procedure for DRE voting systems. This report analyses the current system, as well as a Voter Verifiable Paper Trail (VVPT) system and a votemeter system. Each policy option was evaluated according to four criteria: administrative feasibility, political feasibility, system security and voter verifiability.

My recommendation is that Florida should implement a votemeter system in conjunction with the currently placed DRE machines. It has been found that this measure would increase voter confidence, allow for voter verifiability and an independent audit trail, comply with HAVA requirements for disabled access, and be cost effective.

The implementation of votemeter systems in conjunction with the current DRE voting systems will restore confidence in the integrity of the election system while providing for an individual ballot audit trail in the event of a recount.

Respectfully,

Jennifer D. Orlando
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EXECUTIVE SUMMARY

The presidential election of 2000 brought intense national criticism to the state of Florida with regard to election administration. That election demonstrated how important each and every vote is, as well as the importance of having an accountable and accurate voting process. In order to restore accountability to the election process, a number of election administration reforms were implemented in Florida, including the widespread replacement of punch card ballot systems with electronic direct recording (DRE) machines. Unfortunately, this solution to the 2000 problem has presented a new set of current day problems, namely a lack of voter verifiability and individual ballot audit trail. Voters in Florida are still not confident in the legitimacy of election administration due to these failings, and, as a result, many members of the electorate did not feel confident in the results of the recent 2004 presidential election.

DRE machines have been highly criticized since fifteen Florida counties, representing over half of the Florida electorate, began to use them in replacement of older voter systems that were decertified pursuant to the Florida Election Reform Act of 2001. Numerous instances of lost or misplaced ballot information on many of these machines were documented, especially in close races where the difference of the missing votes could have changed the outcome of the race. Since there was no way to retrieve individual ballot information from these machines, nor was there a way for voters to verify their ballot was in fact cast correctly, many voters lost confidence in the election process and became disillusioned as memories from the 2000 election resurfaced. These problems resulted in the call for a voter verifiable audit trail with which recounts of each and every individual ballot could be conducted.

Information for this report was collected using three methods. First, the professional, technical and academic literature were reviewed; these sources included the Florida Department
of State, Division of Election reports and statistical data, the Collins Center 2004 Voter Satisfaction Survey, the Caltech/MIT voting project was analyzed to provide a history of the evolution of voting systems in Florida and to provide insight into election reform and concerns over the lack of accountability of DRE voting systems. Next, review of the Florida HAVA plan, Florida election laws, the 2005 Florida VVS and applicable proposed legislation were examined to provide an understanding of current DRE voting systems administration guidelines and policy. Finally, an elite interview with a scholar of Florida politics, who has served on important policy making bodies and has detailed knowledge of party politics at the state and national levels, was conducted. This political analyst, who is Republican in partisan affiliation, provided valuable insight into the election process in Florida, reform and administrative and political issues.

Three policy options were composed to address accountability of electronic voting systems in Florida: maintain the status quo, implementation of a VVPT (Voter Verified Paper Trail) and implementation of votemeter technology. Each option was evaluated against four criteria, which include administrative feasibility, political feasibility, system security and voter verifiability.

Based on the analysis of the policy options in consideration of the evaluative criteria, policy option three, implementation of votemeter technology, is recommended. This technology is administratively feasible and complies with the HAVA requirements for access to disabled voters. It is also a secure method to provide voter verifiability and an independent record of each ballot for an audit trail. By implementing votemeter technology in conjunction with currently placed DRE machines, accountability of electronic voting systems in Florida can be achieved and voter confidence in election administration can be restored.
I. Problem Statement

“That who cast the votes decide nothing; those who count the votes decide everything.”
-Stalin

Many members of the American electorate can closely relate to the message conveyed by Stalin in the quote above, an acutely disturbing fact given that our country is founded on the principles of democracy. Fifty years after this phrase was first coined, many Floridians are now questioning the reliability and accountability of electronic voting systems and whether their vote will count on Election Day.

In the wake of the Florida 2000 presidential election debacle, numerous reforms were implemented at both the state and federal levels to help ensure that elections run smoothly and are reliable and accurate. In order to achieve this goal, the voting systems that produced the infamous “hanging-chad” ballots were outlawed pursuant to the Florida Election Reform Act of 2001 and were replaced with voting systems that promised to drastically reduce the level of undervotes and overvotes in future elections. The types of voting equipment now authorized for use in Florida are precinct based optical scan systems and electronic direct recording (DRE) systems. With optical scan systems, documented ballots are fed into an electronic reader and tallies are stored in computer memory. This tallying is done at the precinct level. With DRE systems, voters select their choice by touching the name of the candidate on a computer screen and cast the ballot by pressing a separate button once all choices have been made (Fischer, 2003). These votes must be capable of being tabulated at the precinct level so that voting errors can be identified and corrected immediately and also so that voters can have the opportunity to correct them.
However, this new technology presented a whole new set of problems. Beginning in 2002 and most recently in the 2004 presidential election, numerous documented instances of DRE machine failure and allegations of fraud occurred, drawing public attention to the lack of accountability in these DREs. This lack of accountability was manifested in the lack of an independent voter verifiable audit trail. Had these records of individual ballots existed, it would have provided for a back-up in the event of a recount, as well as assured voters that the choices they made on the DRE screen were recorded as intended.

In a democracy, voters must have confidence in the integrity of the voting system if they are to trust in the legitimacy of the government that serves them. Concerns as to whether the voting system is legitimate have been raised and have decreased the level of confidence voters have in the election process. It is vital to resolve these accountability issues in order for the American electorate to once again trust the legitimacy of U.S. elections, which form the basis of our democratic system. In order to restore this faith and trust, something must occur in the realm of public policy that solves the accountability problems currently being experienced with DREs. The public has now called for approaches that will produce accurate, secure recording of votes with complete integrity. Public administrators and elected officials now have the responsibility to address and find solutions to problems arising in the administration of elections.
II. Background and Literature Review

Background

The failings of the 2000 Presidential election and subsequent Supreme Court case of Bush v. Gore served as the catalyst for election reform all across the United States, and especially in the state of Florida. The presidential race had a margin of victory of only 537 votes, so the failures in voting technology were greatly amplified and became the center of national attention for the first time in history. The “Hanging Chad” became a household term as the country was divided almost completely down the middle between the two candidates.

Suddenly, these voting system failures, which arguably have been occurring on a regular basis for years and years, became the focal point for the reform of the election administration process. In response to these problems, Governor Jeb Bush appointed a bi-partisan task force to make recommendations to improve Florida’s election procedures and technology. This task force met over a two month period and issued a report containing thirty-five recommendations that would improve Florida’s election process. The 2001 Florida Legislature introduced legislation that incorporated many of these recommendations and soon passed the Florida Election Reform Act of 2001. One of the most notable directives of the Act to outlaw the infamous punchcard ballot systems and replace them with either DRE touch-screen voting systems or precinct based optical scanners (Florida Reform Act of 2001). The reason for the replacement was to assure that ballot spoilage would no longer have a differential partisan impact and so that counties would now have uniform rules for recounting votes and interpreting voter intent. True voter intent was the main source of the problems in the Florida 2000 presidential election and the subsequent election reform was created to ensure that voters were able to confidently record their votes in future
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elections. However, this goal of ensuring voter intent and election system accountability was not to be fulfilled.

Although the Florida Election Reform Act of 2001 and subsequent federal Help America Vote Act of 2002 (HAVA) was successful in improving the election process in the state of Florida in many respects, the new mandated voting technology, namely the touch-screen DREs, ultimately became the source of the current day election administration problems. The current policy problem is twofold; first off, these DRE machines do not produce an independent audit trail of each ballot cast. They only remit an electronic image of a representative ballot which is stored on a computer hard-drive, meaning that it would be impossible to recount each ballot by hand. This lack of voter verifiability, coupled with another close presidential election, caused many members of the electorate to doubt the integrity of the election process and subsequently gave rise to a lack of confidence in the system. This issue leads us to the second problem, which is the security of these machines. Since voters cannot verify what their ballot actually looks like after it has been cast, they must have full trust that the systems are secure, reliable and accurate and cannot be corrupted or manipulated by outside parties. Also, since the software in these systems is proprietary, there is no assurance that the software has not been coded to change vote or in other ways manipulate tabulation. These machines are tested prior to the election, but programs can be written not to trigger until election day. These problems combined are causing the current day policy issue regarding the accountability of electronic voting systems, or DREs.

Following in the wake of DRE voting system problems in 2002 and 2003, the Collins Center for Public Policy conducted a study surveying voters statewide on Election Day to better assess the level of voter satisfaction in the recent 2004 presidential election. One of the key questions in the survey was “Did Florida voters have confidence that their votes would count?”
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The respondents rated their confidence level as excellent, good, fair, poor, or don’t know/refused. They were asked to rate their level of confidence in both the 2002 and 2004 elections. The level of confidence voters had that their vote would count systematically decreased across all categories in the 2004 election. Of note is that only 40% of African Americans and 42% of Hispanics rated their confidence that their votes will count as excellent, compared to 66% of white voters that rate their confidence level as excellent. Also, only 52% of those that voted in the 2004 Presidential Election were very confident that Florida has done everything it should to prevent Election fraud (Barcelo, et. al., 2004), which indicates that there still remains much suspicion over the security of election systems. Additionally, when asked which type of voting equipment represents the biggest worry for inaccuracy or fraud in the 2004 election, the DRE touch-screen system was ranked the highest of the three, which were optical scanning, touch-screens, and absentee/paper. Optical scanning equipment was the method voters were least worried about (Barcelo, et. al., 2004). Since it is was determined that DREs have a higher error rate than optical scan systems back in 2001, many voters question why the state did not simply mandate optical scan systems statutorily to assure uniformity and thus address the “equal treatment” issue stressed by the U.S. Supreme Court in Bush v. Gore. It is evident in this study that the state of Florida still has work to do in order to provide for more accountability of DRE systems and the election process. According to the Florida Division of Elections, there are currently 15 counties utilizing DRE machines, accounting for 55% of precinct based votes cast in the 2004 election and over half of all registered voters in the state of Florida. With over half of the state voting on these machines, it is vital that the integrity and accountability of the election process be restored so the electorate can once again feel confident that their vote will count. It will take a change in current policy to effect this change. To better understand the facts and
issues affecting the way elections are currently administered in Florida and therefore better understand the current problem and ways to solve it, a brief history of DRE voting systems, rules and regulations, both at the federal level and the state level, will be examined.

**Evolution of DREs**

DREs were first introduced in the 1970's and are similar to lever machines. The type of DRE used in Florida is the touch-screen DRE. In this type of DRE, a voter makes a choice by touching the name of the candidate on the screen and casts a ballot by pressing a separate button. After the ballot is cast, the votes are stored in a computer memory device; there is no document ballot produced with this machine (Fischer, 2003). DREs are very user friendly. According to the 2002 Florida Department of State Analysis and Report of Overvotes and Undervotes for the 2002 General Election, counties that have replaced punch card systems with touch-screen systems experienced a marked decrease in the level of overvotes, undervotes and invalid write in votes during the 2002 election as compared to the level experienced in the 2000 election. In Palm Beach County, the level of overvotes, undervotes and invalid write in votes decreased from 6.43% in the 2000 election to 1.30% in the 2002 election. However, DREs have a higher error rate than optical scan machines and most urbanized counties have switched to DREs. Therefore, there still remains a partisan bias in the error rate, particularly in heavily Democratic counties, since equipment in predominately Republican counties use optical scan equipment. Although the over-all percentage error rate is lower, there is a definite partisan bias in those Democratic counties that utilize the higher error-rate DREs.

**VSS**
The Florida Election Commission’s (FEC) Office of Election Administration (OEA) published the Voting Systems Standards (VSS) in 1990 in order to set standards to help election officials ease the difficulty and confusion inherent in election administration. It was also created to set federal voting equipment guidelines and standards (Mulligan & Hall, n.d.). This set of standards became outdated as time elapsed because it did not adequately address security issues, privacy protection, quality assurance and voting system documentation. This problem was addressed when the VSS was last updated in 2002. These new standards outline security and privacy protection measures, documentation, and accessibility. (Mulligan & Hall, n.d.).

**Florida Election Reform Act of 2001**

In order to quickly respond to and address the major problems experienced in Florida in the 2000 election, the Florida legislature passed and the Governor signed into law CS/SB 1118, otherwise known as The Florida Election Reform Act of 2001. The most provision of this act mandate that all punchcard, paper ballot, mechanical lever machine and central-count voting systems will no longer be used by the state and must be replaced with a precinct-based tabulation (either optical scan or DRE) system by 2002. The counties may choose only from the list of certified machines as dictated by the Secretary of State Florida Election Reform Act of 2001). This act also created a provisional ballot system so voters with undetermined eligibility could vote on a provisional basis on Election Day. In addition to this requirement, the act: clarifies the statutory “voter intent” standard in Florida’s election code, removed discretion for ordering manual recounts from canvassing boards, stipulates an automatic machine recount if the margin of victory in any race is one-half of one percent or less (as opposed to the previous margin of victory standard of one percent or less), and then, if the margin of victory is one-quarter of a percent or less, an automatic manual recount must be performed, provides for a statewide voter
registration database and mandates minimum standards and hourly requirements for poll worker training. Although the Act called for these changes and several others, the most significant reform required by the act was the replacement of the aforementioned voting systems. The Act also stipulates that the Secretary of State can no longer participate in someone else’s campaign, as Katherine Harris had done in 2000.

**HAVA**

Following the implementation of Florida Election Reform Act of 2001, Congress passed the Help America Vote Act of 2002. This Act is the first piece of federal legislation on election reform and voting since the Voting Rights Act of 1965. HAVA requires that each polling place used in a federal election has at least one voting machine that is fully accessible to persons with disabilities; currently only DRE machines can fulfill the HAVA disability access requirement (Fischer, 2003). This Act also requires that voters be able to review their ballots and correct errors before casting their vote and be notified of over-votes. The state of Florida already addressed many of these issues in the Florida Election Reform Act, but access to disabled persons portion will not be met until the 2006 deadline (Florida HAVA Plan, 2005). In order to ensure compliance to HAVA requirements, the state of Florida has created a HAVA plan, which was most recently updated in June of 2004 (Florida HAVA Plan, 2005). This plan identifies HAVA requirements and divided them into thirteen elements. Within each element is an action plan outlining how the state will meet the requirements; it also indicates the funding requirements necessary to accomplish these goals.

**Certification and Standards Process**
According to the Division of Elections, for a voting system to be certified in the state of Florida, the machine manufacturer must submit it to an independent testing authority (ITA) for testing and examination. These ITAs, which are certified to conduct testing by the National Association of State Election Directors (NASED), test the systems against VSS standards. These duties are in the process of being transferred to the National Institute of Standards and Testing (NIST) and this transfer should be completed by the fall of 2005. There are only three ITAs certified to conduct voting system testing. These include Wyle Laboratories, Cyber and SysTest Laboratories. Vendors are required to pay for ITA testing and must also pay for expenses relating to the Florida certification process. As part of this testing, the State conducts an election on the system to examine its performance. The software used in voting systems is proprietary in nature, so the certification process is closed to public and third party scrutiny.

Following ITA certification, these systems are sent to the State for a thorough examination of the software, firmware and hardware. Then, the system is either not approved or approved and certified by the Division of Elections of the Florida Department of State. After certification, the systems cannot be altered or changed in any way without being examined and tested further. Counties may choose only from the systems that have been certified and approved by the Division of Elections (Mulligan & Hall, n.d.).
Literature Review

Analysis of the literature revealed three common issues pertaining to the accountability of DRE electronic voting systems: the lack of a verifiable individual ballot audit trail, issues with the security and reliability of DREs, and the effectiveness of DRE testing and standards. These three major issues are the main source of the current accountability problem of DRE voting systems. The lack of a verifiable audit trail was perhaps the most prevailing issue throughout the body of literature. Currently, DREs are paperless and do not provide a voter verifiable audit trail (Simons, 2004). When a ballot is cast, the votes are stored in a computer memory device. However, there is no record of each individual ballot, only a tally of all the votes (Fischer, 2003). The voter never sees an actual ballot, but rather a representation of a ballot on the voter interface screen of the machine (Fischer, 2003). Currently, in the state of Florida, DREs do not provide a way for voters to independently verify that the machine correctly records into memory the choices selected on the user interface screen (Norr, 2003). This has become a major cause of concern following several accounts of machine malfunctions and mechanical failures during the past three election cycles, especially since DREs have a consistently high undervote rate and also have problems accurately recording votes. One instance of a machine failing to properly record votes occurred in January, 2004. During this special election, the only item up for vote on the ballot was for district 91 of the Florida House. The winner of this race won by a margin of only 12 votes, yet a recount was not conducted. The most disturbing problem was that there were 134 undervotes cast in this special election of only one race. Either 134 people came to the polls and did not vote at all, or these DRE machines failed to record 134 votes. The latter explanation is the most likely, and is just one instance in which DREs were found to have lost votes and had no
way of retrieving them since there is no independent record of each ballot cast or a method to allow voters to ensure their ballot was recorded as cast (Haggman, 2004).

Another issue addresses throughout the body of literature was the security and reliability of the DRE voting systems. Many prominent security experts have concluded that current DREs are vulnerable to tampering to such an extent as to potentially influence the outcome of an election (Fischer, 2003). David Dill, a professor of computer science at Stanford, found that touch-screen voting machines “pose an unacceptable risk that errors or deliberate election-rigging will go undetected, since they do not provide a way for the voters to verify independently that the machine correctly records and counts the votes they have cast” (Norr, 2003).

A serious concern regarding the security of DREs is that it would be highly difficult to detect an attack if one had been attempted. DREs are “black box” systems; therefore suspicious activity that occurs within the machine is not observable. Given the proprietary nature of the software code, independent third party computer scientists have not been able to study these machines to determine the degree of their vulnerability to threats. However, in early 2003, an open website containing files pertaining to Diebold, a major voting systems vendor, was discovered by several election reform activists. Researchers in what is known as the Hopkins Study analyzed many of those files to and determined that the computer source code had serious security flaws that would allow easy access to hackers at various levels to tamper with the software (Fischer, 2003). An independent security analysis was conducted after the findings of the Hopkins Study were released and concluded that the voting technology was indeed highly susceptible to risk (Fischer, 2003). In fact, Diebold was found to be using the exact same password on every machine.
The third common theme found throughout the literature was that the effectiveness of DRE testing and standards are currently inadequate. According to Fischer, VSS have been criticized for applying too many constraints on the development of technology that could resolve security issues. With the electronic nature of the DRE systems, it is vital that the standards for certification be stringent. The VSS has only been updated twice in twelve years and it is not keeping up with rapid changes in technology or potential threats. According to Mulligan & Hall, the majority of voting systems used in the 2004 election were qualified against the 1990 VSS due to a grandfathering of subsystems that had already been qualified under the 1990 standards. The current 2002 VSS still lacks guidelines that relate to auditability and usability of these systems (Mulligan & Hall, n.d.). Although the state of Florida has hired an independent ITA to certify these systems for use, many critics argue that a truly independent team of computer scientists that are experts in computer technology should be charged with testing the systems as well (Norr, 2003).

To summarize the literature, current research indicates the need to address the verifiable individual ballot audit trail issue, issues with the security and reliability of DREs, and the effectiveness of DRE testing and standards. Several pieces of legislation are currently up for approval in the Florida legislature this session that attempts to provide for more accountability of electronic voting systems in the state. SB 2420, by Senator Hill, would require each voting system approved for use in the state to provide each voter casting a ballot with paper receipt that indicates each vote cast on the ballot. SB 504, also by Senator Hill, would require electronic or electromechanical voting systems to be capable of producing a voter-verified paper record that is suitable for manual audit (flsenate.gov). In addition to this state proposed legislation, several Democrats in Congress have introduced legislation, called the Count Every Vote Act of 2005,
which would provide for a voter verified paper ballot for every vote cast in electronic voting machines. By virtue of the existence of this proposed legislation, it is evident that the need for reform has been realized by policy makers at both the federal and state level. The next step for policy makers in Florida is to determine the best policy option to address these many concerns.
III. Methodology and Evaluative Criteria

Methodology

Information was collected through analysis of the following data sources:

- Collins Center for Public Policy 2004 Florida Voter Satisfaction Survey
- CalTech/MIT Voting Technology Project
- White paper: Analysis of E-Voting
- University of California, Berkeley, Voting Technology Study
- Florida Statutes: Election Laws of the State of Florida: August 2004
- Congressional Reports
- Department of Elections: Facts Publications
- Florida HAVA Plan 2002
- OPPAGA Justification Review: Election Reform Implementation, 2002
- Florida Voting Systems Standards, 2005
- Review of applicable legislation of the 2005 session
- Review of applicable scholarly literature articles retrieved from ProQuest database
- Open ended, qualitative interview with a distinguished Florida University professor who is also a renowned Florida elections and political analyst. The interview lasted approximately fifteen minutes and was based on a series of 9 questions that address each aspect of the current day DRE election administration policy problems.
Evaluative Criteria

The policy options were evaluated according to the following criteria: Administrative feasibility, political feasibility, and voter verifiability. These criteria were chosen because they speak to all of the problems currently being experienced with regard to the DREs.

➢ Administrative Feasibility

This criterion assesses the cost, difficulty/ease in conducting the process, potential new training requirements for poll workers, and ready availability of voting systems. These data sources were obtained through interviews, academic literature, and congressional and state reports.

➢ Political Feasibility

This criterion examines the constitutionality of the proposed policy options (including adherence to HAVA and state of Florida provisions and statutes), the potential of each option to pass through legislation given the current political climate, and public opinion. These data sources were obtained through analysis of 2005 proposed election reform bills in both Congress and the Florida Legislature, through the CalTech/MIT Study, reports obtained from the DOE, and academic literature.

➢ System Security
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This criterion examines the potential policy option’s adherence or lack thereof to current Florida security testing and qualification standards, resistance to hacking or tampering and fraud identification capabilities. These data sources were obtained from the Florida VSS and the CalTech/MIT Voting Technology Project.

➢ **Voter Verifiability:**

This criterion examines the nature of a voter verifiable audit trail, level of voter confidence in election results, and use or non-use of open source software code. These data sources were obtained from the Collins Center for Public Policy 2004 Florida Voter Satisfaction Study.

The criteria were measured based on the ratings of Excellent (4), Good (3), Fair (2), and Poor (1). They were chosen to reflect the major issues of concern discussed in the literature review and were also a reflection of the major issues considered in reform strategies.
IV. Policy Options

Three policy options for enhancing the accountability of electronic voting systems in Florida are outlined in this section. Maintaining the current system, voter verifiable paper trail (VVPT) and votemeter technology are evaluated according the following criteria: administrative feasibility, political feasibility, and voter verifiability. The policy options chosen were the most representative of the options currently being considered in Florida and by other states.

Option 1: Maintain Current System

In order to provide for a baseline comparison of the following two policy options, the option of maintaining the status quo will be analyzed first.

Administrative Feasibility: The current system is obviously administratively feasible as it is presently in place. Most of the costs associated with this system have already been expended. Pursuant to the Florida Election Reform Act of 2001, funds in the amount of $7,500 per precinct in small counties and $3,750 per precinct in other counties were distributed over a two year period to allow for the upgrade of their election systems. Overall, the state of Florida has provided $24 million to counties to assist them in purchasing the new voting systems. Since the state of Florida was under a deadline to implement one of the two approved voting systems by 2002, there no longer exists a need for additional large scale expenditures to be made on voting systems. Poll workers were required to undergo additional training pursuant to the Florida Election Reform Act in order to learn how to operate the new machinery. The initial costs associated with this requirement have also been expended, as the poll workers have already
received this new training. Additionally, there is no problem in the current system with regard to ready availability of voting system machinery, as the systems currently being used in Florida have already been approved and certified by the Secretary of State.

**Political Feasibility:** The current place system is constitutional and complies with current state and federal legislation. Pursuant to HAVA, by the year 2006 all precincts in Florida will have at least one DRE machine on site to fulfill the accessibility for disabled voters requirement, which also lends itself to political feasibility. The current system does not, however, possess an independent voter-verifiable audit trail capacity. This is currently a major problem in the political arena because many voters have lost confidence in the elections process and are now calling for an independent method to provide for voter verification of each individual ballot cast as well as to provide a basis for a recount.

**System Security** Many prominent security experts have concluded that current DREs are vulnerable to tampering to such an extent as to potentially influence the outcome of an election. Since these systems operate on proprietary software, the degree to which they are susceptible to threats is not fully understood; the Hopkins Study found that there were considerable risks inherent specifically in the Diebold system, but this particular system is not certified for use in Florida. Also, there are currently not any documented cases of system hacking or fraud.

**Voter Verifiability:** As stated above, the current system does not provide for a voter verifiable audit trail. This problem has led to the deterioration of public trust in the administration of elections in Florida, and it is threatening to undermine the legitimacy of the government. Voter
confidence has decreased since the 2002 election as evidenced by the 2004 Voter Satisfaction Survey. Respondents in this survey were asked which type of voting equipment represents the biggest worry for inaccuracy or fraud. Of the three voting methods (optical scan, DRE and absentee/paper) DREs received the highest percentage (Barcelo, et. al, 2004).

The policy option of maintaining the status quo is questionable with regard to political feasibility and voter verifiability. It is administratively sound, as it is currently in place and the necessary funding has been expended and poll workers have already received the necessary training.

**Option 2: Voter Verified Paper Trail Technology:**

This policy option would require all DRE machines in the state of Florida to print a paper ballot with the voter’s choices listed, for both verification and recount purposes. The voter would then be presented with the opportunity to verify that the ballot accurately reflected the voter’s choice as made on the DRE user interface screen. If there was a discrepancy, a poll worker would be alerted to handle the discrepancy. This method would allow for greater accountability of DREs and the election system by allowing voters to actually verify their ballot cast and provide for an independent audit trail in the event of mechanical failure or a recount.

**Administrative Feasibility:**

The cost of implementing this requirement would be considerable. According to the Secretary of State, each printer would cost approximately $600 each in addition to the amount of necessary recurring costs, such as paper and ink cartridges. A roll of security paper is estimated to be approximately $80 per roll; it is also estimated that the state would need twenty-two miles of paper for each gubernatorial election. In addition to the costs of printing materials, additional
space will be needed to store these printers and printing supplies. There would also be a need for further poll worker training and the rewriting of procedural manuals. Additionally, people would have to wait longer at the polling place to view these receipts. It is estimated that there would be a need for twenty-five percent more voting machines statewide in order to make up for the longer wait; these additional machines are estimated to cost approximately $3,500 each.

There would also be some additional difficulty in the administration of the election if printers were required. Poll workers, who are on average 72 years old according to the National Association of Secretaries of State, would be required to quickly respond to printer jams and other problems if and when they arise. The tasks of setting up and breaking down the printers each day would also be time consuming and potentially difficult. The state is already experiencing difficulties in finding poll workers; having this additional training requirement may discourage even more people from becoming poll workers. Machines would require retrofitting to accommodate these printers once they have been certified for use in Florida.

**Political Feasibility:**

There are currently several pieces of legislation in the Florida Senate that would require a VVPT on electronic touch-screen voting machines. However, SB 2420 has been referred to four committees and SB 504 has yet to come up in committee since being referred to committees in January, so it is quite apparent that this legislation does not have much chance of making it to the full Senate in session this year. The usage of VVPT is also not advocated by the Executive Office of the Governor or the Secretary of State. Perhaps most importantly, the use of a VVPT would not conform to HAVA accessibility requirements for blind voters, which is to be implemented by January of 2006.
Accountability of E-Voting Systems

According to the Florida Department of State, the printers that would be used to provide a VVPT required would need to undergo testing by the Election Assistance Commission and the National Institute of Standards and Technology (NIST). As of April 6, 2004, ES&S is working on a prototype printer and it will not be put into production until standards are published. ES&S estimates that it would take approximately eight to ten months to go through the certification process. Several other printer vendors have indicated that they are not interested in applying for Florida Certification.

System Security:

The VVPT system would be relatively secure, given that it does not include the introduction of additional software or computer systems. Also, if the paper receipt that is printed out does not conform to the choices made by the voter on the user interface, it will be immediately addressed and resolved. It is a more transparent method where the voter is allowed to immediately view the results of their ballot. There are currently not any VVPT that have been qualified by Florida security testing entities, but at least one vendor, ES&S, is undergoing the certification process now. There are relatively good fraud detection capabilities in this method because the voter will immediately see if the ballot has been recorded as cast.

Voter Verifiability:

The VVPT would allow for immediate voter verifiability of the ballot cast, therefore the level of voter confidence should increase dramatically. It would also provide a basis for an independent audit trail in the event of a recount (Fischer, 2003). This immediate verifiability of
seeing an independent paper receipt of one’s vote choice will lead to a higher level of confidence in the voting system

The policy option of implementing a VVPT is not administratively or politically sound. It does provide for a voter verifiable audit trail, however, and it is relatively secure.

**Option 3: Votemeter Technology:**

This policy option would require all DRE machines in the state of Florida to be retrofitted with a votemeter system, which will allow for once vote choice to be recorded and displayed on a separate user interface that is independent of the DRE for voter verification and for the purposes of a recount or audit (Fischer, 2003). It is essentially an electronic version of the VVPT that provides a secure back-up electronic ballot image record or audit trail. Current DRE machines do not provide an actual electronic ballot image. It is a modular add-on device that can be connected to existing DREs via a USB connector.

**Administrative Feasibility:**

The cost of purchasing a votemeter is approximately $500 per unit. Although this is not inexpensive, it does not require the purchase of additional secondary supplies in order to perform (Caltech/MIT, 2004). They are compatible to existing DREs so there would not be much cost associated with retrofitting. Poll workers would need to undergo new training in order to learn how to operate this new equipment, which would constitute added expenditures.

**Political Feasibility:**
Currently, there is not much debate centered on the potential use of votemeter technology in Florida, so it is unclear as to whether it would be advocated for or against by major political figures and/or policy makers. It does, however, comply with the HAVA requirement for access to disabled voters. Votemeter technology is equipped with a tone based system to provide verifiability to blind voters. Votemeter technology is currently not yet approved for use in Florida and has not yet begun the testing process.

**System Security:**

Votemeter technology operates on a totally separate operating system and hardware system than does the DRE and is fully independent of the DRE. Since the DRE and the votemeter operate independently of each other and the audit trail is under control of a separate operating system, there is little to no chance of collusion. Even if the vote was tampered with after being cast, the votemeter will only display what has actually been recorded by the DRE. The votemeter also checks code on the DRE to confirm that only certified, uncorrupted software is in use. Additionally, votemeter technology allows the Secretary of State to certify the vote as a third party based on real data. There are currently not any votemeter technology systems that have been qualified by Florida security testing entities.

**Voter Verifiability:**

Votemeter technology would provide for immediate voter verifiability on an independent voter interface screen that depicts an actual image of the ballot they just cast. The image displayed on the votemeter is shown as the DRE has recorded it, so the voter will know if it conforms to the choices they made on the voting machine. This independent electronic audit
trail of actual ballot images will also provide for a basis for a recount, should one be
necessitated.

The policy option of implementing votemeter technology is marginally administratively
feasible and politically feasible. It also provides for an independent voter verifiable audit trail
and is relatively secure.
V. Recommendation

The three policy options, maintain the current system, voter verifiable paper receipt technology, and votemeter technology, were assessed according to the evaluative criteria of administrative feasibility, political feasibility, system security and voter verifiability. Table 1 displays the results of the analysis.

Table 1.

<table>
<thead>
<tr>
<th>Policy Options</th>
<th>Evaluative Criteria</th>
<th>Administrative Feasibility</th>
<th>Political Feasibility</th>
<th>System Security</th>
<th>Voter Verifiability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Votemeter Technology</td>
<td></td>
<td>Fair</td>
<td>Fair</td>
<td>Good</td>
<td>Excellent</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Voter Verifiable Paper Ballot</td>
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<td>Poor</td>
<td>Poor</td>
<td>Good</td>
<td>Excellent</td>
</tr>
<tr>
<td>Technology 9</td>
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<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Maintain Current Technology</td>
<td></td>
<td>Good</td>
<td>Poor</td>
<td>Fair</td>
<td>Poor</td>
</tr>
<tr>
<td>System 7</td>
<td></td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: Policy options measured according to evaluative criteria: Administrative Feasibility, Political Feasibility, Voter Transparency and System Security. Rating based on analyst’s assessment and rated on a scale of Poor (1), Fair (2), Good (3), and Excellent (4)
Maintaining the status quo received a rating of good for administrative feasibility because the system is currently in place and is operable. It received a rating of poor for political feasibility because the current DRE voting system is the cause of the recent accountability problems with regard to election administration. The public has called for a solution to this problem and therefore, maintaining the status quo is politically infeasible. This option received a rating of fair for system security, because although there have been no documented cases of hacking or other such malfeasance, many computer experts agree that the current system is vulnerable to attack or fraud. Finally, it received a rating of poor for voter verifiability because there is currently no independent audit trail or way for voters to verify that their ballot was actually recorded as cast.

Policy Option two, VVPT, received a rating of poor for administrative feasibility due to the high costs of purchasing, operating, maintaining and storing the printers. It is also would promote an administrative problem with regard to increasing the amount of time it takes to vote and verify the vote, as well as to set up and break down the machines. It would also cause problems in the event of printer jams or failures. This option received a rating of poor for political practicality because the current legislature is unlikely to pass VVPT legislation and because it does not comply with the HAVA requirement of access for disabled voters. Finally, this option received a rating of excellent for voter verifiability because it provides an independent audit trail of each ballot cast and provides immediate voter verifiability.

Policy option three, implementation of votemeter technology, received a rating of fair for administrative feasibility. Although there would be an additional cost inherent with implementing the system, it is considerably less than the cost of adding on printers. It would also require the need for additional poll worker training, but it would be easier to administer in
the polling location than would VVPT. This option received a rating of fair for political feasibility because it complies with the HAVA requirement for access to disabled voters. Although there are currently no outspoken proponents of this technology in Florida, there does not seem to be any detractors, and it would be more likely to pass through the legislature than VVPT because it requires less cost and produces no paper. This option relieved a rating of good for system security because it operates totally independently of the DRE and on different software. It also provides checks and balances against the DRE to ensure it is operating on the correct software. Finally, this option received a rating of excellent for voter verifiability because it provides an independent audit trail of each ballot cast and provides immediate voter verifiability on a separate user interface.

Upon evaluation of each policy option against the relevant evaluative criteria, it is recommended that Florida add votemeter technology to the current DREs. When administrative feasibility is considered, option three is likely to be the easiest to administer and is less costly than option two. Option one would not require any additional cost, but it is considered to be politically infeasible, in which case the lack of additional cost does not make up for the problems currently being experienced. Also, both option one and two are politically infeasible due to problems with the current system and non-compliance to HAVA requirements, respectively. All three options are either good or fair in systems security, while only option two and three are excellent with regard to voter verifiability. After weighing the pros and cons of each option, policy option three, votemeter technology, is the best public policy decision to implement in order to achieve voter accountability of electronic voting systems in Florida.
References


OPPAGA Justification Review: Election Reform Implementation, 2002


