



Examining Florida's High Invalid Vote Rate in the 2008 General Election

Part I: How Voting System Design Flaws Led to Lost Votes

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I. Did Invalid Votes Double In Florida In 2008?

“Invalid Ballots in Florida Doubled in 2008” was the provocative headline of an article in the *New York Times*, February 26, 2009.¹ Authored by Gary Fineout, the story reported Florida’s “no valid vote” rate in the presidential race had risen from 0.41% in 2004 to 0.75% in 2008. Fineout’s article was based on the findings of the Florida Department of State’s post-election 2008 Overvote and Undervote Report,² which is required by state law³ to analyze the cause of invalid votes and examine voting system performance.

Florida’s 2008 general election marked the first time all Florida counties were required to use optical scanners for all nondisabled voters since the passage of legislation in 2007 mandating the switch to paper-based optical scan technology. Aside from the obvious advantages of verifiability offered by the use of paper ballots, nearly all election experts believed that requiring the use of optical scanners statewide would lead to lower, not higher, invalid vote rates. Thus, the reported large increase was unexpected.

According to the *Times* article, Florida Secretary of State Kurt Browning attributed the increase in invalid votes primarily to the fact that 15 Florida counties that formerly used touchscreens were “forced” to switch to paper ballot-based optical scanners in 2008. Despite the size of the increase, Browning did not express concern. “You aren’t going to find a voting system that protects voters against themselves,” he is quoted as saying.

In this paper, we will show that Browning is wrong on both counts: (1) The higher invalid vote rate in 2008 is *not* the result of the change in technology from touchscreens to optical scanners, and (2) by law voting machines are supposed to prevent precisely the kinds of errors that drove up the invalid vote rate in 2008. We will show that the state’s comparison of the 2004 and 2008 invalid vote rates is itself invalid, leading to a considerable overstatement of the actual comparable increase.

We find that the main contributor to the increase in the no-valid-vote rate was excessive overvoting, more than 23,000 overvotes statewide. Some overvoting on absentee ballots is expected because voters do not have the opportunity to correct mistakes. In 2008, however, nearly two-thirds of all overvotes (15,000) occurred on ballots cast during in-person voting⁴ (early and Election Day) even though voting machines by law were required to reject overvoted ballots and allow voters the chance to correct them.

We will show that these excessive overvotes during in-person voting most likely occurred as a result of a design feature on three of the precinct-tabulator models used in the state. Of these three poorly performing systems, one—the newly certified ES&S digital scanner, the intElect DS200—was by far the worst, suggesting that it had additional design problems that affected overvoting. It performed poorly irrespective of whether the county using the DS200 had previously used touchscreens or optical scanners. Overall, the DS200 was responsible for more than 8 in 10 overvotes statewide, although only 4 in 10 Florida voters used this system.

¹ “Invalid Ballots in Florida Doubled in 2008,” Gary Fineout, *New York Times*, February 26, 2009, <http://www.nytimes.com/2009/02/26/us/26florida.html>

² *Analysis and Report of Overvotes and Undervotes for the 2008 General Election*, Florida Department of State, Kurt S. Browning, Secretary of State, Tallahassee, January 30, 2009, online at: http://doe.dos.state.fl.us/reports/pdf/Over_Under_Report_08.pdf; Data tables accompanying this report at: <http://election.dos.state.fl.us/reports/pdf/generalOverUndervote08.xls>

³ Florida Statute 101.595 at <http://election.dos.state.fl.us/publications/pdf/2008-2009/08-09ElectionLaw.pdf>

⁴ In-person voting includes early voting and Election Day ballots but not provisional or absentee ballots.

II. Discussion

A. *What Is the No-Valid-Vote Rate?*

The no-valid-vote rate (also called the invalid vote rate or the residual vote rate) is calculated by adding together undervotes, overvotes, and invalid write-ins. An undervote occurs when the voter makes fewer choices than allowed in a race; usually, this means no choice at all. An overvote occurs when too many choices are made in a race, and an invalid write-in occurs when the voter fills in the write-in blank with the name of someone who has not qualified to run in that race.⁵

Undervotes may be intentional or unintentional as the undervote may result from the voter's choice not to vote in the race, from a problem with how the voter marked the ballot, or from a machine performance problem. Likewise, invalid write-ins are often "protest" votes—for example, some voters in 2008 may have written in the names of Hillary Clinton or Ron Paul to indicate their dissatisfaction with the candidates selected during the primaries. Overvotes, on the other hand, are nearly always *unintentional*, representing failed attempts to cast legal votes.

In Florida's disputed 2000 election, overvoting was one of the chief problems leading to lost or misread votes. In 2006, excessive undervotes on the state's most widely used touchscreen, the ES&S iVotronic, likely changed the result of the Congressional District 13 race and plagued all top statewide races. The most recent state report found that higher-than-expected overvotes and invalid write-in votes accounted for the majority of uncounted votes in the 2008 presidential contest.

B. *Comparing No-Valid-Vote Rates for 2004 and 2008*

1. *An Invalid Comparison*

Before we can proceed with an investigation of the causes of high invalid votes in 2008, we must address the misleading comparison of the 2004 and 2008 invalid vote rates by the 2008 state report and reported by the venerable *New York Times*. Even the most superficial investigation immediately reveals that the two rates are not comparable as they do not contain the same elements—a fact that should have been well known to the Division of Elections staff and disclosed within its Overvote and Undervote report.

The 2008 invalid vote rate contains three components: undervotes, overvotes, and invalid write-ins—in nearly equal parts (0.26%, 0.28%, and 0.22%). But the 2008 report only compares undervotes and overvotes for 2004 and 2008. Where is the comparison of invalid write-ins? When the report states that the invalid vote rate rose from 0.41% in 2004 to 0.75% in 2008, it includes the invalid write-in votes in that 2008 percentage, but adds the following footnote:

*"The 2004 overvote and undervote report did not address invalid write-ins in its analysis."*⁶

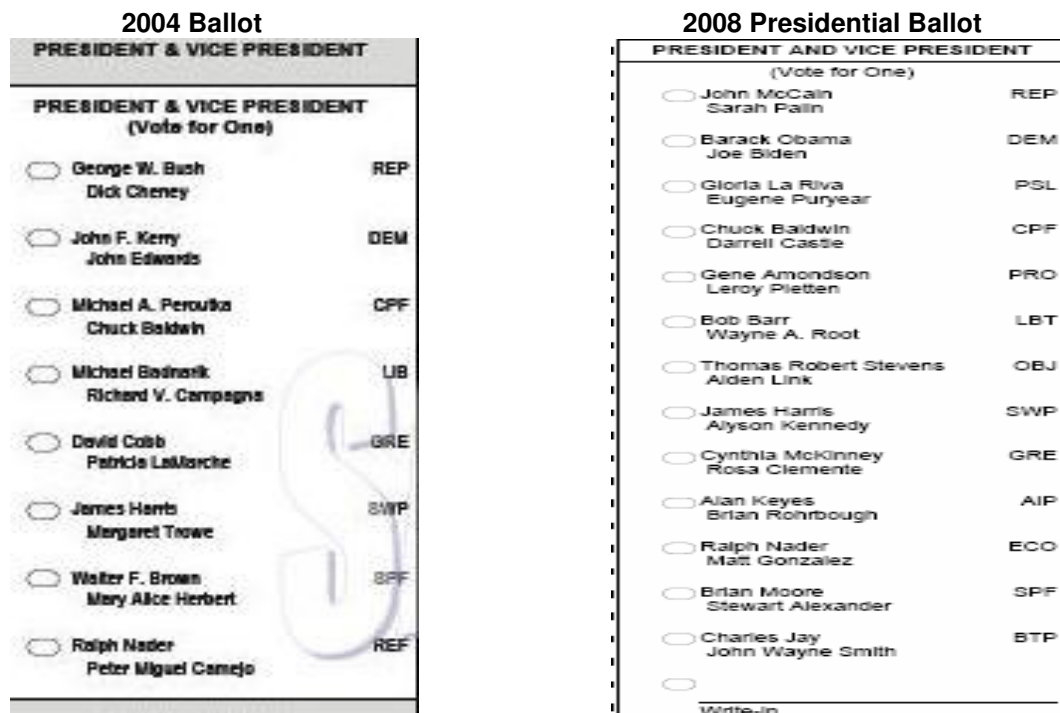
This suggests that the report's failure to compare invalid write-ins for 2004 and 2008 resulted from a lack of data in the 2004 report. As the report goes on with the analysis regardless of this omission, the reader seems justified in concluding that the invalid write-ins are lumped in with the other categories of invalid votes rather than broken out separately.

⁵ In Florida, not every contest allows voters the opportunity for a write-in vote. Write-in candidates, even though not on the ballot, must qualify to be in a particular contest. If there is no qualified write-in candidate, no write-in line is provided in that race.

⁶ *Analysis and Report of Overvotes and Undervotes for the 2008 General Election (including data table)*, Kurt Browning, Florida Department of State, Tallahassee, January 30, 2009, <http://doe.dos.state.fl.us/reports/index.shtml>.

But the truth is much simpler: *There were no write-ins in the 2004 presidential contest at all—valid or otherwise—because no write-in line was provided.*

Figure 1: Florida Sample Ballots, 2004 and 2008, Presidential Race



Source: Sample, Official General Election Ballot, St. Lucie County, Florida, Nov. 2, 2004.

Source: Sample, Official General Election Ballot, Brevard County, Florida, Nov. 4, 2008.

The state report should have disclosed this important fact. The omission is hard to explain. Were the authors of the report unaware that the 2004 presidential race did not contain a write-in line? That seems unlikely. Regardless, *the state should not have included invalid write-in votes as part of the percentage increase over 2004*, since voters in 2004 did not have the opportunity to cast an invalid write-in and voters in 2008 did.

The rate of invalid write-ins does appear to be unusually high, but that will require additional investigation, well beyond what is possible merely by analyzing the data from the state report.

2. Relevant Comparisons Between 2004 and 2008

If we remove the invalid write-in rate of 0.22% from the 2008 data, we find that the comparable invalid vote rates for 2004 and 2008 were 0.41% vs. 0.53%—for an increase of 29%, not 83%. While this is a very significant and troubling increase, it is certainly far less than “doubling.”

Table 1: No-Valid-Vote Rates, Florida's 2004 & 2008 Presidential Race⁷

	2004		2008		Change, 2004 to 2008	
	2004 Total	2004 Rate	2008 total	2008 Rate	In Number	In Rate
Undervotes	31,453	0.36%	21,492	0.26%	-9,961	Decrease of 28%
Overvotes	4,116	0.05%	23,313	0.28%	+19,197	Increase of 460%
Total UV & OV	35,569	0.41%	44,805	0.53%	+9,236	Increase of 29%

As expected, the undervote rate decreased significantly. The overvote rate, however, surged well beyond what would be expected on any type of voting system for any election, much less a presidential contest. Considering that the undervote rate contains legitimate voter choices and the overvote rate generally contains mostly voter errors, the 2008 overvote rate is very troubling.

Table 1 shows clearly that the increase was not only sizable in terms of the percentage, but also in terms of the total number of overvotes—an increase of more than 19,000.

If we exclude absentee balloting and only look at ballots cast in person during early voting and on Election Day, the increase in overvoting is even more alarming. The rate of overvoting increased dramatically for ballots cast in person (early or Election Day voting), even though the actual increase in ballots cast was quite small—about 3.6%. In fact, while overvotes increased by more 1600% on Election Day, the number of Election Day voters actually declined by more than 20%.

Table 2: Overvote Rates, In-Person Voting, Florida's 2004 & 2008 Presidential Race

	2004			2008			Change, 2004 to 2008		
	Votes Cast	Over-votes	OV Rate	Votes Cast	Over-votes	OV Rate	Votes Cast	Over-votes	OV Rate
Early Voting	1,428,477	168	0.012%	2,669,370	4,045	0.152%	+1,239,893	+3,877	+1167%
Election Day	4,866,061	760	0.016%	3,849,489	10,954	0.285%	-1,016,212	+10,194	+1681%
Total In-Person	6,294,538	928	0.015%	6,519,219	14,999	0.230%	224,681	+14,071	+1433%

The increase was also significant in terms of the numbers of votes lost during in-person voting. During in-person voting, when machines should have prevented these types of errors, there were 14,071 more overvotes in 2008 than in 2004. We know that such a large number of overvotes could be pivotal in a close election, such as the 2000 presidential race when only 537 votes separated the two candidates.

The above shows us conclusively that something went wrong in 2008 that resulted in high levels of overvoting. But we want to determine whether the problem was the change from touchscreens to paper ballots as the state report indicates or a problem with the newly certified equipment. For that, we need to look at the following:

- How legally mandated overvote protection works to protect votes cast in person
- How Florida voting systems changed between 2004 and 2008
- How overvoting varied by voting system for in-person voting.

⁷ Unless otherwise noted, all 2008 data were obtained from the statistical spreadsheet accompanying the *Analysis and Report of Overvotes and Undervotes for the 2008 General Election*, Florida Department of State, January 30, 2009. The 2008 report is at http://doe.dos.state.fl.us/reports/pdf/Over_Under_Report_08.pdf and the 2008 spreadsheet is at <http://doe.dos.state.fl.us/reports/pdf/generalOverUndervote08.xls>. All 2004 data were obtained from the statistical spreadsheet accompanying the *Analysis and Report of Overvotes and Undervotes for the 2004 General Election*, Florida Department of State, January 31, 2005. The 2004 report is at http://election.dos.state.fl.us/reports/pdf/Over_Under_Report_04.pdf and the 2004 spreadsheet (referred to as "Attachment B") is at https://doe.dos.state.fl.us/reports/pdf/Sorted_Over_Under.xls.

C. **Overvote Protection**

Kurt Browning’s comment that voting systems can’t protect voters against themselves is flatly wrong; overvote protection is intended to do just that, and Florida law requires it on all machines used for in-person voting. All scanners must reject overvoted ballots and allow voters the opportunity to correct them. Thus, unless the protection has been turned off (which is illegal), a human being must press the override button to force the machine to accept the overvoted ballot. When this happens, that vote will not be counted.

The reason that Florida law requires overvote protection is precisely *because* overvotes are usually unintentional. Overvotes usually represent unsuccessful attempts by voters to cast legitimate votes for a candidate. This can be the result of a voter error—for example, attempting to change one’s vote without getting another ballot or inadvertently making a stray mark on the ballot that hits another oval. It is even possible for machines to misread ballots that appear to be perfectly marked.

For the most part, overvoting should be confined to absentee ballots, which do not afford voters the opportunity to know that their ballot is being rejected and to correct that ballot. Other problems leading to overvotes are machine malfunctions that result in ballots being put aside and scanned after voters have left the polling place. In many counties, election officials override overvoted ballots instead of inspecting them for intent when voters are not present during scanning even if that is due to a machine failure. When voters are present for the scanning of their ballot, there should be few, if any, overvotes.

D. **How Florida Voting Systems Changed from 2004 to 2008**

In 2004, fifteen of Florida’s 67 counties used DREs (direct recording electronics), commonly called touchscreens, for in-person voting. Eleven of these used the ES&S iVotronics; four used the Sequoia AVC Edge. The remaining 52 counties used optical scanners. The greatest number (31) used the Diebold, now called Premier, Accuvote OS; seven used the ES&S Optech III-P Eagle; and the remaining 14 counties used the ES&S M-100. All counties used optical scanners—either regular precinct tabulators or special high-speed scanners—for counting absentee ballots.

After a highly embarrassing and expensive election debacle in 2006 involving the ES&S iVotronics touchscreen, the Florida legislature passed a law in 2007 requiring all jurisdictions in Florida to switch to optical scanners for their primary voting equipment in time for the 2008 election cycle. Touchscreens were allowed for disabled accessibility through 2012.

Meanwhile, the voting system vendors had announced that they were phasing out the old optical scan systems and moving to the new digital scanners, none of which were certified at that time. In 2007 and 2008, the state certified several new digital optical scanners, including the ES&S intElect DS200, the Sequoia Insight Plus, and the Premier Accuvote OSX. None of the new machines certified by the state were federally qualified; Florida does not require such qualification as a prerequisite for state certification.

Table 3: In-Person Overvote Rates, 2008 Presidential Race, Florida Counties Changing Voting Systems

Counties	2004 System	Type	2008 System	2008		
				In-Person Turnout	In-Person OV	In-Person OV%
Collier	ES&S iVotronic	TS	ES&S DS200	105782	693	0.66%
Miami-Dade	ES&S iVotronic	TS	ES&S DS200	694120	4385	0.63%
Pinellas	Sequoia Edge	TS	ES&S DS200	283815	1380	0.49%

Counties	2004 System	Type	2008 System	2008		
				In-Person Turnout	In-Person OV	In-Person OV%
Lee	ES&S iVotronic	TS	ES&S DS200	190312	877	0.46%
Pasco	ES&S iVotronic	TS	ES&S DS200	178625	645	0.36%
Orange	ES&S Optech	OS	ES&S DS200	346322	1195	0.35%
Broward	ES&S iVotronic	TS	ES&S DS200	601399	2045	0.34%
Nassau	ES&S iVotronic	TS	ES&S DS200	29825	87	0.29%
Martin	ES&S iVotronic	TS	ES&S DS200	53143	154	0.29%
Charlotte	ES&S iVotronic	TS	ES&S DS200	57031	160	0.28%
Lake	ES&S iVotronic	TS	ES&S DS200	117874	310	0.26%
Sumter	ES&S iVotronic	TS	ES&S DS200	40264	68	0.17%
Escambia	ES&S Optech	OS	ES&S DS200	115730	182	0.16%
Palm Beach	Sequoia Edge	TS	Sequoia Insight Plus	467764	1226	0.26%
Indian River	Sequoia Edge	TS	Sequoia Insight Plus	53600	36	0.07%
Hillsborough	Sequoia Edge	TS	Premier Accuvote OSX	392821	172	0.04%
Sarasota	ES&S iVotronic	TS	Premier Accuvote OSX	153580	51	0.03%

Eleven of the 15 former touchscreen counties changed to the DS200. All had high in-person overvote rates. Two of the former touchscreen counties—Indian River and Palm Beach—changed to the Sequoia Insight Plus. Palm Beach had a high in-person overvote rate; Indian River had a moderate rate. In contrast, two of the former touchscreen counties—Sarasota and Hillsborough—changed to the Premier Accuvote OSX. Both had low overvote rates for in-person voting, similar to the 31 Premier counties that had not changed voting systems.

Two counties—Orange and Escambia—changed from the Optech optical scan system to the DS200. Both of these counties had very high overvote rates, just like the other DS200 counties, even though these counties had long used optical scanners.

Thus, every county that used the DS200 had very high overvote rates, regardless of whether they had used optical scanners or touchscreens previously. In contrast, the former touchscreen counties that changed to the Premier system had low overvote rates, indistinguishable from those of Premier counties that had long used the system.

The data show that overvoting varied by the particular system used, rather than by a county's former use of touchscreens or optical scanners.

E. Overvoting by Voting System for In-Person Voting

1. Overvoting for In-Person Voting, by Voting System, for 2008

As we have noted, relatively high rates of overvoting are common on absentee ballots, where voters cannot avail themselves of the overvote protection features on the precinct tabulators.⁸ The question

⁸ While overvotes are more common on absentee ballots because of the lack of overvote protection, high rates of overvoting on absentees are neither inevitable nor acceptable. To ameliorate unnecessary vote loss, the county canvassing board should examine all overvoted ballots—whether cast in-person or by absentee—to determine intent; the state has set clear guidelines for counting these votes.

is: What were overvote rates for in-person voting, which featured the new precinct tabulators and which should not have permitted overvoting?

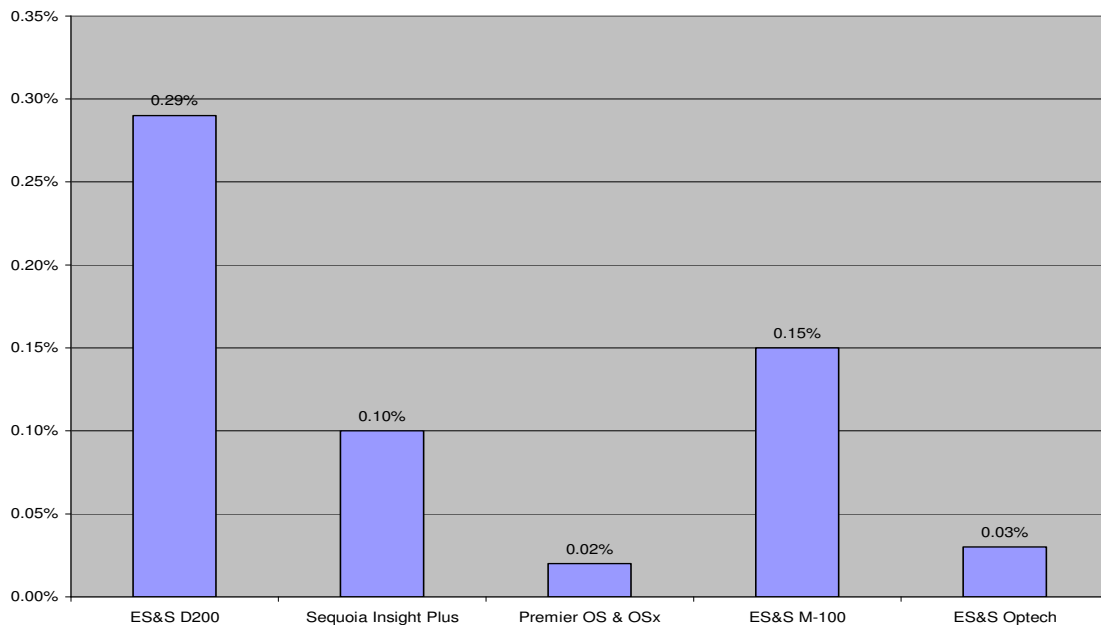
a. Early Voting. As seen in the following graph, differences in overvoting by voting system were profound and unmistakable. The overvote rate for the DS200 was more than **15** times that of the Premier system and nearly **10** times that of the Optech. The DS200 rate was 3 times the rate of the Insight Plus and double the rate on the M-100. About **84%** of all overvotes registered during early voting occurred on the DS200 (3,390 of 4,045), even though less than half (44%) of the early voting ballots were cast on this machine.

Interestingly, the second-worst performing system was the ES&S M-100, a system that is not new. Its overvote rate was 7 times that of the Premier system and 5 times that of the Optech system.

The Sequoia system was still significantly worse than the Premier and Optech systems. Its overvote rate was 5 times that of the Premier and more than 3 times that on the Optech.

Overall, three of the five⁹ systems—the ES&S DS200, the Sequoia Insight Plus, and the ES&S M-100—performed much worse than the other two systems—the Premier Accuvote OS/OSX and the ES&S Optech.

Figure 2: Overvoting by Voting System, Early Voting, Florida’s 2008 Presidential Race



b. Election Day Voting. The systems that performed poorly during early voting did badly for Election Day voting as well. In fact, the performance of these three systems dramatically worsened. The two better performing systems—the Accuvote OS/OSX and the Optech—continued to perform much better than the others.

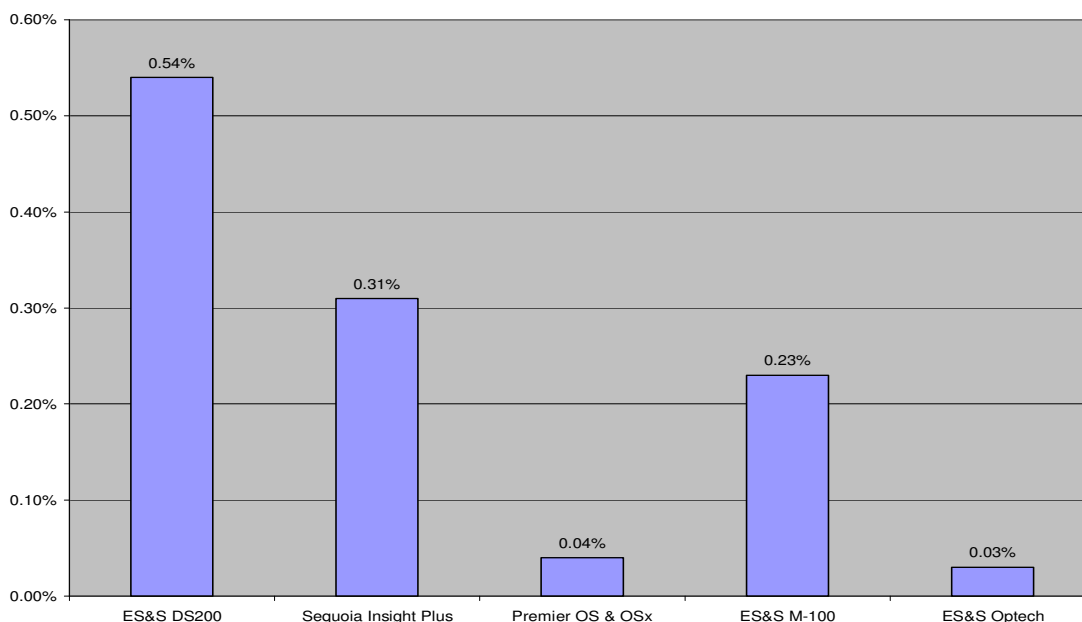
As shown in the following graph, the Election Day overvote rate on the DS200 was nearly double its rate for early voting, rising to 0.54% from 0.29%. The Insight Plus and M-100 also experienced dramatic increases in overvoting for Election Day compared to early voting. The Insight Plus

⁹ There are six systems, but the state treats the Premier Accuvote OS and OSX as one system in its data and report.

Election Day overvote rate *tripled* from 0.10% to 0.31%. The increase for the M-100 was not as dramatic, rising from 0.15% to 0.23%, an increase of more than 50%.

In contrast, the Premier and Optech rates remained relatively low at 0.04% and 0.03% respectively. Indeed, the Optech rate is unchanged from its early voting rate. While the Election Day rate on the Premier was double its early voting rate, both rates were still very low.

Figure 3: Overvoting by Voting System, Election Day, Florida’s 2008 Presidential Race



What this means for Election Day voting is that at least one of every 200 people who cast their ballots on the DS200 lost his or her vote through a particular type of error that should have been prevented by the machine. In contrast, only one of every 3,300 voters who voted on the Optech on Election Day and only one of every 2,500 voters who voted on the Accuvote OS and OSX lost his or her vote because of such an error.

2. What Was the Impact of the Switch from Touchscreens to Optical Scanners?

Touchscreens do not permit overvoting; neither do optical scanners when the overvote protection is turned on as required by state law. The difference is that optical scanners have an override function that allows human beings—poll workers, election officials, or voters—to force the machine to accept an overvoted ballot. Overriding a ballot means that vote will not count. When voters are present to correct their ballots, there should be very few overvotes. In fact, some optical scan counties in 2004 and 2008 experienced zero overvotes for in-person voting; others had only a handful.¹⁰

So, some small increase in overvotes during in-person voting was expected in counties that switched to optical scanners. This increase should have been quite small, however, and more than offset by a large decrease in the undervote rate. Consequently, no overall increase in the no-valid-vote rate should have occurred.

¹⁰ Despite the overall increase in overvoting, a majority of Florida counties (35 of 67) in 2008 had fewer than 20 overvotes in the presidential contest during in-person voting. Seven counties had zero overvotes for in-person voting.

To calculate overvotes due to the change from touchscreens to optical scanners, we looked at the number of overvotes that would have occurred on the DS200 and Insight Plus if they had experienced the same rate of overvoting as the Premier system. That should give us a fair approximation of the amount of overvoting attributable to the change in technology. We then compared that with actual overvotes to see what portion can be attributed to voting system design or performance differences.

Table 4 below shows overvotes and overvote rates for each of the five systems. In 2008, about 40% of in-person ballots were cast on the Premier Accuvote OS and OSX, yet this system accounted for less than 6% of the overvotes for in-person voting statewide. In contrast, the DS200 accounted for a similar percentage of early voting and Election Day ballots (44%), but more than 81% of the overvotes. Thus, its overvoting rate on the DS200 was about 13 times the rate on the Premier equipment. Because the Sequoia Insight Plus only served 8% of Florida's early and election day voters its impact on the overvote was slight, even though the system's rate was far higher than would have been expected based on the change in technology. The M-100 counties also experienced elevated rates of overvoting, but a comparison with their 2004 numbers showed that their 2008 overvote rate (0.20%) was actually significantly lower than their 2004 overvote rate (0.36%). Thus, the M-100 counties did not contribute to the increased overvote rate in 2008.

Table 4. In-Person Overvoting, by Voting System, Florida's 2008 Presidential Race

Voting System	No. of Counties	In-Person Total	Percent of State Total	In-Person Total OV	Percent of State OV	In-Person OV%
Sequoia Insight Plus	2	521,364	8.0%	1262	8.4%	0.24%
Premier OS or OSX	33	2618392	40.2%	848	5.7%	0.03%
ES&S DS200	13	2814242	43.2%	12181	81.2%	0.43%
ES&S M-100	14	324348	5.0%	640	4.3%	0.20%
ES&S Optech	5	240873	3.7%	68	0.5%	0.03%
State total	67	6519219		14999		0.23%

We can see from Table 5 below that overvoting on the two new systems was far above what would have been expected if they had experienced overvote rates similar to those on the Premier system—which should be approximately what could be attributed to the change in technology, i.e., switching from touchscreens to optical scanners.

Table 5: Comparison of Expected Overvotes to Actual Overvotes, DS200 and Insight Plus, Florida's 2008 Presidential Race

	Early Voting Overvotes			Election Day Overvotes			In-Person Overvotes		
	Actual	Exp'd*	Dif.	Actual	Exp'd	Dif.	Actual	Exp'd	Dif.
ES&S DS200	3,390	234	3,154	8,791	656	8,135	12,181	890	11,291
Sequoia Insight Plus	178	34	144	1,084	140	944	1,262	174	1,088
Total	3,568	268	3,298	9,875	796	9,079	13,443	1,064	12,379

Note: Exp'd = expected

If the Insight Plus and DS200 had experienced overvoting at a rate due to change in technology, the overall comparable no-valid-vote rate (based on only overvotes and undervotes) *would have declined slightly* (by 3,143 votes compared to 2004) because of the offsetting decrease in undervotes.

Clearly, the increase in the invalid vote rate was not due to a change in technology in these counties, but to extremely poor performance by the newly certified equipment—especially the DS200.

F. Voting System Design or Performance Implicated

Based on data taken directly from the data table accompanying the state's 2008 Overvote and Undervote report, the above suggests the following:

- Design or performance differences that distinguish the Premier and Optech from the other three systems are the likely source of the differential rates of overvoting.
- Design or performance differences that distinguish the DS200 from the Insight Plus and M-100 systems are the likely cause of its extremely high overvotes.

G. Excessive Overvoting Predicted in 2007

In April 2007, after observing a demonstration of the DS200 in Sarasota County, we sent an e-mail to Miami-Dade Supervisor of Elections, Lester Sola, expressing concern that the ready availability of the override button on the new system might lead to excessive overvoting, especially by language-minority voters. That e-mail is excerpted below:

...When I saw the latest version of the ES&S scanner demonstrated at a recent meeting in Sarasota County ...I was dismayed by another feature: the machine operator is able to override a rejected ballot without having to seek authorization or obtain a key....The Diebold optical scanner that we use here in Volusia County requires opening a locked compartment in order to access the override button. That key is usually kept by the poll clerk since the same compartment also allows access to the memory card.

I spoke to Ion Sancho [Supervisor of Elections in Leon County, FL] about this issue, and he and I are in agreement. No one should be overriding rejected ballots at the precinct. If a ballot is rejected, the voter is supposed to be able to correct the problem and re-insert the ballot. If the ballot is being processed after the voter has left (in the event of a power failure or other equipment problem) and the machine rejects it, then it should be put in the side pocket to be evaluated for voter intent by the canvassing board....Voters should not be disenfranchised by equipment failures. Ion says that in his eighteen years as SOE, he only knows of about six instances where the override button was used to accept an otherwise rejected ballot at the polls in Leon County. In those cases, the ballots were blank, and the voter was informed and insisted on voting a blank ballot. Even in those cases, however, it can't hurt to let the canvassing board inspect the ballot.

I hope that this feature can be disabled so that machine operators do not have the option of deciding whether an overvoted ballot should be accepted. Once the override button has been hit, someone has lost his or her vote in at least one race. As you know, voter intent can usually be easily discerned on overvoted ballots. Often the machines are so sensitive that they pick up stray marks. And it is easy to imagine that there could be communication problems that might result in rejected ballots cast by non-English speaking voters being overridden.

Supervisor Sola responded that he would take up this issue with the vendor.

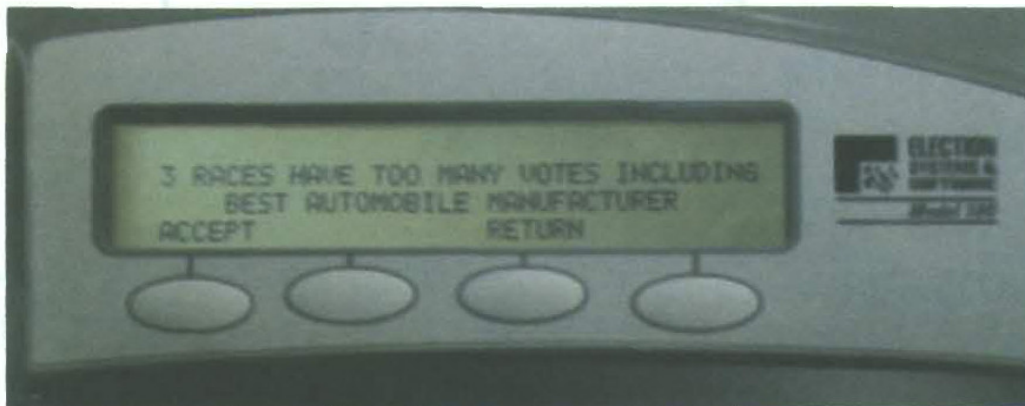
It now seems that what we predicted may have happened. Further investigation has revealed that all three systems with higher overvote rates have readily accessible override buttons, while both systems with lower overvote rates have override buttons that are relatively difficult to access.

H. Overvote Screens and Buttons

1. The M-100 Overvote Screen

The figure below shows the overvote message received by voters on the M-100. It is similar in size and message to the one on the Sequoia system.

Figure 4: ES&S M-100 Overvote Screen



Source: "Instructions for Using Optical Scan Ballot, M-100 Ballot Scanner, and AutoMark," Kanawha County Guide for Voters, http://www.kanawha.us/shared/content/Page_objects/pdfs/county_clerk/Optical%20Scan%20Ballot.pdf

Imagine the voter's experience. After waiting in line for a couple of hours to vote, he inserts his ballot in the machine only to have the machine begin to emit loud beeping noises and display the above, somewhat confusing message. The voter, who probably knows nothing about voting machines, is asked if he wants his ballot "accepted" or "returned." Voting has come to a stop as he tries to figure out what to do. Those behind him in line begin grumbling. The machine operator has to explain what has happened—that the voter has overvoted and has the option of correcting his ballot. Does he want his ballot accepted or returned? At that point, the voter wants the embarrassing beeping noises to stop so that he will cease being the focus of attention. "Accepted" sounds like the right choice. And it will immediately solve the problem. But an "accepted" ballot means his vote has been discarded. The psychology is all on the side of losing this vote.

Now imagine the voter's experience who overvotes on the Premier or Optech machine. When he attempts to insert his ballot, the machine automatically rejects it. The Premier machine displays a message and the Optech machine issues a small tape to inform the voter that a particular race is overvoted. The ballot is still in the voter's hand because the machine will not take it. In the Premier and Optech systems, accepting a bad ballot is not presented as an option to the voter, just as it is not an option on the old touchscreen machines. The machine operator explains what has happened and offers the voter the chance to go to another table and get a new ballot. If he does, voting can continue. But let's say the voter demands to vote the ballot as it is. The machine operator informs him that voting must stop while the operator goes over to the poll clerk, gets the key, comes back and unlocks the machine so that he can hold down the override button as the ballot is inserted. This time the easiest and least embarrassing choice is to correct the ballot. The psychology here favors saving this vote.

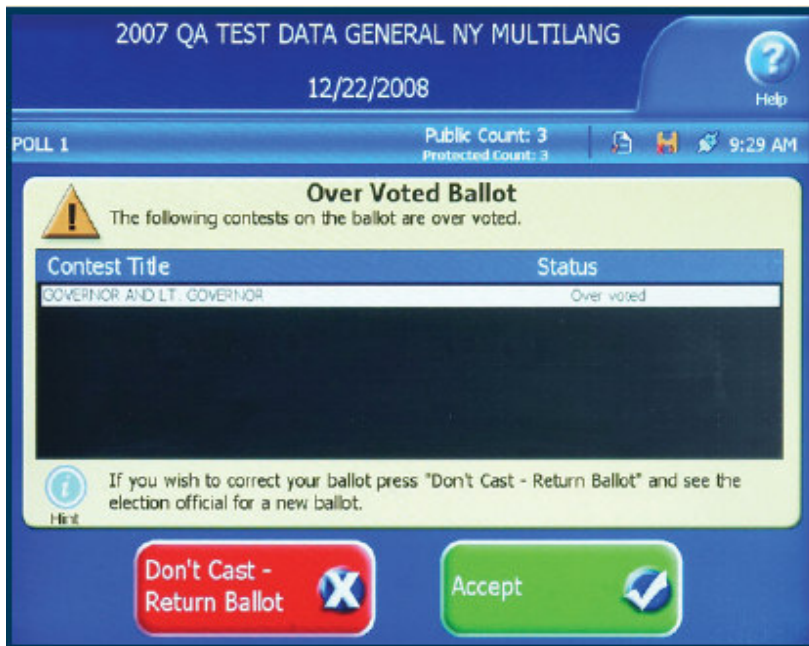
It is noteworthy that state law¹¹ requires a voting system to “immediately reject” an overvoted ballot, but the M-100, Insight Plus, and DS200 do not do this. The machine takes the overvoted ballot and does not return it to the voter unless he pushes the “return” button. The Optech and Premier systems comply with state law and immediately reject overvoted ballots.

It is no surprise that making it easier to override rather than correct overvoted ballots resulted in an increase in the number of overvotes.

2. The ES&S intElect DS200 Screen—Even More Problems

Like the M-100 and the Insight Plus, the DS-200 screen presents casting an overvoted ballot as though it were a legitimate option along with correcting the ballot. It also retains rather than rejects the ballot. The main difference is that the DS200 has a large touchscreen.

Figure 5: The ES&S DS200 Overvote Screen



Source: ES&S IntElect DS200, Product Overview, Election Systems & Software, http://www.essvote.com/HTML/docs/ES&S_intElect_DS200_V1_01-09.pdf

Like the M-100 and Insight Plus screens, the easiest thing to do on the DS200 is to hit the “accept” button. The “accept” button is a pleasant green, with a checkmark. The “return” button is an ominous red with an x. Also like the M-100, the DS200 emits loud beeps and keeps the ballot while the voter attempts to make the right decision. Once again, the psychology is all on the side of hitting the accept button and losing one’s vote.

Just looking at the two screens, it would seem that the added explanation on this screen might make it more likely that the voter would understand the situation and correct his ballot. We know, however, that this didn’t happen. We know that this system had more, not fewer, overvotes than the others.

For one thing, the explanation on the screen is rather small and inconspicuous compared to the larger, colored text on the buttons. Some ballot design research suggests that colored text on a touchscreen can draw the eye away from other text, making it more likely that the reader will not

¹¹ Florida Statute 101.5606(3) at <http://election.dos.state.fl.us/publications/pdf/2008-2009/08-09ElectionLaw.pdf>

notice or read the black-and-white text. In addition, the voter is likely making a hasty decision to stop the embarrassing warning beeps emanating from the machine.

But there is another possible complication. The attraction of the DS200 for jurisdictions such as Miami-Dade was its ability to display messages in three languages—English, Spanish, and Haitian Creole. An examination of the certification process for the DS200 reveals that the machine went through the process several times. The first time, one of the observers noted grammar and spelling errors in some of the messages. After this was corrected, it was discovered that the firmware submitted for certification had a simultaneous tri-lingual display. Miami-Dade required a selectable language. Although the simultaneous display version was certified, the vendor did submit a version with the selectable language.

This raises more questions. Clearly, the vendor was not able to produce a machine capable of knowing the voter's language by the ballot submitted for scanning. If it could have done so, it would not have been necessary to put all three languages on the screen initially. So it seems that the change made for the final system required the voter or machine to select the language manually at some point in the process. If the language were selected at the beginning of the process, it would have significantly slowed down the process of voting. If it were selected when the overvote message was displayed, then the voter might have first been faced with a message he could not understand. Further investigation is needed to clarify what did happen.

I. How Indian River Avoided High Overvotes

During our investigation of the role of accessibility of the override button in causing overvotes, we talked to election officials in both Palm Beach and Indian River counties. We wanted to find out why Palm Beach had such high rates of overvoting for in-person voting when Indian River, using the same system, managed to keep its overvoting much lower—especially for early voting. Palm Beach's early voting overvote rate was 6 times the rate for Indian River (0.12 vs. 0.02%); for Election Day, Palm Beach's rate was nearly 3 times Indian River's rate (0.12 vs. 0.33%).

First, we made sure that the two counties used identical tabulators—the Sequoia Insight Plus. We were assured by officials from both counties that they did. We verified that the LED screen on the Insight Plus was similar in size and design to the M-100 rather than to the larger touchscreen on the DS200.

So the equipment was identical, but we did find one important and very significant difference—training. In Indian River, the assistant supervisor of elections told us unequivocally that workers were trained to tell voters bluntly that pressing the “accept” button would mean that their vote “would not count.”

Palm Beach poll workers also were trained about the function of the override button, but election staff did not say that the workers were specifically told to inform voters that their votes “would not count” if they hit the “accept” button. Instead, poll workers were instructed to tell voters that they had overvoted and could correct their ballot if they wished. The result was that overvoting in Indian River for early voting (staffed by elections office staff) was very low (0.02%), just like the Premier and Optech counties. Election Day overvoting in Indian River (staffed by poll workers) was quite a bit higher, however, at 0.12%, but still much lower than in Palm Beach County (0.33%).

We think it is admirable that Indian River County's elections officials cared enough about preventing unnecessary vote loss that they took additional steps to ameliorate the effects of the unfortunate placement of the override button. We would never recommend voting system designs that have to

rely on such extra measures by elections staff, and despite their precautions, overvoting in Indian River was still higher than in the Premier or Optech counties. The realities of poll worker training—particularly in large counties such as Palm Beach—mean that not all precincts will have diligent, competent, and caring poll workers. It is the responsibility of the voting machine vendor to provide equipment that prevents overvoting, and the responsibility of the state Bureau of Voting System Certification to ensure that equipment certified by the state does not unnecessarily facilitate overvoting.

III. Findings

Based on the same data used by the state to produce its report, we have reached quite different conclusions:

1. The state's comparison of the 2004 and 2008 no-valid-vote rates is itself invalid because the rates for the two years do not contain the same components. While the 2008 rate contains undervotes, overvotes, and invalid write-ins, the 2004 rate contains only undervotes and overvotes. Why? There were no write-in votes in 2004 because there was no write-in slot on the ballot in the presidential race. Language in the state report tends to obscure this fact.
2. The evidence does not support the state's contention that the increase in the no-valid-vote rate between 2004 and 2008 was driven by the change in technology from touchscreens to optical scan voting systems; in fact, the data effectively refute this conclusion.
3. While undervoting decreased in 2008, overvoting soared, rising by more than 460% over 2004 and more than 1400% for in-person voting; however, we found that overvoting did not depend on changing technology, but varied by voting system.
4. The comparable invalid vote rate (composed of undervotes and overvotes) for 2008 vs. 2004 would have actually declined if the newly certified systems (ES&S DS200 and Sequoia Insight Plus) had experienced only an expected increase based on the change in technology from touchscreens to optical scanners. In fact, the rate would have declined if only the DS200 had had such a rate.
5. Two of the three systems that experienced higher-than-expected overvoting were new, but the third—based on the M-100—was an old system that had been experiencing relatively high rates of overvoting for years, without detection or comment by the state.
6. Of the state's five systems, the three with readily available override buttons had much higher rates of overvoting than the two systems whose override buttons were locked within the cabinet. In 2007, we predicted the possibility of excessive overvotes because of this feature.
7. Extremely poor overvote performance by the DS200 accounted for a large portion of the state's no-valid-vote rate—particularly for in-person voting when overvote protection on the machine should have prevented excessive overvoting. Yet, more than 8 of 10 overvotes in the state occurred on the DS200, even though it only accounted for 4 of 10 votes cast.
8. It is likely that vote loss driven by the location of the override button and content of the message displayed disproportionately affected specific classes of voters, including language minority voters.

IV. Recommendations

- A. We recommend the following actions be taken immediately by the Florida Department of State:
1. De-certify all equipment that exhibited high rates of overvoting until suitable changes can be made to insure that votes are not being unnecessarily and disproportionately discarded.
 2. Require federal qualification as a prerequisite for state certification to minimize unforeseen problems and to maximize the ability of the federal and state governments to force vendors to make appropriate changes to equipment.
 3. Conduct usability testing on all voting equipment user interfaces to determine the relative impact of various features on invalid vote rates. Use qualified, objective outside consultants to conduct the testing and analyze results.
 4. Do not certify systems for use in Florida that are not in use elsewhere. A system should have a proven track record, with all bugs and other problems documented and addressed before certification for use in Florida elections.
 5. Produce a rigorous overvote and undervote report for each statewide election that seeks to determine the level of invalid votes and their causes aggressively and accurately, including voting system performance problems as required by law. Make sure such reports are prepared by qualified, objective, outside experts, untainted by political influence, conflicts of interest, or connections to the vendors.
- B. Regardless of the state's actions, the counties should take the following actions immediately:
1. Disable the override (accept) button so that ballots cannot be overridden at the precinct or early voting.
 2. Put all overvoted ballots aside to be examined by the canvassing board for intent. The state has very specific guidelines for determining intent in order to ensure uniformity across jurisdictions.
 3. Document all cases of overvoted or spoiled ballots for forensic purposes. Communicate these results to the state via the post-election conduct of election report.

V. Limitations of this Report and Future Investigations

- **Not a comprehensive report**
 - This report looks at Florida's "no valid vote rate," and specifically looks at overvotes, one of the three categories of invalid votes. It does not include an analysis of the drop in undervotes between the 2004 and 2008 elections, nor does it explore in depth the reasons for what appears to be a high rate of invalid write-in votes. Also, it looks primarily at overvoting for in-person balloting, rather than for absentee ballots. We noted unexplained wide variations in overvoting on mail-in ballots; however, an investigation of overvoting on absentees would require additional research and, thus, must wait for another paper.

- This report does not include an evaluation of the overall performance of the voting systems that were certified by the Florida Department of State for use in the 2008 election, and should not be used as the sole basis for deciding on a new voting system.

- **Suspect data**

Data supplied in the Division of Elections' data tables is based on information submitted by the counties. We know that there are inconsistencies in how the data is collected and reported by the counties as well as outright errors. Thus, the accuracy of the data is suspect. For example:

- Why did six of 33 Premier counties (Duval, Calhoun, Columbia, Glades, Madison, and Taylor counties) report zero overvotes in the 2008 presidential race? To have not even one overvote would be most unusual. If these totals have not been correctly reported by these counties (one of which is a large county), this would slightly alter the overvote percentage for Premier counties.
- The absentee overvote rate varied widely from county to county—from zero overvotes to almost 1%. Why?

Determining the accuracy of this information and/or the reasons for these fluctuations will require further investigation.

- **Performance problems**

Each of the newly certified digital optical scan voting systems used in Florida in the 2008 election—the ES&S DS200, the Premier OSX, and the Sequoia Insight Plus—had specific problems. These included voting system bugs, discrepancies between voter turnout and ballots cast, performance problems, and other issues that were observed at the local level but never addressed by Department of State. For example:

- Why did Palm Beach County, using the Florida-certified Sequoia Insight Plus digital optical scan system, record 5,252 more votes than voters in the 2008 general election?
- Why did Sarasota County have 14 more Election-Day ballots recorded on the Premier OSX tabulator than actual ballots cast in Precinct 64? (One of only four precincts audited.) Why did the Sarasota supervisor of elections explain this difference (in the audit report at <http://www.srgelections.com/content.aspx?id=35>) by saying that poll workers had accidentally rescanned ballots with write-in votes, *when there were only two write-in votes in Precinct 64 on Election Day, not 14?* (For this official explanation to be correct, poll workers would have had to accidentally rescan the write-in ballots seven times.)
- Why was the Florida-certified Premier OSX digital optical scan voting system, used only in two counties (Sarasota and Hillsborough) unable to merge the results from Election Day, early voting, and absentee voting without manual intervention?
- Why can't the Florida Division of Elections reconcile the number of voters in the 2008 general election with the number of ballots cast?

These and many other issues will require further investigation, including the certification process at the Florida Bureau of Voting Systems Certification, which has consistently

certified flawed voting systems and has allowed the delivery of uncertified systems to counties—in *anticipation* of eventual certification—in violation of state law.

- **Examination of Paper Ballots and Audit Logs and Reports**

Conducting extensive investigations of the invalid vote rate, voting system bugs, and performance problems will require looking at the complete audit logs and reports from the counties in question. In many cases it will require looking at the ballots themselves. For example, in order to determine why there was such a high rate of invalid write-in votes, we must examine ballots to see whether new voters marked their preference in the presidential race and then also wrote in that candidate's name in the write-in space, causing that vote to be rejected; or whether many voters wrote in the name of the candidate they had strongly supported in the primary who was not on the general election ballot; or whether there were other causes of the high number of invalid write-in votes.

We are especially interested in conducting additional research to determine if particular features of the ES&S DS200 were problematic for language minority or elderly voters and led to a disproportionate loss of votes among these or other groups. Preliminary investigations suggest that overvote rates were higher in counties that had multi-language ballots.

The wide variation on overvoting on absentee ballots is another subject for future investigation. This unexplained differential is not likely to result from machine problems as the equipment does not provide overvote protection for mail-in ballots; rather it suggests a lack of uniformity in how overvoted ballots are handled in Florida's 67 counties.

These and many other questions remain.