EVIDENCE OF ELECTION IRREGULARITIES IN SNOHOMISH COUNTY, WASHINGTON GENERAL ELECTION, 2004[1]

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[1] The opinions expressed herein are solely those of the authors and do not represent the views of Northern Michigan University or the law firm Lehto & Penfield, PLLC

EXECUTIVE SUMMARY

- Counties such as Snohomish County Washington that run parallel voting technologies on Election day over the same precincts and the same races are useful for isolating any effect voting technology may have on patterns of voting.
- Because of the parallel voting technologies present and because of a historically close gubernatorial race between Democrat Christine Gregoire and Republican Dino Rossi that was subject to an unprecedented hand recount (as well as good recordkeeping and reporting of paper and touch screen voting results on a precinct by precinct basis) Snohomish County was an excellent place to study the 2004 election.
- Touch screen systems, controversial for their proprietary counting software that can not be verified, claim as a positive "product feature" the reduction or elimination of undervotes, or persons not voting for any candidate in a race.
- Evidence from New Mexico suggests that undervoting, at least in heavily minority districts, was very high, an average of four times higher than national averages with undervoting for President exceeding 9% in many minority precincts.
- This strongly suggests that either electronic machines do not actually reduce undervoting substantially, or else something is wrong with the machines in New Mexico, or both.
- Undervoting rates in Snohomish County were quite low, but numerous persons reported that touch screens would appear pre-voted, or else would select the Republican box when the Democratic candidate's box was pressed either with a finger or the stylus provided. Problems of switched voting or machines freezing up appeared in over 50 polling locations out of approximately 148 total.
- Statistical analysis shows high correlations between reported voting irregularities and high Republican voting results.
- Statistical analysis of machines that recently had their CPUs repaired shows a propensity for Republican voting that is present but weak on the individual level but strong at the polling location where the machines were placed.
- Sequoia touch screens are required to have their power cords daisy chained, forming a de facto network that third parties can use to tap into the machines or have the machines communicate among each other.
- Snohomish county had the highest election day increase in vote for Republican governor candidate Dino Rossi relative to absentee voters, while other nearby counties had either smaller increases or election day actually favored the Democrat Christine Gregoire.
- Election day voting in Snohomish County is not like paper voting for Republicans and Democrats which forms a bell curve with noise, but instead forms a smooth twin peak curve, suggesting different mechanisms acted on the electronic vote relative to the paper vote.

- The chances that 2/3 of the vote would show a Democratic lead of 97044 to 95228 votes, while the remaining 1/3 of the vote on touch screens would show a Republican lead of almost 5% (50,400 Republican to 42,145 Democratic) as a result of voters randomly choosing whether to vote by paper ballot or by touch screen is one in 1,000 trillion! A true impossibility.
- Simple mechanisms exist for multiple voting or hacking the Sequoia touch screen machines by single individuals, and they are further identified in the paper.
- Machines with repair histories within two weeks of the election or exhibiting problems on election day with observed vote switching, prevoted ballots, or freezing up performed better than the average Republican gain in the governor's race on election day (of just under 5%) in 46 out of 58 polling locations, and did better than the absentee results for the same precincts in 56 out of 58 polling locations. In the remaining two instances, electronic results were roughly equal to absentee results.
- The average of the 58 polling places reporting vote switching, freeze-ups, or repairs within two weeks of the election was 11.58% more favorable to Republican Dino Rossi than absentee voters did, and averaged 10.8% more votes than Gregoire on election day, while Rossi's overall spread among all electronic voters at all polling locations was under 5%.
- Given the coincidence of observed vote switching behavior doing this very thing with actual precinct results reporting enhanced Republican outcomes relative to absentee paper ballots, the probability is that Democratic votes and/or undervotes are being assigned improperly to Republican candidates and contrary to at least some voters' intent, and forensic analysis of the machines along with their impoundment is necessary to rule this out.
- Even though evidence of fraud exists here, the parallel voting technologies and recordkeeping are unusually good in Washington state, making investigation somewhat easier.
- Citizens should not have the burden of proving fraud, it is our government that has the burden of proving the election was transparent, fair and clean from the perspective even of the loser, because the continued vitality of democratic government depends upon the election loser's acceptance that the loss occurred through a fair and democratic process.
- The security of our elections should be an important part of protecting democracy and our country, yet no one has an incentive to identify risks and problems with our elections so that they can be corrected.
- Sequoia machines similar to those in Snohomish County, Washington were used in all of Nevada, almost all of New Mexico, and four counties in Florida.
- Although free and independent testing is badly needed, the authors of this paper have been told in writing that they will be allowed no testing of the Sequoia machines without Sequoia's express permission.

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"Investigative" Tribnet reporter David Seago's 8/18/04 email suggesting language to the Snohomish County auditor for an editorial about security issues on touch screen voting systems, reflecting a nonchalant attitude about election security:

> ***"How about: "Screw the loonies who think hackers will steal your votes. Our system works good."***

INTRODUCTION

Nationally, the subject of electronic and touch screen voting has been the subject of vigorous discussion about the election security risks they present.[5] Because the operating systems of these electronic voting systems are claimed to be proprietary trade

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[2] Mr. Lehto served a two year term on the Board of Governors of the Washington State Bar Association from 2001 to 2003, and practices in Everett Washington. He previously worked as an aide to state senator Mitch Irwin in the late 80s, including being an assistant field coordinator for several counties in his congressional campaign in 1988. Lehto also served as a volunteer observer during the 2004 General Election, for the Democratic Party, for the purpose of facilitating all persons to exercise their voting rights, and was stationed at Penny Creek Elementary School during Election Day.

[3] Dr. Hoffman is married to Mr. Lehto's sister. His Ph.D. is in the area of the physics of internal combustion and he works frequently with statistics.

[4] *This Executive Summary may be freely distributed and posted to websites provided that credit is given as above and you agree to post updates if and when available. Your comments, additions, and criticisms of the facts or argument here are welcome as this paper is being reviewed and expanded for eventual publication. A full length paper will be available on January 5, 2005 or later. Comments or feedback may be directed to Mr. Lehto at paul@lehtopenfield.com and to Dr. Hoffman at jehoffma@nmu.edu Special thanks also to Kurt Hulse of Seattle, Washington for his extensive and very able assistance with statistical and graphical analysis, and to Aileen Ash, mathematician and statistician, for her assistance with the "27,500" calculation. Professor Bob Franza at the University of Washington also assisted in spotting anomalous precincts in the Snohomish County presidential canvass, and to Ellen Theisen of VotersUnite.org for New Mexico data, advice and general editing assistance.*

[5] So-called DRE (direct recording electronic) voting systems have been widely criticized elsewhere for various deficiencies and security vulnerabilities: that their software is totally closed and proprietary; that the software undergoes insufficient scrutiny during qualification and certification; that they are especially vulnerable to various forms of insider (programmer) attacks; and that DREs have no voter-verified audit trails (paper or otherwise) that could largely circumvent these problems and improve voter confidence.

secrets, in effect the counting of electronic ballots takes place in electronic "rooms" where the public is never allowed to observe, even though most state statutes grant observers the right to observe all aspects of the vote counting process. Because this lack of security was widely publicized along with the status of the various battleground states, no one supporting Kerry or Bush needed an order from on high or a sign held up by Tim Russert of Meet the Press to know what the candidate needed (votes), in what states he needed them, and in what amounts they were needed. A seeming replay of the 2000 election debacle, including exit polling discrepancies and widespread voting problems has, without any substantial media coverage, led to fully 20% of the American public being convinced the election lacked legitimacy, according to one poll. See Keith Olbermann's MSNBC blog. http://www.msnbc.msn.com/id/6210240

The Problem Presented

Washington state recently had a historically close gubernatorial election, in which Democrat Christine Gregoire trailed Republican Dino Rossi by only 42 votes statewide after a machine recount, and a hand recount was then requested by Gregoire and the Democrats. In normally Democratic Snohomish County, Kerry had easily won the county (though the race against Bush was much narrower in election day touch screen voting), but in the governor's race, Republican Rossi defeated Gregoire in Snohomish County by over 6000 votes thanks to an election day touch screen landslide of over 8000 votes.

Thanks to mathematician Arlene Ash, we calculate that the chances that above 2/3 of the vote that is paper balloting would show a Democratic lead of 97044 to 95228 votes, while the remaining 1/3 of the vote on touch screens would show a Republican lead of almost 5% (50,400 Republican to 42,145 Democratic) resulting in an overall Republican win of over 6000 votes in Snohomish county *as a result of voters randomly choosing whether to vote by paper ballot or by touch screen* is one in 1,000 trillion! A true impossibility.

Normally, pundits would try to explain away anomalies like these with "late surges" for one candidate or the other, or a "heavy absentee program" by one party. In the course of this paper, we will examine the reasonableness of any such possible explanations, and examine the evidence for fraud or irregularity.

Can fraud be found?

In Ohio, electronic voting machine failures led to some Ohio races showing votes of negative 25 million. Commenting on these results, Mahoning County Board of Elections chairman Mark Munroe stated "the numbers were nonsensical *so we knew there were problems*". http://www.vindy.com/basic/news/281829446390855.php (emphasis added). However, the challenge in correcting election problems is in identifying them when the numbers are not "nonsensical" as they were at negative 25 million, but when they in fact fit in with a seemingly legitimate dynamic such as a "late surge" for one candidate or another, in which case they could be either an irregularity or a genuine late surge. This territory where shifts in votes can be both legitimate and illegitimate is where

the real investigatory work is done, because the facts will be capable of more than one interpretation. Put another way, only a relatively competitive election race can be stolen, because if the race is not competitive, the numbers will appear nonsensical and the error might be discovered and the election surely doubted. Thus, an investigator wishing to do a thorough job must, over a sustained period of time, be willing to entertain both the possibility that there are and that there are not election irregularities, in order to be open to all of the evidence.

Prior Scholarship on Irregularities

Prior scholarship on the 2004 general election has focused on the discrepancies between exit polls and reported election results, and established that either the exit polls or general election results on the Presidential race were flawed. (Freeman, et al) While this study does not itself prove the existence of election irregularities because it states that either the exit polls or the election results must be flawed, nevertheless discrepancies between exit polls and election results are a clear sign that more investigation needs to be done on both, since we can neither assume the exit polls were flawed nor can we assume that the election was irregular.

Further scholarship by Dr. Ron Baiman found the media claims that exit polls were systematically flawed to be "implausible", for the reasons cited therein. A follow-up paper by Freeman and Simon states that if the exit polls are indeed within the historical expectations of accuracy (which have been sufficiently strong to lead to fears that voting on the West Coast would be suppressed by early release of exit poll data), then the overwhelming likelihood is that Senator John Kerry won both the electoral college and the popular vote as well, i.e., the national presidential election was stolen in some manner.

We set out to examine whether there was evidence for the second possibility, namely that election returns reported by the states and counties are flawed, and that the election was therefore stolen either by virtue of a malfunction or deliberate election fraud.

Prior studies of the 2004 Election have alleged that a correlation exists between voting technology used and election results, even though it is obvious that voting technology should be completely neutral and not affect voting results in any way. (Kathy Dopp, et al, www.uscountvotes.org) Critics of this allegation have suggested that the observed correlation between voting technology and election results may not reflect actual causation, because the differing voting technologies being studied were also used in demographically different counties, thus lending themselves to various "apples and oranges" defenses being raised to the initial studies on the impact of voting technologies on the vote itself.

Many thousands of internet pages have been devoted to documenting evidence and claims regarding Election 2004, especially in Ohio where lawsuits are attempting to overturn the electoral college result there. No attempt is made here to review any of that evidence, but interested persons may start with www.votersunite.org and

www.freepress.org for links to some of the available articles and information. Many other pages have been devoted by computer security professionals to showing that electronic elections are unverifiable, resulting in a situation where we simply will never know for sure whether an election result is accurate, and where security risks are ever present. See, for example http://www.avirubin.com/vote/op-ed.html

Intent and Scope of this Paper

In order to attempt to reduce or eliminate this apples and oranges debate, we set out to examine voting patterns where electronic and paper technologies were used in the same county, and on the same elections. That is, we set out to study "parallel" voting technologies.

With regard to the data that can be obtained from parallel voting systems with detailed precinct by precinct reports, one nonpartisan observer stated:

> "Many types of errors or attempts at fraud in either the absentee voting system, or at the polls, can potentially be detected by analyzing this [parallel] data. In the case of fraud, the presence of two separate voting systems complicates the job of a vote-rigger -- any "adjustment" made to one system in a small set of precincts would have to be compensated for in the other system to avoid creating anomalies. We should be as wary of calls for a more "unified" voting system as we are of calls to do away with exit polling. Such would rob us of a valuable tool for verifying the integrity of an election. While it is important that voting afford all citizens an equal expedience, regardless of race, class, or party affiliation, separate methods of voting are, on balance, a boon."
> http://abrij.org/~bri/my2c/wabs.html

Parallel technologies present themselves in Washington state, which presents a unique opportunity to investigate Sequoia touch screen voting machines which are used on election day (and are the only results reported under "election day") and paper ballots that are optically scanned (which are used for both absentee and provisional voting, and reported as "absentee" votes).

The Facts and Effects of the Hand Recount of Gubernatorial Paper Ballots in Washington State

Snohomish County was further selected because the historically close Gubernatorial election caused first a machine recount of the paper ballots and then a hand recount of all the paper ballots, thus eliminating the risk of machine error or machine fraud as to the paper ballots when the hand count was completed. With regard to the hand recount of the election day/touch screen ballots, the actual electronic ballots for the touch screens were not recounted at any time; instead the parties stipulated to a procedure that amounted to re-adding together the original results tapes. Thus, the "hand recount" of the touch screen votes posted exactly the same totals as before, and nothing changed in terms

of overall vote totals, and there was not a meaningful recount of electronic votes. In fact, Scott Konopasek (who helped bring touch screens to Snohomish County) wrote in October 2004 that recounts on touch screens are not meaningful, and that what is needed to assess accuracy is not a recount but an audit.[6]

But on the absentee/paper side, the hand recount produced enough additional votes statewide for Democrat Christine Gregoire to certified as Governor-Elect of Washington state over Republican State Senator Dino Rossi, and a net of 46 additional votes came from Snohomish County out of approximately four hundred new votes discovered by the careful hand count. This margin was itself enough to overcome the statewide 42 vote deficit Gregoire faced as she entered the hand recount phase.

Nevertheless, the election day results in Snohomish County still loom large because of the mathematical impossibility that Gregoire's 1800 vote lead on absentee paper ballots was completely overcome by an 8000 vote Rossi landslide on election day on the Sequoia touch screens, ultimately leaving Republican Rossi with a 6000 vote margin in traditionally Democratic Snohomish County. Even though Senator Kerry won both Snohomish County and Washington state relatively easily, a secondary focus of this paper is to see if there were any similarities in the Presidential balloting that may have contributed to the unfair enhancement or reduction of President Bush's reported popular vote lead.

2004 Results in Snohomish County, Compared to Results Since 1992

Paper ballots were used for absentee ballots as well as election day provisional ballots (which together were 67.6% of the entire vote) while Sequoia touch screens recorded the remaining 32.4% of all votes on Election Day. After all paper ballots have been counted, Gregoire leads in Snohomish county by 97,044 to 95,228 for a lead of 1,816 votes. However, with only a remaining 32.4% being touch screen ballots, Rossi picks up almost five full percentage points, and wins Snohomish County's electronic vote 50,400 to 42,143, a net difference of 8,257 touch screen votes, for a net victory for Rossi in Snohomish County of by over 6,441 votes.

In winning Snohomish County, Rossi became the only Republican since 1992 to beat a competitive Democrat in Snohomish County.[7] For example, in the most recent hot race in Washington state, Democrat Maria Cantwell ousted incumbent Republican Senator Slade Gorton by a narrow margin statewide of only a couple thousand votes. However, in Snohomish County, Cantwell won easily, taking 132,148 votes to Gorton's 91,265 votes, or approximately 59% of the vote in both absentee and election day voting.

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[6] Mr. Konopasek worked in Snohomish County for several years after 15 years with Army Counterintelligence. He then transferred to Riverside County, California where he implemented another touch screen system, and has recently set up a consulting business to help other jurisdictions do so as well. His article "Paradigm Lost" can be downloaded at http://grouper.ieee.org/groups/scc38/1583/emailstg3/msg00022.html

[7] Only highly popular incumbent Republicans have previously managed to win in Snohomish County, such as current secretary of State Sam Reed and former Secretary of State Ralph Munro, both are moderate Republicans perceived as handling their jobs very evenhandedly.

Similarly, a survey of all county wide races in Snohomish County since 1992 shows (with only a single exception) the Democrats either doing better on election day (consistent with the historical rule that Republicans do better on absentees), or having the election day and absentee totals within two percent, which is consistent with the populations being more or less the same.

2002, The Advent of Touch Screens in Snohomish County

However, in 2002, Sequoia touch screens were implemented in Snohomish County, while paper ballots that are optically scanned were preserved for absentee voting. Starting in 2002, in all county-wide races pitting Democrats against Republicans, Republicans have gained in excess of 2% on election day in every race. Most recently, Rossi gained 5% over Gregoire and Bush gained 3.05% over Kerry.[8]

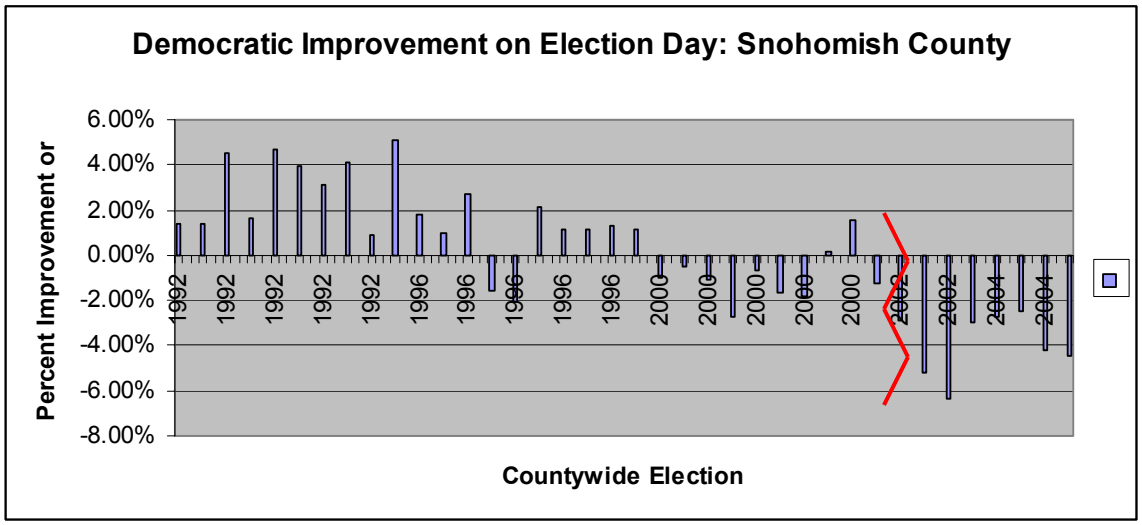


Chart 1: Democratic Election Day results are better or close to even, until touch screens appear in 2002, where Republican performance in each case equals or bests all previous performances since 1992 in countywide races.

Widespread reports of Unintended Votes Appearing on Touch Screens

Our first Public Disclosure Act request was for reports of problems and complaints regarding electronic voting. The reported problems were commonplace enough that KING5 TV did an Election Day television piece on touch screens switching over to vote for what KING5 called "the opposite candidate." Indeed, at 3:30 p.m. on Election day Snohomish Count Auditor Bob Terwilliger (D), wrote an email to another elections official in California stating that "we seem to have widespread screen

[8] Kerry won paper voting 107,439 to 88,769 and Kerry more narrowly won election day voting 48,947 to 45520. From absentees to election day, Bush went from 44.25% to 47.30% a gain of 3.05%. Overall totals were 156,468 (52.69%) for Kerry to 134,317 (45.23%) for Bush.

calibration problems", referring to incorrect boxes appearing checked off on the screen when the voter intended to vote for some other candidate. While KING5 did not specify which party's candidates were involved, in all subsequent written reports from Election Day, all of the complaints that were timely made to the Auditor's office, the WA Secretary of State (R) or to 866-OUR-VOTE concerning Snohomish County consist of problems with Democratic votes switching to Republican votes, and not the other way around. These written reports are 19 in number. Voters several times expressed their concerns that other voters would not catch the error, though the persons complaining were seemingly able to correct it themselves, but only after several frustrating attempts in many cases. The experience of having the wrong choice highlighted and then having difficulty changing it back would likely lead a reasonable voter to doubt whether the votes were ultimately recorded correctly on the first and only try, since the touch screen did not correctly record the touch of the screen on the first, second, third or fourth tries in many instances. Nationally, the national database of calls made to 866-OUR-VOTE indicates that changes in touch screens were reported in several other jurisdictions as well.

Based on telephone logs of the election troubleshooters, we have cryptic entries indicating yet more complaints that were not written up in any detail, and polling place check off sheets and citizen complaints reflect admissions from polling personnel that problems with Republican candidates being checked when Democratic was pressed were frequent occurrences. While we can only make educated guesses as to the true rate of reporting these incidents in writing, it may be that only 1 in 100 voters actually bothered to fax or email the auditor with the complaint they experienced that day. If so, as many as 1900 complaints (or more) could have been made at least verbally on election day.

Because this admittedly high number of problems was considered to be a relatively unimportant "screen calibration" problem, we decided to investigate whether this assumed diagnosis made sense. The contrary explanation provided on the internet was that the machines were "defaulting" to Republican candidates, and perhaps assigning undervotes to Republican candidates as a result (because by making pre-selected choices for voters, it eliminates the possibility of no choice being made, whether intentional or unintentional). Two distinct types of "default voting" had been reported: one where the screens appear prevoted before the voter makes any choices, and another where pressing the Democratic candidate resulted in the checking of the Republican box, which was then often difficult to uncheck.

We spoke with engineers who are involved in the manufacture of touch screen technology and manufacturing quality control. They stated that while screens can become miscalibrated over time, long periods of use are normally required for this to happen, and not just a single day of Election use. However, there remains a belief among elections officials that the movement of the voting machines to their stations on election day jostles the machines in sufficient numbers to cause the screen calibration misvoting problem, and (in addition) running a "screen calibration routine" apparently, but not always, corrects the problem at least temporarily. It should be noted that the screen calibration adjustment routine is a software program that is run to help adjust the screen by pressing

it in defined spots, and that screen calibration issues are more properly considered software issues than screen issues.

However, to use the misleading terminology anyway, if "the screen" was off by half an inch, it remains unexplained why the machines that were taking Democratic votes to be Republican votes (the line just below Democrats), were not also taking Republican votes and making them Libertarian votes, (the line just below Republicans) with similarly large numbers of complaints from Republicans about "screen calibration issues". Indeed, it might also be asked why no Republican votes were recorded as Democratic, though a true screen calibration defect would not produce errors in both directions at the same time, one would expect a calibration issue to occasionally go in the up direction and not just the down direction. Interestingly, the reports of these screen calibration problems were virtually all on major ticket races, and not on the various issues and candidates that were lower on the ticket, even though some of the lower races are in the same position on the screen as the earlier major ticket races, and thus should be subject to the same "miscalibration" problems, even if the miscalibration was somehow isolated to one portion of the screen.

Example 1: Voter K.K. pressed the screen to vote for a Democratic candidate, and a Republican candidate was selected instead. Doing this for another Democratic candidate, the checkmark jumped all the way down to the Libertarian candidate, seemingly passing by the Republican. Then, while his hands were at his side, he saw several screens flash by to bring him directly to the end of the ballot, forcing him to backtrack to the missed screens.

Example 2: Voter C.P. attempted to vote for Lt. Governor on the Democratic candidate and the Republican candidate Wiest was selected. He had difficulty deselecting the Republican candidate, and summoned his wife and the pollworker over to observe the problem. This problem happened regardless of using finger or stylus, pressing hard or softly (as poll workers instructed). Unintended selections appeared on several races, but only on major races and not on any minor races.

Example 3: Voters in Gold Bar inserted their activation cards and found the ballot appearing, already voted on, when the voter had not made any choices.

Undervoting is Much Higher in Other Places, and Extremely High in New Mexico

It is interesting to note the differences in undervoting (no choice) being made for President in New Mexico, a battleground state where Sequoia touch screens were used for early voting and much election day voting (where Shouptronic electronic machines were the dominant provider). As shown in more detail in Appendix A, the average undervote for President in New Mexico was almost 5% statewide, and by using the database at www.votersunite.org for New Mexico, selecting precincts with an undervote of more than 8% (fully eight times the undervoting rate seen in Ohio for E-voting machines) we find that 65 precincts comprising over 34,000 registered voters had undervoting/nonvoting rates for President of 8% or more, and that the average combined

Hispanic and Native American percentage of the population in those precincts averages a very high 78.81%. While we can not ascertain whether the problem is in New Mexico, or Ohio, or both, undervoting rates on "the election of a lifetime" for the office of President are highly suspect, and it's possible that some may be too high, and others too low.

Given the undervoting rates on electronic machines in New Mexico, one possible hypothesis is that the "reminder" feature telling people they haven't voted in a given race may not be the only mechanism that reduces undervoting, the reduction in undervoting in Snohomish County and other places may be due to "default voting", or vote switching. Most likely, some voters do choose to vote where they otherwise wouldn't have because of the reminder feature, but even though this is an advertised product feature, it still is indisputably changing the way people vote from historical patterns. Yet unlike overvoting (voting for more than one) which is never allowable and the machines appropriately forbid, undervoting ("none of the above") can be a legitimate choice by voters. Thus, the true amount of any undervotes being inappropriately lost or assigned by default, if any, is unlikely to be known without extensive testing that simulates election day conditions.[9]

Not satisfied that all of the vote switching incidents reported were merely "screen calibration issues", we looked to track the results of polling locations where screen calibration problems were reported. Because the hand recount in the Washington's race added a net of 46 votes to the Democratic side but was generally within a couple hundred votes of the machine recount results, we used paper voting patterns determined by the hand recount as the baseline for how a precinct was likely to vote.

Figure 1 below shows a graph called a histogram, which was developed by using the actual paper ballot absentee votes for the Democrat Gregoire. The horizontal axis represents the percentage of the vote cast in favor of Gregoire while the vertical axis denotes the probability that a given precinct will vote at that percentage. The mean or average of the paper vote distribution for Gregoire is 48%. This distribution is approximately bell shaped overlaid with a random noise denoted by the tall peaks and variation along the curve. The noise that is seen should be expected as voting demographics of various precincts and random behavior will often play themselves out in the form of noise. Similarly, vote distributions from Yakima County, Washington (discussed further below in the paper) also exhibit a similar noise that is normal. However, despite the noise which is ignored the shape of the curve is still important and can be seen as rising up above the noise or slight variations of single bars.

[9] "Parallel testing" is completed of a limited number of machines on election day, but the test is less rigorous and not under the full stresses of election day conditions in polling places where multiple machines are daisy chained together.

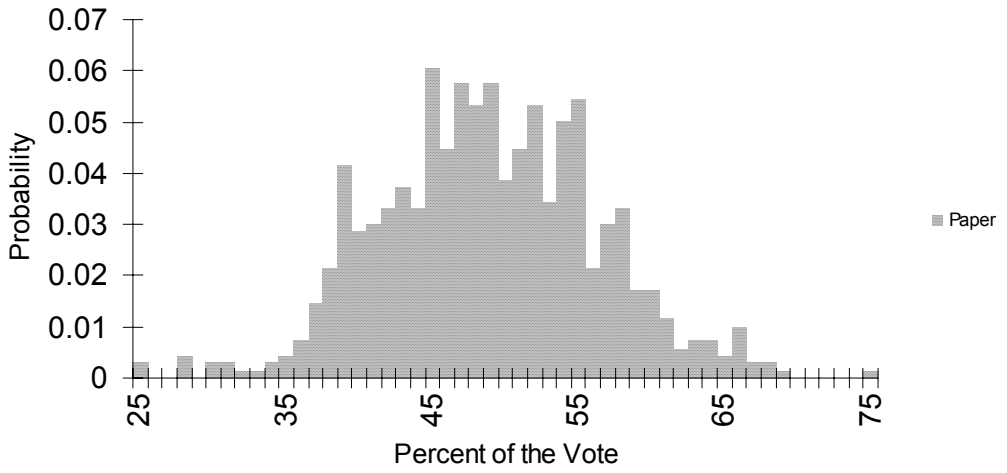


Figure 1: Histogram of the paper vote distribution for the Democrat Gregoire, showing a bell curve with associated "noise".

Figure 2 provides a histogram of the electronic vote obtained on election day. This distribution presents three significant changes relative to the paper vote histogram. First, the mean has shifted from 48% to 44%. In order for the mean to shift 4%, something has changed on election day. Exactly what that change was cannot be ascertained from these data alone but with 100% certainty, there has been a change between absentees and election day (touch screen) voting. In addition to the shift in the mean which is best seen in Figure 3, there is also significant reduction of the noise present in the paper vote, and a relatively smooth curve is presented. Lastly, the bell shaped distribution with noise has been replaced with a relatively smooth "twin peak" distribution. Interestingly, the right peak coincides with the paper vote peak suggesting it represents some of the same voting patterns captured by the paper vote, but a second peak denoted by multiple bars appears where previously there was only one bar noise.

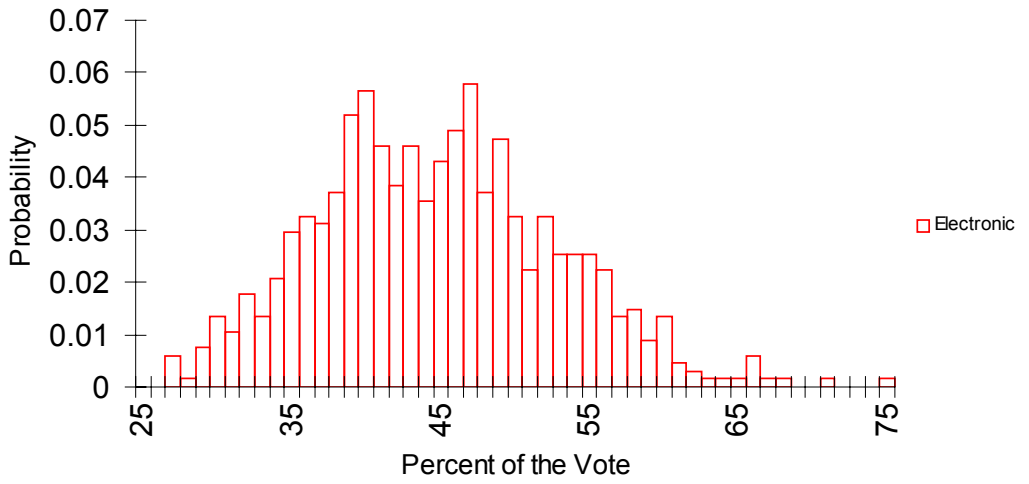


Figure 2: Histogram of the electronic vote distribution for Democrat Gregoire showing a "twin peak" pattern without the bell curve or noise seen in the paper balloting distributions for both the Republican and the Democrat..

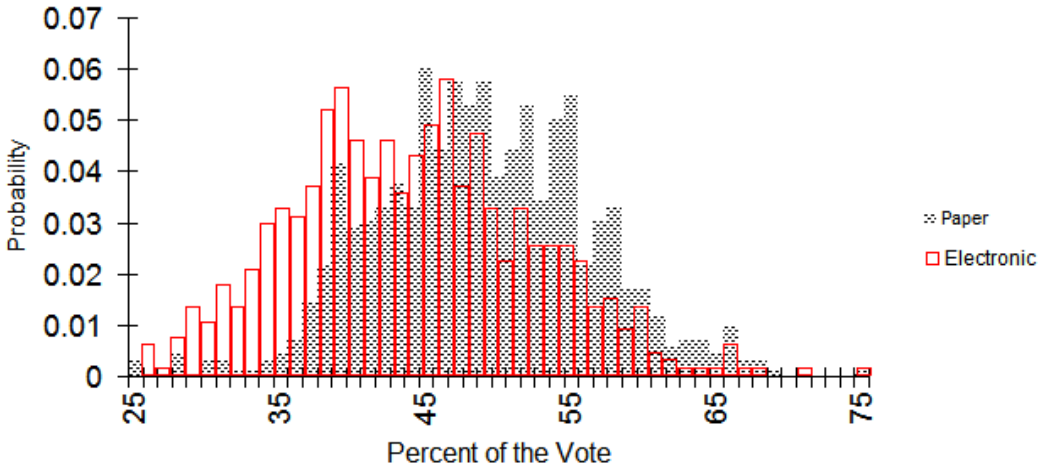


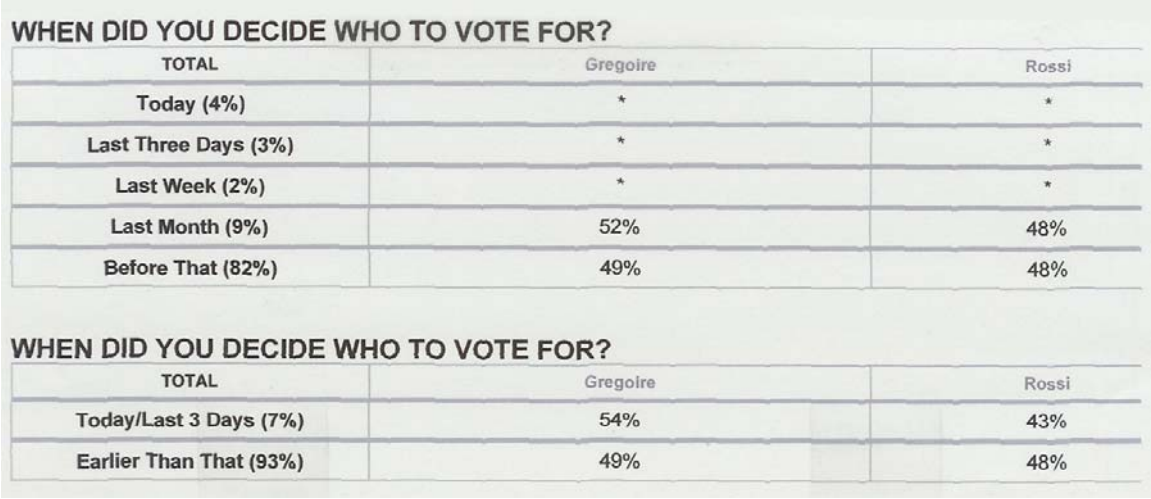
Figure 3: Overlapping histograms of the paper and electronic vote for the Democrat Gregoire, showing twin peaks superimposed over the bell curve with noise.

While normal phenomena do not always form bell curves, when the paper voting can be approximated with a bell curve *for both parties,* one is much harder pressed to explain why the electronic touch screen voting does not also form a bell curve. This indicates both that some mechanism acted upon the electronic vote that did not act upon the paper vote, and additionally the existence of a twin peak distribution suggests that the mechanisms were felt by less than all of the precincts that voted on Election Day, or was felt unequally among the precincts sufficient to distort the curve, rather than just shift the mean average in a Republican direction.

At this point, possible routine explanations for the transformation between paper and electronic distributions included (1) a massive Democratic absentee voter success sufficient to wipe out the traditional Republican advantage in absentees, (2) widespread avoidance of touch screens by Democrats more than Republicans even though a Democratic Auditor is in power in Snohomish County, or (3) some kind of late breaking surge for Rossi that was not felt by earlier absentees or (4) political "segregation", in that Republicans were voting on election day and Democrats by absentee vote. We examined these in reverse order.

Election Day Was Not All Republican. Although slight differences may have been presented, because 67.6% of the vote was absentee, it would be hard for either party to overwhelm the other party with such a large "sample". In addition, on election day touch screen voting, Kerry still won a narrow victory. Even though that victory paled with Kerry's margin among absentees, it indicates that no credible argument can be made that Election day was dominated by Republicans in any overall sense.

There Was No Late Surge for Rossi. First of all, CNN exit polls for Washington state indicate that there was no statewide late surge for Rossi. In fact, the percentage of people who made their decision in the governor's race was in the week prior to the Election was too small to measure, and of those who did decide late, 54% said their choice was Gregoire, and not Rossi. Thus, any kind of late surge theory would have to be county-specific and counterbalanced in other parts of the state.



WHEN DID YOU DECIDE WHO TO VOTE FOR?

TOTAL	Gregoire	Rossi
Today (4%)	*	*
Last Three Days (3%)	*	*
Last Week (2%)	*	*
Last Month (9%)	52%	48%
Before That (82%)	49%	48%

WHEN DID YOU DECIDE WHO TO VOTE FOR?

TOTAL	Gregoire	Rossi
Today/Last 3 Days (7%)	54%	43%
Earlier Than That (93%)	49%	48%

Figure 4. Excerpt of screen shot of CNN exit poll on Washington gubernatorial race.

We also looked at provisional ballots for Snohomish County, the "temporary" ballots that are used until it can be confirmed that a voter is registered, in which case the ballot is then counted. These are voted on Election day but counted in Snohomish County as "absentees". There are also ballot accountability forms from each polling location that list how many absentees were dropped off at polling locations. From these two sources of data, it can be determined that no less than 27,500 paper ballots were dropped off at polling locations on Election Day. This number is certainly low because ballots were also

dropped off at the Auditor's office on election day and ballots postmarked on election day are also counted, but no records exist of these numbers. Conservatively "backing out" 27,500 paper ballots from the paper ballot totals and assuming that those election day ballots were also subject to a hypothetical "late surge" for Rossi, we find that Rossi's election day surge would have to be 5.8%, and not 5% as originally indicated.

In an email dated October 20, Snohomish Auditor Bob Terwilliger stated they had a 12.5% return on absentees, a total of 27,000 returned at that point. However, according to the Secretary of State, Republican Sam Reed, as of October 28 (only five days prior to the election), about 30% of the absentees had been returned statewide. http://seattlepi.nwsource.com/local/197111_returns28.html Thus, 70% of the absentees are themselves voted and returned within five days of the election. Thus, any late surge for Rossi would have had to affect a significant portion of the absentee ballots beyond the 27,500 absentees and provisionals calculated above. Thus, if there was a late surge for Rossi in Snohomish County, we are looking for a surge in excess of six percent. The expected hypothetical "actual" election day surge is shown mathematically in Appendix B (Thanks to Arlene S. Ash, Research Professor, Boston College of Medicine).

We then looked at surrounding counties to see if they had election day surges for Rossi in the area of six percent. While Skagit, King and Pierce showed small election day gains for the Republican (not as large as Snohomish), other Democratic counties like Whatcom and Jefferson actually showed election day gains for Democrat Gregoire. Even the counties where Rossi gained the percentage gains were closer to being even than the 4-5% difference in Snohomish County. Thus, a "late surge" of this magnitude occurring only in Snohomish County does not appear explainable by any kind of last minute region wide or statewide media blitz or direct mail blitz, because these types of forces would tend to impact broadly rather throughout all of a county rather than selectively in some but not all of the electronic precincts, given the approximate bell curves for both parties in terms of their distribution throughout the county.

Democrats Did Not Avoid Touch Screens in Large Enough numbers. Another possibility was that Democrats engaged in a huge vote of "no confidence" in the touch screens by voting absentee in numbers several thousand higher than Republicans. While some polling locations do indicate that one to five voters refused to use a touch screen, this would only account (assuming an average of 3 voters per polling location) to less than 500 votes when we are trying to account for a swing of 5.5% or nearly 9000 votes. Thus, while there was undoubtedly some avoidance of touch screens by Democrats, there should have been some avoidance of touch screens by Republicans as well, since the Snohomish County auditor is a Democratic official and there is no indication that those asking for provisional ballots were all Democrats. Consequently, because of the offsetting nature of Republicans and Democrats avoiding touch screens, and because of the small reported numbers of people refusing touch screens, this appears to be at best only a very small factor.

Democratic Absentees?. Finally, we looked at whether the Democrats had disproportionately massive absentee programs or whether the Republicans had a

disproportionately massive get out the vote program on election day sufficient to swamp the other side's traditional advantages. While both parties have definitely pushed absentees and to get out the vote, no party appears to have been overwhelmingly better at either. Also, it is well known that the infrequent voters trend Democratic, so high turnout elections favor Democrats. Yet despite a Snohomish County turnout of 84%, Gregoire lost by an electronic landslide. At the same time, Maria Cantwell beat Slade Gorton handily there in 2000 and Snohomish County has helped elect a female majority to the Washington State Supreme Court. In addition, in 2004 Snohomish County decisively re-elected Senator Patty Murray over Congressman George Nethercutt by 160,402 to 124,986, or 54.89% to 42.77%. And despite the track record of electing women and Democrats, Snohomish County defeated 3 term attorney general Christine Gregoire even though Gregoire led in most pre-election polls by 5-10 points.[10] The always-optimistic internal polling of candidate Rossi claimed it was a "dead heat" just before the election.

In summary, the various political explanations for the election day Republican surge appeared to be either inapplicable, or only a small amount. Accepting these as explanations would be tantamount to being gone for two days and explaining the absence by saying one went out to lunch with a friend. A suitable explanation should account for all of the discrepancy, not just part of it.

The Other Washington County with Electronic Technology Parallel to Paper Balloting

We then looked at Yakima county, the only other county in Washington state that runs parallel voting technologies with electronic on Election day and paper for absentee balloting. Yakima also showed a Rossi gain on Election day vs. absentee voting of 2.8%, consistent with either random variation and/or a small election day advantage for Rossi. Figure 3 consists of overlapping electronic and paper vote distributions for the Democratic candidate. With the exception of a slight shift in the means, both distributions are similar complete with noise. Again, this contrasts Snohomish where the distributions changed in addition to a significant reduction in noise.

While similarly shaped voting distributions do not prove the absence of fraud (ten votes added to every precinct would still form a bell curve) the existence of the twin peaked curve relative to the bell curve for paper indicated that something affected the election day voting in parts of Snohomish county that did not affect the absentee voting or the electronic voting in at least some of the county, and also did not affect at all a substantial number of nearby counties.

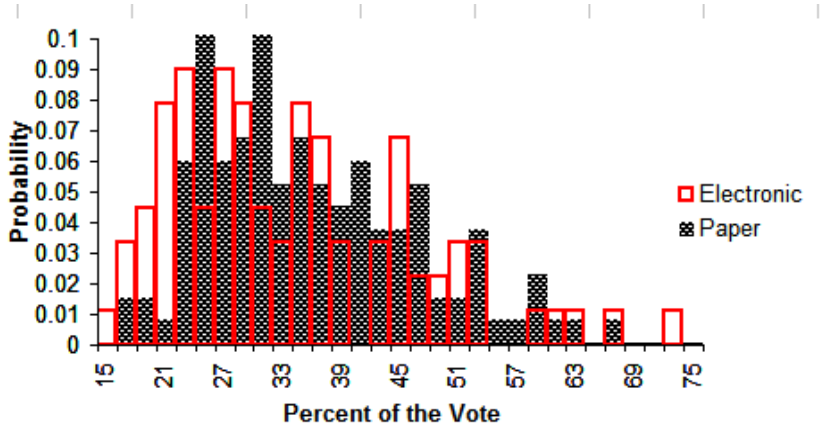


Figure 3: Overlapping electronic and paper voting distributions for Yakima County precincts – Democratic Gubernatorial Race.

The above double curves for both Yakima County's paper and Yakima County's electronic votes could indicate either that Yakima's election was more normal than Snohomish on Election day, or it could indicate that the forces that affected Yakima county to give Rossi a modest gain there relative to absentees acted more evenly on the entire county, thus preserving a bell curve instead of distorting it as happened in Snohomish County. Thus, even in a county that showed an modest election day surge to Republicans, both paper and electronic were similarly shaped curves.

Differences Between Paper and Touch Screen Vote Totals in the Same Precincts and Polls

We then calculated the percentages by which the E-vote exceeded the P-vote (or paper vote), in order to identify polling locations and precincts where discrepancies between paper and touch screen were largest. We then compared those precincts and polling locations with the list of precincts and polling locations that had reported problems with votes switching over to Republicans as follows:

Flagged Polling Locations vs. All Polling Locations

	Number of Polls	Number Exceeding Rossi absentee performance	Number of problem polls Exceeding Rossi overall Election day increase	Number of problem polls where Gregoire did Better on Election day vs. absentees
Countywide	148	100	42	2
Flagged Problem Polls	58	56	42	2

Chart 2: With over one third of all polling locations flagged for problems, those flagged polls beat Rossi's performance on absentee ballots in the same polling locations 56 out of 58 times. In the remaining two times, the performance was essentially the same.

In each case, polling locations where vote switching was reported had substantial improvements for Rossi in e-voting over p-voting, beyond the countywide average improvement of nearly 5 percent. Thus, reports of vote switching are highly correlated with reported overall election day results favoring Republicans. We also have some complaints for which we have not been able to assign polling locations.

Examining Characteristics of Repaired CPUs and their Voting Totals

Given the correlation between reported problems and Republican voting, we then looked at the repair histories of the Sequoia touch screen machines. In the primary election, numerous machines had inexplicably frozen up. This also occurred to some extent in this election, where 19 machines had to be taken out of service prior to registering 30 votes (some machines used all day registered vote totals in the 30s, though the average touch screen machine received approximately 100 votes in a day). We reasoned that machines that were powered down prior to a full day would, if no votes were lost, provide a snapshot of the pattern of what was being recorded by the voting machines during the hours just before they got shut down.

The nineteen machines that were taken out of service due to repeated "screen calibration" problems or because of freezing up voted as follows:

	Total Gregoire	% Gregoire	Total Rossi	%Rossi
All 19 machine	101 votes	**38.11%**	155 votes	**58.49%**

See Appendix C for data.

The 155 votes for Rossi and 101 votes for Gregoire means that Rossi was obtaining more than 50% more votes than Gregoire on these malfunctioning machines.

At this point, we realized that substantial questions concerning the integrity of this election existed, and yet if anyone had spotted such issues, no one was investigating them.

With elections officials generally, the problem appears one of attitude: because the elections officials have been involved in purchasing decisions for electronic technology and don't wish their offices to be dogged by "scandal" they have little incentive to seriously investigate and look for problems, because they will be quite likely to be punished for finding any such problems. According to typical responses of elections officials, they have set up a situation where it is logically nearly impossible to have a problem: (1) either there is "no evidence" of any such problems (often because no one has looked) or (2) if there is evidence, then the problem has been "caught and corrected" and therefore no one need worry, and the factually empty claim that "no votes were lost" is taken at face value and not questioned. Thus, in all cases, there appears to be simply no cause for public concern at any time. This is far from an accurate way to look at elections, and it is certainly no way to be protective of democracy.

What Do the Sequoia Operating Manuals Say?

Having found vote distribution curves similar to each other in Yakima (the only other Washington County to run parallel election technologies like Snohomish County) we remained perplexed by the transformation of the Snohomish electronic vote distribution as well as the total size of the Rossi and Bush gains on election day relative to absentees. We decided to request and review operator's manuals for the touch screen machines.

In response to our request, we received a letter from Sequoia stating that they would take "all actions", presumably including litigation, to stop us from looking at an operator's manual, on the grounds that California law protected its trade secrets. We did, however, receive the local Snohomish County pollworker's guide and a troubleshooters guide given out for each polling location.

To understand touch screen voting, you should know that a card activation machine is used to activate a credit card of sorts, that is then used to instruct the touch screen that the person is authorized to vote, and to tell the touch screen which of the preprogrammed ballots in its memory should be offered to the voter for the precinct that voter is registered in. However, we noted that Section XIII of the Troubleshooter's guide shows a "manual mode" which gets around the security features of the regular mode. See Appendix D, copy of excerpt of Troubleshooter's Guide.

The troubleshooter's manual tells workers how to activate manual mode, which is by pressing a color coded button twice. A beep the Auditor characterized verbally as "a soft beep" is heard, and then the manual warns that pollworkers MUST observe the voters to make sure that ONLY ONE VOTE PER VOTER IS RECORDED. In other words, in manual mode, the security features of the card activation system are no longer applicable, and voters or technicians can vote as many times as they want to, provided only that the soft beep is muffled or not noticed. Thus, a single individual can vote repeatedly. There would then be a mismatch with signatures in the poll book if signatures were not purposely added to the poll book, but over half of the polling locations in Snohomish County have such mismatches on the face of the official ballot accountability sheets filled out by poll workers at the end of election day.[11]

Even When Votes Equal the Number of Voters, Errors Can Offset Each Other.

At this point, we had two possibilities for sources of irregularity that were offsetting of each other: There could be manual voting that would create more votes than voters, and then there could be votes getting lost or not recorded, in which case the number of votes would be less than the number of voters, and additionally there is the risk that some or many people did not notice that the machine checked the Republican candidate when they pressed Democratic, and thus results would be distorted, though not

[11] A substantial number of these were apparently reconciled by a more careful count of signatures, but many discrepancies are still left. In addition, approximately 3 polling locations appear to have the same number of votes as voters on the face of the ballot accountability sheet, but in fact they added the DRE totals wrong. It appears that if the sheet balanced, there was no checking of the numbers beyond that.

in a way that would create more or less votes than voters, just in a way that was not faithful to the voter's intent. Particularly troubling was the offsetting nature of the problems, such that the poll books at the end of the day might match the total number of votes and yet the election could have been very irregular at the same time.

We then decided to look at the specific machines that had been repaired between the primary and 2004 general election, which were identified by serial number on a document entitled "Repairs Between the Primary & General 2004 by Sequoia Technician from Harvard". On these documents, repairs on 15 different Sequoia voting machine CPUs are documented to have occurred between October 13 and October 19, 2004, just days prior to the 2004 general election on November 2. Two of these machines were not used in the general election, but a total of 13 machines with repaired CPUs were used in the general election.

When we totaled up the votes from the repaired CPUs, once again Rossi won handily.

	TotalVotes	TotalGovVote	Gregoire	Rossi
All serviced Machines	1,223	1,207	497	685
All other machines at the same polling locations	7,572	7,452	3,050	4,237
Total: Serviced machines plus other machines	8,795	8,659	3,547	4,922

Chart 4: Machines with serviced CPUs favored Rossi on the individual level by over 15% (56.8% of gov vote vs. 41.2% for Gregoire) and even more strongly on the polling location level when fellow machines are considered (56.9% to 40.9%).

However, voting machines should be completely neutral absorbers of voter's intent, taking on whatever character the local voters have. Therefore, we needed to examine the repaired CPUs in the context of the other machines at the same polling location. In this regard, the repaired machines were sometimes more and sometimes less Republican in their vote totals than the mean average for the polling location. However, where two such repaired machines were present or where there was also a polling location report of vote switching, the repaired CPUs voted more heavily for Republican Rossi. The machines were good Republican performers even if "in the pack" with other machines.

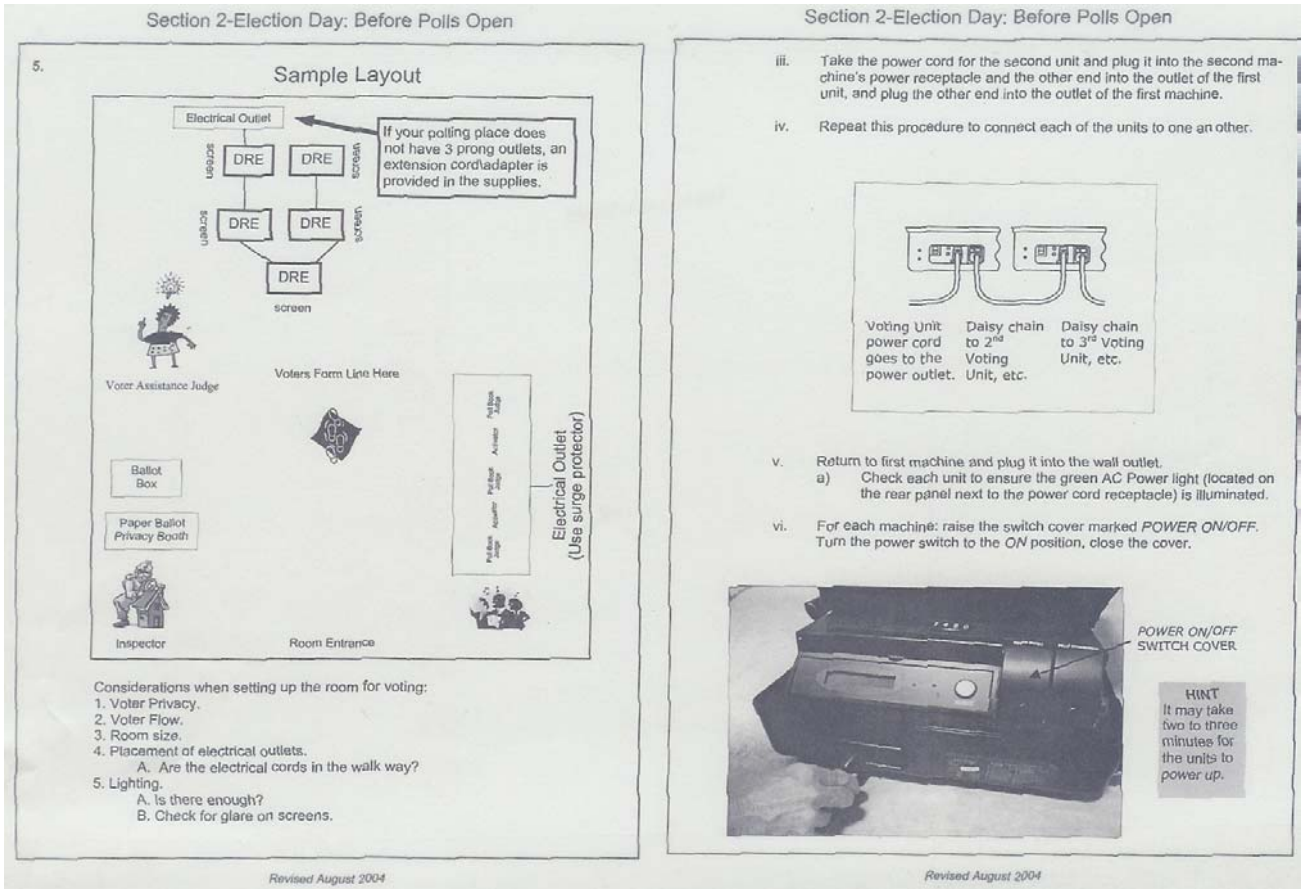
For example, one machine was placed at Gold Bar Community Center, and that serial number was specifically reported as having problems with switching votes. Gold Bar had an E/P ratio of 1.243, meaning that on election day Rossi did 24.3% better than he did in absentees. Conversely, Gregoire's E/P was .749, meaning she rated 25.1 percent worse off on election day than in absentees, fully five times more than the county average 5% election day bump for Rossi. A similar pattern was shown in the presidential race,

where both Gold Bar 1 and Gold Bar 2 voted for Kerry on paper but voted for Bush by a fairly large margin on the touch screen voting system.

Moreover, we calculated that if the polling locations where these machines were placed had only voted just under 5% over their absentee totals on Election Day, Rossi would have resulted in at least a two thousand vote change in standings and the race would have been nearly as tight on election day as it was on absentees, where Gregoire won narrowly, albeit with Rossi still winning election day based on this calculation. However, it can be assumed that we have not been able to flag all polling locations because some reports remained verbal, so these figures could change.

However, there remains a pressing question concerning why machines at the same polling place might "affect" each other. They should "affect" each other in the sense that if the polling locations machines are randomly distributed, each machine will look roughly the same as the others, subject to variances for random variation. Therefore, one can argue that the reason the whole polling place was affected is because the voters that showed up at that polling location were affected by a desire to vote Republican, thus affecting all the machines there. Conversely, some method of communication would have to exist between voting machines in order for a single machine that is voting improperly not to itself stick out like a sore thumb. Activists on election issues have warned that networking would be highly dangerous, and Snohomish County advertises in its frequent questions regarding electronic machines that its touch screens are "not networked" as a safety precaution.

However, when we examined the local pollworker's manuals, we discovered that the machines at each polling location are required to have their power cords "daisy chained", meaning that rather than plugging in each power cord into a surge protector which is then plugged into the wall, the machines are plugged into each other ("daisy chained") and then one of them is plugged into the electrical outlet in the wall. Moreover, each polling place checkoff sheet requires the workers to certify that the machines are correctly daisy chained.



Looking for more information about possible hacking or communication routes, we also examined some RFP responses Sequoia has made over the years and found that as early as 1999, Sequoia was offering counties a cellular modem as an add-on, indicating that its proprietary operating system is capable of communicating with other machines if only modem-enabled. See Appendix E, copy of RFP response page.

Networking Is Easy Even Through An Electrical Grid

A brief check with computer engineers indicates that it is commonplace to transfer data via the electrical grid by multiplexing a signal on top of the existing 60 hertz power line in order to make packets of data pass over electrical cords. Some entire countries are investigating the cost of wiring their countries for the internet this way. With voting machines, very little data would need to actually pass over an electrical cord. In fact, networking over electrical power lines is now so common that in the fall of 2004 the FCC approved a standard so that home entertainment devices made by different manufacturers can all communicate with each other over the household power grid, even between floors. http://www.homeplug.org/powerline/ Therefore, given that there is no issue of language "translation" when all the machines are from the same manufacturer, we can only conclude that the daisy chained power cords are a potential or actual network and a security risk, in that anyone within the same electrical grid could tap in to the

voting machines via the electrical network. Thus, there is substantial third party risk of attack, and no defenses or countermeasures are presented to it, and in fact some of the data suggest that machines are able to affect each other.

In addition, while the Auditor confirms that while he knows there are no cellular modems on the voting machines, there is no actual check performed to confirm that this is the case, and certainly no detection devices on hand to determine if there are any cellular signals emanating to or from the voting machines. Therefore, while we can assume that no cellular technology is in place on the machines, we have little specific basis for that assumption other than faith that no one has placed them there.

In addition to the potential networking, something akin to a "modem" capability might be possible. This capability could allow voting to be monitored externally and modifications to the network response could occur in real time. With regard to whether any Sequoia machines might have such a chip or board, we note the following 9/22/04 email to Sequoia from Election Technician Michelle Smith concerning the 15 CPU boards she just received that she was supposed to install in Sequoia machines (the Sequoia tech later came out in October and installed them himself):

> **On September 16, 2004 I received the 15 CPU boards I had ordered. Problem; they are missing a part on the board. This part obviously comes with the board normally because it does not have a unique part number. This small board fits into the slots on the back of the CPU next to the printer board connections. <u>I know I am not dreaming this up; our CPUs have always came [sic] with this</u>. When I send CPU's back to Harvard for repair I send the board complete, I have not cannibalized the board at all. At this point I can not use these CPUs to do my repairs I don't have any of these smaller boards to install on the CPU board. I have verified that the correct part number and rev are on these CPU boards.**
>
> **Michelle Smith**
> **Snohomish County Auditor – Election Division**
> **Polling Place Coordinator/Election Technician**
> **[…] (emphasis added)**

The above email points to at least four distinct possibilities: (1) There is an extra board or chip fitting the description of a possible communications device that is "always" on Sequoia, but that Sequoia did not include when Snohomish was to install the boards; (2) CPUs are often shipped off site for repairs; (3) There possibly was a prior conversation where someone at Sequoia or somewhere else suggested that nothing was in fact missing and the perhaps her memory was wrong; and (4) Election Technicians are unsure of exactly what is in the voting machines and what it does. Sequoia later flew out a tech to install these (now apparently "complete") boards between October 12 and October 19, 2004. See Appendix F re list of repairs between Primary and General. Based on the above description, Sequoia machines need to be forensically examined for any

communications capability, past or present. On election day, electronic machines should be monitored for wireless or cable traffic, if one was serious about election security. This points to the huge cost and relative security advantages of paper elections.

Here, with election security, the problem may also be one of resources. At a cost of over $5000 each including spare parts, there is little money left for the kinds of technical security checks that would help ensure a secure election. Moreover, even a Voter Verified Paper Trail would not detect repeated voting in Manual Mode, because the paper trail would be created to parallel the extra votes and an audit of the paper trail would not catch this problem. An audit of the voting computer's audit log might catch the problem by showing that manual mode was activated, provided this information is faithfully recorded by the machine itself and the rogue program, if any, does not instruct the computer not to record these activities in its audit log. We know of no county that checks audit logs prior to certifying results, and Snohomish County is no exception.

In any event, the type of security countermeasures that are needed to provide real election security would substantially increase the already high per unit cost of each machine. Thus, while there were lines of up to 45 minutes at some electronic polling locations despite the fact that 67.5% of all votes were cast on paper, these lines would be much longer if the county went to an "all touch screen" system or if the amount of absentee voting went down from the 2/3 lion's share it currently enjoys. In a nutshell, while touch screens advertise themselves as cost savers, they are clearly not cost savers if one considers the cost of true recounts (computer forensics) the cost of people waiting in lines because expensive machines are now bottlenecks in the voting process, and the cost of the security countermeasures needed to create a reasonably secure process.

After an examination of all the counties data, our current working hypothesis is that the Sequoia machines are capable of communications as are most computers these days, and that those machines that we can show were accessed just prior to the election appear to have affected their cohorts at the same polling location in a way that can account for a substantial portion of the election day surge for Rossi. A complete audit is indicated, including computer forensics.

This audit implies a large expense for which the authors have no money, but a further problem is revealed in the email from Bob Terwilliger to the authors, stating "Let me reiterate that under no circumstances, without Sequoia's approval, will you be allowed to run any kind of testing on the machines." This email was extremely clear and echoed earlier verbal comments that no testing would be allowed without express permission.

This comment likely flows directly from Terwilliger's contractual responsibility to Sequoia, one that was presumably approved by the county board. Mr. Terwilliger's job is specifically complicated by apparent contractual responsibilities to Sequoia to help preserve Sequoia's "trade secrets". (These trade secrets include how what some call "the secret counting room" works precisely). Sequoia also has an ongoing service agreement with Snohomish County in the nature of a warranty agreement and may be re-servicing

the machines immediately after every election. While such contracts are not uncommon in the computer industry, because a contract is directly a form of "private law" agreed to by the parties, Sequoia has in effect legislated very important conditions regarding our elections and the counting of our votes. To this date, the interpretation of those contractual responsibilities prevents any real investigation from occurring, leading to only more questions.

Sequoia has several times reminded Snohomish County in writing that placing any third party machines on its voting machines will "void the warranty", as may some other actions. With regard to consumer transactions, the Magnusson Moss Warranty Act provides that unreasonable restrictions that will act to void warranties are illegal, but it may be debatable whether the purchase of the voting machines by the county is for consumer purposes, even though ultimately used by consumers. In any case, it may be argued that such warranty restrictions are unreasonable, especially if they interfere with a determination of whether the product does what it is advertised to do: perform a clean and fair election.

In any case, some of the evidence will shortly be destroyed. Under the normal schedule, the computer cartridges that contain second copies of the results will be erased before the next election, which is February 2004. It is not known whether the hard drives and operating system retain past election info. We have requested that all evidence be preserved, but don't know if it will be.

While we have been advised in writing that under "no circumstances" may we perform any tests on Sequoia voting machines without the permission of Sequoia, we remain hopeful that Sequoia will completely open up its proprietary operating system and hardware to inspection so that a full security evaluation and investigation can take place. Only then will the data anomalies be solved. As it currently stands, there are at least 45 polling locations in which the number of voters does not equal the number of electronic votes, and in some cases "phantom votes" appear, where vote totals greater than the machines recorded on election day are reported in the precinct results.[12] However, it is unlikely that any serious investigation will ensue simply because no one is rewarded for finding problems, and the media no longer takes its role as watchdog seriously.

In the absence of more official efforts, should any citizens wish to do their own fraud investigation, one should be open to two possibilities simultaneously, one is the possibility that political forces account for all of the behavior seen, and the other is that malfunctions or fraud must have entered into the process. In order to prove any kind of fraud, it is always the TOTALITY of the evidence that proves the fraud, while individual facts are never enough to make a case, with each individual fact having some at least semi-plausible explanation.

[12] One such example is Penny Creek Elementary School, where 687 votes printed out on "results tapes" on election night for the five precincts at that school, but the five precincts of Fircrest, Hearthstone, Pinewood, Pioneer Trails and Seattle Hill reported a total of 688 electronic votes in the final tallies.

Thus, those who are investigating potential election fraud would be well advised to keep their minds open. Similarly, any robust form of election fraud would want to hide itself behind colorable political "explanations", so the mere probability of a political explanation can not be the death knell of the investigation. Indeed the entire purpose of an election fraud would be to change significant (but not unlimited and therefore obvious) numbers of votes in such a way as it appears natural (such as by having a little of the data go "the other way" to give arguments but not enough to change the overall result). On the other hand, one should not interpret every fact in a negative way. Again, it is the totality of the information that ultimately counts, and there will always be seeming "defenses" to any individual piece of information.

The Importance of Defending Democracy by Taking Possible Election Risks Seriously

If we are serious about defending and guarding democracy, as they have been in the Ukraine with the help of American exit polling, we will rise up to investigate the "strange noises in the night" even though we think they're "probably just the cat". Similarly, banks rigorously check the books for signs of embezzlement, and outside auditors are brought in. No person would expect to deposit money in an ATM without a receipt that could be used to verify the deposit later on, and our ballots are more important than money, they are sacred to our democracy. Why should the most important events in our democratic life (elections) be the subject of such benign neglect and lack of any interest in their security?

It is our hope that society realizes that the state of election security is poor, even in the state of Washington which in many ways is groundbreaking and advanced. We could not have discovered the evidence and the questions we've raised here if it weren't for excellent recordkeeping work by local officials. Yet, these same officials have failed to connect the dots, or haven't had the resources to connect the dots. Significant attitude problems are seen in the media where they often won't investigate apparent problems because it's "probably" something political or "won't change the result". Unfortunately, all frauds are designed to look like it's "probably" something innocent. Notwithstanding the fact that any thoughtful attempt to manipulate our elections would consist of numerous small and different "bites" not any one of which is sufficient to change the outcome of an election, if we are to fight for democracy abroad, we should protect it at home even if the "error" at first doesn't appear to be enough to change a result. In the end, the number of points a candidate loses by is still important to their chances next time around, funding decisions, and the extent of any "landslides" or "mandates".

At the end of the day, whether you are a journalist, elections official, citizen or activist, being willing to defend something like democracy means being willing to put on your clothes and boots and going outside to make sure everything is OK. If we're not willing to take the risk of being wrong by investigating red flags and strange noises in the night, then we're not defending democracy. Democracy should be worth the risk of preparing for and the expense of investigating threats to our elections. Indeed, the continued confidence of our people in our government demands that a bright light shine

on our elections. Perhaps Avi Rubin, Professor Computer Science, John Hopkins University said it best when he wrote: **"***"Our goal should be voting technology that is beyond reproach. That goal may never be fully attainable, but we must do better than this. The foundation of our democracy is at stake, and thus, ultimately, so is our freedom."* http://www.avirubin.com/vote/op-ed.html

Updates and appendices to this paper may be found at www.votersunite.org, which has graciously agreed to host the paper, but is not responsible for its content except where indicated.

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AFTERWORD
(Thanks to All Who Have Worked for Democracy)

Because voting is our one moment when we are all supposed to be most equal, equal even to the President of the United States, we can be proud to vote. It is said that we are once again a Nation polarized and divided, with the former slave states and the mountains and plains divided against the coasts and the Great Lakes, and our commitment to union and to democracy is tested. With regard to that equality and freedom, and in the context of dying to preserve that union and democracy, Abraham Lincoln famously said:

> **Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.**

Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure. We are met on a great battle-field of that war. We have come to dedicate a portion of that field, as a final resting place for those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this.

But, in a larger sense, we can not dedicate -- we can not consecrate -- we can not hallow -- this ground. The brave men, living and dead, who struggled here, have consecrated it, far above our poor power to add or detract. The world will little note, nor long remember what we say here, but it can never forget what they did here. It is for us the living, rather, to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us -- that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion -- that we here highly resolve that these dead shall not have died in vain -- that this nation, under God, shall have a new birth of freedom -- and that government of the people, by the people, for the people, shall not perish from the earth.

---Abraham Lincoln, The Gettysburg Address

This paper is dedicated to all those people who reached out with their votes and with their lives in our recent election, and who continue to work for and protect democracy, equality, and justice. And to all those people in all political parties who sincerely believe in counting every vote. Because when we count every vote, it means that in our democratic moment when we are all equal, we all matter equally with the same vote, and in so making ourselves equal, the entire nation and democracy is exalted.

As Lincoln said, “It is for us the living, rather, to be dedicated here to the unfinished work” of democracy, which others have themselves so nobly advanced. The great task remaining before us in 2005 is to count every vote with all deliberate seriousness, so that those who have been denied the counting of their vote shall not have had their vote killed in vain, and that government of the people, by the people, and for the people, shall not perish from the earth. It’s a very real way to defend democracy.

In the final analysis, the integrity of an election must be such that the LOSER accepts that the process was fair, or else the “consent of the governed” will cease to exist. The consent of the winner to the election is never a problem, it is the perspective of the loser that counts, for only if the process is sufficiently clean, transparent, and understandable by the average person can the losing party be required to accept the results of the election. It is critically important that integrity be restored, because elections have given us such a long history of violence-free transfers of power. But if care is not taken to preserve their integrity, illegitimacy comes first and instability later.