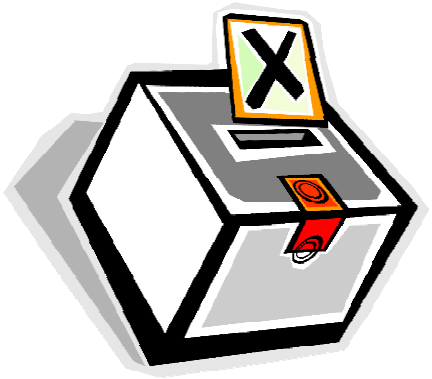
Voting Equipment and Procedures on Trial



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From quill to touch screen: A US history of ballot-casting

1770s Balloting replaces a show of hands or voice votes. **Voters write out names** of their candidates in longhand, and give their ballots to an election judge.

1850s Political parties disperse preprinted lists of candidates, enabling the illiterate to vote. The ballot becomes a long strip of paper, like a railroad ticket.

1869 Thomas Edison receives a patent for his invention of the voting machine, intended for counting congressional votes.

1888 Massachusetts **prints a ballot,** at public expense, listing names of all candidates nominated and their party affiliation. Most states adopt this landmark improvement within eight years.

1892 A **lever-operated voting machine** is first used at a Lockport, N.Y., town meeting. Similar machines are still in use today.

1964 A punch-card ballot is introduced in two counties in Georgia. Almost 4 in 10 voters used punch cards in the 1996 presidential election.

1990s Michigan is the first to switch to' **optical scanning,** used for decades in standardized testing. One-quarter of voters used the technology in the 1996 election.

2000 A storm erupts over Florida's punch-card ballots and Palm Beach County's "butterfly ballot" in the presidential election.

2002 New federal law authorizes $3.9 billion over three years to help states upgrade voting technologies and phase out punch cards and lever machines. Georgia is the first state to use **DRE touch-screen technology** exclusively.

Sources: Federal Elections Commission; "Elections A to Z," CQ, 2003; International Encyclopedia of Elections, CQ Press, 2000; League of Women Voters.

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VOTING EQUIPMENT AND PROCEDURES ON TRIAL

Hanging chads! Lost registrations! Double voting! Florida!

The impetus for election reform all across America stems from the chaos that occurred in Florida during the 2000 presidential election. In October 2002, the Congress of the United States responded by passing the Help America Vote Act (HAVA). In 2003, the League of Women Voters of Washington responded by adopting a study to examine how elections are conducted in this state and changes being considered.

The first year of the two-year study looks at voting with absentee/vote-by-mail ballots, reviews the security checks in the ballot counting process, evaluates the role voting equipment plays in voting and tallying, and includes a definition of terms. New developments are occurring every day, and the committee has made a sincere effort to make this study as current as possible. In the second year, the League will examine timelines for elections in Washington, consider how this state is implementing HAVA requirements, and update developments since this was written.

HELP AMERICA VOTE ACT (HAVA)

The Help America Vote Act (HAVA) directs states to improve their voting administration, record keeping systems and voting equipment. The Act requires that this be done through the use of provisional ballots, statewide computerized voter lists, and private access for the disabled, the visually impaired and for language minorities.

One of the challenges faced by HAVA is that election administration is primarily a state responsibility; consequently, it is difficult to generalize about problems at the federal level and appropriate solutions at the state level. Because election laws vary from state to state, each state is required to draw up its own plan for HAVA implementation. The federal government budgeted $3.9 billion to assist states in meeting HAVA requirements. A member of the LWV of Washington served on the Help America Vote Act steering committee appointed to help devise the plan for Washington State.

Washington's plan was completed in August 2003. It allocates approximately:

- $14.5 million to replace voting equipment in the 16 counties that still use punch cards, and to place at each polling place at least one voting machine capable of enabling sight impaired voters to cast ballots without help from another person. The only equipment currently certified to accomplish this task is called a Direct Recording Electronic machine (DRE).
- $11 million to create a statewide voter registration database and county election management systems compatible with the new state system.
- $14 million for voter education, training and a new complaint procedure.

While HAVA funds may be used for a wide variety of voting related purposes, the requirement that has drawn the most public discussion and debate is the one requiring each polling place to have at least one computerized voting machine equipped for the visually handicapped, usually thought of as a DRE. With many election officers planning to replace <u>all</u> their current voting equipment with DREs, some people are concerned about the security of these machines, particularly those that do not have a voter verifiable paper trail. The potential impact of this HAVA requirement is magnified by a combination of events: pressure to eliminate punch card machines, demands for ballots in an increasing number of languages, and availability of federal money to buy new equipment. As a result, election administrators throughout the country have been preparing their spending plans and planning their equipment orders.

CURRENT VOTING EQUIPMENT IN WASHINGTON

Washington voters currently vote using punch cards, optical scan ballots, or DREs.

- **<u>Punch Cards</u>**: The voter perforates the card to remove the chad in the location corresponding to each of the intended votes for candidates or ballot issues. The card is then placed in a sealed ballot box. The box is taken from the polling place to the elections office at the close of voting, where

the cards are inspected for damage and stacked for insertion into the card reader for counting.

- **Optical Scan**: The voter marks the ballot with a pen or pencil, indicating candidate or ballot issue preferences. The ballot is placed in the ballot box where it is "read" by the optical scan. If more than one candidate receives a vote for the same office (over vote), the machine will reject the ballot so that the voter can make a correction. As the machine accepts the ballot, the scanned votes are recorded on a memory card that can be accessed only after the polls close. Depending on election department policy, the vote totals for that polling place can be printed from the memory cards, the memory card contents may be sent to election headquarters by telephone modem, or the memory cards may be physically transported to election headquarters along with all the ballots, where the final consolidation of votes takes place.

- **Direct Recording Electronic (DRE with touch screen only) machines**: The voter signs in at the polling place and receives a magnetic smart card activated by the poll worker, which is taken to the voting booth and inserted into the smart card reader to begin the voting process. Data on the card directs the software to bring up the proper ballot style for that voter. The voter is presented with on-screen instructions and ballot choices for candidates and issues. Voting is done by touching a designated spot on the screen with a finger, a pointer instrument or a dial for each individual race or issue. Upon completion of selection of the voter's choices, he/she selects a "Finished" option. One or more confirmation steps follow to permit the voter to review and approve the choices displayed, or to spoil the ballot and start over, eventually touching a spot that casts and finally records the voter's choices within the data archive of the equipment. The smart card is ejected if it remained in the reader, and the machine is locked. The voter then returns the smart card to the poll worker, who can use it for another voter. The card does not contain the vote. It is a token used to identify the voter to the DRE on a one-use basis. These machines are currently being used in Snohomish County.

VOTING EQUIPMENT IN VARIOUS STAGES OF DEVELOPMENT

The HAVA requires accommodation for those voters who are not proficient in English. Using software to generate instruction and ballots on screen in other languages is more flexible and economic than printing multiple versions in large quantities. All variants discussed below that have an on screen or audio ballot presentation can incorporate other languages. Washington state law requires that the Secretary of State certify any new voting equipment, and that it has been used in at least one other state prior to certification here.

- **DRE with voter verified paper trail**: Operates the same as the no paper DRE, except for the addition of one more verification step. Upon completion of selection of all desired choices, when the voter touches a "finished" spot, the confirmation steps include a printout of the ballot choices on an attached printer to permit the voter to review and approve the choices displayed in both places, the screen and the paper. If they are the voter's choices, and both match, then touching a spot that accepts the final "finished" order registers the vote both internally in the memory of the machine and on the voter inspected paper. The paper representation of the ballot is then handled in much the same way as optical scan ballots. Completed and read sheets are collected in a ballot box and transported for storage to the elections office. The computer tally is usually considered official. However, if an audit is required, the paper record is available as a check on the electronic record. Some find it helpful to think of this system as a kind of double-entry bookkeeping.

- **DRE with controls for the sight-impaired**: A standard DRE with the addition of tactile input and audio output for the voter, and a preliminary step by the poll worker at the voting booth to activate the machine in sight-impaired mode, and place the earphones and hand controls in functional positions for the voter. DRE-type voting

machines can be designed to guide the visually disabled through the voting process without help from another person, giving them an advantage that sighted people currently enjoy. The display can be enlarged, and headphones provided to give verbal guidance through the process. Dials and buttons that don't require fine motor skills can be utilized, and multiple language ballots can be produced.

- **Ballot Generator**: Touch screen with voter verified paper ballot. This equipment is a method of using a computer to display instructions and ballots, which could be in multiple languages and be used by the sight impaired, but its only product is printing a marked paper ballot in a standard format, as though the voter had manually marked it. This gains the advantage of a computer program, yet avoids the uncertainty of only having an electronic record of the ballot choices. It is, in effect, an electronic pencil. The ballots are then placed in a counting machine.

- **Independent (stand alone) software**: Programs that have no specific hardware. As is common with home and office computers and network servers, new programs may be installed on machines for specific purposes. Software to manage voting data can be similarly distributed. One advantage of this option is to economize equipment costs by using general-purpose computers borrowed from everyday duties, taking them to the polls for election day, then returning them to their other uses after the election.

- **Internet - ordinary computers**: Washington state, along with ten other states, will participate in a pilot project of Internet voting by overseas voters (civilian and military) in 2004. The voter pre-registers and receives a security code, somewhat similar to the PIN identification used for banking and credit at ATMs, or for online transactions. At the time of voting, the voter accesses the website of the Federal Department of Defense database server for the jurisdiction, which displays the proper ballot on screen, and the voter makes selections using either a mouse or the keyboard. Upon pushing the final button, the machine on screen display repeats the entire ballot. When accepted, the vote is recorded within the data archive of the Department of Defense database server. It also notes that the voter has cast a ballot, blocking any second attempt to vote. The elections office then must collect the voting data from the Department of Defense computer.

- **Internet - special machines**: Online custom voting machines may be constructed to resemble a merger of the DRE and an ordinary computer. They would be located at designated voting locations on election day (and before that day, if the laws of the jurisdiction have authorized "early-voting"). The process of voting starts with log in with the personal identification information and the security code. From then on, the process is similar to a DRE with touch screen only (without a paper trail).

Security Issues

A huge increase in electronic voting machines seems to be inevitable; however, the computer science community has raised concerns. More than 1,400 computer scientists across the country signed a petition posted on Stanford Professor David Dill's web page (http://www.verifiedvoting.org/resolution.asp) warning that:

> "Computerized voting equipment is inherently subject to programming error, equipment malfunction, and malicious tampering. It is therefore crucial that voting equipment provide a voter-verifiable audit trail, by which we mean a permanent record of each vote that can be checked for accuracy by the voter before the vote is submitted, and is difficult or impossible to alter after it has been checked. Many of the electronic voting machines being purchased do not satisfy this requirement."

In the summer of 2003, a large chunk of source code from one of the largest manufacturers of voting equipment was discovered online. This gave the public a rare opportunity to examine internal computer instructions that are proprietary (company owned and secret). Computer scientists from Johns Hopkins and Rice University examined

the material and issued a highly critical report of flaws it found. As a result, several states put their equipment purchases on hold and ordered additional, third party laboratory testing. Today, systems that contain proprietary source code that is secret and not available to the owner/user are not acceptable to government in such applications as traffic management, process control and communication. Some people believe that elections offices should have the same requirement.

A recent analysis of voting issues in Massachusetts by Caltech/MIT said this about DREs:
They "provide no opportunity for independent paper based audit and are built on proprietary software. As a whole, the current set of DREs being used across America is no better than the lower-tech optical scanning equipment. Touch screen voting is no panacea for election woes." (Caltech.edu/reports/index.html)

Many election officials, however, express confidence that the current generation of paperless DREs provide adequate safeguards. Some see the addition of paper ballots as nullifying one of the advantages of DREs: a speedy vote count free from the mishaps that can occur from human handling of paper ballots. Prior to the passage of HAVA, Snohomish County replaced all its voting equipment with DREs that do not provide a voter verifiable paper trail. The County has conducted its last four elections with this equipment, and has not reported any irregularities.

The League of Women Voters of the United States has taken a similar stance. A statement on the League website (http://www.lwv.org/where/promoting/votingrights_hava_drevm.html) says:

> "The LWVUS does support an individual audit capacity for the purposes of recounts and authentication of elections for all voting systems, including, but not limited to, DREs. The LWVUS does not believe that an individual paper confirmation for each ballot is required to achieve those goals. An individual paper confirmation for each ballot would undermine disability access requirements, raise costs, and slow down the purchase or lease of machines that might be needed to replace machines that don't work."

To ensure the legitimacy of elections, the LWVUS has recommended putting in place appropriate policies and processes that give election officials – not the DRE manufacturers – control over ballot creation; mandate that voting systems are randomly tested as they come off the assembly lines, upon delivery, prior to opening the polls, during election day and post election; and at the appropriate level of government obtain a copy of the source code that operates the machines.

Voting equipment vendors, too, maintain that touch screen equipment provides important advantages over voting equipment currently in use in most jurisdictions, and they oppose efforts to delay the time when this new technology can be put to widespread use at polling places. Nevertheless, many voting machine companies are now working to add a voter verifiable paper option to their DRE equipment although they are reluctant to make major commitments until the election community indicates what it wants.

California's Secretary of State recently announced a new rule requiring all electronic voting machines to provide paper receipts by 2006. Further, all counties that purchase new touch screen terminals must provide a voter verified paper trail starting in July 2005. Because California commands a sizable share of the market for voting machines, the move may inspire vendors to speed production of DREs with a voter verifiable paper option. It may also cause other state and local governments to adopt changes to their standards for new voting equipment. County election officials will make final equipment decisions in Washington. However, they can only choose equipment that has been pre-certified by the Secretary of State's office, and so far, no DREs offering voter verifiable paper ballots hold Washington State certification

Almost every day, new information is surfacing and new ideas are being put forth regarding voting equipment. For example, the Leadership Conference on Civil Rights, while among the supporters of DREs, has called for states to make funds available to meet security requirements and to upgrade existing voting equipment. They have also called for convening a national roundtable on voting machine security consisting of "experts in election technology and election reform implementation to analyze issues involving security and reliability of computerized voting machines and determine an appropriate national course of action."

Arguments Pro and Con

With the increasing interest in DREs by election officers across the country, the need for a voter verified paper trail has been vigorously debated.

Proponents of DREs without a paper trail say there is no reason to believe that a well run election system based on DREs will steal your vote. They say modern voting systems like DREs and precinct count optical scan voting systems can be much better than the punch card voting machines and lever machines they are replacing. With DREs, vote totals are recorded on the flash memory device that resides on the hard drive, on a memory card that is removed to compile vote totals at the end of voting, and on a paper tape printed out at the conclusion of voting. Additionally, an image is captured of every ballot cast; these can be printed out if needed for a recount or other verification process.

Proponents say the most significant problem in requiring a voter verified paper trail as part of DREs is that it does not provide a safeguard against the supposed problem: a machine that is programmed to record the incorrect vote. They say that if the machine can be programmed to record the wrong vote, then it can be programmed to print out a misleading confirmation.

Proponents contend that computer specialists with limited experience with election systems have focused narrowly on the DRE machines themselves without taking into account the management systems and safeguards that can protect against tampering, and without acknowledging the problems associated with other voting systems such as punch card machines.

Proponents point out that currently available DREs eliminate the cost of paper, printing and storage for paper ballots.

Proponents contend that fraudulent programming on a scale that would influence the outcome of an election has never been proved. Supporters of paperless DREs say that fraud has been going on as long as there have been elections, no matter what kind of voting method was used.

Proponents point to other drawbacks of providing paper verification – printers that can jam, run out of paper or ink, and add weight to the machine. They say this would complicate setup at the polling site and add another factor to quality control and security.

Opponents of DREs without a paper trail do not object to anything that will make voting easier, or more accessible, but they do worry about ballot security. They believe that equipment improvements for the disabled must not come at the cost of less secure ballots for all voters. Most DREs currently in use lack a voter verifiable paper trail. Although most DREs produce a paper tally, as well as an electronic memory card at the end of the election day, there is no way for each voter to know that his/her choices have been accurately recorded before leaving the voting booth.

Opponents say that without a paper trail, there is no way to hold a meaningful recount, or sample audit. The voter cannot be sure that the ballot summary seen on the touch screen is the same as the one recorded within the computer. Errors in programming, intentional or accidental, are unlikely to be caught without any way to determine true voter intent through a paper trail.

Opponents cite an example of how easy it would be to affect election results in thousands of machines: for instance, one rogue programmer might tell the computer to transfer every fifth vote for the candidate of one party to the candidate of another party, but to do this only on election day between the hours of 9 a.m. and 7 p.m. Such instructions would not be revealed in any logic and accuracy testing. Most DRE machines contain printers for the end of the day tally, and should be able to be modified to print paper ballots. Printers that now produce grocery store or ATM-type receipts seldom jam or run out of paper, and are much more heavily used than the few hundred ballots cast at each polling place on a given day.

Opponents point to two examples of faulty election results that could not be corrected, from areas using DREs without a voter verifiable paper trail.

- "I was the clerk in Precinct 12f in Broward County FL during the Nov. 2002 election. (We) counted 713 people that actually voted in my precinct and the machine total count was 749. We used the ES&S Ivotronic DRE system. I was told by election officials when I returned my supplies that if we

were plus or minus 10% the amount of people that voted vs. the machine counts that we had a smooth election." (In a written report by Ellen Brodsky, confirmed by telephone with study committee member.)

- In 2000, a Sequoia DRE machine was taken out of service in an election in Middlesex County, New Jersey, after 65 votes had been cast. When the results were checked after the election, it was discovered that none of the 65 votes was recorded for either the Democrat or Republican candidates for one office, even though 27 votes each were recorded for their running mates. A representative of the company insisted that no votes were lost, and that voters had simply failed to cast votes for the two top candidates. Without a paper trail, it was impossible to resolve either question. (This report "Who Gets to Count Your Vote?" by David Dill, Bruce Schneier and Barbara Simons appeared in the August 2003 edition of the Association for Computing Machinery (ACM) member publication.)

Opponents note that newly passed requirements in California could speed up the availability of DREs that provide a voter verifiable paper trail, and could even reduce the cost, making it easier for elections officials in other areas to acquire these machines in a timely fashion.

HAVA --Timing and Funding

It has been said that the only part of HAVA that did not change during the two years it was "under construction" were its deadlines for action. Each day that passes, these deadlines seem more unrealistic for three reasons:

1. **Slow rate of federal appropriation of funds that were promised to the states.**
   The Act anticipates $3.9 billion in federal dollars going to the states over a three-year period under a formula that would fund approximately 95% of its mandates. However, the amount funded or currently anticipated for funding only comes to $2 billion.

2. **Unmet federal organizational deadlines within the Act.**
   The Act calls for the creation of a four-person Election Assistance Commission no later than 120 days after its enactment. That deadline was April 28, 2003. These nominations were finally sent to the Senate for confirmation in September, 2003 and were confirmed December 11, 2003.

   Among its very broad responsibilities, the Commission plays a major role in the adoption of voluntary, voting system guidelines and the testing, certification, decertification and recertification of voting system hardware and software. Part of the Commission's charge is to work with a standards board comprised of 55 state election officers and 55 local election officials; a 37 member board of advisors composed of representatives of various national associations representing mayors, counties, election directors, governors, legislatures, etc., and a technical guidelines development committee, chaired by the Director of the National Institute of Standards and Technology. It is unlikely that any of their reports and recommendations will come out before 2005 – too late for any serious equipment changes and certification to be reflected in state purchases due before January 1, 2006, HAVA's absolute deadline.

3. **Growing concern about security issues connected with the current generation of voting equipment which otherwise meets mandated requirements, and the long timeline required to certify newly designed machines.**
   The measure of this concern will depend upon the reader's attitude about the necessity for DRE equipment to provide a voter verifiable paper trail which is still in the development phase by most equipment vendors.

It seems obvious that we have national legislation providing for orderly studies leading to voluntary guidelines, federal funds for the states to upgrade their election equipment, and deadlines that force those equipment purchases to be made before the studies and guidelines can be put in place. If concern over security issues requires new development, even more time will be required.

Since HAVA currently requires that the money not spent by the deadlines be returned, some people have suggested that states be allowed to deposit their federal payments into earmarked accounts and hold them beyond current deadlines until sufficient equipment improvements have been demonstrated and certified. Other people warn that state legislatures might try to use such "banked" funds for other state purposes. Some people suggest that any new equipment purchased now must carry a guarantee that the maker will provide updates at no additional cost. Others suggest eliminating the equipment problem by going to all mail balloting. Still others believe the deadlines must be pushed ahead to more realistic schedules. Although it was hoped that most improvements could be in effect for the 2004 elections, all states have used their option to obtain an automatic extension to January 1, 2006, for most of the plan's elements.

PRESENT VOTING PROCEDURES

Registration

A person registering to vote in Washington state must be a citizen of the United States, at least 18 years old on election day and a legal resident of this state. Voters, who have been convicted of a felony, lose voting rights, but may have those rights restored by a court upon completion of their sentences and payment of court ordered financial obligations. Under HAVA, new registrants must provide their Washington drivers license or ID number, or the last four digits of their social security number when registering. Currently in Washington, it is not necessary to register by political party or declare party membership to vote in primary elections.

Registrations must be changed whenever there is a name or address change. Special forms are available for changes within a county. Re-registration is required if moving to another county.

Voters must be registered at least 30 days in advance of the election, to vote at a polling place. Registration is allowed between 30 and 15 days before an election, if done in a place designated by the county. The voter must vote by absentee ballot for that election.

Mail-in registration forms are available from county election offices, city or town clerks and in some counties at public libraries, fire stations and schools. Most offices of the League of Women Voters also have registration forms. Registration forms are available online in several languages at (www.secstate.wa.gov), and can be mailed in. Voters may also register or transfer their registrations when applying for or renewing driver licenses.

Voters may be placed on inactive status if they fail to vote in two federal elections (four years), and a confirmation notice mailed by the auditor is returned as undeliverable. Other triggers to inactive status are undeliverable absentee ballots, or undeliverable notices of jury duty. The county auditor shall return an inactive voter to active status if the voter:

1) notifies the auditor of a change of address within the county;
2) replies to a confirmation notice with information that he/she continues to reside at the registration address;
3) votes, or attempts to vote, in an election and resides within the county; or,
4) signs any petition for which the signatures are required by law to be verified by the county auditor.

If a voter is not registered in the appropriate book, or is challenged on eligibility to vote, a provisional ballot will be offered. Provisional ballots are kept separate from other ballots until election officials can check on the validity of the voter's registration.

Washington state is currently developing a HAVA mandated statewide registration database. This will make it easier to determine if people are registered more than once within the state. To accomplish this, each county must have a computer that is compatible with the central computer. Currently, there is no interstate cross checking for multiple registrations.

Voting Without Going to the Polls

All Washington state voters can vote by mail.

To vote by mail, a voter must request an absentee ballot from the county auditor or elections department or from the Secretary of State. They can be requested for a single election or on a permanent basis, and no reason is required. Permanent absentee ballots are mailed automatically for every election. Absentee ballots

must be postmarked by election day, or can be dropped off at any polling place. Prior to election day, Washington state voters may go to the county courthouse and vote with an absentee ballot.

Some jurisdictions conduct a total election by mail, called vote-by-mail (VBM). For instance, in Clallam and Ferry Counties, the only way you could have voted in the 2002 election was by mail. Island, Pierce and Thurston Counties have also conducted some elections strictly by mail. (See Chart: Voting and Counting Equipment by County – 2003 in Appendix.)

The League of Women Voters of Oregon led a successful initiative drive to put vote-by-mail on the 1998 general election ballot. The initiative was approved by 67%. Since 1998, all elections in Oregon have been conducted by mail, and voter turnout has increased.

Absentee or vote-by-mail ballots are generally mailed to Washington voters about three weeks prior to the election, and, when voted and returned, must be postmarked no later than election day. Properly postmarked ballots will be accepted for counting until the election is certified, 10 days following the primary election, and 15 days following the general election.

Voting by mail seems to increase voter turnout. More than 72% of Kitsap County's registered voters have elected to become permanent absentee voters. In recent general elections in that County, more than 80% of voter participation has come from absentee voting, while poll place voting sometimes represents as little as 12% of the entire turnout.

Some claim that these methods of voting are "undermining participation in an important civic ritual," that going to the polls is important to our society. Others say that it is making it easier for those people who *would* vote; those who typically don't vote probably won't, no matter what.

Advantages of Voting by Mail

- More people vote.
- The process is simpler for election officials.
- The voter has more opportunity to study the ballot.
- Travel and weather issues don't apply. There is no confusion about where people should go to vote on election day.
- It is less expensive. Conducting elections totally by mail would be less expensive than going to the polls. County auditors must now conduct two different types of elections--one at the polls and one mail-in. Polls require poll worker recruitment, classes, distribution of materials, paychecks, W-2's, and polling place leases. Oregon reports that the cost of conducting all vote by mail elections is one-third to one-half the cost of elections using polling places. In the three special elections conducted in Oregon from 1995-1997, the counties saved more than one million dollars by using vote by mail.
- Voting records are kept more up to date. If a ballot is returned from the post office as being undeliverable, the voter can then be placed on inactive status.

Disadvantages of Voting by Mail

- Ballots are mailed to the voter two to three weeks in advance of the election. Those who vote early could miss out on late breaking information that might change their minds.
- Privacy could be compromised if a spouse or family member pressures the voter to vote a particular way.
- Since mail ballots don't have to be mailed until election day, the wait for their arrival delays the final count.
- Some worry that a person could vote more than once, although all of Washington state's auditors compare signatures on the envelope with a signature on the auditor's computer system.
- More people handle vote-by-mail or absentee ballots, which could result in mistakes, misplaced ballots or fraud.
- Vote-by-mail may not meet HAVA requirements for allowing sight-impaired and disabled voters to vote in private.

Ballot Counting

Polling Place Ballots

The election Inspector at each polling place is responsible for collection and delivery of ballots or ballot records to a central point for counting. Punch card ballots are counted at election headquarters; if optical scan ballots are counted at the polling place, the memory card within the scanner is delivered to election headquarters. Where ballots are counted at the polling place, the results are posted when the polls close.

Absentee Ballots

Absentee ballots are required to be mailed to the voter 20 days before the election. Contract mail service is used in some counties. Absentee voters place their ballot in an anonymous security envelope, then in the outer mailer envelope signed by the voter and delivered either to a post office, or directly to a collection location operated by the elections office, including polling places on election day. Ballots returned by mail are sorted and delivered to county election workers. The signatures of the voters on the outer envelope are verified for valid registration before the envelopes are opened. Envelopes with invalid signatures are set aside for follow up. If there is no signature, or an invalid signature, the voter may be notified and allowed to correct, if time permits. In King and Snohomish Counties, the opening of the inner envelope and examination of ballots is done in the same location by a different work crew.

Ballots that are not marked or punched in a way that can be read by the counting device are set aside. If time permits, the voter may be notified and allowed to correct the ballot. If the intent of the voter is clear, the ballot may be remarked or enhanced by election officials; if the ballot cannot be read because it is torn or blotted, a duplicate ballot may be created. Snohomish County does not enhance ballots, a duplicate ballot is marked and the original kept. These actions take place in the presence of observers for the major political parties - in 2003 these were the Democratic, Libertarian and Republican parties. (In King and Pierce counties, the party observers are paid.) This process takes place as ballots are returned. Actual counting of absentee ballots takes place no earlier than election day. Absentee ballots not returned by mail may be taken to any polling place on election day.

Testing Equipment

The Secretary of State is required to conduct a pre-election and post-election system test for functional errors in the counting system. This Logic and Accuracy (L & A) test is done in the presence of major party observers. The L & A test may find some system errors, but does not assure the absence of all errors. There are various procedures conducted at the polling place and at headquarters to assure that the number of ballots voted, collected and counted agrees at each step. After they are counted, ballots are kept in sealed boxes and stored in a secure location for a prescribed period of time, 60 days for state and 22 months for federal elections.

Recounts

State law requires a recount of voting results if the vote on a ballot measure, or between two top candidates, is one-half of one percent or less and the margin is 2,000 votes or less. If the margin is one-fourth of one percent and 150 votes or less, the recount must be done by hand, a procedure only possible if original paper ballots actually exist. A candidate or political party may request a recount at his/her or its own expense if the margin is less than one percent. A machine recount takes precedence over the original count; a hand recount is the ultimate control. A recount of up to three precincts may be performed on election night if the party observers agree on which precincts. Anyone can petition for a recount at a cost of 15 cents per ballot for a machine recount and 25 cents per ballot for a hand count.

Recent debates about election equipment frequently refer to audit trails. Proponents of audit trails point out that having the ability to audit the accuracy of election equipment is of little value if such audits are not actually conducted. No matter what kind of voting equipment is used, they believe random manual recounts must be conducted with enough frequency to make it possible to detect error or fraud even when election contests are not close enough to trigger automatic recounts. Several states have such a requirement, but Washington does not. California requires that one percent of its ballots be randomly audited. A proposed HAVA amendment would require a mandatory surprise recount of half a percent of all votes for all federal offices. Such audits would increase the cost of elections.

Canvassing Board and Certification of Elections

The canvassing board in each county consists of three elected officials or their designees: the county auditor, the prosecuting attorney and the chair of the county governing body. This board is responsible for examining special ballots and questionable absentee ballots. Once these have been examined and tallied, the combined results represent the official count, and the election is certified. This process is open and public, with the political parties having observers present. Special (or provisional) ballots are those issued to a voter whose registration was questioned or challenged. The date for certification is set by state law to occur 10 days after a primary election and 15 days after a general election.

CONCLUSION

Election reform is receiving nationwide attention. Care must be taken, however, that changes that are ultimately adopted do not create new problems, or have unintended consequences. It is hoped that the information provided in this study will enable us to better evaluate the new equipment and procedures that are rapidly coming our way. All Americans have a stake in maintaining the integrity of our election system.

Appendices

BASICS OF ELECTRONIC VOTING TECHNOLOGY

Any model of voting equipment incorporates hardware, most models have some software, and there are many variations of both. All models for voting must have some capability of being set up with the proper ballot choices by the county elections office of the jurisdiction, receiving the ballot choices from the individual voter, and transferring data to a central collection point at the elections office. All models for vote-counting (tallies) must have the capability of receiving information from the dispersed voting machines, calculating the interim and final vote totals, and reporting the results to the elections officials and to the public.

The equipment can be installed and used at a bewildering array of voting locations, including traditional polling places on election day, early voting locations in public places before election day, the elections office, and any computer capable of networking via communications means, such as the Internet, intranets, or private direct channels (wire or wireless).

Hardware for voting can be as small as a customized box or plate, or as large as a fully functional general purpose computer with a screen, keyboard, mouse, printer and networking connection such as a modem.

Hardware for voting must have a means for the voter to receive information (the ballot and instructions) and to give information (the choices – literally, the votes). It must also have similar in-out capabilities for the elections official, to signify the pre-testing, the start and the end of the voting, and perhaps other functions. Most readers are familiar with keyboards, pointing and selection devices (a mouse and its variants), display screens, printers, speakers and microphones, panels or control boxes with push buttons (like game controllers and joy sticks).

Hardware must have two kinds of memory components for these functions, and may have a third kind. Memory is the storage element of the machine, and storage happens in two ways – permanent or temporary.

Permanent memory storage has content that is fixed when the component is manufactured, and cannot be altered later. **PRAM memory storage** (programmable random access memory) may only be altered with advanced methods, not accessible to the casual user.

Temporary memory storage has two variants. Making an analogy to a workshop – they are a supplies cabinet and a workbench. **Disk storage** (commonly called hard disk or floppy disk or a CD) is the supplies cabinet. Files reside there in a more or less stable manner (they are ”saved” on the disk.) **RAM storage** (random access memory) is the workbench. Data is brought from a disk onto the RAM for step-by-step processing, just as a craftsman assembles a product by adding component pieces taken from the workshop storage bins or shelves, following the rules set out for the gadget being built.

Software (programs) for voting must be installed in a computer to enable it to perform the desired operations. Software is the set of instructions for calculations, input, output and all the housekeeping activities. Software, broadly considered, includes both the source code (as written by, and often kept secret by, the developer) and the executable code (which is the part saved on users’ computers). Following the workshop analogy, software is the set of instructions to the operator, like: “**Get** piece A from storage; **Put** it on the workbench, etc, (until all pieces are in place); then **Put** the product in the finished storage (record the result).”

Software and Hardware marriage – Programs may be incorporated into the voting location equipment and the vote counting equipment by a variety of technical options, which are not relevant here, except for security factors. There are several ways that the software is placed within the hardware – on permanent memory storage, on fixed or floppy disks, on a CD, with removable media cards, or via networking with a communications means such as the Internet, intranets, or private direct channels (wire or wireless) or even by keyboarding or other means.

GLOSSARY

Absentee ballot -- Ballot requested by a voter for casting a vote before an election by either voting in person or by mail before Election Day. In Washington, it can be requested for single elections or on a permanent basis.

Audio ballot -- Ballot presented through ear phones to sight-impaired people. The voter follows spoken instructions, and proceeds through the process and election choices by means of a scroll or distinctively shaped buttons. May be a function of a DRE or of a Ballot Generator.

Audit trail -- A record of individual votes cast, which can be examined by trained personnel to check the accuracy of the vote tally.

Ballot -- The official list of all candidates and issues upon which a voter is entitled to vote at an election. Or, a facsimile of the contents of a particular ballot, whether printed on a paper ballot or ballot card or as part of a voting machine or voting device. Or, as of 1990, when the definition was expanded, a physical or electronic record of the choices of an individual voter in a particular election.

Canvassing Board -- County board that reviews ballots, subtotals and cumulative totals to determine the official returns of and to certify an election. Its members are the county auditor, county prosecuting attorney and chair of the county legislative authority, or their deputies.

CD -- Compact disk. A disk on which data or programs of any type or content is recorded and read by optical means.

Certified by the federal government -- Voting devices and systems, which have met the voluntary standards and passed certain testing of functioning under the auspices of the Federal Election Commission. The new DRE voting devices and systems will be subject to the voluntary standards and testing to be developed in the future by the new Election Assistance Commission established by HAVA. For voting systems, HAVA requires that they must: produce a permanent paper record with a manual audit capacity; comply with the established error rate; provide for a legal vote as defined by each state; and, provide alternative language accessibility.

Certification by the Washington Secretary of State -- The state examination, and possibly testing, of a voting system to determine its compliance with state laws, regulations, and rules and any other state requirements for voting systems. In Washington, an approved voting device has to provide: secret voting; the appropriate lists of candidates and issues; accurate registration of all votes; protection against voting for more than one candidate (except President and Vice President); and it must have been tested, certified, and used in at least one other state or election jurisdiction.

Computerized voting -- Casting votes in an election by using computers.

Data accuracy -- The system's ability to process voting data absent errors generated by the system internally.

Data integrity -- The invulnerability of the system to accidental intervention or deliberate, fraudulent manipulation that would result in errors in the processing of data.

DRE - Direct Recording Electronic voting equipment -- Electronic devices that display the ballot on a screen, which the voter uses to cast the vote by touch screen, push buttons, or similar method. There is provision for write-in votes, the use of alternative languages, and auditory ballot and instructions when desired by the sight impaired. The voter's choices are stored via a memory cartridge, diskette or smart-card, added to the choices of all other voters, and tallied electronically.

Electronic memory card -- A smart card, which holds the records of a DRE

Enhanced ballot -- see Re-marked ballot

Hacker -- One who uses proficient programming skills to gain illegal access to a computer

HAVA -- Help America Vote Act

Mail vote - Election by mail, or VBM – vote-by-mail -- An election where all ballots are mailed to eligible voters and no voting is conducted in person at a polling place. Authorized by the Washington Secretary of State for certain small size precincts, or for certain types of elections.

Optical scan ballot -- A paper sheet printed with outline symbols corresponding to the appropriate ballot for the election, which the voter marks by choosing the symbols to fill in with a suitable pencil or pen, and which is collected at the polls or by mail and read by special machines.

Paper trail -- A paper record, not including voter names, of individual votes cast that can be examined by lay personnel to check the accuracy of the vote tally.

PIN -- Personal Identification Number.

Process control -- Involves systems that control and operate such diverse activities as filling bottles, making plywood, treating sewage and waste, controlling power plants, manufacturing drugs, or even cooking and canning soup. Today, almost all of manufacturing or treatment processes are using programmable computer devices involving software and digital hardware.

Proprietary -- Exclusively owned, private property.

Provisional ballot, or Special ballot -- Ballot used by a voter whose name does not appear on the official voter registration list. It is held separately and counted later only if the voter's eligibility is established.

Registration data base -- A list of all registered voters. HAVA requires a state-wide registration data base.

Re-marked ballot (Enhanced) -- A paper ballot that is clarified by election staff during tallying when the mark made by the voter cannot be read by the tally system. The intent of the voter must be clear to the committee of election staff and to observers from each major political party.

Security of the ballot -- Secret vote, recorded as intended and tallied as recorded.

Smart card -- Card programmed electronically with information to be used in an electronic operation. In the case of DRE voting, the voter inserts a smart card into the machine in order to be matched with the appropriate ballot. After voting is over, other smart cards are used in the tally process.

Software -- Programs and routines that control the functioning of computer hardware and direct its operations.

Source code -- Instructions written by a programmer in computer language for the computer to perform a certain series of actions. Source codes are like hidden recipes and are the bases of programs such as are sold at computer stores.

Spoiled ballot -- A ballot marked in error by the voter, which is turned in to poll officials at the polling place and replaced by a new ballot.

Touch screen -- Input method that the voter uses by touching a designated spot on the screen for each procedure. At the appropriate place in the sequence of the procedures, the vote is cast by touching a "Finished" spot. May be a DRE or a Ballot Generator.

Vote by mail. VBM -- Any vote cast by mailing a ballot. See Absentee ballot and Mail vote.

Voter verifiable audit trail -- A paper record of each choice made by the voter on the ballot that can be checked for accuracy by the voter before the vote is officially recorded by the voting system, and that can be retained by election officials for recount or audit purposes.

Web page -- A document on the World Wide Web. It is often hyperlinked to other documents on the Web.

Website -- A set of interconnected web pages prepared and maintained as a collection of information by a person, group, or organization.

VOTING AND COUNTING EQUIPMENT BY COUNTY - 2003

County	Locations	Manufacturer	Models	Year	Type	Number of Units	Number Polling Places
Adams	Central	ES&S	150	1996	Optical Scan	1	3
Asotin	Central	DIS/BCCS	Votomatic	1960's	Punchcard	83	14
Benton	Polling Place	"various"	"various"	1971	Punchcard	450	27
Chelan	Polling Place	Diebold	Accu-Vote	1995	Optical Scan	15	7
Chelan	Central	Diebold	Global	1995	Optical Scan	1	
Clallam	Central	CES/BCCS	CES card readers	1976	Punch card	2	**VBM**
Clark	Polling Place	IBM	Votomatic 228	1969	Punchcard	750	67
Clark	Central	BCCS/Webb	"N/A" (?)	1969	Punchcard	2	
Columbia	Central	AIS	150	1995	Optical Scan	1	1
Cowlitz	Central	ES&S	550	1985	Optical Scan	2	13
Douglas	Central	ES&S	150 tabulators	1985	Optical Scan	2	9
Ferry	Central	ES&S	150	1997	Optical Scan	1	**VBM**
Franklin	Central	Sequoia	DATAVOTE/ TEAMWORK	1992	Punchcard	100	8
Garfield	Central	ES&S	AIS 150	1998	Optical Scan	1	**VBM**
Grant	Central	ES&S	550	2000	Optical Scan	1	33
Grays Harbor	Central	ES&S	150 & 550 & M100	1997	Optical Scan	1	45
Island	Central	BCCS/Webb	LRC Ballot Reader	1998	Punchcard	1	16
Jefferson	Central	ES&S	Optech 4-C, Model 200	1992	Optical Scan	1	15
King	Polling Place & Central Office	Diebold	GEMS	1998	Optical Scan	545	*545*
Kitsap	Central	ES&S	Optech 04C	1995	Optech Scan	3	28
Kittitas	Central	ES&S	AiS 315	1990	Optical Scan	1	11
Klickitat	Polling Place & Central Office	Diebold	GEMS	1994	Optical Scan	15	11
Lewis	21 precincts	BCCS	Votomatic	1976	Punchcard	88	21
Lewis	58 precincts	BCCS	Votomatic	1976	Punchcard		**VBM**
Lincoln	Central	LRC	DIS	1996	Punchcard	1	7
Mason	Central	BCCS	BCCS-7	1990	Punchcard	1	32
Okanogan	Polling Place	CES	Votomatic III	1979	Punchcard	150	9
Okanogan	Central	BCCS	Counting Software	1979	Punchcard	2	
Pacific	Central	BCCS/Webb	228	1976	Punchcard	2	20
Pend Oreille	Central	AIS/ES&S	AIS115	1992	Optical Scan	1	**VBM**
Pierce	Polling Places	ES&S	Optech III-P Eagle	1992	Optical Scan	130	96
Pierce	Central	ES&S	Optech IV-C	1992	Optical Scan	4	
San Juan	Polling Place & Central Office	Diebold	GEMS Accuvote	1993	Optical Scan	9	6
Skagit	Central	ES&S	550	1999	Optical Scan	2	46
Skamania	Central	ES&S	115	1984	Optical Scan	1	**VBM**
Skamania	Central	Hart Intercivic	ballot tabulation	2003	Optical Scan	1	
Snohomish	Polling Place	Sequoia	Sequoia EDGE	2002	**DRE**	1000	
Snohomish	Central	Sequoia	Sequoia 4Cs	1995	Optical Scan	8	174
Spokane	Polling Place	ES&S	M100	2001	Optical Scan	135	93
Spokane	Central	ES&S	650'S	2001	Optical Scan	2	
Stevens	Central	ES&S	BRC 600 count	1988	Punchcard	1	24
Thurston	Polling Place	ES&S	Votomatic	1999	Punchcard	551	70
Thurston	Central	ES&S	Central Count	1999	Punchcard	2	
Wahkiakum	Central	ES&S	150	1997	Optical Scan	1	11
Walla Walla	Central	AIS (ES&S)	315	1992	Optical Scan	1	28
Whatcom	Polling Place	Various	Various	1979	Punchcard	320	42
Whatcom	Central	BCCS	DIS - BCCS V 7	1979	Punchcard		
Whitman	Central	ES&S	150	1996	Optical Scan	2	19
Yakima	Polling Place	Sequoia	DataVote ballots	1986	Punchcard	200	36

Sources: Auditors' Office of each County; Compiled by Marian Beddill

STUDY COMMITTEE RESOURCES

CalTech/MIT Voting Technology Project, a report: "Voting - What Is, What Could Be", July 2001
http://www.caltech.edu/Reports/index.html (look at "Fast Facts")

Citizens' Elections Oversight Committee (King County): Background, Mission and Responsibilities

Civil Rights Coalition for the 21st Century. Relevant and up to the minute civil rights news and information.
http://www.civilrights.org

Dill, Professor David, computer scientist and originator of the Resolution which has been signed by over 1,400 other computer scientists as well as numerous political scientists, organizations and concerned citizens.
http://www.verifiedvoting.org/resolution.asp

Federal Election Commission. Information on HAVA: text, dates, new commission, boards and committees. No summary or glossary. Select "Help America Vote Act 2002".
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Federal Election Commission: Glossary. Used Google. Click "Contain the term", then, Voting System Standards.
http://www.fec.gov/pages/vss/v1/v1aa.htm

Hansen, Ellen: Final Report to the King County Council;
A Review of the Election Process
Addendum to Final Report, August 2003

Hansen, John Mark: "Task Force on the Federal Election System" July 2001

HAVA text and summary from Legislative Information on the Internet. Route for HAVA summary: Bill Summary and Status; then 107 (# of Congress); (write) HR 3295 or Help America Vote Act; then, CRS Summary
http://www.thomas.loc.gov

King County Citizen's Election Oversight Committee member from LWV/Seattle

King County Elections Division:
Calendar/Checklist for 2003 Fall Elections
Election Official Quick Reference Guide/Flip Chart. (Poll worker guide, revised April 2001)

League of Women Voters Bellingham/Whatcom; study: Voting Patterns in Whatcom County Since 1992
http://www.lwvwa.org/bellingham/

League of Women Voters of Washington Education Fund: "Absentee Voting, Vote: The First Steps" 1996

League of Women Voters of Washington Education Fund: "An Evaluation of Major Election Methods, 2002"

League of Women Voters US. This site displays the national League's statement regarding DREs and has links to Cal Voter, and other LWV sites.
Click "contain term" to see Accessible Society. Cal Voter, and LWV Cincinnati (good summaries)
http://www.lwv.org/where/promoting/votingrights_hava_drem.html

LWVUS National Voters
Dickson, Jim. "Accessible Voting for All". January/February 2003 p 24
Senecal, Jeanette. "HAVA: Make It Easier to Vote", May/June 2003 p.14

National Association of State Election Directors. On the Home Page there is a link to the certification process.
http://www.nased.org

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Secretary of State, Washington: King County Election Review (2002 Primary and General Election)

Washington Administrative Code (WAC): Title 434 Sec State. 434-208 to 434-381
http://www.leg.wa.gov/wac

Washington State HAVA Planning Committee, member from LWV/Seattle

Contacts by Study Committee Members

Auditor for Kitsap County, WA, Karen Flynn: Interview

Director of Electors, Oregon, John Lindbock: Telephone Interview

DRE voting machines presentation by vendors, Pierce County: Observation

Election in Snohomish County, November 2003: Observation

Secretary of State, Oregon, Bill Bradbury: Telephone Interview

Testing of election equipment, King County: Observation

REFERENCES FOR FURTHER INFORMATION

Black Box Voting, by Washington state writer, Bev Harris. The entire book can be downloaded from:
http://www.blackboxvoting.com

Center for Voting and Democracy (nonprofit, nonpartisan). Has a great on-line library
http://www.igc.apc.org/cvd

Common Cause. Nonpartisan citizens' organization whose goal is to ensure open, honest, accountable and effective government at the federal, state, and local levels.
http://www.commoncause.org

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http://www.detnews.com/2002/politics/0310/31/a06-312561.htm

Dill, Professor David. This site contains links to many sources including the petition and his email newsletter.
http://www.verifiedvoting.org

Election Center, a nonprofit organization dedicated to promoting, preserving, and improving democracy. Its members are government employees in voter registration and elections administration.
http://www.electioncenter.org

Election Reform Information Project. This non-partisan, non-advocacy research effort is supported by The Pew Charitable Trusts and administered by the University of Richmond. It produces a free weekly email newsletter with up-to-the-minute national news on election reform.
http://www.electionline.org

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http://www.holt.house.gov/issues2.cfm?id-5996

Mercuri, Dr. Rebecca, considered a leading independent expert on electronic voting technology. Huge web site and many links.
http://www.notablesoftware.com/evote.html#Egroup

Secretary of State, Washington. On the Home Page, see the report, The Electronic Vote, then try "Elections and Voting," then More Information and Glossary.
http://www.secstate.wa.gov

Legal opinion: Re HAVA and Americans with Disabilities Act, and contemporaneous paper record not accessible to sight-impaired. (Used Google and "contain the term")
http://www.usdoj.gov/olc/drevotingsystems.htm

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