



Hard Facts about Soft Voting

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Trusting Software with Money



Diebold ATM

"Reduce risk exposure with enhanced automated teller machine (ATM) modules incorporating the latest in fraud-preventive solutions."

Trusting Software with Money



Software Slot Machines

Trusting Software with Life



Software-guided Surgery



"Fly-by-wire" Avionics

Why not trust software with votes?



1 Start: Insert Card
Insert voter access card into slot at right of screen. Card should be face up with the arrow first. Push card firmly until you hear a click.

2 Read "Instructions to Voters"
Touch "LargeText" to increase text size.
Touch "High Contrast" to view a black and white ballot.
Touch "Next" to access ballot.

3 Select Candidates or Questions
Touch the box next to the candidate or question of your choice. To change or cancel your selection, touch the box again.
Touch "Next" to advance the ballot page.
Touch "Instructions" to go back to the instructions page.
Touch "Previous" to go to previous screen.

4 Review or Cast Ballot
On "Summary Page," review your choices. If you do not fully vote a contest, the "Vote Card" will appear in red.
To go back, Touch a contest or Touch "Previous."
Touch "Cast Ballot" when ready to record your vote.
Once your ballot is "cast," you may not vote again.

5 Finish: Remove Card
Remove the voter access card and return it to the election judge.

Maryland VOTES
In Touch With The Future



Accountability and Auditability



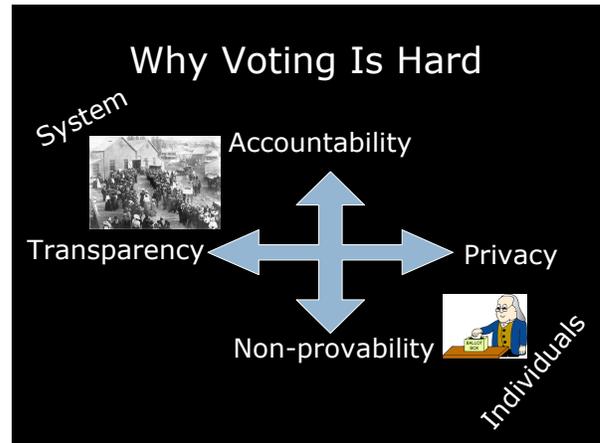
Serious Regulation



Trained Operators



Gradual Deployment and Close Monitoring



How did we get here?



- ## HAVA 2002
- \$3.8B for states to replace punch card and lever machines
 - To receive money, state must produce a plan to replace machines by first 2006 election
 - Replacement machines must:
 - Notify voters of overvotes
 - Be accessible to disabled (including blind) voters (at least one per precinct)

HAVA Paper Trail?

SEC. 301. VOTING SYSTEMS STANDARDS.

- (a) Requirements.--Each voting system used in an election for Federal office shall meet the following requirements:
- (2) Audit capacity.--
- (A) In general.--The voting system shall produce a record with an audit capacity for such system.
 - (B) Manual audit capacity.--
 - (i) The voting system shall produce a permanent paper record with a manual audit capacity for such system.
 - (ii) The voting system shall provide the voter with an opportunity to change the ballot or correct any error before the permanent paper record is produced.
 - (iii) The paper record produced under subparagraph (A) shall be available as an official record for any recount conducted with respect to any election in which the system is used.

Software Voting (DRE)

- Direct-Recording Electronic voting machine
- Records votes as bits in memory
- Prints out paper at end of election (vendors claim this satisfies HAVA)

Good things:

- Unambiguous record
- Prevents overvotes
- Audio interface for blind



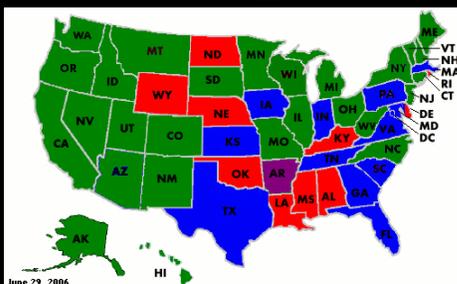
WVote™ VOTING MACHINE
INSTRUCTIONS FOR CASTING A WRITE IN VOTE

Step 1:	Step 2:	Step 3:	Step 4:
<p>SELECT WRITE IN</p> <p>To cast a write in vote, LIGHTLY touch the Write In box, which is located at the bottom of the Officer's list of candidates on the ballot screen.</p> <p>A Write In Keyboard screen will immediately be displayed.</p>	<p>TYPE NAME OF WRITE IN</p> <p>Spell out the name of the person you wish to write in by LIGHTLY touching the letters on the keyboard. The name will appear in the Name field which is located near the top of the keyboard.</p> <p>When you have completed entering the name, LIGHTLY touch the Enter button, which is located in the lower right-hand side of the screen.</p> <p>A Write In verification screen will be displayed.</p>	<p>VERIFY NAME OF WRITE IN</p> <p>To change or cancel your Write in vote, LIGHTLY touch "No".</p> <p>OR</p> <p>If you are satisfied with your Write in vote, LIGHTLY touch "Yes" to return to the Ballot screen.</p>	<p>BALLOT SCREEN</p> <p>The name of your write in candidate has been added.</p> <p>A red checkmark will appear and your write in candidate's name will be highlighted in red.</p> <p>When you are satisfied with ALL your selections, LIGHTLY touch NEXT, which is located in the lower right-hand side of the screen to continue.</p> <p>Review your write in vote on the summary screen.</p>

Hopkins/Rice Report

- July 2003: Tadayoshi Kohno, Adam Stubblefield, Avi Rubin, Dan Wallach
- Analyzed code for Diebold AccuVote-TS DRE voting machine
 - Many security vulnerabilities
 - Ridiculously poor software quality
 - 50,000 lines of code
- Maryland hires SAIC to analyze machines (concludes: "high risk of compromise")

US Voting Laws

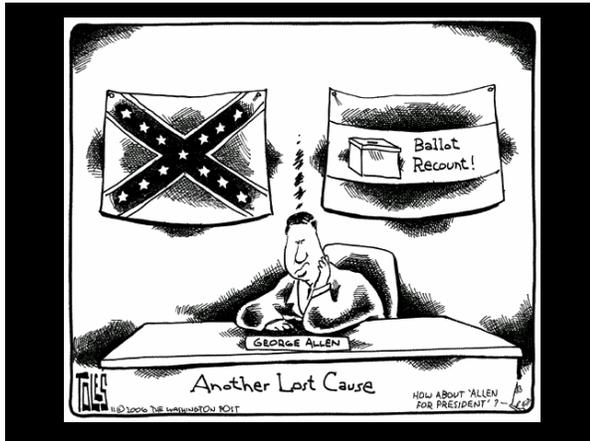


■ Paper ballot required (27)
 ■ Legislation Proposed (12)

<http://verifiedvoting.org/article.php?list=type&type=13>

Virginia 2006

- 17 different types of equipment used statewide
 - Albemarle: Sequoia AVC, EDGE
 - Lynchburg: Diebold AcuVote
 - Montgomery, Roanoke: WinVote
- No paper trail
- "Recount" means print out the totals again



Virginia 2006



Voting machines in Alexandria, Falls Church and Charlottesville cut off Jim Webb's last name ("James H. 'Jim'")

"We do have people complain and say they don't get it, I completely understand what they're saying, but it's not something I can control." – Sheri Iachetta, Charlottesville general registrar

"If I have to personally get on a plane and bring Hart InterCivic people here myself, it'll be corrected." – Jean Jensen, Secretary of Virginia State Board of Elections (promising to have it fixed by 2007)

Sarasota, FL 2006

- Christine Jennings (D) lost by 373 votes out of 237,861
- 18,000 voters no vote (13% compared to 2% in other counties)
- Hundreds of voters claim to have selected Jennings, but nothing selected on review page
- "Recount" underway

Pennsylvania 2006

- Polling hours extended due to machine problems
- Santorum (R) lost senate election
- Republican State Committee claims 27 counties had voting equipment malfunctions
 - Changing votes from Santorum to Casey

How do I know my voting equipment is accurate?

Under the Code of Virginia, the State Board of Elections must approve any mechanical or electronic voting system or equipment before it can be used by any locality.

Each system must successfully complete three distinct levels of testing:

1. Qualification testing (testing of hardware and software that may be conducted by Independent Testing Authority);
2. Certification testing (to ensure it meets all applicable requirements of the Code of Virginia); and,
3. Acceptance testing (conducted by the locality to assure it meets their needs and is identical to the certified system).

www.sbe.virginia.gov/cms/Election_Information/Election_Procedures/Index.html

"Independent" Testing

- Done by ITAs paid by vendors
- No vulnerability analysis
- No source code analysis

"Program testing can be used to show the presence of bugs, but never to show their absence!" – Edsger W. Dijkstra

(Note: the machine in the video passed all the tests just fine...)

Joint Subcommittee Studying Voting Equipment

- Initiated in 2004
- Bill to add 2 citizen members with "computer security expertise" (Feb 2005)
- 5 Meetings (through Jan 2006)
 - Remarkable citizen participation
 - Testimony from Justin Moore, Paco Hope



Virginia Bills

- SB424 (Devolites-Davis), HB1243 (Tim Hugo):
 - Requires voter-verifiable paper record
 - Random audits
 - Disclosure of machine source code
 - No wireless capability
- Proposed in January 2006, held over to 2007 legislative session

The core of our American democracy, members, is the right to vote. And implicit in that right is the notion that that vote be private, that vote be secure, and that vote be counted as it was intended when it was cast by the voter. I think what we're encountering is a pivotal moment in our democracy where all that is being called into question - the privacy of the vote, the security of the vote, and the accuracy of the vote. It troubles me, and it should trouble you.

...
You know it's very interesting that, recently when I made the decision to require a paper audit trail, a number of county officials very respectfully denounced them and a number of vendors, many of whom are represented behind me, said it wasn't necessary, said their machinery was secure. At the same time, a number of those within the community, the voter advocacy community, have oft times alleged Armageddon if we don't make immediate changes. Well you know, I don't know who's right. I'm like the average voter. I don't know. **And because I don't know, I want the confidence that a paper trail provides.**

Kevin Shelley
(then Secretary of State of California)

Questions

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