The Trials and Tribulations of Electronic Voting

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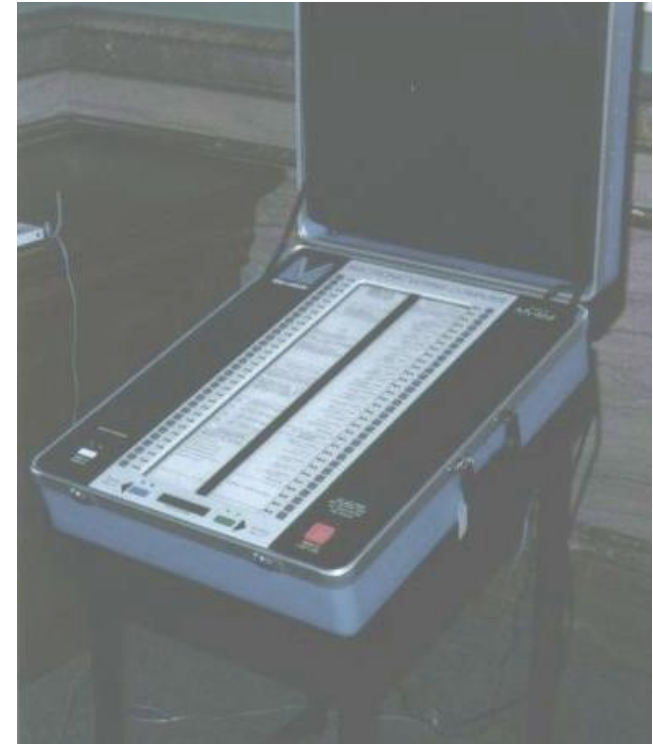October 27, 2005, Columbia, South Carolina

What is E-voting?

Voting using any electronic mechanism

Not just touch screen
voting machines

Machine-counted paper
ballots are a kind of e-voting

Even punched cards were
usualy tabulated by computer!

Scanned Paper Ballots

Oldest type of E-voting
Emerged in the 1960's

- Punched Cards
- Optical Mark-Sense
  Ballots

OFFICIAL BALLOT
Random County, Somestate

INSTRUCTIONS: To vote for a candidate, fill in the oval to the left of the name. Use pencil or black ink!

PRESIDENT
(vote for one)

○ G. Washington

○ A. Lincoln

○ _____
(write in)

U.S. CONGRESS
(vote for one)

○ S. Rayburn

○ J.G. Cannon

○ N. Longworth

○ _____
(write in)

Advantages: Voter verification
Disadvantage: Voter mistakes

Punched Card Ballots

K. Dougan, U.S. Patent 440,545, Nov. 11, 1890

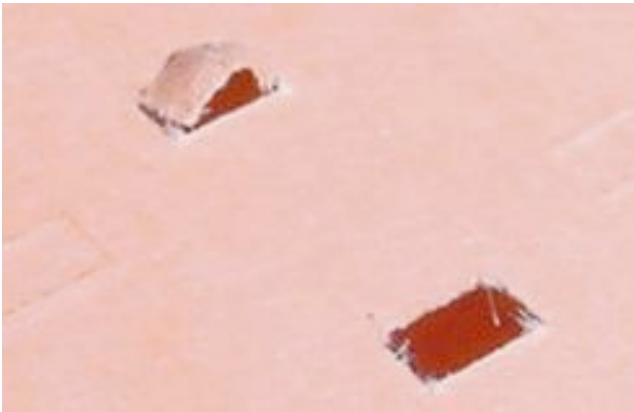J. P. Harris, U.S. Patent 3,201,038, Aug. 17, 1965

First Use
- November 1964 General Election,
- Monterey, San Joaquin CA; Fulton, DeKab GA.

Problems with Punched Cards

- Chad everywhere, but few Chadologists
- Delayed Count = Opportunity to Manipulate
- Voter Verification Failure

Central-Count Mark-Sense

H.R. Keith, US patent 2,750,108, June 12, 1956
Norden Vote Talley System (not patented?)

First Use
- 1962, Kern City, CA.

Widely used for absentee voting
- Origins in Educational Testing

Problems with Central Count

- ## Absentee ballots handled by many people
  Each may add marks, mostly smudges

- ## Delayed Count = Opportunity to Manipulate
  Secure ballot transport and storage is not easy

- ## Voter Training to make correct marks
  Which of these marks ought to count?
  Which ones do the scanners actually count?
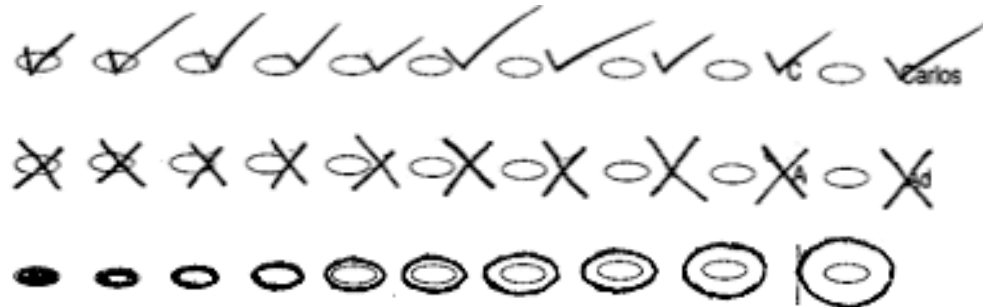
Precinct-Count Mark-Sense

U.G. Iles, US patent 500,001, June 20, 1893
G. Holzer, US patent 3,218,439, Nov. 16, 1965

First Use (partial precinct-count)
- 1964, San Diego, CA.

With advent of microprocessor
- Cost low enough for one per precinct
- Direct insertion of ballot by voter
- Return ballot to voter if blank
- Return ballot to voter if overvoted

Problems with Precinct Count

- Direct insertion of ballot in box by voter
  Recalls memories of laminated tissue ballots in 19th century

- Voter confusion when ballots returned
  Pollworker must explain problem without seeing ballot

- Masses of paper to distribute and securely store
  The bane of election officials everywhere

Direct-Recording Electronic

F.S. Wood, US patent 616,174, Dec. 20, 1898
McKay, US patent 3,793,505, Feb. 19, 1974

First Use of the Video Voter
- 1975, Streamwood and Woodstock, IL.

With advent of microprocessor
- Cost low enough for one per precinct
- Direct insertion of ballot by voter
- Return ballot to voter if blank
- Return ballot to voter if overvoted

Problems with DRE

- No fallback in case of machine failure
  Mechanical lever voting machines were no different

- Opaque ballot counting
  Mechanical lever voting machines were no different

- Administrators don't understand the technology
  With mechanical voting, county's technicians understood it
  With DRE, county's technicians are largely in the dark

- Counties at the mercy of vendors' technicians
  Are we outsourcing democracy?

Elections are hard because

Two requirements conflict:

- Secret Ballot
  You can't disclose your vote
  Nobody can see your vote

- Transparency
  Anyone can observe that all votes counted correctly

AND
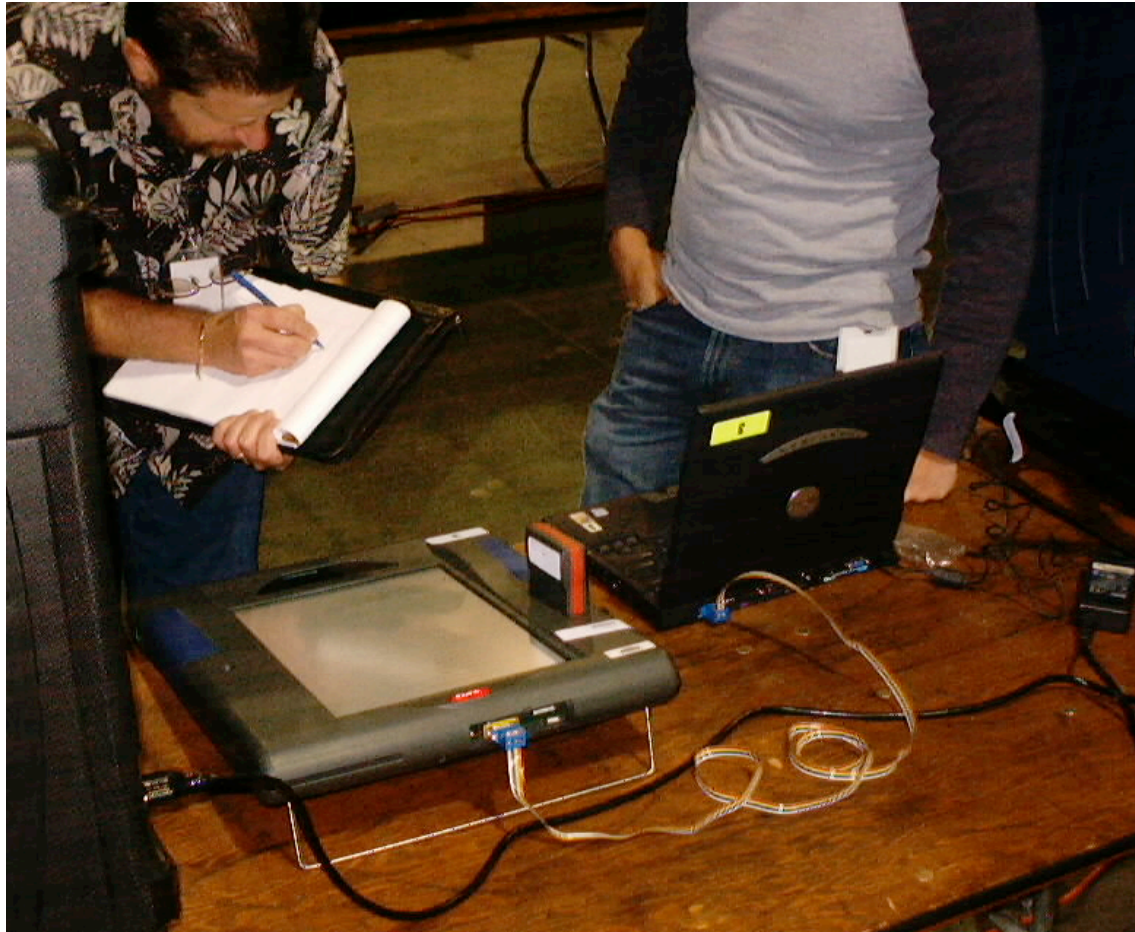
Elections are run by temps –

2 election workers per 100 voters, on average

Complete Transparency

George Caleb Bingham's *The County Election*
Depicts election of 1846 in Saline MO

Complete Opacity

What are these people doing?
Miami-Dade County, August 2004

Voter Verified Paper Ballots

J.A. Gray, US patent 620,767, Mar. 7, 1899
Sequoia VVPT printer retrofit

First state to require use
- Dec. 2003, Nevada

Win back transparency by:

- Print paper copy
- Voter may check correctness
- Audit mechanism
    by checking paper

The Importance of Hand Recounts

- If recounts always done by machine,
  recount cannot discover machine failure

- Therefore, do some recounts by hand
  A reasonable rule [from Ohio]:
  Count 3 percent, at random, by hand;
  If this finds no discrepancies,
  count the rest by machine

- Without hand recounts,
  paper ballots are no better than DRE

The Importance of Auditing

- If you only recount controversial or close elections
    You will not catch the most competent thieves
    You will miss many careless errors

- Therefore, do routine recounts of random precincts
    A reasonable rule [from California]:
        After each election, pick random precincts
        until you have 1 percent of the ballots, then
        do hand recounts of those precincts.

The Help America Vote Act of 2000

- Proposed in early 2001
- Died in Committee (we all thought)
- Passed very quickly, fall 2002

Why did it pass?

The August 2002 primary in Florida.
- New E-voting systems replaced punched cards
- Change was done to avoid a repeat of 2000
- Change was planned very badly!

Good things about HAVA

- Eliminated punched cards

- Eliminated mechanical voting machines

- Restrict central-count scanning to absentee ballots

- Created emphasis on handicapped accessibility

Bad things about HAVA

- Created a Byzantine administrative structure
  Dominated by elected officials (NASED, NASS)
  Very little requirement of technical competence
  Charged with overseeing voting system standards

- Spent millions of dollars on new voting systems
  Before any new standards could be set

- Badly underfunded and seriously delayed
  Except for purchases of new machines

- Forced massive upheaval in voting system market

This Fall, I expect:

More of the same:
- Widespread patterns of clerical errors
- Scattered fraud, mostly in local political machines

With problems compounded because

- 1/3 of the country will be voting on unfamiliar machines in a single election – unprecidented!

- Many jurisdictions will be using mixed systems to meet accessibility requirements of HAVA.

Emergency Paper Ballots

Voting Systems can break down.
    What do you do when this happens?

Iowa Code 721-22.431(52)
    Temporary use of printed ballots
    in voting machine precincts.

       Sets a model for the nation.
       Other states would be well advised to do this,
       or better, to try to improve on it!