INSURING THE INTEGRITY OF THE ELECTORAL PROCESS: RECOMMENDATIONS FOR CONSISTENT AND COMPLETE REPORTING OF ELECTION DATA

CALTECH/MIT

VOTING TECHNOLOGY PROJECT

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Many factors affect the quality of election administration. To name a few, personnel, preparation, equipment, polling places and legal regulations each play a role in determining how well the voting process works. However, an election in a democratic nation is actually an accounting procedure. Voter preferences must be counted precisely and fairly so that the correct, winning candidates can take their positions and those who lose can vacate theirs. A variety of steps can be implemented to insure that an election is just, accurate, trustworthy, and can withstand expert and public scrutiny.

Calls for greater openness and increased public access to information about the election process are not new. If anything, these demands have grown in volume and intensity since the 2000 election. It is very possible that these pleas will become even more urgent after the November 2004 election. In order to avoid national uproar because of carelessness in some poorly run election jurisdictions, election officials must immediately devise a plan to completely and accurately document the upcoming election. At present, the quality and quantity of election records are determined by local election officials. We strongly recommend that every election jurisdiction in the nation (in some cases, counties and in others, states) provide a complete and public accounting of how they conduct this fall's election.

Below, we detail simple audit information that should be collected before, during, and after the election in order to improve results and help everyone learn how to improve the election process in the future. Prior to the election, data confirming inventory, equipment tests, ballot design tests and human interventions should be carefully collected. During the election information about voting must be recorded, especially data on precinct voting operations. Post-election certification requires documentation, compilation and cross comparisons of results.

"Must-Have" Data from the November 2004 Election

Specifically, each election jurisdiction will have fewer problems certifying their elections under scrutiny if they securely collect and report in this fall's elections and in the future the following data:

1. The total number of registered voters who cast ballots in their jurisdiction.

2. The total number of votes cast for every federal candidate on the ballot, including all votes cast for write-in candidates.

3. The numbers of absentee, early, and provisional ballots distributed, and the numbers of these included in the official tabulation of the vote.

4. The technologies utilized for precinct, early and absentee voting.

5. Documentation about all incidents and problems that arose in precincts with the voting equipment and administrative procedures, including what steps were taken to resolve each problem.

These data should be collected and provided to the public at the precinct-level.

A report of these data will help the public understand the scope of the electoral process. Evaluation of patterns and problems shown in these data will be part of any genuine improvement to election certification and administration. To facilitate that accounting, we provide below a more complete list of necessary data that can help insure an election's integrity, both this November and in the future.

Auditing Elections

In order to evaluate elections in the United States, policy makers, election officials, and the public need accurate and consistent data from across the nation. Collecting and analyzing election data and reporting findings have helped us make better decisions. For example, comparing the total ballots cast and the number of votes cast for president has been used to estimate a measure of accuracy called the residual vote (the fraction of total ballots cast for which no preference was recorded in the top-of-the-ballot race). Many places that were told they had high residual rates in 2000 worked to cut them to a fraction of what they were by 2002. Georgia, for example, had a high (3.2%) residual vote rate for president in 2000. In the 2002 senatorial race, this statistic was reduced to 0.9%, a low state-wide residual vote rate. We anxiously wait to see if this result can be sustained or improved upon in 2004.

Today, election laws and administrative practices determined at the state and local level dominate what is documented about an election, how long this information is retained, and who can access it. Many state and local election officials are willing to provide as much information as they can in order to aid research; others will require legislation to do so. As states and counties across the nation move to implement significant changes to their election practices (such as the acquisition and use of new voting technologies), it is critical that they assure that the actual problems found in real elections are being solved. This can only be done if adequate information on elections is collected and made publicly available. All states and local jurisdictions should collect this essential information (at the precinct-level when possible) so that the integrity of the electoral process can be properly analyzed.

It is imperative to note that we are advocating more here than just an "audit trail" from precinct voting systems. While carefully collected redundant records of votes might play an important role in assuring that election data is correct, fully auditing an election requires much more than this.

A comprehensive plan for auditing elections should incorporate all information that can impact the election outcome, including data about activities that start well before the election and that continue long after the polls close. It must include important facts such as how voting machines were formatted, how ballots were designed and tested, and how voters received and deposited their ballots. To thoroughly audit an election from top to bottom, we need to know about polling place operations, how poll workers were trained, and to get their feedback about election day problems. In addition, a complete election audit also requires a full accounting of all election materials --- from ballots to voting machines. How can this be done without undue expense and in a way that will be helpful for more than just pointing fingers?

Developing an Auditing Process for Election Administration

Currently, the United States lacks a national process or guidelines for auditing federal elections. The important regulations, which govern what we consider information fundamental for this purpose, exist at the state and local levels. These state and local regulations limit the amount of information that election officials are required to retain after any federal election, the length of time this data is kept, and public access to those records. The amount of available information about federal elections is spotty and uneven across states and, in many cases, across counties within the same state. These practices frustrate efforts to use data to improve elections and their certification.

There are models for how an open, effective federal election auditing process can be developed. Following the Great Depression in the 1930's, reforms throughout the economy were imposed in the United States to better regulate corporations, finance, and the banking sector. Important innovations in monitoring the corporate sector included the development of "generally accepted accounting procedures", which have resulted in a largely independent Financial Accounting Standards Board, which currently helps determine standards for financial accounting practices. Similarly, the Securities and Exchange Commission (SEC) was created to oversee and regulate the finance sector. Lastly, the Federal Reserve Board was established to watch over the banking sector. Although in recent years both the Financial Accounting Standards Board and the SEC have come under some significant criticism, scandals in their respective sectors have, if anything, increased the perceived value of having such regulating organizations. These three examples provide positive and negative lessons for the development of federal standards and regulations for election administration.

An independent process should be similarly created to oversee elections and establish auditing standards. It should evaluate information and issue general

principles and specific regulations to govern which information election administrators need to report to the public. It should determine guidelines about data retention and the best practices for election auditing procedures. In order to be reliable, the process for developing these principles, standards and best practices must be open to experts and to the public.

Sometimes election officials use outside accounting firms to certify their elections. Such independent organizations are not beholden to the election industry, to election officials, or to elected politicians. However, a national system must be implemented to insure that the monitoring of elections is unbiased and uniform across local jurisdictions.

Election Administration Information Required for a Complete Audit

This report proposes a set of baseline information that should be collected, retained, and distributed for every federal election in the United States. Most of this data will originate from county election officials, but could easily be retained and distributed by their state election offices or the federal government (perhaps under the auspices of the Election Assistance Commission). It is imperative for election officials to collect and report these data, at the precinct-level when possible, in order to:

- Justify election results under scrutiny
- Document the effectiveness of their work
- Justify the results of changes to election policies and procedures
- Allow best practices to be identified and evaluated
- Provide confidence that elections are the best they can be

We provide a short-hand method to identify the purpose of each type of data. That information critical for undertaking performance audits we denote with the letter "**P**"; that information critical for security audits we indicate with the letter "**S**". In cases where the information can be used to audit both performance and security we use both letters, in order of priority.

1. Data to collect before the election:

a. Local voter registration numbers and lists. [P,S]
b. Inventories of equipment and ballots upon acceptance (e.g., date of purchase, source, maintenance records, vendors, serial numbers, retain code versions in offsite escrow). [S]
c. Seal numbers for ballots and machines and storage locations for voting equipment. [S]
d. A record of personnel with access to equipment, including detail such as when and where. [S]
e. Changes made to the equipment (e.g., oiling, charging, battery changes, memory upgrades, putting in a module, checking odometers, code drop). [S,P]
f. A list of the times and modes by which voting equipment is transported (including license plate number and driver for chain of custody purposes). [S]
g. Inventory of equipment and materials before and after transportation. [S]
h. Inventory of equipment and materials before voting begins. [S]
i. Pre-election equipment testing data, including the number of systems tested and problems observed during testing. [S,P]
j. Number of training sessions held for poll workers, and a roster of poll workers attending each session. [P]
k. Copies of sample ballots and voter information materials. [P]

This data helps assure that ballots, equipment and polling places are usable and also makes it possible to solve some problems and questions that may arise later.

2. Data to collect during the election:

a. Number of poll workers at each poll, including the times at which poll workers arrive and leave. [S]
b. Signatures (not check marks) of those present. [S]
c. Signatures for inventory received election night, both in precincts and when inventory is returned to the central office. [S]
d. Tally at precinct and time it was conducted. [S,P]
e. The number of poll and early voting sites and any rents required to use these locations. The number of workers in each poll or early

voting site, their rate of pay, and their required number of hours of work. [P]

f. If "parallel testing" is conducted on Election Day, the number of voting machines tested, the way in which they were selected for testing, and the results of those tests. [S,P]
g. Exact time when each poll site opened. [P]
h. The number of poll sites that experienced significant problems, an explanation of the problems experienced, and a description of how these issues were resolved. [P,S]

These data will ensure that processes during the election are monitored. They also give the best possible means to later establish what voters' intentions were, and that they were allowed to vote correctly.

3. Data to collect after the election:

a. Inventory of equipment and materials after polls close. [S]
b. The total number of ballots cast (report absentee and poll site totals separately, if possible). [P,S]
c. The number of votes cast for all candidates for federal office (reporting absentee and poll site totals separately, if possible). [P]
d. The number of registered voters. [P,S]
e. The number of people who voted as indicated on check in/check out lists. [P,S]
f. The numbers of absentee ballots applied for, tabulated, and challenged. [P,S]
g. The number of absentee ballots received, recorded by date received. [P]
h. The number of absentee ballots returned from citizens residing outside the country, and the number of these that are challenged. [P,S]
i. The number of tabulated provisional ballots provided to voters that were challenged. [P,S]
j. The number of early voters. [P]
k. Transportation records of equipment (consistent with above criteria). [S]
l. Storage records of materials. [S]

These data establish the ability to know that votes were handled and reported correctly. Furthermore, they give people the ability to know how to improve processes for future elections.

4. Demographic and administrative data:

a. The annual expenditures for election administration, including personnel and capital expenditures. [P]
b. The number of physical voting sites and the number of precincts (if not the same because of consolidation) used in the election. [P]
c. The number of days in which early voting is allowed, and the number of early voting sites operated. [P]
d. Census demographics of voting precincts, if available. [P]
e. Salary, by job category, of poll workers for the election, details of their job qualifications and hiring process, and years of experience [P,S]
f. Type of election administration system (e.g., elected or appointed board, elected or appointed registrar). [P,S]

Additional Recommendations

This data further gives researchers an ability to compare elections across jurisdictions to improve practices throughout the United States.

All information, from records taken when the first equipment is received to the final data on how election data is stored, should be verified by more than one person. This is especially important when it is transcribed by hand. To the extent possible, human transcription should be avoided for the simple reason that this will eliminate many commonplace errors. However, all information should be carefully checked by at least two people.

The distribution of these data to the public will help improve trust and transparency in elections. The goal should be to assure accurate certification of elections and to improve future process and technology. Having this information is crucial not only for studying the accuracy of voting machines and the efficacy of different voting methods, but also for analyzing the overall integrity of the election process. To create a truly collaborative effort toward this end,

every state's chief election official should require counties to report the data listed above for every federal election—aggregated from precincts, polling places and election jurisdictions—and to keep this information in a protected, secure, but public location for archival historical assessments.

Today's technology allows for the collection, storage, and public distribution of this information in ways that do not need to incur undue additional costs on already financially-strapped state and local election officials. The federal government should --- perhaps with the assistance of the Election Assistance Commission and the National Institute of Standards and Technology, or perhaps by providing competitive funding opportunities through other research bodies like the National Science Foundation --- develop innovative programs that can assist election officials in their efforts to collect, store, and publicly disseminate this information. If the records outlined in this report were thoughtfully collected before, during, and after an election it would be possible to secure the most accurate recording of voters' intentions in history. The same data could also be used to firmly establish the validity of an election and identify both equipment and process improvements for future elections.

WHO WE ARE

The furor over the 2000 presidential election in Florida brought this group together. David Baltimore, the president of the California Institute of Technology, and Charles Vest, the president of the Massachusetts Institute of Technology, assembled our original team of computer scientists, mechanical engineers, and social scientists to consider what is and what could be. We produced our original report in June 2001.

Our ultimate goal is to develop ideas about what could be. The United States is in the midst of a revolution in communication and computing technology. That revolution is and will transform voting in the future. These technologies hold enormous promise --- to make voting easy, convenient, and accessible, and to allow voters to see that their votes are counted. The current VTP faculty research group who assisted in the production of this report are:

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