Mission bells were used in colonial California for telling time, announcing events, and for passing on news from one city to another. Our symbol is the classic outline of a mission bell because THE BELL newsletter serves similar purposes.

Web Page

Visit The Bell's web page at http://www.thebell.net – more information, more up-to-date.

Call for Papers

Join the dialogue and submit your paper to THE BELL. See page 2. All papers are peer–reviewed. Submissions accepted at any time.

Free Subscription

THE BELL is FREE of charge for Internet distribution in PDF format, and is also available in hard copy. For information, see the back cover.

Read Also...

California Election Technology Expo and Assembly Hearings

Read about the California Election Technology Expo 2000 held in Sacramento on January 16 and sponsored by the Secretary of State Bill Jones. More than 40 companies and organizations participated in the Expo, which also had several panels on election issues. Concurrently, Assemblyman John Longview (D) chaired the hearings by the California Assembly Elections & Reapportionment Committee, including a panel on Internet voting.

by Eva Waskell, p. 3

Election Reform in Maryland

The Governor of Maryland's Special Committee on Voting Systems and Election Procedures is looking into considerations for voting systems. The author presents a review of current vote-casting systems, with improvement considerations as well as an analysis of weak and strong points of each technology. It is suggested that advanced developments should be reviewed and followed, including Internet voting.

by Roy G. Saltman, p. 4

Internet Voting: What Voters Want

Interviews with voters were conducted during an Internet voting test in Contra Costa County, California in November 2000. While there were concerns expressed about privacy and security, 60% would want to vote from home, 35% from work and 5% from a precinct using the Internet interface.

by Eva Waskell, p. 8

IACREOT's Election Reform Commission

The President of the International Association of Clerks, Recorders, Election Officials and Treasurers (IACREOT) describes the leading role IACREOT is playing in election reform by gathering information on the conduct of elections throughout the United States and offering expert testimony at Congressional and state hearings on federal, state and local election reform.

by Gerald A. Gibson, p. 11

From the Editor

Dear Reader:

Now that the public is focused on election administration, election officials from around the country have an opportunity to get attention for problems they have been talking about for years. But a one-size-fits-all solution will not work in this country. That was the unanimous feeling at the winter meeting of the National Association of State Election Directors (NASED) held in Washington, DC on February 2-4, 2001. There was also concern that Congress may move too hastily without thinking through the consequences of its actions. And beware of the so-called "election experts" who offer well-intentioned but misguided suggestions for reform.

Election officials at the NASED meeting also agreed that technology alone will not solve all of the problems. Many jurisdictions may use the state or Federal funding they receive for poll worker training or a variety of other administrative improvements.

In order to speak to Congress about election reform with a common voice, two members from each of the following groups will coordinate their message: the Election Center; the International Association of Clerks, Recorders, Election Officials and Treasurers; the International Institute of Municipal Clerks; the National Association of Counties; the National Association of County Recorders, Election Officials and Clerks; the National Association of Secretaries of State; the National Association of State Election Directors; and the National Conference of State Legislatures.

The National Association of Secretaries of State held a meeting concurrent with NASED and issued its own recommendations. The Secretary of State of Missouri issued a report on his state on January 29, 2001. Nationwide and state-based task forces will be issuing reports within the coming months.

PSINet in Huntsville, Alabama is the new Independent Testing Authority for NASED. Shawn Southworth (formerly at Nichols) will be conducting the tests. PSINet will begin accepting applications for voting system software review on February 14.

The Bell is starting Volume 2 this month! The issue number now coincides with the calendar month.

Eva Waskell
Editor

California Election Technology Expo and Assembly Hearings

by Eva Waskell[*]

> *The Election Technology Expo held in Sacramento on January 16, 2001 was a first of its kind opportunity for election officials, members of County Boards of Supervisors, County Executive Officers, political party leaders, members of the legislature, officials from other states, and other interested parties to get some hands-on experience with the kinds of voting technology that's available today or on the cutting-edge for use in the future. Three panels ran concurrently with the Expo and hearings were held by the Assembly Elections & Reapportionment Committee on January 16-17. This is a brief report of the highlights of these events.*

Exposition

The 2000 Election Technology Exposition in Sacramento, sponsored by California Secretary of State Bill Jones, was well-attended by over 300 people interested in getting some hands-on experience with both current voting technology and systems on the cutting-edge for use in the future. The exhibitors included AtPac, Booz-Allen & Hamilton, Compaq Computer Corporation, Computer Resources Group, Data Information Management Systems, Inc., DFM Associates, Diebold, Inc., Diverse Integrated Systems, Inc., Drake Communications, Inc., election.com, Election Systems & Software, Electric Lightwave, Inc., ExecuTrain of Sacramento, Global Election Systems, Hart InterCivic, Identicator, Ikon-Data Image Services, InfoSENTRY Services, Inc., League of Women Voters, Los Angeles County, Natoma Technologies, Quad Media, SacWeb, Safevote, Inc., Science Applications International Corporation, Secretary of State, Sequoia Pacific Systems, The Benton Company, The SMR Group, Inc., Transcend, Unilect Corporation, Unisys Corporation, US Postal Service, Validity Systems, Verify First Technologies, VoiceVoting.com, VOTEC Corporation, VoteHere, Inc., and WEBVOTE, Inc.

Attendees included election officials and county representatives from throughout California. Some counties were seriously considering upgrading their voting systems. Sacramento County fell into this category. There were many people from the county's election department asking very detailed questions regarding cost, maintenance, storage requirements, and the amount of poll worker training needed for the equipment. Members from the Grand Jury in Butte County also asked a multitude of detailed questions as did representatives from CALPIRG, the International Foundation for Election Systems, the US Department of Labor and the California Institute of Technology. The City of Berkeley and The Center for Voting and Democracy were interested in knowing if voting systems could handle alternative methods of vote counting like proportional and instant runoff voting, to name only a few. Visitors from Georgia, Nevada and Washington state were also present.

The vast majority of voting systems were touch-screen DREs, a technology that has been around for over a decade. One vendor of DREs stated at the hearing that their DREs had been installed for over two decades. In addition to touch-screen and bush button DREs, there were other election-related products and services represented as well. For example, some companies did poll worker training or provided identification ink and fingerprint pads used for the voter registration process. In short, the bulk of the voting systems displayed were single-purpose machines specialized for public elections, which are still a niche market. Internet voting systems, on the other hand, can be used in both public and private elections.

Concurrent with the exhibit were three panels covering the certification of voting systems in California, challenges in changing voting systems and emerging technologies in elections.

Assembly Hearings on Election Procedures

John Longville (D), the Chair of the Assembly Elections & Reapportionment Committee, co-sponsored the Expo and also held hearings on the afternoon of January 16 and the morning of January 17.

In an interview with The Bell, Longview said that "The hearings went very well. It was important that committee members hear from election officials directly. But this was just the beginning of the information gathering phase of our work."

Election Reform in Maryland

by Roy G. Saltman[*]

> Roy Saltman is the author of the 1988 report from NIST that, 12 years ago, called for an end to the use of pre-scored punch card voting systems. He has been involved in consulting on election policy and technology since he retired from the Federal Government in 1996. Saltman presented this paper to the Governor of Maryland's Special Committee on Voting Systems and Election Procedures on January 4, 2001, by invitation.

Introduction

Governor Glendening's establishment of this committee is responsive to the flaws in national vote-casting and counting made clear from the dispute in Florida in the recent Presidential election. The Governor's action demonstrates a sensitivity to the needs of the citizens of this state for an election system in which they can have complete confidence. The debacle in Florida was caused by the widespread implementation in that state of a user-unfriendly system whose inaccuracy was greater than the difference in votes between the two major candidates. We in Maryland are fortunate that the pre-scored punch card voting system that was primarily responsible for the ambiguous results that required a resolution by the U.S. Supreme Court is not used in this state.

The publicity that surrounded the count of the Florida votes has brought to the fore some important issues that need to be reviewed in this and every other state: specifically, (1) the accuracy of the voting system in use, which is extremely important when the difference in vote totals between the major candidates is small, (2) the standardization of procedures to determine "the voter's intent" so that they are the same throughout the state, and (3) the "user-friendly" quality of the voting system to maximize the likelihood that the voter will be able to correctly translate his or her intent into commands that a computer will unambiguously understand and that will result in an exact recorded electronic equivalent of the voter's intent.

You are probably aware that I have written two major reports on the assurance of integrity in computerized elections, the first completed in 1975 and sponsored by the U.S. General Accounting Office, and the second finished in 1988, sponsored by the John and Mary R. Markle Foundation of New York City. Both reports were written while I was employed as a computer scientist at the National Institute of Standards and Technology (formerly National Bureau of Standards) in Gaithersburg in Montgomery County. The second report has now achieved its fifteen minutes of fame recently with the wide dissemination of its statement that the use of pre-scored punch card voting systems should be ended. The statement was written over 12 years ago but was ignored by almost everyone but a small group of election integrity experts until the Florida crisis came upon us.

Both reports, of 1975 and of 1988, made important technical recommendations for the improvement of election operations, and also made extensive policy recommendations for institutional change. I found, in the analysis of the election process, that it is not possible to separate significant technical matters from policy issues. The two subjects are bound together because of the deep involvement in the process by the general public of all walks of life, both as participants in voting and as citizens whose lives are affected by the subsequent actions of those persons converted from candidates to office holders by the election results.

Therefore, I intend to present here some technical facts of voting systems as they are now, as well as some technical and policy recommendations to be implemented in the future. My recommendations are conditioned by what legislation I expect to be adopted concerning elections in the forthcoming session of the U.S. Congress. While no predictions dependent on the actions of humans can be expected to be totally correct, some general predictions can be made that are likely to occur, if a detailed specificity is not demanded.

Public Confidence: The Bottom Line

It is essential to stress first that "public confidence" in the voting process is a fundamental requirement that we should keep in mind when considering what improvements to propose and carry out. We should be aiming to assure a voting system with very strong fraud-prevention characteristics, with strong assurance of accuracy, integrity, user-friendliness, and reliability, and which produces results that are unambiguous and demonstrable with

---

supporting documentation. There must be in place clear procedures and instructions that both voters and poll workers can easily carry out. We should be aiming for a system design causing our voting process to be "transparent," so that recourse to the courts, as we have just witnessed in Florida, will be extremely rare. We cannot assure 100% system operability at all times, but we can have in place fallback mechanisms and procedures that anticipate almost all unplanned possibilities.

It is important to recognize that the adoption of the most effective methods of vote-casting and vote-tallying are not the only requirements for public confidence. We need to review our current voter registration and voter identification systems for possible improvement. This review cannot be undertaken without considering the Federal Government, since there is extensive Federal law on voter registration. Additionally, application of new technology for voter identification may require considerable funds for research and development, for which Federal assistance could be available in the future. Furthermore, maintenance of an up-to-date list of registered voters, given the situation of our very mobile population, will require extensive use of data processing techniques and considerable interstate cooperation, hopefully fostered with Federal Government assistance and involvement.

Current Vote-Casting Systems

A voter in Maryland now may use one of the following mechanical or electronic systems in casting votes, depending on the selection by the county of the voter's residence: a mark-sense system, a Datavote punch card system, a lever machine, a push-button direct-recording electronic (DRE) system or a touch-screen DRE system. Let us assume that any lever machines now in use, e.g., in Prince Georges County, will be replaced soon, so that the future use of those machines need not be an issue. It is my opinion that any of the computer-based systems listed above (note that a pre-scored punch card voting system is not listed), with the proposed redesign and operational system changes that I will mention, are acceptable for continued use in Maryland, absent additional requirements imposed by court decisions or by new law or regulation. Each of these systems has both advantages and disadvantages; there is not one "best" system. However, future research on human factors in vote-casting may show that some of these systems are more user-friendly than others, although I have no good data on this, currently. Some characteristics of the three basic types of systems are given, following the discussion on the need for precinct counting.

Precinct Count versus Central Count

With ballot-tallying systems, i.e., either mark-sense or Datavote, I propose that Maryland use only a precinct-count process in the future, rather than the current mixed use of both precinct count and central count. With the latter

system, voted ballots are not counted at the precincts, but are collected and transported to a central location where they are counted. (DREs are typically designed only for precinct count.) Precinct counting allows for a voter to be informed of overvotes and to correct his or her ballot. Precinct counting also minimizes the insecurity of transportation of voted but uncounted ballots, permits local precinct officials and workers to receive the results quickly, and eliminates the uncertainty of having the ballots counted (and possibly altered) somewhere else. Although precinct counting is more expensive than central counting, requiring a machine in each voting location, the advantages in risk reduction, elimination of overvoting, and increase in public confidence are worth the extra cost, in my opinion. It appears to me that the historic inability to apply sufficient resources to elections has disadvantaged both administration and the voters, and has hurt public confidence.

Mark-Sense Systems:
Positives, Negatives and Recommended Changes

Positives:
- Overvotes can be prevented in a precinct located system if an overvoted ballot is returned to the voter by the computer, and the voter is offered the opportunity to correct errors of this type.
- The likelihood of voter waiting lines is very small as many voters can fill out their ballots simultaneously.
- A maximum of one computer is required per voting location.
- If all ballots are accounted for, a paper audit trail is available.
- The hard-copy ballot is an automatic fallback mechanism if the local computer fails.
- Write-in voting is easy to accomplish.
- It is a good system for absentee balloting.

Negatives
- A voter may disregard instructions and not correctly fill in the voting location, or forget to turn the ballot card over to complete the voting process.
- A voter should request a new ballot if an error is made. (Erasures may confuse the computer.)
- "Voter intent" may have to be determined in a very close election.
- Informing the voter of unintentional undervotes is not possible, in general.
- Ballot stub numbering and special precinct procedures must be used to prevent "ballot stuffing" and "chain voting."
- The cost of ballots may be an issue; ballots cannot be reused.
- Card stock must be carefully selected, and printing must be precise.

Recommended Changes
- A small percentage of precincts should be hand-counted to verify computer-based results.

Datavote Systems:
Positives, Negatives and Recommended Changes

Positives
- If the ballot is properly fixed in the holder, the voter can only punch in a voting location.
- All punches are the same size, and no hanging or dimpled chad results from punching, minimizing the likelihood of a "voter-intent" issue.
- Other "positives" are the same as for mark-sense systems, except that Datavote is not as good for absentee ballots.

Negatives
- A voter may not fix the ballot properly in the holder, making incorrect punches possible.
- The small size of the ballot card requires the use of several ballot cards for each voter, and requires higher speed card readers. The extra cards provide the potential for voters to forget to vote all cards or to forget to turn over the cards to vote the other sides.
- Other "negatives" are the same as for mark-sense systems.

Recommended Changes
- Precinct count rather than central count should be used, and the card readers should be redesigned so that a wider, single ballot card such as is available with mark-sense ballots, could be used. The number of pieces of paper handled would be considerably reduced.
- A small percentage of precincts should be hand-counted to verifycomputer-based results.

DRE Systems:
Positives, Negatives and Recommended Changes

Positives
- No "voter-intent" issue exists, as each voting action is immediately converted to a standard electronic form.
- Re-programming is easier than re-printing for hard-copy ballots if a court should order a change in ballot very soon before an election.
- No hard-copy ballots are used, except for fallback and absentees; this saves costs.
- Overvotes are automatically prevented by computer logic.

Negatives
- Each voter monopolizes the use of the DRE machine while voting; this may create waiting lines.

- The elimination of waiting lines requires the use of more than one DRE machine per precinct; this is clearly a more expensive implementation than the use of a single computer and reader to receive and count hard-copy ballots.
- There is no automatic fallback. Spare DRE machines must be available, or hard-copy ballots must be made available if machines fail.
- The write-in process may be more difficult than for hard-copy ballots. A keyboard may have to be provided.
- The assurance of machine correctness is very difficult to prove, as there is no paper audit trail.
- DREs cannot be used for absentee ballots; a hard-copy ballot must be used, until such time as remote on-line voting is possible and generally available for all absentees.

Recommended Changes
- DRE machines should be redesigned to allow for pre-voting checkout at the precinct, to make sure that the machines are operating correctly before being allowed to be used by the voters.
- DRE machines should be designed to separately store, in a write-only-once memory, the "electronic ballot image" (EBI) of each voter's choices; the requirement of retaining EBIs is included in the Federal Election Commission voluntary standards.
- EBIs should be stored on removable diskettes, and a small percentage of precincts should be recounted on an independently programmed computer.
- DRE machines should be programmed to inform the voter, after a first press of the final "vote" indicator, that he or she has neglected to vote on some contests, if that is the case, giving the voter the option to go back and vote additionally or to ignore the message and press the final "vote" indicator a second time. Such a message may assist a forgetful voter, and gives a second chance to a voter who has mistakenly pressed the final "vote" indicator sooner than he or she intended.

Public Policy and the Future:
The Potential for an Augmented Federal Role

The Florida disaster has resulted in increased concern in Congress for the vote-casting and vote-counting aspects of Federal elections, a significant change from conditions existing over many years, in which only campaign finance and voter-registration presented any interest whatsoever. It is likely that some Federal legislation concerning voting systems will be adopted in the forthcoming session of the U.S. Congress. At minimum, it is likely that some appropriation will be made available to enable states to pass new funds on to counties for upgrading systems.

In addition, there is the possibility, although less certain, that Congress will establish a Federal research and standardization program, assigning this responsibility to an existing agency, such as the National Institute of Standards and Technology, or to a Federally funded research and development center, a non-government independent testing laboratory, or an upgraded Office of Election Administration having new powers and programs. The latter office now exists as a 4-person staff, with minimal resources and little clout, within the Federal Election Commission.

The advantage of a Federal research and standardization program is that a coherent national effort would be established. An analogy is the function of the U.S. Department of Transportation in its relationship to the states. The Federal department does not build roads, the states do that, but it does collect data on traffic accidents and airplane accidents, causes unsafe transportation products to be modified or removed from the market, sets standards for road construction, and distributes funds to the states, provided that the states adopt the established standards.

A national effort in election administration, research, and standardization could include, for example:

- data collection of incidents in elections that indicate problems with particular types of voting machines, or of insufficient training of voters, or of problems with voter registration files, etc.,
- studies of the user-friendliness (human factors considerations) of different vote-casting methods,
- the development of new voting systems, including ATM-like terminals and use of the internet,
- analysis of how implementation of the Americans with Disabilities Act in vote-casting would affect the cost and operability of voting equipment,
- promulgation of mandatory national standards for election hardware, software, and voter-interfaces, including assurance of continued availability of independent testing laboratories,
- development or improvement of new methods of voter identification that could be applied to precinct-located voting or to remote voting, and various comparisons among alternatives,
- implementation of interconnected state databases of registered voters, with ability to communicate changes in registration.

A Program for Maryland

If a solid Federal program not imposing significant costs on the state were to be put forward in a detailed legislative proposal, the Maryland Congressional delegation should vote for it and the state should support it, in my opinion. Such a program will result in benefits to Maryland as well as to other states. Maryland should name participants to present the state's view if such a program is started, and to assure understanding of any requirements that are imposed

and their effect in Maryland. If no coherent national program is begun, each state will be on its own, as is presently the case. Then, Maryland must decide which, of the list of possible Federal activities given above, it wishes to pursue on its own. A more pro-active and involved statewide program than exists at present is recommended.

Data collection: An improved collection of data on election results should be undertaken. The data should concentrate on (1) human factors aspects of voting, (2) failures of equipment, and (3) failures of procedures to assure a smooth, rapid and noncontroversial completion of the count.

Decisions as a result of data collection: The human factors studies should determine, for example, which system types and methods of presentation of choices are best suited to clarity for the voting population. As a result of an analysis of this data, decisions could be made as to whether (a) additional training in system usage should be offered to voters, or (b) only systems with the best characteristics should be purchased in the future, or (c) both options should be exercised. Data collected on failures of systems and procedures should lead to recommendations to correct these problems and a schedule for implementation. If data collection and decision-making on failures of systems and procedures are done centrally by the state, that will provide a greater capability to pressure vendors to correct defects, to assure the availability of spare parts, to assure the availability of repair and maintenance personnel, and in general to assure contract performance.

Alertness to new equipment: Vendors of election equipment will be continually bringing out new models. The state and local administrators should be alert to the introduction of more cost-effective and reliable systems. An important trend to watch is the possibility of reductions in cost of DRE systems, as cost is the most restraining factor in deploying a multiplicity of DRE units at a single voting location to eliminate waiting lines.

The possibility of statewide procurement: An institutional problem in the vote-counting equipment industry is disaggregation, that is, sales are made in small quantities to small governmental units. The state may wish to determine whether there should be a statewide purchasing process that would reduce unit costs through aggregation of sales. In addition, the state may wish to determine whether all of Maryland should use only one type of voting equipment. The up-side of such a decision is that all citizens would be voting on the same type of equipment, procurements and maintenance would be statewide and voter training could be statewide. The down-side is that all units might have to be replaced at one time to retain commonality, and new developments could not be introduced in a single small jurisdiction for testing purposes without violating commonality.

Internet Voting: What Voters Want

by Eva Waskell[*]

Interviews with voters were conducted during Safevote's shadow election test in Contra Costa County, California in November 2000. While there were concerns expressed about privacy and security, 60% would want to vote from home, 35% from work and 5% from a precinct using the Internet interface. Convenience was cited as a major factor in this decision.

Introduction

The Secretary of State of California, Contra Costa County and Safevote, Inc. defined test objectives and signed an agreement for a shadow election test during the national elections in November 2000 [The Bell, Vol. 1, No. 7, p. 9]**.**

During the period of early voting, from October 30th to November 3rd, voters first used the voting system in the Contra Costa County election office at Martinez to cast their legally binding vote and then had an opportunity to cast a mock Internet vote using Safevote's voting system at the same location – but not remotely (from home, for example) in this test.

The main goal of the project was to provide a testbed for the development and testing of technologies that can be applied to Internet voting, both for precinct-based as well as for remote voting, such as voting from home.

A total of 307 people cast mock votes during the five-day-long Internet election test. The test was done at one location, using one computer (another computer was always online but as back-up). The number of voters was enough to allow some properties to be measurable in terms of statistics. Also, 307 is the number of voters that would usually vote in one precinct in California. Doing the test at 10 precincts might have allowed 10x more voters to be counted but it would also have added logistic and personnel problems which have nothing to do with testing Internet voting at precincts.

The average voting time was 10 seconds per race, measured automatically by a timing tag in the vote and tested in a ballot with four races of varying lengths, with at least one multiple choice race. Average registration and login time was 60 seconds, measured manually.

Voting test results are available at http://www.safevote. com/contracosta/tally.html in totals and per ballot style, for all ballot styles used. The results were tallied after the official election closed, on November 7th. All the results were authorized to be shown at Safevote's website but they were not verified by the office of the California Secretary of State. A total of 146 valid ballots were tallied, excluding the 161 test ballots cast by voters, for a total of 307 ballots.

Voter feedback about the test and the possibilities of voting using the Internet, including voting from home, was even more important than knowing the voter's political preferences in this case. Thus, a Safevote representative personally interviewed the i-voters at Contra Costa after they voted and presented a series of questions to them.

When asked if Safevote's system was easy to use, all 307 i-voters answered yes. As voters' time permitted, other questions followed with a pre-defined format and also included room for spontaneous responses. Approximately 200 i-voters took the time to answer all questions. This article summarizes the voter feedback.

Study Methodology

This in-depth qualitative study was conducted through personal interviews done by a Safevote representative with voters after they cast their ballot. Interviews typically lasted from 1-5 minutes; some interviews took up to 15 minutes. Approximately 200 voters out of 307 were interviewed, depending on whether or not they were in a hurry to leave the election office to feed a parking meter, get back to work, or had some other business to attend to.

The goal of qualitative research is to develop an understanding of the needs, concerns and dynamics of the target subjects, i.e. voters, and to learn the "language" they use to articulate those needs and concerns. In contrast, quantitative research is used to develop statistically significant data on the percent of the voters who have the needs, concerns, etc. identified in the qualitative research.

The questions asked were adapted as the study progressed, reflecting an increasing understanding of voter response. A variety of additional questions were developed during the course of the study to accommodate specific age groups.

To allow for quantitative results, we tried to get a "yes" or "no" response where possible by asking, for example, "Would you vote from home?" Other questions required a more detailed answer. These questions are among the most important in the study because they provided an opportunity for voters to spontaneously comment about the test and Internet voting in general.

Questions Asked

The majority of voters were asked the following questions:

1- Was the system easy to use?
2- How could it be improved?
3- Would you vote on the Internet from home?
4- Would you vote on the Internet from work?

Follow-up questions were asked if voters were able to spend more time being interviewed:

5- What are your concerns about Internet voting?
6- What do you think about inviting hackers to attack the system?
7- What do you think about being able to go on the Internet and verify for yourself that your vote was received for tallying?
8- What do you think of the DVC?
9- What do you think about peer review and open source software for Internet voting?
10- How does this system compare to other voting systems you've used?
11- When do you think there will be remote Internet voting for public elections?
12- Would you like to vote on the Internet in the next election?

The Safevote System Used by the Voters

To use the system, voters sign onto a voting computer using a unique Digital Vote Certificate (DVC) issued to them by election officials.

For this test, a representative of Safevote issued the DVCs which were printed using one of the county's off-line standard PCs running Safevote's DVC Generator software. The DVC is an anonymous combination of six letters and numbers endowed with the mathematical properties of a digital certificate, allowing complete voter privacy when voting and providing for election integrity. The voting computer is in "stealth mode" on the Internet: It can "see and talk" to a set of remote ballot boxes (i.e., secure servers on the Internet) but cannot be seen by anyone on the Internet – including attackers. The DVC authenticates not only the eligibility of the voter, thus preventing someone voting twice, but also authorizes by cryptographic authentication the ballot style defined by the election officials for each voter according to their residence, and provides services to allow for irreversible proofs in various stages of voter authentication and ballot casting, for election auditing. The voter uses either a mouse or a touch screen to make selections, which considerably reduces the barrier to someone who would have to face a 103-key computer keyboard for the first time. A mouse was used in this test.

The system prohibited voters from overvoting but allowed them to undervote (as requested by the Secretary of State).

Since the ballots are encrypted and digitally certified, they cannot be "opened" or tampered with. Voters could (and did) verify that their ballots were received at the remote ballot boxes by visiting a Web service with voter lists. Voter verifiability can considerably reduce the probability of undetected fraud. If only a small fraction of voters verify that their cast ballots were received for tallying, voters in the entire county will benefit because this process reduces the probability of undetected fraud from ballots being "lost."

Voter Reaction to the Mechanics of Voting

After voters were given their DVC, they were told: "Click on 'Begin' and the rest is self-explanatory. If you have any questions, just ask." When voters sat down at the voting computer, they sometimes looked around for a keyboard–several got up from their seats and looked under the table–before realizing that only a mouse was needed. Nearly all of the voters were able to use the mouse, except for two senior citizens who became so frustrated that they got up and left within a minute of sitting down. Everyone else found the system easy to use, including grade school and high school students, the elderly, a drunk, and people who had never used a computer. Approximately 30% of the voters spontaneously remarked that it was either "easy," "simple" or "a piece of cake" at the moment they finished voting.

Even though almost all of the voters were able to use the mouse, the right mouse button should be disabled to prevent computer novices from accidently clicking on it and then having to see menus suddenly appear on the screen.

Voter Reaction to the Interface

The opening screen contained squares with numbers and the letters of the alphabet. Voters were to click on the squares corresponding to the 6 characters of their DVC. The characters then appeared in a large rectangle right below the 2 rows of squares. It was easy for almost everyone to enter the DVC and make any corrections necessary. Several people did not read the directions, went straight to the rectangular box and began clicking. When characters failed

to appear, voters soon figured out that they were to click on the squares above. The remedy to this situation is to use a larger font to make the directions stand out more.

Voters entered their month of birth by clicking on one of 12 squares; no one had a problem with this. Entering the day of birth, however, was confusing because there were 31 squares to chose from. Many voters clicked on 1 and 5, for example, instead of clicking on 15. After talking with people, it became clear that they preferred to click on squares containing numbers 1 to zero. "I use keypads all the time," one voter said, "and I'm used to seeing that type of format."

The ballot layout and presentation were 100% clear and legible. Four voters were visually impaired and yet were able to read the names of the candidates. Voters marked their ballots with an X by clicking on a box on the right hand side of the screen to indicate their choices. Everyone knew exactly who they were voting for and could easily go back and review or change their choices before submitting their final vote.

Everyone agreed that a touch screen would be the easiest to use.

Three suggestions were made. Use thicker lines between the candidate names. Decrease the distance between the candidates name and the box on the right to be clicked upon. And finally, the "confirm all" button on the final screen could be changed to "cast your vote" or simply "vote." [Some voters thought that "confirm all" referred to confirming all of the candidates (in vote for 2 or vote for 3 races) on the final screen.]

Voter Feedback

Questions 1 and 2
Everyone who used the system said it was easy to use. Voters included grade school and high school students, the elderly, a drunk, people from all walks of life, individuals who had never used a computer, the visually impaired, staff members of the election office and members of the press. Typical responses were: "It's very easy." "It's pretty simple to use. A piece of cake." "It's good. Much better than the punch cards which I've used for years." "Totally easy to use. Totally." "It's pretty cool." "It's so easy. Nice and easy." "I like it. Very easy, very elegant. It makes sense." "Pretty easy. And I can't even turn a computer on." "It's simple. That's good."

Two people used–and liked–the system even though they said they were against Internet voting.

Questions 3 and 4
When asked if they would vote from home or work if Internet voting were available, 95% of the voters said they would. Convenience was a very large factor in this decision.

Many people had to drive an hour to get to the main election office to vote. As one voter replied: "I love Internet voting. I would do it. It's painless, convenient and I don't have to go out in the rain. It would really help turnout." Others were taking time off from work and would have preferred to vote at their office. One woman said she would like to vote at home because she could have all of her election materials in front of her and take all the time she needed to deliberate before casting her ballot. Another woman said that her husband would look over her shoulder if she voted at home. All of the students who tried the system thought it was "cool" or "neat" and indicated they would vote from home if given a choice. Some people stressed that they would only feel comfortable voting at a precinct. They liked the ritual of going to the same physical location in their neighborhood and believed that Internet voting was making it too easy to vote.

Summary of preferred locations for the Internet interface used:
60% vote from home
35% vote from work
5% vote from a precinct

Answers to Follow-up Questions

Question 5
When voters were asked what their concerns were about Internet voting, 70% of the people expressed a concern about security and teenagers or hackers breaking into the system. Almost everyone quoted a horror story they had read in the paper regarding the harmful effects from a computer virus, Trojan horse or a denial of service attack. Three people were concerned about foreign governments being able to fix a U.S. election.

Of the 70% who were concerned about security, about 30% thought that banking online and voting online were similar activities and if we could do one, we should be able to do the other. But 70% knew that online banking and online voting were not the same kind of transaction and had different requirements, especially regarding privacy.

60% of the voters interviewed expressed concern about voter privacy. Some were even concerned that Safevote might be able to compile a list of registered voters during an election. Of course, this is impossible to do with the system.

20% of the voters had concerns about authentication and asked specifically how the system would know that only registered voters were voting. Many people purposely tried to vote twice with their DVC but failed to do so.

IACREOT Election Reform Commission

by Gerald A. Gibson[*]

Gerald A. Gibson is the President of the International Association of Clerks, Recorders, Election Officials and Treasurers (IACREOT), whose membership includes over 1500 elected and appointed state and local government officials from 36 states and members from Canada, Great Britain, Australia and New Zealand. Over 800 of these members serve as the official responsible for the conduct of elections in their respective jurisdictions. IACREOT members are taking a leading role in the movement for election reform.

Election Reform

Our country has just been through the most contentious Presidential Election we have ever experienced. Many of our peers, co-workers and friends are participating in this process at all levels from the ballot box to the courts. IACREOT members are being called upon by the media to share their expertise, and knowledge of the election process is helping to shape world opinion. IACREOT commends these public servants for their tireless efforts in carrying out the duties prescribed to them. They truly are "Earning Public Trust through Excellence in Service."

In December 2000, I announced the formation of an Election Resource and Review Commission. The Commission will gather information on the conduct of elections throughout the United States and will offer expert testimony at Congressional and State hearings on federal, state and local election reform.

I, along with the First Vice-President, Director-at-Large Election Division, Education Committee Chair and General Counsel, have also met with the Federal Election Commission to begin the arduous process of strengthening the election system. Further we met with the staff of Senator Torricelli and have been asked to assist in drafting legislation on election reform that is already in draft form for presentation (Senate Bill 218 sponsored by McConnell (R-KY) / Torricelli (D-NJ). We also have on-going dialogue with Senator Schumer's staff who has also solicited our participation in drafting their proposed legislation. (Senate Bill 3273 sponsored by Schumer (D-NY). At least one other Senate Bill is being offered by Senator Spector (R-NY) and a House Bill is being offered by DeFazio (D-OR) and Leach (R-IA). Copies of these drafts have been forwarded to all IACREOT members and are available on the IACREOT website at www.iacreot.com. Please do not hesitate to give us your assessment and input.

Our Mid-Winter Conference was held in Billings, Montana on January 17 thru 20, 2001. The Election Resource and Review Commission met to address proposed legislation and to package information gathered from its members through email questionnaires and through its quarterly publication THE IACREOT NEWS. My view is that IACREOT can be a major contributor to election reform. Our members from coast to coast have an unparalleled amount of election experience and are anxious to share our knowledge with federal and state legislators. IACREOT members have, in fact, often been called on by United States agencies to serve as observers and facilitators in democratic elections around the globe.

There were also many educational opportunities at the Mid-Winter Conference, including the first modules of the Certified Public Administrator Program offered in partnership with the University of Missouri. This Conference gave us a preview of the Annual Conference to be held in Billings on June 16 thru 20, 2001. A tentative agenda for the Annual Conference is available on the IACREOT website.

Summary

IACREOT stands ready as an organization and its members stand ready individually to offer whatever expertise it and they can to assist Congress and the States in producing a solution that is workable within the framework of election administration as it currently exists in the 50 States. With the national and world spotlight on the 2000 Presidential Election and the resulting call for election reform, it was to be expected that Congress would introduce legislation to establish guidelines for preventing a re-occurrence of the 2000 vote problems.

IACREOT believes election reform deserves serious study, but points out that it is important to remember that according to the Federal Election Commission's Office of Election Administration, it is estimated that there are 180,000 voting precincts in the United States today. These polling places are staffed by 1,000,000 workers on election day to serve the nation's 100,000,000 voters - all of which is managed by 13,000 local election officials. We should move with due caution.

Background on IACREOT

IACREOT was founded in 1971. Its membership includes over 1500 elected and appointed state and local government officials from 36 states and members from Canada, Great Britain, Australia and New Zealand. Over 800 of these members serve as the official responsible for the conduct of elections in their respective jurisdictions. Although members represent widely disparate constituencies - from the most densely populated urban counties with multimillion dollar budgets to sparsely settled rural areas with small appropriations - either extreme can learn from the other, as can every gradation in between. IACREOT also assists in preparing formal training and certification programs at the state or regional level.

IACREOT acknowledges the fact that it is impossible to establish hard and fast rules for conducting the day-to-day business of county offices. The changing, multi-faceted expectations and needs of the general public often dictate handling similar situations in different ways. At the same time, it is important to provide a venue for regular review of existing performance philosophies and methods.

The value of this healthy preoccupation with detail has been demonstrated in various ways, but never more dramatically than when such natural disasters as fires or floods have forced county officials to reconstruct their offices from scratch. Calling upon their IACREOT background basics, they have been able to accomplish this with only temporary inconvenience to the public.

Regarding upgrading and standardization, IACREOT members have access to the latest innovations in hardware, software, and procedures through workshops and the cooperation of potential vendors. In this era of scarce resources, standardization resulting in economies of scale in public office operation is increasingly desirable.

> Gerald A. Gibson was elected Clerk of Circuit Court of Danville, Virginia in 1980. He has been a member of IACREOT since 1985 and in that time has served on various committees, chaired several committees, and served two terms as Director-at-Large for the Clerks Division. Gibson was elected Secretary of IACREOT in 1997 and has moved through the chairs to his current position as President. He can be reached at 1-800-890-7368 or at ggibson@courts.state.va.us

California Election Technology Expo and Assembly Hearings

(continued from p. 3)

"We still have many more people to talk with before a bill can be drafted. The bill will focus on two areas. First, we want to find holes in the current election laws and fill them so California doesn't have an experience like Florida. Input from election officials and those experienced in election contests is critical, "concluded Longview.

Just how critical these issues are was underscored when one of the panelists, attorney Fred Woocher from Strumwasser & Woocher L.L.P., remarked that the California election code provisions on election contests are "almost incomprehensible." Woocher also said that "the whole election code is out of date."

"The second thing the bill will focus on is equipment acquisition for the counties," Longville continued. "We want to help the counties that want to upgrade their voting systems. The Speaker of the Assembly has a bill, AB 56, that provides for a county's being eligible for a grant if it meets certain requirements, including, that the county provides

matching funds to purchase an updated and certified voting system at a ratio of $1 of county funds for every $3 of state funds. Of course, what form the final bill will take is still an open question. We'll have to see how much we can get done before the legislature becomes heavily involved in reapportionment issues."

Transcripts of the hearing are not available. Video tapes of the January 16 hearings can be obtained by calling the Senate Televising Committee at 916-445-4913. Video tapes of the January 17 hearings can be obtained by calling the Assembly Member Services at 916-319-3800.

> Eva Waskell has been involved with the U.S. election system and computerized elections since 1985. She has a background in software programming. Her research regarding election-related lawsuits became the primary source material for a July 1985 New York Times article on the vulnerability of computerized voting systems. She is the Communications Director of Safevote, editor of The Bell newsletter and a member of the Advisory Board of the Internet Voting Technology Alliance (IVTA). She can be reached at ewaskell@safevote.com

THE BELL'S MISSION STATEMENT

Our mission is to contribute to the public dialogue on Internet voting as well as to lead discussions on collaborative decision-making in general. THE BELL intends to provide high-quality, non-partisan, timely and useful information regarding privacy, security, technology, voting, their markets and relevant policy issues.

Election Reform in Maryland

Adherence to standards: The state should ensure that all voting equipment used in Maryland adheres to Federal standards, if any. In some aspects of voting machine use, there may be no Federal standards, for example, in the vote-casting interface between the voter and the machine. Even though Florida adopted the Federal voluntary standards, the lack of standards on this subject contributed to the recent Florida fiasco.

More stringent standards: In some aspects of voting, Maryland may wish to adopt more stringent standards than the Federal Government. Human factors in vote-casting may be one of these areas. A second area may be the assurance of computer program correctness and the ability to review source codes. At this time, only the national independent testing authority for software has access to the source codes, which must remain in escrow in case there is a dispute about correctness. Maryland may wish to require that source codes, particularly for DRE equipment, be made available to the state authority to assure correctness. Maryland may wish, also, to assure that voting equipment that has been updated or modified is re-submitted for testing.

No research and advanced development: It is not recommended that Maryland undertake its own research and advanced development program. The benefits of such a program could not be restricted to Maryland, and our state would be subsidizing national developments. Advanced systems, such as remote internet voting, will not be available soon. Participants in a national workshop, held in October, 2000, and sponsored by the National Science Foundation, agreed that difficulties in security prevent remote internet voting from going forward at this time.

Keeping track of advanced developments: Advanced developments, such as internet voting, fingerprint-based voter identification or remote identification using cryptographic techniques, should be reviewed and followed, and should be considered for implementation only if shown to be cost-effective and solidly designed. It is not appropriate for Maryland to serve as a test site for new and unproven developments. However, for new developments that clearly have some promise, cost-sharing by a potential vendor could be considered.

Roy G. Saltman, M.S., M.P.A., works as a consultant in computerized voting. He is retired from the U.S. National Institute of Standards and Technology (NIST) and is well-known for his reports and presentations on the integrity of computerized voting. He is a member of the Advisory Board of the Internet Voting Technology Alliance (IVTA). Saltman can be contacted by email at roysalt@aol.com, by phone at (410) 730-4983 or by fax at (410) 997-4355.

Internet Voting: What Voters Want

Question 6
Hackers were the source of a large concern among the voters. Everyone had read press accounts of teenagers breaking into a variety of so-called "secure" sites. The fact that Safevote invited hackers to attack the system was seen as a good thing. Everyone agreed that just one test wouldn't prove that the system was safe but they said it sounded like an effective strategy to test the security of the system. "You learn from the best," as one voter commented.

Question 7
Several people finished voting and immediately asked, "How do I know what happened to my vote?" One woman inquired, "Since there's no paper to vote on, how do I know that I voted?" When voters were told that they could go on the Internet and check for their DVC in a voter list, they seemed to breath a sigh of relief. In short, everyone liked the idea of being able to go on the Internet to verify that their vote had been received for tallying.

Question 8
Many of the voters initially thought that the DVC was a PIN or an entry code. However, after hearing an explanation of how the DVC functions and then seeing for themselves how it works, voters realized that the DVC was truly anonymous and guaranteed their privacy. The DVC also ensured that they received the correct ballot style.

Typical questions included:

Can anyone else use my DVC to vote? Someone would have to know both your DVC and your password in order to use your DVC to vote. But a DVC can only be used to vote once. If a DVC and password are entered again, the system will recognize them both and deny access to a ballot.

How would I get my DVC in a real election? One way for election officials to distribute DVCs is to mail them to registered voters in a double blind envelope similar to the

way in which banks mail PINs to their customers. Another way, is to give voters their DVCs at the precinct. Both methods can be used in combination, allowing also for provisional ballots.

Question 9
Almost all of the voters were unaware of the fact that current voting systems run on proprietary software. Open peer review and open source software for Internet voting systems was seen as a much better way to produce confidence in election results. Voters readily saw the benefits in having thousands of experts in cryptography, security, and elections scrutinize the requirements and standards for Internet voting systems. In short, there was 100% agreement that open peer review and open source software would lead to more confidence in election results.

Question 10
Everyone thought that the system was easier to use than the punch card or mark-sense voting systems they had used in the past. Reducing election costs due to paper ballots was also viewed as a major benefit, as well as being able to get election results in a timely manner.

Question 11
There was a wide range of opinion regarding when people thought remote Internet voting would be available for public elections. Answers ranged anywhere from two to ten years from now. The majority of people thought it would take more than five years.

Question 12
People were very anxious to vote on the Internet in the next election, referring to the 2002 election year frequently. Many spontaneously asked when it would be available and said they were ready to vote on the Internet today. Convenience seemed to be the determining factor. Many voters had to drive an hour or more to get to the Martinez office and would have preferred to vote from home. All of the people who came from their place of work were very vocal about the fact that they would have preferred to vote from their computer at work. "It would be so easy," said one man, "if I could just vote right there at the office and not have to drive down here."

Eva Waskell has been involved with the U.S. election system and computerized elections since 1985. She has a background in software programming. Her research regarding election-related lawsuits became the primary source material for a July 1985 New York Times article on the vulnerability of computerized voting systems. She is the Communications Director of Safevote, editor of The Bell newsletter and a member of the Advisory Board of the Internet Voting Technology Alliance (IVTA). She can be reached at ewaskell@safevote.com

---

From Our Readers

From Chris Wilson, Election Technology Administrator, Franklin County, OH
"The Bell is very interesting. I post it on our internal website. I especially enjoy the articles in terms of laying out the logical conditions needed for security and privacy in an Internet voting system. This is very important. There are a lot of people coming out of the woodwork now who want to build an Internet voting system. But they know little about the nitty gritty of election administration and voter registration. And besides, Internet voting is a complex undertaking. Anyone who wants to be involved in it should read this newsletter."

From Patricia Donath, State President, League of Women Voters of Michigan
"The information in The Bell on Internet voting will be extremely useful to us in the context of the on-going discussions here in Michigan regarding what we should do after Florida and where do we go from here."

From Edwin William Brill, Jr., Security Analyst, New York
"The Bell is a fairly well-rounded approach to Internet voting and Internet voting is a very difficult puzzle to do for anyone. You're hitting a good range of topics. And the attack test in the November 2000 shadow election was set up really well, with practical solutions."

From Roy Saltman, Consultant on Election Policy and Technology, Columbia, MD
The article in the Orlando Sentinel headlined "Optical Scanners Topped Pregnant Chads as Most Flawed in Florida" demonstrates how it is possible – yes, even very easy – to misinterpret simple statistics. The article is comparing the statewide average of invalid pre-scored punch card ballots (3.9%) with the tail end of the variations in invalid optical-scan ballots (5.7%). The article is comparing whole apples to orange peels and finds, not surprisingly, that apples taste better.

Over the 36 counties in which optical-scan ballots were used, the average percent of invalid ballots was 1.4%. Over the 15 counties in which pre-scored punch card ballots were used, the average percentage of invalid pre-scored ballots was 3.9%. I made this calculation myself from the reported percent of invalid ballots (both overvotes and undervotes) cast in each Florida county. The public statement of the American Society for Quality on the subject of voting equipment used in Florida reported very similar percentages.

In the worst case for optical-scan ballots, Gadsden County, a rural county in the Florida panhandle on the northern border of the state, had 2,073 invalid ballots out of 16,800 ballots cast, or 12.3%. Note, however, the small number of

ballots cast. I was told by a North Carolina election official who grew up in Gadsden County that hardly anyone who continues to live there has a high school diploma. Even the Orlando Sentinel was willing to admit that "Most of the 15 counties using this optical-scan system [with central count rather than precinct count] are small and rural, and together they represent just 4.6% of all the ballots cast ..."

The worst case for pre-scored punch card ballots was Duval County, where there were 26,909 invalid ballots out of 291,000 cast or 9.23%. Duval County includes the city of Jacksonville and some beach communities. Also, Palm Beach County, which includes the city of West Palm Beach and other communities such as Delray Beach, used pre-scored punch card ballots and had 29,702 invalid ballots out of 462,900 ballots cast, or 6.42%. Invalid ballot percentages for Duval and Palm Beach are both more than the cited 5.7% for the worst cases of optical-scan ballots.

Media Watch & Links

Make Your Vote (Machine) Count
"Before Florida, we thought we would have to provide a detailed proof of concept before launching," said Ed Gerck, Safevote's CEO. "Florida compressed the time for us." Florida's compression was felt everywhere. "I have been developing this technology for four and a half years. We are sure we can make it secure," Gerck said. Safevote's machines will use off-the-shelf components and an Intel architecture, all of which can be made ready as soon as counties want it.
http://www.wired.com/news/politics/0,1283,41137,00.html

Race Is On To Improve Voting Technology
Pressure to retire punch-card voting machines across the United States has kicked off a technology race for a less error-prone election system.
http://www.usatoday.com/life/cyber/tech/review/crh818.htm

Optical Scanners Topped Pregnant Chads as Most Flawed in Florida
Another voting system was even less reliable than the punch cards, the Orlando Sentinel found: an optical scanning system used in 15 of Florida's 67 counties.
http://www.latimes.com/print/asection/20010128/t000008236.html

Internet Voting: Threat to Privacy?
To prevent a new vote-counting debacle, we need to guarantee that any new voting method does more than provide a rapid turnaround of election results. It must earn our trust.
http://pcworld.com/features/article.asp?aid=38262

Internet Voting Gains New Appeal
Hugh Denton, a Contra Costa County election official, said the county was pleased with Safevote's Internet voting experiment. In that test, voted ballots were encrypted for privacy, and the system can be set to record votes on CD-ROM, microfilm or even paper to create a vote audit trail, said Eva Waskell, Safevote communications director.
http://www.fcw.com/civic/articles/2001/jan/civ-comm1-01-01.asp

Testimony in Tallahassee
Douglas W. Jones, Associate Professor of Computer Science, University of Iowa and Chair, Iowa Board of Examiners for Voting Machines and Electronic Voting Systems, provided testimony before the United States Civil Rights Commission in Tallahassee, Florida, on January 11, 2001.
http://www.cs.uiowa.edu/~jones/voting/uscrc.html

Uniform Voting System Urged
The Florida Legislature should adopt a uniform voting system and consistent standards for recounting ballots by 2002 to avoid yet another election controversy, the state's election supervisors agreed on January 23.
http://www.herald.com/content/today/news/florida/digdocs/110755.htm
http://www.gopbi.com/partners/pbpost/epaper/editions/today/news_4.html

In Touch with Voting's Future
The Election Technology Expo in Sacramento was organized in the weeks between the election and the inauguration of a president who may owe his mandate to an error-prone election apparatus. "Obviously, the election problems in Florida shined the light of public interest on election technology," said California Secretary of State Bill Jones, whose office co-sponsored the event.
http://www.sacbee.com/news/news/local09_20010117.html

Philadelphia to Get High-Tech Voting Machines
http://inq.philly.com/content/inquirer/2001/01/15/front_page/MACHINE15.htm

City Vote Tally Doesn't Add Up, Review Shows
http://inq.philly.com/content/inquirer/2001/01/22/front_page/PVOTE22.htm

Letter to the Editor from King County, WA
http://www.fcw.com/fcw/articles/2001/0108/web-letter-01-09-01.asp

Links

http://www.privacy.org

THE BELL c/o Safevote, Inc.
1001 D Street, Suite 202
San Rafael, CA 94901-2800

DATED MATERIAL
Please Expedite

FIRST-CLASS MAIL

California Election Technology Expo   See p. 3

To enter your FREE monthly subscription, visit the website www.thebell.net or use the form below.

cut here   **M A I L   O R D E R   F O R M**   cut here

Enter your one year monthly subscription to THE BELL: visit the website www.thebell.net or fill out the form below

   Privacy Notice: We will not forward to third parties any personal, address or credit information supplied to us by you.

NAME/TITLE_____

COMPANY_____

ADDRESS_____

E-MAIL_____

[ ] PDF 12-Month Subscription – FREE

[ ] Printed 12-Month Subscription – $ 30.00 SUBJECT TO AVAILABILITY

[ ] Year 2000 Public Sector U.S. Market Intelligence Study, 200+ pages – $ 850.00 SUBJECT TO AVAILABILITY

[ ] Hard-copy Six Issues of THE BELL, 96 pages, from May to October/2000 - $ 15.00 SUBJECT TO AVAILABILITY

INSTRUCTIONS: Mail completed order form to the address below. Pay by CHECK or MONEY ORDER, payable to Safevote, Inc. Allow two weeks for processing.

   THE BELL c/o Safevote, Inc.
   1001 D Street, Suite 202
   San Rafael, CA 94901-2800