COMMITTEE/BOARD OF SUPERVISORS

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Completed by: ___Alisa Somera___   **Date** November 26, 2014
Completed by: ___Alisa Somera___   **Date** December 4, 2014

1669

1   [Supporting the Creation of Open Source Voting Systems - Studying New Models of Voting
     System Development]

2

3   **Resolution committing the City and County of San Francisco to work with the**

4   **California Association of Voting Officials and other jurisdictions and organizations to**

5   **create new voting systems using open source software; and to study the feasibility of**

6   **the City and County of San Francisco developing and using a new voting system,**

7   **either whole or in part, through a collaborative model like the Los Angeles County**

8   **Voting Systems Assessment Project.**

9

10   WHEREAS, The City and County of San Francisco holds it in the interest of its citizens

11 to conduct efficient and accurate elections in a manner which promotes public trust in the

12 integrity of every aspect of the elections process; and

13   WHEREAS, Transparency in the recording, collection, transmission, aggregation and

14 tally of votes promotes public confidence in the integrity of elections; and

15   WHEREAS, A growing number of government leaders, good government groups,

16 citizens, and media reports have questioned the value and integrity of the existing, limited

17 choices of voting systems certified for use in conducting elections; and

18   WHEREAS, A limited number of vendors dominate the voting systems marketplace,

19 reducing incentives to innovate, and their refusal to make public their voting system software

20 and hardware designs conflicts with the goal of election transparency; and

21   WHEREAS, In order to address these issues, the San Francisco Board of Supervisors

22 on November 18, 2008, adopted Ordinance No. 268-08, File No. 081227, amending the

23 Administrative Code by adding Sections 5.400-410 to establish a Voting Systems Task Force

24 comprised of individuals with backgrounds in good government, computer science or the

25 computer industry, election administration, and accommodations of persons with disabilities,

1   to make recommendations to the Board of Supervisors about voting system standards, design

2   and development; and

3   WHEREAS, Pursuant to Ordinance No. 268-08, the San Francisco Voting Systems

4   Task Force was created to provide the City with recommendations on: standards and

5   guidelines for development and acquisition of voting systems; methods for acquiring voting

6   systems in conformity with federal, state and municipal laws; models for the development of a

7   voting system; business models, including the City and County of San Francisco acting as its

8   own vendor, which promote transparency; and any other issues related to voting systems

9   which will engender public trust in the elections processes of the City and County of San

10 Francisco; and

11 WHEREAS, In June 2011, "Recommendations on Voting Systems for the City and

12 County of San Francisco – A Report by the San Francisco Voting Systems Task Force

13 (VSTF)" was completed, in which the VSTF recommended that San Francisco advocate with

14 the California Secretary of State and the State legislature for a new, comprehensive state

15 certification process to replace the existing requirement for federal certification; and

16 WHEREAS, California Governor Jerry Brown on October 5, 2013, approved California

17 Senate Bill No. 360 amending the California Elections Code to create a comprehensive state

18 certification process and adding a new Section 19006 to the Elections Code stating the intent

19 of the Legislature that:

20 (a) All voting systems be certified or conditionally approved by the Secretary of State,

21 independent of voluntary federal qualification or certification, before they are used in

22 future elections to ensure that the voting systems have the ability to meet accuracy,

23 accessibility, and security standards.

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1   (b) The Secretary of State adopt and publish testing standards that meet or exceed

2   federal voluntary standards set by the United States Election Assistance Commission

3   or its successor agency.

4   (c) The Secretary of State study and encourage the development of voting systems

5   that use nonproprietary source code and that are easy to audit.

6   (d) A local jurisdiction may use available public funds to purchase and maintain any

7   certified or conditionally approved voting system or part of a voting system.

8   (e) California receives the benefits of the publicly funded development of a

9   nonproprietary voting system in the state.

10   (f) A local jurisdiction may use available public funds to research and develop a

11   nonproprietary voting system that uses disclosed source codes, including the

12   manufacture of a limited number of voting system units, for use in a pilot program or for

13   submission to the Secretary of State for certification; and

14   WHEREAS, The VSTF in its June 2011 report also recommended that:

15   (a) the San Francisco Department of Elections give strong preference to a voting

16   system licensing structure that gives San Francisco all of the rights provided by a

17   license approved by the Open Source Initiative, a global non-profit that supports and

18   promotes the open source movement ("OSI-approved license"), even if the system is

19   maintained by an external party.

20   (b) San Francisco work with other jurisdictions and organizations, if an open source

21   model is used, to develop and manage the code-base in order to leverage additional

22   resources and expertise, and participate during the requirements gathering stage of

23   development so that its unique requirements can be incorporated into the system

24   design and implementation.

25   (c) San Francisco be an active participant in the movement toward more open and

1   transparent voting systems, acknowledging the complexity of moving from the existing

2   marketplace toward more innovative voting systems; urging San Francisco to move

3   steadily toward the goal of transparency—even if it must do so in incremental steps;

4   encouraging the City to be a strong advocate in the private sector marketplace for more

5   transparent systems and to be open as well to new collaborative development models;

6   and

7   WHEREAS, The Los Angeles County Voting Systems Assessment Project (VSAP) is a

8   collaborative project to design and implement a new voting system that was launched by the

9   Los Angeles County Registrar-Recorder/County Clerk and is a project that San Francisco

10 officials can learn from; and

11 WHEREAS, The California Association of Voting Officials (CAVO) is a California

12 nonprofit non-stock mutual benefit corporation designed to create new voting systems utilizing

.3 free open source software and inexpensive commodity components, with a mission to develop

14 and make available open source voting systems for use in public elections, as well as to

15 provide training, education and management practices to election officials for the effective

16 employment of technologies; and

17 WHEREAS, CAVO's mission is to create certified and freely shareable voting

18 technology that will be based on free and open source software working with common off-the-

19 shelf modern hardware, including but not limited to tablets, battery-powered printers,

20 computers, and scanners, thus enhancing quality, security, and availability of voting systems

21 available to counties; and

22 WHEREAS, The City and County of San Francisco recognizes that development and

23 certification of these systems will entail substantial investment, but by pooling resources from

24 other jurisdictions and organizations, the cost to each participant can be reduced; now,

25 therefore be it

1   RESOLVED, That the City and County of San Francisco, in order to further these

2   goals, pledges to support the California Association of Voting Officials (CAVO) and other

3   jurisdictions and organizations working to implement open source voting programs ; and, be it

4   FURTHER RESOLVED, That the City and County of San Francisco supports the

5   movement toward more open and transparent voting systems and the creation of new voting

6   systems using open source software and inexpensive commodity components; and, be it

7   FURTHER RESOLVED, That the Board of Supervisors requests that the Local Agency

8   Formation Commission conduct a study of the feasibility and cost-effectiveness of the City

9   and County of San Francisco leading an effort to develop and use a new voting system, either

10 whole or in part, through a collaborative model, and which includes researching and

11 presenting options for structuring such a development project, as well as reviewing the work

12 of the Los Angeles Voting Systems Assessment Project (VSAP) and its process of voting

13 system design and acting as its own vendor, as a model for San Francisco in its pursuit of

14 transparent, secure and fair elections.

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VOTING SYSTEMS TASK FORCE

Edwin M. Lee, Mayor

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4 # RECOMMENDATIONS ON VOTING SYSTEMS FOR
5 # THE CITY AND COUNTY OF SAN FRANCISCO

6

7 **A Report by the San Francisco Voting Systems Task Force (VSTF)**

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17 ## June 2011

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1 Section 1:

2 Introduction and Background

3

4 1.1 Mission and Context of the Voting Systems Task
5 Force (VSTF)

6   In September 2008 the City and County of San Francisco[1] Board of Supervisors established the
7   Voting Systems Task Force to make recommendations to that body about voting systems
8   standards, design, and development.[2] We define our work as follows:

9   **Mission:** Our mission is to advise San Francisco on the development and/or acquisition of voting
10   systems that ensure fair and accurate elections, achieve voter intent, and provide for transparency
11   and public auditability of voting systems components and election data.

12   **Scope and Objective:** Activities encompass voting systems and related elections issues that
13   affect or are affected by voting systems and voting system acquisition in San Francisco. A
14   "voting system" for this report is defined to be a system of hardware, software, and processes
15   that prepares a ballot and records, collects, transmits, counts, and reports on votes and election
16   results as cast by voters. Included in this definition are the associated reports and audit logs that
17   provide information about management of election data in the system and system use, integrity,
18   administrative access, configuration and configuration changes as well as documentation for
19   support, use and training on use of the system.

20   Our report contains recommendations, coupled with supporting rationale, for each of the five
21   areas identified by Section 5.405(b) of the Administrative Code:[3]

22   1. Standards and guidelines to gauge the adequacy, accuracy and trustworthiness of any
23   voting system to be developed or acquired and the adequacy of any vendor or other entity
24   that might develop and deliver such a system;
25   2. Methods for generating or acquiring designs for a voting system that meets applicable
26   Federal, State, County and City laws, regulations and other requirements and all other
27   goals for the voting system while minimizing system life-cycle costs;
28   3. Models for development of a voting system including proprietary, disclosed and open
29   source software and hardware approaches and which address aforementioned voting
30   systems requirements and assure a cost effective, highly reliable, maintainable system;

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[1]Unless specified individually as "the City" or "the County," San Francisco" will be used to refer to the
City and County of San Francisco throughout the remainder of this report.
[2]San Francisco, Calif., Ordinance 268-08 (2008);
www.sfbos.org/ftp/uploadedfiles/bdsupvrs/ordinances08/o0268-08.pdf.
[3]San Francisco, Calif., Ordinance 268-08 (2008), page 3, line 4;
www.sfbos.org/ftp/uploadedfiles/bdsupvrs/ordinances08/o0268-08.pdf.

1   4. Business models, including the City and County of San Francisco acting as its own
2   vendor, which promote the transparency of all aspects of design, development,
3   production and the business relationship of all parties associated with production,
4   delivery, implementation and use of the voting system;

5   5. Any other considerations related to voting systems that will promote public trust in the
6   conduct and results of elections.

7   Recommendations are presented in five topic areas: election records and post-election audit
8   procedures; balloting systems and services; security; Ranked-Choice Voting; and acquisition
9   strategies.

10   This report is not intended to be a complete statement of requirements or technical specifications,
11   and it is not an exhaustive study of all topics related to voting systems. Rather, it provides a
12   framework that will guide San Francisco as it seeks its next voting system. A coordinated effort
13   will be needed to establish a policy direction for San Francisco and to support its Department of
14   Elections through a robust and forward-thinking process. We recognize that the City may wish to
15   initiate further investigation of certain topic areas as it considers a direction for San Francisco's
16   next voting system. We recommend that the San Francisco Board of Supervisors establish a body
17   or process to implement the recommendations contained in this report and to maintain steady
18   focus on this issue over coming months and years.

19   **Time Frame for Recommendations:** San Francisco is currently under contract with Sequoia
20   Voting Systems (which was acquired by Dominion Voting Systems Corporation in 2010),[4] and
21   has the option to extend that contract through elections in 2013. We have identified several
22   opportunities for improving public confidence in the City's use of Sequoia Voting Systems.
23   However, this report primarily offers guidance regarding San Francisco's next voting system.
24   Our recommendations can be found in Section 2 of this report.

25   **Audiences:** Our recommendations are intended to provide guidance to a variety of audiences
26   including the following:

27   • the San Francisco Board of Supervisors

28   • the San Francisco Department of Elections

29   • the San Francisco Elections Commission

30   • San Francisco voters

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[4]Dominion Voting Systems Corporation website (2010), "Dominion Voting Systems Corporation
Acquires Assets of Sequoia Voting Systems," (news release);
http://www.dominionvoting.com/images/pdfs/DominionAcquiresSequoiaFinal.pdf.

1.2 Background on San Francisco's Current Voting System

On March 31, 2005, the San Francisco Department of Elections (DOE) initiated a Request for Proposals (RFP) process seeking bids for a new voting system (including equipment and services) to collect, count, tabulate, and report votes.[5] In December 2007, the San Francisco Board of Supervisors approved a contract with Sequoia Voting Systems for voting systems/services.[6] Sequoia replaced Elections Systems and Software (ES&S) with which the City had been under contract through the 2007 election cycles.

The Sequoia system was implemented beginning with the February 2008 election. The contract runs through December 2011. The contract with Sequoia Voting Systems for a voting system and associated services is valued at $12,650,233.35 (per Resolution 654-07).[7] The DOE has the option to renew the contract two times, each time for one year and has indicated that it anticipates extending the Sequoia contract through the end of 2013. Were it to do so, the DOE estimates that annual maintenance would be approximately $400,000, and services per election would be approximately $500,000. With three elections scheduled in 2012, the projected cost would be approximately $1.9 million. With one election scheduled in 2013, the projected cost would be approximately $900,000 (two year total: $2.8 million).[8]

Sequoia Voting Systems was acquired by Dominion Voting Systems in June 2010. Subsequently, the City accepted the assignment of the contract from Sequoia to Dominion. In this report, San Francisco's voting system is referred to as the "Sequoia Voting System."

San Franciscan voters use an optical scan voting machine to cast their ballots at the polling place. This machine is a paper-based voting system that optically scans the marks that voters make on a paper ballot and counts the votes electronically when the ballot is inserted. Additionally, each polling place has one Sequoia AVC Edge accessible touchscreen voting machine.[9]

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[5]City and County of San Francisco, DOE (6 February 2007),"Contract for New Voting System" (memo from DOE Director John Arntz to Merrick Pascual, Budget Analyst, Board of Supervisors); http://www.sfgov2.org/ftp/uploadedfiles/elections/Announcements/MR2007/20070206.pdf.
[6]City and County of San Francisco government website, "City and Country of San Francisco—NFAMIS Blanket Purchase Order Writing"; http://www.sfgov2.org/Modules/ShowDocument.aspx?documentid=152.
[7]San Francisco Board of Supervisors website, "Resolution No. 65-08," http://www.sfbos.org/ftp/uploadedfiles/bdsupvrs/resolutions08/r0065-08.pdf
[8]San Francisco Department of Elections, e-mail message to Jody Sanford, April 14, 2010.
[9]Nataliya Kuzina, Deputy Director, San Francisco Department of Elections, e-mail message to Jody Sanford, April 19, 2011.

1   The technical specifications of San Francisco's current voting system are as follows:[10]

2   Optech Insight Plus
3   APX Firmware K2.16.080626.1320
4   HPX Firmware K1.44.080501.1500
5
6   Optech 400-C Hardware version 3.00P
7   WinETP Software version 1.16.6
8
9   AVC Edge Model II
10   Firmware version 5.0.24
11
12   WinEDS versions 3.1.012 and 4.0.116B
13   WinEDS Extended Services 1.0.47
14   WinEDS Election Reporting Software 4.0.44
15
16   Card Activator version 5.0.21
17
18   MemoryPack Receiver (MPR) Hardware version D
19   Firmware version 3.01.080422.0522

20   1.3 Opportunities Presented by "Next Generation"
21   Voting Systems

22   John Arntz has been the director of the San Francisco Department of Elections (DOE) since
23   2002. Under his capable leadership, DOE has conducted well-run elections. Yet, the VSTF
24   believes that there is room to improve the underlying voting system and the procedures that
25   accompany the elections process. We have identified opportunities for improvement in several
26   areas:

27   • intent of voter and accessibility

28   • audit and verification procedures

29   • security

30   • transparency

31   These issues exist across the entire election systems landscape. In order to address them, there is
32   a need for innovation in the voting systems marketplace. Yet there are many barriers that limit
33   advancement and prevent new players from entering the market: the regulatory environment at
34   the state and federal level is shifting and cumbersome; developing, testing, and certifying new
35   systems are costly endeavors and time-consuming; the voting systems market is fragmented with
36   multiple jurisdictions and differing systems requirements; and many jurisdictions lack adequate

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[10]Nataliya Kuzina, Deputy Director, San Francisco Department of Elections, e-mail message to Jody
Sanford, April 19, 2011.

1 funding to invest in a new system. (The regulatory environment and acquisition marketplace is
2 discussed in detail in Section 2.5: Acquisition Strategies.)

3 Given these challenges, San Francisco would be prudent (a) to begin immediately considering
4 the characteristics of the voting system it would like to implement after the contract for its
5 current voting system terminates, and (b) to consider the acquisition model it will use to obtain a
6 new system. In fact, the City would be on par with other jurisdictions. Across the nation,
7 jurisdictions are grappling with how to provide elections that are accurate, fair, secure,
8 transparent, and accessible, and with how to evaluate the merits of various systems and
9 acquisition models.

10 The conversation about next generation voting systems is generating opportunities for
11 collaboration and information sharing. An effort to study future voting systems has been
12 undertaken by at least two other jurisdictions, including the following:

13   1. County of Los Angeles (California) Voting Systems Assessment Project (VSAP)
14   http://www.lavote.net/voter/VSAP
15   2. Travis County (Texas) Elections Study Group 2009
16   http://www.co.travis.tx.us/county_clerk/election/study_group_2009

17 We acknowledge that the obstacles to progress are significant and that jurisdictions must balance
18 aspiration with pragmatism. However, we believe that San Francisco should be an active
19 participant in the movement toward modernized voting systems, and it should consider a broad
20 range of possibilities regarding the business and partnership model it will pursue to
21 acquire/develop its next voting system.

22 While a flawless voting system is not attainable, the VSTF members hope that this strategic
23 guidance will help San Francisco implement a voting system that earns the highest level of
24 public confidence.

25

Section 2: Recommendations

2.1. Election Records and Post-Election Audit Procedures

2.1.1 Introduction

This section concerns the records generated in the course of an election and the procedures for checking records to verify that the election was conducted properly. Comprehensive records and audit procedures are essential for ensuring a correct outcome, deterring fraud, building public confidence in elections, and understanding how to improve the election system. Though there are many types of audits, this section deals only with post-election verification of the results.

2.1.2 Concepts and Definitions

Election records include paper or electronic records at all stages of an election, such as the following:

- **Voter registrations:** lists of the registered voters
- **Election definitions:** lists of the contests and candidates in the election and which groups of voters are eligible to vote in which contest
- **Ballot definitions:** descriptions of the contents and layout of each type of blank ballot
- **Cast vote records (CVRs):** electronic records of the choices that a voter made
- **Audit logs, event logs, and error reports:** timed records of events that took place during the election (e.g. accessing of sensitive information, opening or closing of polls, casting of ballots, granting or revocation of access, actions by election workers)
- **Canvass records:** all records used to reconcile vote totals during the post-election canvass period (period between election night and the date an election is certified), including ballot reconciliation sheets, records establishing chain of custody, and other precinct records
- **Vote counts:** counts of the votes (usually within an election district)
- **Election outcome:** the winning candidate in a contest, or the winning side of a referendum, as determined by the vote counts from all districts
- **Election results:** the final report of overall vote counts and outcomes, including the number of ballots cast, voter registration and turnout percentages, and other election statistics

A **post-election manual tally** (sometimes called a post-election audit) is a procedure conducted after an election to check the vote counts. It is usually performed by dividing the cast ballots into

1   groups called **audit units**, selecting some fraction of the audit units for a manual count, and
2   checking that the manual counts for each unit match the vote tallies from the election. The
3   California Elections Code, Section 15360,[11] currently requires a manual tally of the ballots from
4   1% of the precincts.

5   A **risk-limiting audit** is an audit that ensures a high, pre-specified chance of detecting and
6   correcting an incorrect election outcome. Any auditing procedure that can provide such a
7   guarantee qualifies as a risk-limiting audit. For the purpose of this definition, the correct outcome
8   is the outcome that a full hand count of all the ballots would have produced. Audits can be made
9   risk-limiting by establishing specific criteria under which a full hand count must occur. Typically
10   a risk-limiting audit involves hand-counting a randomly selected sample of the ballots (where the
11   number of ballots to count depends on how close the contest was), comparing the hand-verified
12   results to the vote tallies, and escalating to a full hand count if the error is sufficiently large. For
13   example, to limit the risk of an incorrect outcome to 1%, the sampling procedure and escalation
14   criteria must be chosen such that there is at least a 99% chance of escalating to a full hand count
15   when the outcome is incorrect.

16   **Ranked-Choice Voting** (RCV) is an election method in which each voter ranks the candidates
17   and the votes are counted through a multiple-round elimination process. This method is also
18   known as Instant-Runoff Voting or the Alternative Vote. As currently implemented in San
19   Francisco, each voter indicates a first choice, an optional second choice, and an optional third
20   choice for an elected office. In the first round of counting, all ballots are assigned to their first
21   choices. If one candidate now has a majority of the ballots, that candidate wins. If not, the
22   candidate with the least ballots is eliminated; ballots with that candidate as their first choice are
23   then reallocated to their second choice, or set aside as exhausted ballots if there is no second
24   choice. Rounds of counting and elimination repeat—always assigning each ballot to its highest-
25   ranked non-eliminated candidate—until one candidate has a majority of the non-exhausted
26   ballots.

27   **Election Markup Language** (EML) is a suite of XML-based data formats for election records,
28   defined by the Organization for Advancement of Structured Information Standards (OASIS). The
29   current version is EML 5.0 and work on EML 6.0 is under way. EML defines several different
30   data formats for different kinds of records; each format is identified by a number.

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[11]California Legislative Counsel government website, "Election Code Section 15360";
http://www.leginfo.ca.gov/cgi-bin/displaycode?section=elec&group=15001-16000&file=15360.

1 2.1.3 Findings

2 2.1.3.1 Voting System Vulnerabilities

3 Numerous independent investigations have discovered serious security weaknesses and design
4 errors in widely used electronic voting equipment. Some examples are cited as follows:

5   • In 2004, four computer security experts examined the source code of a DRE voting
6   machine[12] and found it to be "far below even the most minimal security standards
7   applicable in other contexts."

8   • In 2006, investigators at Princeton University demonstrated that it is possible to construct
9   a software virus that spreads from voting machine to voting machine—even when the
10   machines are not connected to a network—while altering votes in an undetectable
11   fashion.[13]

12 • In 2007, a team of reviewers appointed by the California Secretary of State found major
13   security flaws in three of the major brands of voting systems used in California, [14, 15, 16, 17]
14   including vulnerability to infection by a software virus in some cases.

15 • In 2008, the election system in Humboldt County erroneously deleted 197 ballots.[18]

16 Voting machines are still perceived as untrustworthy in the public consciousness. The
17 investigations mentioned above were widely publicized, and there continues to be a steady flow
18 of news headlines raising concerns about flaws and reliability problems with voting machines.

19   **Finding 1:** It is not safe to rely solely on electronic voting equipment for accurate results.

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[12]Kohno, Tadayoshi, Adam Stubblefield, Aviel D. Rubin, and Dan S. Wallach (2004). Analysis of an
Electronic Voting System. In *Proceedings of the 2004 IEEE Symposium on Security and Privacy*, pp. 27-
40. IEEE Computer Society Press.
[13]Feldman, Ariel J., J. Alex Halderman, Edward W. Felten (2007). "Security Analysis of the Diebold
AccuVote-TS Voting Machine." In *Proc. 2007 USENIX/ACCURATE Electronic Voting Technology
Workshop (EVT/WOTE '07)*; http://citp.princeton.edu/pub/ts06EVT.pdf.
[14]California Secretary of State Debra Bowen government website, "California Top-to-Bottom Review of
Voting Systems" (TTBR); http://www.sos.ca.gov/voting-systems/oversight/top-to-bottom-review.htm.
[15]Calandrino, Joseph A., Ariel J. Feldman, J. Alex Halderman, David Wagner, Harlan Yu, and William P.
Zeller (2007a). "Source Code Review of the Diebold Voting System." (report, University of California,
Berkeley under contract to the California Secretary of State's TTBR); http://www.sos.ca.gov/voting-
systems/oversight/ttbr/diebold-source-public-jul29.pdf.
[16]Inguva, Srinivas, Eric Rescorla, Hovav Shacham, and Dan S. Wallach (2007). "Source Code Review of
the Hart InterCivic Voting System." (report, University of California, Berkeley under contract to the
California Secretary of State's TTBR); http://www.sos.ca.gov/voting-systems/oversight/ttbr/Hart-source-
public.pdf.
[17]Blaze, Matt, Arel Cordero, Sophie Engle, Chris Karlof, Naveen Sastry, Micah Sherr, Till Stegers, and
Ka-Ping Yee (2007). "Source Code Review of the Sequoia Voting System." (report, University of
California, Berkeley under contract to the California Secretary of State's TTBR);
http://www.sos.ca.gov/voting-systems/oversight/ttbr/sequoia-source-public-jul26.pdf.
[18]California Secretary of State Debra Bowen government website, "Report to the Election Assistance
Commission Concerning Errors and Deficiencies in Diebold/Premier GEMS Version 1.18.19," (2009).
https://www.sos.ca.gov/voting-systems/vendors/premier/sos-humboldt-report-to-eac-03-02-09.pdf.

1 **Finding 2:** Public confidence in electronic voting has been diminished by the discoveries
2 of serious flaws in electronic voting systems.

3 2.1.3.2 Current Auditing Procedures

4 San Francisco's post-election audit is known as the "1% Manual Tally," in which the ballots
5 from a random selection of precincts are manually counted.[19] The manual counts are checked
6 against machine reports at the precinct level. For speed and accuracy, the contests are counted
7 one at a time; that is, each counting team counts a single contest for an entire precinct, then
8 counts the next contest for the entire precinct, and so on.

9 We inquired as to the procedure taken when the audit appears to be at variance with the reported
10 election results. When there is a discrepancy of even one vote, the ballots are counted again, with
11 particular attention to counting the ballots as a machine would count them, not as a human would
12 interpret the voter's intent. That is, the audit seeks a way to interpret the ballots that confirms the
13 machine result. If a discrepancy remains after a second count, the audit team fills out a Manual
14 Tally Incident Report, which is reviewed by supervisors in charge of the canvass. There is no
15 formal written procedure for escalating the audit or challenging the election results based on such
16 a discrepancy.

17 **Finding 3:** The current post-election audit procedure does not establish a known limit on
18 the risk of an incorrect outcome.

19 2.1.3.2.1 Auditing Procedures for Non-RCV Contests

20 For a regular contest, the manual count produces a tally of the number of votes for each
21 candidate. These numbers are then compared directly to the vote counts on the machine report
22 for the precinct. The counting process is quite fast, because the ballots are first sorted into piles
23 (one pile for each candidate), and then each pile is counted. We watched a video of the manual
24 tally for a ballot measure; a member of the team counted the "Yes" pile, speaking "Yes, yes, yes,
25 yes, yes…" at a rate of about two ballots per second.

26 If this manual tally process were carried out for every precinct, it would give assurance that the
27 counts are correct in every precinct, and thus the totals are correct for the entire election, and
28 thus the outcomes (winners) are also correct. Performing this process for a randomly selected
29 fraction of the precincts therefore verifies the outcome with a known level of confidence. This
30 level of confidence can be calculated, and it depends on how many precincts are checked, the
31 number of ballots, and the margin of victory. A 10% tally provides higher confidence than a 1%
32 tally, and a 100% tally provides complete confidence.

33 2.1.3.2.2 Auditing Procedures for RCV Contests

34 For an RCV contest, the team manually counts the first choices, second choices, and third
35 choices separately, as if they were three independent contests, resulting in three counts for each
36 candidate. These are compared directly to the machine report, which also provides vote counts of

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[19]San Francisco Department of Elections, SF RCV BDProcedures2009-Final.xls, electronic file.

1 each RCV contest as though it were three independent contests. Next, the team carries out the
2 RCV elimination process *at the precinct level*. That is, if no candidate has a simple majority of
3 the first-choice votes *in the precinct*, then the candidate with the lowest number of first-choice
4 votes in the precinct is eliminated; those ballots are transferred to piles for their second-choice
5 candidates, and so on.

6 Since the actual election outcome is determined by elimination based on totals for the entire
7 election, the sequence of candidates eliminated during the manual precinct tally bears no
8 relationship to the actual elimination sequence. Also, checking the three independent totals does
9 not verify the outcome because the outcome depends on which first-choice votes are cast with
10 which second-choice votes—not just how many of each there are. Thus the RCV manual tally
11 process does not verify the outcome of the election (see Appendix A for a detailed example).

12   **Finding 4:** The manual tally procedure for RCV contests is significantly more complex
13   than the procedure for non-RCV contests.

14   **Finding 5:** The manual tally procedure does not verify the outcome of RCV contests.

15 ## 2.1.3.3 Alternative Auditing Procedures

16 **2.1.3.3.1 Independent Verification**

17 The deletion of 197 ballots in Humboldt County led to the certification of incorrect results in the
18 November 4, 2008, General Election. The discrepancy went undetected until it was discovered
19 by an audit conducted by the Humboldt County Election Transparency Project.[20] The ballots
20 were scanned with a general-purpose, high-speed office scanner. A pre-imprinter attached to the
21 scanner printed a unique serial number on each ballot before scanning. The resulting scanned
22 images were then counted by an image analysis program called TEVS,[21] written by Mitch
23 Trachtenberg. TEVS is freely available under an open source license and has been developed
24 further since 2008.

25   **Finding 6:** An independent verification of an election has been successfully conducted
26   by scanning and counting ballots using ordinary office equipment and free software, and
27   such procedures can be effective at detecting errors in election results.

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[20]Humboldt Election Transparency Project, last accessed on June 23, 2011; http://humtp.com/.
[21]Trachtenberg Election Verification System, last accessed on June 23, 2011;
http://code.google.com/p/tevs/.

1 **2.1.3.3.2 Risk-limiting Audits**

2 In 2008, Joseph Hall et al. conducted risk-limiting audits of four contests from elections that took
3 place in California's Marin, Yolo, and Santa Cruz counties. The authors reported that "[t]he cost
4 and the time required were modest....There remains room for big gains in efficiency—that is, for
5 reducing the number of ballots that must be counted to confirm an election outcome that is, in
6 fact, correct."[22]

7 In 2009, risk-limiting audits were performed for two contests in Yolo County, as reported by
8 Philip Stark.[23] In one case, the audit units were batches of between 200 and 600 ballots, and the
9 risk-limiting audit required hand-counting 1,437 ballots—a little more than 11% of the ballots
10 cast. In the other case, the audit units were individual ballots, and the risk-limiting audit required
11 hand-counting only 32 ballots.

12   **Finding 7:** Risk-limiting audits have been carried out successfully in California.

13 We note that several risk-limiting audit methods have been proposed and published in peer-
14 reviewed literature. One notable example is the method proposed in "Super-Simple Simultaneous
15 Single-Ballot Risk-Limiting Audits," [24] which audits all the contests on the ballot at once,
16 requires just one parameter to be calculated by a formula (which needs to be calculated only once
17 before the audit begins), and has a simple method for determining how many ballots to check.
18 However, all the proposed methods so far assume a non-RCV contest: there appear to be no
19 peer-reviewed, published methods for risk-limiting audits of RCV contests.

20   **Finding 8:** There is at least one peer-reviewed risk-limiting audit method for non-RCV
21   contests that is practical and straightforward to carry out.

22   **Finding 9:** There do not appear to be any peer-reviewed risk-limiting audit methods for
23   RCV contests that have yet been published.

24 **2.1.3.3.3 Ballot-level Auditing**

25 In addition to Stark, other researchers also report that auditing at the individual ballot level
26 dramatically reduces the number of ballots that need to be hand-counted in order to achieve a
27 high degree of confidence. Calandrino et al. (2007b)[25] have proposed a method of ballot-level
28 auditing that uses a machine to mark each ballot with a unique number, so that randomly selected

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[22]Hall, Joseph Lorenzo, Luke W. Miratrix, Philip B. Stark, Melvin Briones, Elaine Ginnold, Freddie
Oakley, Martin Peaden, Gail Pellerin, Tom Stanionis, Tricia Webber (2009). "Implementing Risk-
Limiting Post-Election Audits in California";
http://www.usenix.org/event/evtwote09/tech/full_papers/hall.pdf.
[23]Stark, P.B. (2009). "Efficient Post-Election Audits Of Multiple Contests: 2009 California Tests."
(Refereed paper presented at the 2009 Conference on Empirical Legal Studies.);
http://ssrn.com/abstract=1443314.
[24]Stark, P.B. (2010). "Super-Simple Simultaneous Single-Ballot Risk-Limiting Audits," in the 2010
Electronic Voting Technology Workshop/Workshop on Trustworthy Elections (EVT/WOTE '10);
http://www.usenix.org/events/evtwote10/tech/full_papers/Stark.pdf.
[25]Calandrino, Joseph A., J. Alex Halderman, and Edward W. Felten (2007b). "Machine-Assisted Election
Auditing"; http://www.usenix.org/events/evt07/tech/full_papers/calandrino/calandrino.pdf.

1 ballots can be individually retrieved and checked against their corresponding cast vote records.
2 Even without such markings, keeping the ballots stacked in the same order that they were
3 scanned is sufficient to make ballot-level auditing possible.[26] The number of ballots to check
4 depends on the margin of victory; closer contests require more manual checking. Calandrino
5 et al. (2007b) analyzed the statewide contests in the Virginia elections in November 2006 and
6 found that in order to achieve a 99% confidence level of detecting an incorrect outcome, a ballot-
7 level audit would require hand-counting 40 times fewer ballots than a precinct-level audit.

8 **Finding 10:** Performing a risk-limiting audit with large audit units (e.g. randomly
9 selecting entire precincts for manual counting) is likely to be more expensive than a 1%
10 manual tally.

11 **Finding 11:** Performing a risk-limiting audit at the ballot level (i.e. randomly selecting
12 individual ballots for manual counting) is likely to be considerably cheaper than a 1%
13 manual tally, while providing stronger assurance that the outcome is correct.

14 **2.1.3.3.4 Assembly Bill 2023**

15 We note that California Assembly Bill 2023[27] (AB 2023) authorizes the establishment of a
16 groundbreaking pilot program to conduct risk-limiting audits in "5 or more voluntarily
17 participating counties" during 2011. The program will yield a report to the California
18 Legislature evaluating the effectiveness and efficiency of the audits. We find that the definition
19 of "risk-limiting audit" given in AB 2023 matches the meaning intended in this report.

20 **Finding 12:** The AB 2023 pilot program provides a valuable opportunity to conduct
21 officially recognized risk-limiting audits, advance the state of the art in post-election
22 auditing procedures, and achieve higher confidence in election outcomes.

23 **2.1.3.3.5 File Formats**

24 Those who have conducted the aforementioned audits also reported that "[a] great deal of
25 scripting and hand editing was required to make the exported data [from Election Management
26 Systems] useful....Election auditing requires better 'data plumbing' than EMS vendors currently
27 provide....One suitable format is the OASIS Election Markup Language (EML)...."[28]

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[26]Note: In order to preserve voter anonymity, it is important not to order the ballots in a way that can be
correlated with the order in which public records show the voters as having cast their votes.
[27]Official California Legislative Information, "Assembly Bill 2023"; http://www.leginfo.ca.gov/pub/09-
10/bill/asm/ab_2001-2050/ab_2023_bill_20100719_chaptered.pdf.
[28]Hall, Joseph Lorenzo, Luke W. Miratrix, Philip B. Stark, Melvin Briones, Elaine Ginnold, Freddie
Oakley, Martin Peaden, Gail Pellerin, Tom Stanionis, Tricia Webber (2009). "Implementing Risk-
Limiting Post-Election Audits in California";
http://www.usenix.org/event/evtwote09/tech/full_papers/hall.pdf.

1 Neal McBurnett worked with the Boulder County Elections Division to conduct an audit for the
2 2008 General Election in Boulder County, Colorado,[29] and reported the following:

- 3 Most of the reports produced by the Hart tally system were poorly specified or hard to
  4 parse for auditing.
- 5 The Hart tally system produced an XML report that was usable for auditing, though it
  6 still lacked some important information and did not adhere to the EML standard.
- 7 Effective audits are easier and require less hand counting to achieve a similar level of
  8 confidence if results are reported in smaller audit units.

9 Both of these reports point to non-proprietary reporting formats, specifically EML. We are also
10 aware of IEEE P-1622, which is another voting data standard under development with more of a
11 focus on elections in the United States. We have not reviewed the specification for P-1622, as the
12 IEEE P-1622 Working Group's working documents are not freely available on its website. If and
13 when P-1622 is a fully developed, freely available open standard with comparable
14 expressiveness to EML, it may also be a suitable option.

15   **Finding 13:** The use of proprietary, vendor-specific data formats increases the difficulty
16   of conducting an audit or forensic investigation.

17   **Finding 14:** Election Markup Language is a suitable structured data format for enabling
18   efficient post-election audits.

19 **2.1.3.3.6 End-to-end Verification**

20 Another way to establish confidence in an election is to provide the voters with a way to verify
21 that their own votes were correctly recorded and included in the tally. Voting systems that make
22 this possible are said to offer **end-to-end verification**. At the same time, however, it is important
23 to avoid enabling voters to prove how they voted in such a way that they can sell their votes, and
24 also to avoid enabling voters to fraudulently claim that their votes were misrecorded. Although
25 this is a tricky set of requirements to satisfy all at once, there is a substantial body of research
26 and invention in voting systems that actually do have all of these properties. To cite one
27 example, a system called Scantegrity II[30] allows voters to note confirmation codes for their
28 choices and check those codes against a published list of the codes for all the cast ballots, but it
29 does not allow them to prove to others which candidates those codes represented. The City of
30 Takoma Park, Maryland, used Scantegrity II for its November 2009 election.

31   **Finding 15:** There is at least one voting system offering paper-based end-to-end
32   verification that has been used to conduct a real election.

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[29]McBurnett, Neal (2008). "Obtaining Batch Reports for Audits from Election Management Systems:
Election Audits and the Boulder 2008 Election" National Institute of Standards and Technology;
http://www.nist.gov/itl/vote/upload/neal-mcburnett-boulder-paper.pdf.
[30]Scantegrity, last accessed on June 23, 2011; http://www.scantegrity.org/.

1 2.1.4 Recommendations

2 Based on the findings above, the VSTF makes the following recommendations.
3 Recommendations 1 through 7 can begin implementation now. Recommendations 8 through 12
4 concern longer-term or more speculative changes, such as the criteria for San Francisco's next
5 voting system. Below, the phrase "EML or an equivalent open standard" refers to a publicly
6 available, freely licensed format of equivalent expressiveness to EML, established by a vendor-
7 independent national or international technical standards body.

8 2.1.4.1 Near-term Recommendations

9   1. Publish all election records on the city's website, redacting records only as necessary to
10   protect the anonymity of each voter's votes and the privacy of each voter's personally
11   identifying information. Give public notice when records are published. Whenever
12   feasible, use EML or an equivalent open standard format for the published records. The
13   VSTF recommends prioritizing these four types of records first:

14   a. *Tallies of the vote counts, under-votes, and over-votes from each precinct:*
15   Publish (using EML section 500 or equivalent formats) as soon as possible after
16   each precinct closes its polls. For RCV contests, publish the tallies of each
17   preference level, to the extent that these tallies can be compared against totals
18   published at the polling place in order to verify the correct transfer of ballots to
19   the central election office.

20   b. *Text files of cast vote records, which are currently called "ballot image files":*
21   For precinct-scanned ballots, publish as soon as the memory packs are loaded; for
22   centrally scanned ballots, publish as soon as the ballots are centrally scanned.
23   These must be published before any precincts are randomly selected for audits.

24   c. *Election definitions:* Publish (using EML section 200 and 600 or equivalent
25   formats) as soon as the Qualified Candidate List and Official Measures List are
26   complete.

27   d. *Ballot definition files:* Publish (in the current proprietary format) as soon as ballot
28   layouts are complete. When EML or an equivalent open standard format is used
29   (see Recommendation 7), publish in that format.

30   2. Correct the audit procedure for RCV contests in such a way that a 100% tally would
31   actually ascertain the outcome. In particular, as recommended by the California Secretary
32   of State, use entire-election totals—not precinct vote totals—to determine which
33   candidates to eliminate.[31]

34   3. Pursue participation in the post-canvass risk-limiting audit pilot program authorized by
35   California AB 2023.

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[31]California Secretary of State Debra Bowen government website. Debra Bowen (2010) "Instant Runoff
Voting in Charter Counties and Charter Cities"; http://www.sos.ca.gov/voting-
systems/oversight/directives/irv-guidelines.pdf.

1   4. Define, pilot, and use a ballot-level risk-limiting audit procedure for all non-RCV
2   contests, taking guidance from Hall et al.'s "Implementing Risk-Limiting Post-Election
3   Audits in California"[32] and considering as one option Stark's "Super-Simple
4   Simultaneous Single-Ballot Risk-Limiting Audits." [33]

5   5. At such time as a peer-reviewed method for risk-limiting audits of RCV contests has been
6   published, define, pilot, and use a ballot-level risk-limiting audit procedure for all RCV
7   contests.

8   6. Permit academic organizations[34] to publicly request and obtain timely access to all the
9   paper ballots (without any information linking ballots to voter identities) for the sole
10   purpose of digitally scanning the ballots and analyzing the scanned images to
11   independently verify election results,[35] and to publish their findings from such
12   verification.

13   7. Permit academic organizations to publicly request, obtain, and study machine audit logs
14   from which any information identifying individual voters has been removed, and to
15   publish their findings from such study.

2.1.4.2 Longer-term Recommendations

17   8. Consider broadening the audience with access in Recommendations 6 and 7 to include
18   other organizations that serve the public interest, or all members of the public, under
19   conditions that limit conflicts of interest, provide full transparency, protect voter privacy,
20   and discourage vote-selling.

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[32]Hall, Joseph Lorenzo, Luke W. Miratrix, Philip B. Stark, Melvin Briones, Elaine Ginnold, Freddie
Oakley, Martin Peaden, Gail Pellerin, Tom Stanionis, Tricia Webber (2009). "Implementing Risk-
Limiting Post-Election Audits in California";
http://www.usenix.org/event/evtwote09/tech/full_papers/hall.pdf.
[33]Stark, P.B. (2010). "Super-Simple Simultaneous Single-Ballot Risk-Limiting Audits," in 2010
Electronic Voting Technology Workshop/Workshop on Trustworthy Elections (EVT/WOTE '10); URL:
http://www.usenix.org/events/evtwote10/tech/full_papers/Stark.pdf.
[34]Note: Due to the precedent set by the Humboldt County Election Transparency Project, the
VSTF finds great potential value in enabling independent parties to scan and analyze the ballots.
However, we also recognize that making all ballots available to the public creates concerns about
voter privacy and may enable large-scale vote-selling. Because we believe that independent
verification is a powerful way to establish voter confidence, we prefer to see short-term action
rather than have such action delayed, perhaps indefinitely, by the controversy that the public
distribution of ballots would raise. Thus, we propose the compromise of making the ballots
available for scanning to academic organizations, under the assumption that such organizations
have sufficient reputations and oversight to be trusted not to engage in large-scale vote-selling
schemes. We do not intend this recommendation to prohibit members of the public from
collaborating with academic organizations to participate in the verification process. In fact, we
encourage a publicly transparent process.
[35]By way of example, two such systems are or will become available from TEVSystems
(http://www.TEVSystems.com, http://code.google.com/p/tevs/) and the Clear Ballot Group
(http://www.ClearBallot.com).

1   9. Use EML or an equivalent open standard format internally within the Department of
2   Elections as the primary data format for election definitions and results.

3   10. Announce an acquisition preference for voting systems that facilitate auditing of
4   individual randomly selected ballots, for example, by exporting digital cast vote records,
5   by exporting scanned images of ballots, and/or by printing a unique identifier on each
6   ballot at the time the ballot is scanned in order to associate each physical ballot with its
7   digital cast vote record.

8   11. Announce support for EML or an equivalent open standard format as a procurement
9   requirement for new voting systems—specifically, as the format for election definitions,
10   results, outcomes, and any reports necessary to support the risk-limiting audit procedure
11   in use.

12   12. Announce an acquisition preference for voting systems that allow individual voters to
13   verify their cast votes after the election and independently check the vote tally, without
14   enabling voters to sell their votes or fraudulently claim that their votes were miscounted.

15

2.2 Balloting Systems & Services

2.2.1 Introduction

3 This section addresses selected issues and opportunities for balloting systems and services,
4 which the VSTF believes are the most important to consider in any next-generation elections
5 administration and voting systems platform. Where possible, this section makes tactical
6 recommendations that can be applied to the current system(s) in place. The majority of this
7 material, however, focuses on recommendations to guide the defining of requirements and
8 specifications for any future voting system acquisition to enhance, extend, or replace what
9 San Francisco currently has deployed.

10 "Balloting systems and services" as used in this Report refers to those technologies employed
11 for the following uses of secret ballots in a public election: (1) producing ballots prior to an
12 election or on-demand during an election; (2) delivering a ballot to a voter, either in person or
13 remotely for absentee voters; (3) marking a ballot, whether manually marking a paper ballot,
14 digitally marking an electronic ballot, or using digital means to indicate ballot choices that are
15 then represented on a printed ballot; (4) presenting a ballot to be counted, whether remotely or
16 in-person, or presented physically or digitally; and (5) the actual counting of ballots.

17 The "secret ballot" is used here in recognition that it has been traditionally a term of art within
18 the elections administration community. However, it is important to balance the access to and
19 verifiability of election records (including ballots) with the need to maintain voter privacy. The
20 principal quality of the U.S. election system that guarantees this privacy is perhaps best
21 described more constructively as "ballot anonymity" rather than "ballot secrecy." Ballot
22 anonymity means that voters cannot provably be associated with their vote data. It does not mean
23 that ballots should be kept secret after casting. Incidental recognition of a ballot image or a vote
24 pattern by the voter is probably unavoidable without closing off access in an irrevocable manner.
25 Even so, there are means available to reduce the likelihood that personal identities will be
26 associated with otherwise anonymous records.

27 Ballot anonymity should be recognized as an essential part of any existing or future voting
28 system. There is concern that coercion and vote buying/selling might occur when specific ballots
29 can be linked to specific voters. (See recent cases of vote buying and selling in Kentucky for an
30 example.)[36] This danger, however, should not be over interpreted in a way that leads to the loss
31 of necessary transparency in the counting of ballots or the verification of counts. At the same
32 time, it is important to consider dangers inherent in selective access to election records (e.g. for
33 officials only).

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[36]See http://www.kentucky.com/2010/11/03/1506063/voting-going-smoothly-across-kentucky.html.

2.2.2 Concepts and Definitions

- **Direct-Record Election device (DRE):** a computer-based device that presents a ballot as a series of ballot items; accepts voter selection(s) for each ballot item; provides navigation, help, confirmation and other UI functions; records an electronic ballot that comprises all of a voter's ballot item selections. Some DREs include a voter-verified paper audit trail (VVPAT).

- **Remote Digital Voting:** is a voting method in which marked ballot data is digitally transmitted from voter to election officials, either with or without a paper trail.

- **Uniformed and Overseas Civilian Absentee Voter Act (UOCAVA):**[37] an act of the U.S. Congress that places requirements on states' conduct of elections to include measures to enhance access by (a) military or civilian voters not residing in the U.S. or (b) military voters on service away from their locality of voter registration.

- **Vote By Mail (VBM):** a voting method by which a blank ballot and voter affidavit are sent via postal service to an absentee voter, who is expected to complete both documents and return them via postal or express service, packaged in such a way that the affidavit can be viewed without viewing the marked ballot. Jurisdictions employ a wide variety of methods for packaging, for information required on affidavits, and for validation (if any) of the affidavit sometimes including a signature.

- **Voter-Verified Paper Audit Trail (VVPAT):** a paper-based component of a DRE. Some DREs print a VVPAT for a voter to view and independently verify before casting an electronic ballot. Such VVPATs are removed from view after casts; in some jurisdictions, VVPATs are used for hand-count audits of DRE counts.

A **Ballot Marking Device (BMD)** presents a ballot as a series of ballot items; accepts voter selection(s) for each ballot item; provides navigation, help, confirmation and other user interface functions; records the voter's selections by printing a paper ballot that the voter can cast in the same manner as paper ballots that were marked by hand. Some BMDs print only selection marks (e.g. bubbles) on pre-printed ballots; other BMDs print a complete ballot on a blank sheet(s) of paper.

The **Central Count Optical Scan device (CCOS)** incorporates digital image capture and digital image processing techniques to acquire an image of each sheet of a deck of paper ballots, identify voter marks on the ballot, and interpret each mark as a choice for a particular contest's candidate or choice. The votes from each scanned and counted ballot are tallied to produce vote totals from the set of ballots scanned during a single run of the device. Some CCOS devices retain ballot images and/or individual records of each counted ballot. Some CCOS devices reject ballots with ambiguous marks, while others provide a user interface for election officials to interpret the voter's intent and indicate how an ambiguous mark should be realized and recorded as a vote or non-vote.

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[37]Uniformed and Overseas Civilian Absentee Voter Act;
http://web.archive.org/web/20080126231627/http://www.fvap.gov/laws/uocavalaw.html.

1 The **Precinct Count Optical Scan device (PCOS)** is similar to a CCOS device, except that a
2 PCOS device works on individual paper ballots rather than a deck of ballots, and the intervention
3 for ambiguous ballots is to offer the voter (presumed to be present while the ballot is scanned
4 and counted) options to re-try with a new or updated ballot, or to proceed with counting despite
5 ambiguous marks that might result in some of the voter's votes not being counted.

6 An agency of the U.S. Federal government, **Federal Election Assistance Commission (EAC)**
7 was created by the Help America Vote Act (HAVA) of 2002[38] with the task of assisting state and
8 local election administration organizations in improving their capability to conduct U.S.
9 government elections. The EAC primarily funds state and local election administration
10 organizations, but it also awards research contracts for investigation of election-related matters.
11 The EAC has funded the replacement of voting systems for much of the country, notably
12 including voting systems that meet HAVA mandates for accessibility.

13 The **Federal Write-In Absentee Ballot (FWAB)** is a paper form that UOCAVA voters may use
14 (a) to fill out an absentee voter affidavit, and (b) to write a list of ballot items and the voter's
15 choice for that ballot item. Use of an FWAB requires that the voter have independent knowledge
16 of the items on the ballot that the voter is entitled to vote. If a voter makes errors in following the
17 instructions for the affidavit, including the State-specific requirements, then local election
18 officials may choose not to count the voter's ballot.

19 **DRE Double Commit** refers to a DRE function that creates a risk for disenfranchisement. With
20 some DREs, when a voter casts a ballot, the voter is prompted to confirm that they are finished
21 voting, and then prompted a second time to commit and cast the electronic ballot. The
22 disenfranchisement risk arises in practice because voters sometimes leave the polling place after
23 the first confirmation, but without responding to the prompt for the second confirmation. At that
24 point, the DRE will eventually time-out the voter session and not cast or count the ballot; also,
25 until that time, poll workers have the opportunity to cast the ballot, either as is, or with
26 modifications to the voter's selections.

27 ## 2.2.3 Findings

28 ### 2.2.3.1 Ballot Accessibility and Availability

29 The current state of ballot accessibility and availability issues apply distinctly to three categories
30 of voters:

31 - **Local In-person Voter:** Voter and ballot information is provided by postal distribution
32   and Web publication of personalized sample ballots that are close facsimiles of the actual
33   paper ballots.
34

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[38]Federal Election Commission, "Help America Vote Act of 2002"; http://www.fec.gov/hava/law_ext.txt.

1   • **Uniformed and Overseas Voter:** Voter and ballot information as well as the official
2   vote-by-mail blank ballot with an associated attestation document are made available by
3   postal distribution at least and digital means at best to be compliant with Federal MOVE
4   Act regulations.[39]

5   • **Other Absentee Voters:** Voter and ballot information as well as the official vote-by-
6   mail blank ballot with an associated attestation document are provided by postal
7   distribution. Applications materials for absentee voter status are available by Web
8   download for preparation and return via postal service or in-person delivery. Special
9   needs voters are able to obtain assistance in ballot marking and casting only if they are
10   physically able to make it to a public polling place. These voters' only option is to rely on
11   paper vote-by-mail ballot if they are able.

12   **Finding 1:** Voter and ballot accessibility and availability are tailored to different types of
13   voters' needs, but there are still areas that could be improved when voters need assistance
14   completing a ballot (e.g. special-needs voters using vote-by-mail ballots).

15 **2.2.3.1.1 DRE Devices for Special-Needs Voter Ballot Casting**

16 In addition to those issues discussed above, there are issues pertaining to accessibility and
17 usability of the ballot itself.[40] These devices do not produce a durable paper ballot of record
18 equivalent to ballots provided to non-DRE voters. For special-needs voters utilizing DRE-based
19 ballot casting services, there is an increased risk of loss of anonymity via a voter-sequence-
20 correlation privacy exposure. This exposure arises in a scenario where most voters cast a paper
21 ballot—and DREs are typically only used by special-needs voters—in small numbers.[41] Poll
22 workers are capable of recalling or recording by name the sequence of special-needs voters
23 and then communicating that information to staff members who have access to VVPATs or
24 time-stamped audit logs and who can then determine how each DRE voter voted.

25 Even when the number of DRE voters is not small, privacy exposure can occur in other ways—
26 especially during primaries and other elections with multiple ballot-styles used in a single polling
27 place. The privacy violation risk for the special-needs voter is one example of the importance of
28 the principle that all voters cast a ballot in the same manner, so the ballots of some voters are not
29 erroneously segregated, creating a risk for ballot attribution. This principle supports the use of
30 BMDs so that voters can choose to mark manually or digitally, but the ballot is cast and counted

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[39]California Secretary of State Debra Bowen government website (28 January 2010).
Memo regarding "Military and Overseas Voter Empowerment Act";
http://www.sos.ca.gov/elections/ccrov/pdf/2010/january/10042cbm.pdf.
[40]See Noel Runyan and Jim Tobias (26 July 2007), "Accessibility Review Report for California Top-to-
Bottom Voting Systems Review"; http://www.sos.ca.gov/voting-systems/oversight/ttbr/accessibility-
review-report-california-ttb-absolute-final-version16.pdf.
[41]Note: For example, if a few hundred people in a polling place vote on paper and PCOS, and a handful of
special-needs voters use a DRE, then poll workers know that the handful of special-needs voters cast that
handful of votes. Or, if one person is the only one to vote for a particular party, then poll workers would
know who cast that single ballot. However, when BMDs are used (as discussed elsewhere in this Section),
voters can choose to mark manually or digitally, but the ballot is cast and counted in the same manner
regardless.

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1 the same manner regardless. The advantage of a BMD over a DRE is that a paper ballot is
2 produced for counting, audit, and verification purposes.

3   **Finding 2:** DRE devices incur a risk of loss of voter anonymity.

4   **Finding 3:** A BMD could provide a record for each ballot.

2.2.3.1.2 Physical Durability of VVPAT Ballots

6 DRE-voters are disadvantaged in audits or recounts due to the less durable nature of a VVPAT
7 ballot compared to standard paper ballots. Moreover, VVPAT rolls of paper are difficult to count
8 in the case of manual recounts and full recounts.[42]

9 Three usability limitations should be addressed:

10   1. The need exists to verify instruction text meets EAC guidelines[43] for plain-language and
11   moderate-level literacy accessibility.
12   2. The need exists to verify visual aids exist in instruction text.
13   3. There is likelihood that ballot layout does not meet guidelines of EAC-funded AIGA[44]
14   best practices in ballot design.

15   **Finding 4:** VVPAT ballots have questionable limitations in design and physical
16   makeup.

2.2.3.1.3 Other Supportive Rationale

18 The VSTF also located three areas where improvements in the system could be beneficial to
19 voters.

20 The State of California historically asserted compliance to the MOVE Act, which is a 45-day
21 advance availability provision by postal distribution means of absentee voter materials for
22 UOCAVA voters. Nevertheless, exploring opportunities to make these materials more readily
23 available by digital means pursuant to the MOVE Act could better serve U.S. overseas and
24 military voters.

25 Special-needs voters tend to be disenfranchised should their individual situation prevent their
26 ability to travel to a polling place to cast their ballot. Mobile accessible balloting services could
27 provide these voters with a more accessible means to vote.

28 As an equal protection principle, consistent enfranchisement depends on consistent ballot format
29 and ballot counting procedures. This principle is not currently met in practice because some
30 voters have their votes counted from paper ballots while other voters have their votes counted
31 relying on VVPAT devices. Therefore, aspiring to a single ballot design, layout, and presentation
32 for the ballot of record can achieve the long-term recommendation.

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[42]For example, see the VVPAT section on this page: http://www.countedascast.com/issues/audits.php.
[43]EAC guidelines, last accessed on June 23, 2011;
http://www.eac.gov/testing_and_certification/voluntary_voting_system_guidelines.aspx.
[44]See generally: http://www.aiga.org/content.cfm/election-project.

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1   **Finding 5:** U.S. overseas and military voters could be better served with a digital means
2   of receiving election information and a blank ballot.

3   **Finding 6:** Special-needs voters could benefit from mobile accessible balloting services.

4   **Finding 7:** Consistent ballot format and counting procedures can help to maintain voter
5   enfranchisement.

6   2.2.3.2 Ballot Marking and Casting

7   The current state of ballot marking and casting can be divided into three methods of voting:
8   in-person; remote; and use of the Federal Write-in Absentee Ballot (FWAB).[45]

9   **In-person voting** involves the casting and counting of ballots in person in polling places using
10   two methods: (a) precinct optical scan of hand marked ballots, and (b) use of DRE devices for
11   digital casting and counting. In addition to the these methods, some voters are required to vote
12   provisionally by casting a hand-marked paper ballot that is not counted in the polling place but
13   may be counted centrally, if approved by election officials. San Francisco also employs central
14   count optical scan for vote-by-mail ballots and provisional ballots that have been approved by
15   elections officials.

16   There is significant controversy regarding the security risks of **remote voting**. It is well settled
17   that marking ballots in an uncontrolled environment is vulnerable to fraud and coercion—mostly
18   during transportation (of ballot from voter to election officials) wherein marked ballots are
19   subject to risks that are not present in ballots marked in a controlled environment.

20   Similarly, in discussing **remote digital voting**, it is well settled that all forms of remote digital
21   voting also share these vulnerabilities, although there is significant controversy regarding scope
22   and scale of the security risks of each form of remote digital voting, as compared with non-
23   digital remote voting. Among the risks specific to remote digital voting are insider technical
24   threat and Internet accessibility of remote digital voting systems to adversaries. Insider technical
25   threat is the expansion of the scope of trusted insiders to include IT operations staff charged with
26   managing remote digital voting systems, as well as anyone who is able to obtain IT operations
27   privileges. Internet accessibility is a necessary consequence of using public networks for
28   communication between remote voters and local election officials; anyone anywhere with
29   Internet access has the ability to target remote digital voting systems in order to carry out the
30   same type of Internet-based attacks that have succeeded against several organizations with
31   security expertise that far exceeds that of any voting system vendor or election jurisdiction—
32   including Google,[46] Adobe, RSA Security,[47] and dozens of other large corporations. With the
33   digital-specific risks, both ballot anonymity and ballot integrity are at risk in many ways that are
34   not applicable to ballots marked in a controlled environment with controlled transportation to
35   election offices facilities.

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[45]Federal Voting Assistance program website; http://www.fvap.gov/FWAB/fwab-ca.html.
[46] Zetter, Kim (14 January 2010), "Google Hack Attack Was Ultra Sophisticated, New Details Show,"
Wired; http://www.wired.com/threatlevel/2010/01/operation-aurora.
[47]Zetter, Kim (7 June 2011), "RSA Agrees to Replace Security Tokens After Admitting Compromise,"
Wired; http://www.wired.com/threatlevel/2011/06/rsa-replaces-securid-tokens/.

1 An interesting example was the Okaloosa Distance Balloting Pilot,[48] which used a combination
2 of early-voting center operations, kiosk-style Internet voting in controlled environment, and
3 paper ballot-like voter-verified paper records used for auditing the Internet voting tallies. More
4 recent proposals for digital-enabled kiosk voting have included methods that do not rely on
5 Internet voting techniques. In any event, the concepts of controlled environment and a verifiable
6 paper trail and audit trails have emerged as the top issues wherein any remote voting solution is
7 contemplated.[49, 50]

8 These issues were highlighted in the Okaloosa report that noted the system is vulnerable to attack
9 by trusted insiders (such as election officials behaving maliciously). Defending against such
10 attacks can be challenging in any voting system. In Scytl's system, Voter Choice Records are
11 pivotal to this defense. Manual counts of the Voter Choice Records, as well as procedural
12 controls on insider access to the system before and during an election, are the only way we have
13 identified to secure the system against insider threats. We also note that an EAC report reported
14 irregularities in the post-election audit of the Voter Choice Records.[51] There are a number of
15 open issues to be resolved, including but not limited to scalability, transparency, and independent
16 testing.

17 **Federal Write-In Absentee Ballot (FWAB)** is a method that is approved by a process similar to
18 vote-by-mail process, but it requires manual intervention for counting purposes.

19   **Finding 8:** Although all voting methods must be carefully monitored to prevent
20   malicious or negligent events, the use of remote digital voting—especially the digital
21   return of voted electronic ballots with no audited paper ballots—is far too insecure in
22   public elections application for the foreseeable future.

23 **2.2.3.2.1 Other Supportive Rationale**

24 There are several ways to ensure all voters have equal protection and enfranchisement. A single
25 kind of ballot and a single method of counting can be supported along with support for
26 accessibility. As mentioned earlier in this section, a BMD ensures two principles: (a) special-
27 needs voters obtain automated assistance in ballot marking; and (b) all voters have a paper ballot
28 that is consistently counted in the same manner. Ballot image retention can also be used for
29 improved audit and verification. Moreover, CCOS logging capability can provide improved
30 accountability, audit, and verification.

31   **Finding 9:** The use a single type of ballot, BMDs, image retention, and CCOS logging
32   can equally protect and enfranchise all voters.

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[48]Okaloosa Distance Balloting Pilot, last accessed on June 23, 2011; http://election.dos.state.fl.us/voting-systems/pdf/ODBPplanJune_19.pdf.
[49]See http://www.operationbravo.org/documents/NASS%20VP%20Briefing.pdf.
[50]See http://election.dos.state.fl.us/voting-systems/pdf/ODBPplanJune_19.pdf.
[51]See http://www.eac.gov/assets/1/AssetManager/Martha%20Mahoney%20-%20Comment%20on%20Pilot%20Project%20Testing%20and%20Certification.pdf.

2.2.4 Recommendations

2.2.4.1 Ballot Accessibility and Availability

2.2.4.1.1 Near-Term Recommendations

To improve ballot accessibility and availability in the near future, the VSTF offers the following recommendations:

1. Support provisions of the Federal MOVE Act regulations for digital blank ballot distribution.

2. For special-needs San Francisco-based voters who are physically unable to cast their ballot in a polling place, experiment with mobile accessible ballot marking and printing services.

3. Promote the opportunity for San Francisco voters to access voting information online, including sample ballots.

4. Adopt a stronger privacy-enhancing procedure that requires a larger minimum number of voters using the DRE machines in order to reduce the risk of ballot attribution.[52] Enhance poll worker training to stress this procedure and the need to comply with it. Measure compliance, and publish compliance findings, based on polling-place records of number of checked in voters and number of DRE voters.

5. Create, train, and enforce a requirement that the accessible voting system be set up and working (according to specific criteria communicated in poll worker training) before the polling place is opened for general voting at the start of the Election Day.

2.2.4.1.2 Longer-Term Recommendations

We recommend these long-term actions:

6. Extend the intent of the California Election Code Section 15360[53] by requiring the ballot of record be specifically a paper record of uniform style, layout, and presentation consistent with its hand-marked counterpart instead of a paper artifact fulfilled by VVPAT devices.

7. Use paper ballot layout practices and/or tools that follow the EAC guidelines on visual design and plain language, and deliver these benefits to all voters.

8. Rather than providing polling-place disabled access via DREs, instead provide access via the combination of (a) ballot-marking devices for enhanced access to the ballot, and (b) use of the same precinct-count casting method used by voters without special needs. In addition to removing a ballot anonymity threat of DREs, this approach would have additional benefits: lacking the so-called "double-commit issue" of DREs; providing for a digital count for audit purposes; and adhering to the EAC guidelines on visual design and plain language.

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[52]See Footnote 41.
[53]California Legislative Counsel government website, "Election Code Section 15360"; http://www.leginfo.ca.gov/cgi-bin/displaycode?section=elec&group=15001-16000&file=15360.

2.2.4.2 Ballot Marking and Casting

2.2.4.2.1 Longer-Term Recommendations

9. The official "ballot of record" should be a paper **artifact** in uniform design, layout, and presentation consistent with its hand-marked counterpart, in order to enable a consistent method of counting, audit, and verification as well as to ensure a consistent method of ballot anonymity.

10. Enhanced access to ballots should be provided by non-tabulating ballot marking devices rather than tabulating DREs.

11. All in-person voters should have the options of either marking paper ballots by hand, or via the use of a ballot-marking device.[54]

12. Encourage voters who use BMDs to review their printed ballots before casting.

13. All optical scanning devices should retain a good-resolution scanned image of each ballot, together with a complete cast-vote record for auditing support.

14. CCOS devices should provide a user interface for election officials to interpret ambiguous ballots as needed—with full logging of every interpretation—and that said logs should be publicly available.

15. If not done so already, provide data to track cases of UOCAVA voters receiving absentee voting materials, but not having a ballot arrive in time to be counted.

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[54]Note: In California, the voters do have the choice of using paper ballots or DREs with VVPATS. However, as a policy matter, the use of DREs is discouraged since all votes cast on a DRE with VVPAT must be counted by hand.

1 2.3 Security

2 2.3.1 Introduction

3 Elections security is vital to protect each voter's rights and assure the integrity of election data.
4 Security throughout the election cycle—including use of the voting systems—must be
5 implemented with procedures. Equally important is the security of the voting system's design,
6 engineering, and manufacture—all elements are fundamental in garnering the trust voters must
7 have in the system they are using to cast and count their ballots. Essentially, each voter relies on
8 the soundness of the security of the voting procedures and the use and design of the system to
9 ensure his or her vote is counted. If not, the integrity of elections and the jurisdictions that
10 manage them can be compromised.

11 Steps must be taken to build and maintain the voter's trust that (a) the digital chain of custody
12 has not been broken and (b) no event has occurred that might affect the integrity of the election
13 data. Unfortunately, for both physical ballots and the voting system, there are opportunities for
14 fraud or error. The VSTF has scrutinized the issue of security and has determined
15 recommendations that may lead to safer and more secure elections.

16 2.3.2 Concepts and Definitions

17 When considering voting system security, the vulnerabilities throughout its use in the election
18 cycle must be examined. The following are major parts of the end-to-end election process that
19 must be considered in system and procedural security:

20 • **Cryptography:** protecting data from theft or alteration by transforming it (encrypting it)
21 into an unreadable format, called cipher text that requires a secret key to decipher (or
22 decrypt) the data back into plain text

23 • **Ballot Definition:** the description of the ballot for ballot cards and for the digital vote
24 records

25 • **Logic and Accuracy (L&A) Testing:** pre-election testing of voting system elements and
26 devices to assure that cast votes will be properly recorded in the voting system

27 • **Vote Capture:** the point at which the voter's intent becomes a digital record, which will
28 ultimately be aggregated with other votes to determine the election result

29 • **Vote Transmission:** the movement of electronic data to an electronic/digital data store so
30 that all votes for San Francisco can be read by a computer that tabulates the election
31 results

32 • **Vote Tabulation:** the tallying of ballots to determine the result for each election contest

33 For paper ballots, the precinct- or central-ballot **optical scanner device** (e.g. Sequoia Eagle and
34 400C, respectively) translates the marked, paper ballot to a digital record of the vote. When a
35 **direct recording electronic device** (e.g. Sequoia Edge DRE) is used, the digital vote record is
36 created by touching the devices screen to cast a vote that also produces the voter verifiable paper
37 audit trail (VVPAT). In advance of use for an election, all of these machines undergo a L&A test
38 and recalibrated or repaired as needed to assure they are fit for use in the election.

1 Data can be **sneaker netted** (downloading data to a device that is physically transported to
2 another location and connected to another device for data upload) or may be transmitted
3 electronically over a network. In San Francisco, the data recorded by the precinct optical scanner
4 and the precinct DRE (Sequoia Eagle and Edge respectively) is saved to a removable memory
5 pack that is transported from the precinct to the election center for upload to the central election
6 data store. San Francisco processes vote-by-mail ballots and validated provisional ballots at the
7 election center with a large, fast optical scanning machine (Sequoia 400C) that transmits data to
8 the central data store over a private computer/data network of CCSF.

9 For contests that are determined by a plurality, this is a matter of summing of the votes to
10 determine passage of a measure or winner of a race. For **Ranked-Choice Voting (RCV)**—when
11 there is no one candidate who received 50% +1 vote as a first choice—computer algorithms are
12 then used to eliminate candidates and redistribute votes where needed for the voter's second- or
13 third-choice candidate.[55]

14 2.3.3 Findings

15 Without proper system security, handling of physical ballots can be open to fraud and error;
16 however, malicious manipulation or negligent management of an electronic version of ballot data
17 can be executed in greater volume, be more precise in intended impact, and be harder to detect.
18 Thus, the level of security in voting systems is essential to assuring an accurate, correct election
19 outcome and in garnering public trust in the election outcome. Effective procedural measures
20 must be implemented throughout the election process to bolster security and to detect issues. A
21 voting system that is designed with security—which is integrated into all of its elements
22 (hardware, software, firmware, data, and network)—that supports effective security procedures
23 will improve voter confidence in the system and election outcome. A system that is designed in
24 concert with effective security procedure can reduce the cost of manual procedures required for
25 security assurance of a system that has poor system security.

26 Generally, the focus of voting system security is on preventing malicious or negligent events that
27 cause corrupt or inaccurate voting data or otherwise disrupt the ability for a jurisdiction to obtain
28 an accurate election result from its election system. Unfortunately, the jurisdiction conducting an
29 election cannot rely solely on preventive security measures because a completely invulnerable
30 system is impossible to construct. Thus, the review and audit of the election and system
31 information are essential procedures in (a) providing the assurance that security measures were
32 successful or (b) determining that events had transpired that somehow compromised the system.
33 Only with this step is the security regimen complete.

34   **Finding 1:** Security must be considered in every feature of a voting system to ensure
35   voter confidence.

36   **Finding 2:** A voting system that is designed to be highly secure and designed in concert
37   with security procedures can reduce the cost of security assurance.

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[55]See "Section 2: Election Records and Post-Election Audit Procedures" for a more detailed definition of
RCVs.

2.3.3.1 San Francisco's Current Voting System: Existing Security Issues and Mitigation

2.3.3.1.1 San Francisco's Procurement Action and Voting System Security Concerns

In 2002, the Federal government mandated a modernization of voting systems with the enactment of the Help America Vote Act (HAVA); funds were allocated for implementation of this mandate.[56] HAVA was timely law for San Francisco, which needed to replace an aging voting system for which its maintenance contract was about to expire. As detailed in the Introduction of this report, San Francisco issued a Request for Proposal (RFP)[57] for the procurement of a new voting system in May 2005. The RFP consisted of an Introduction and 15 appendices that totaled 197 pages. Appendix E "Design, Fabrication and Performance Requirements" (25 pages) contains all requirements, including security. This was not due to disinterest on the part of San Francisco or its Department. of Elections (DOE) on the importance of security, but it does reflect the reliance on the vendor and other agencies to detect and correct security flaws.

The systems that could be implemented to satisfy HAVA requirements and were certified for both Federal and California elections were few. Only two vendors responded to the San Francisco's RFP: Sequoia Voting Systems and ES&S. Public objections to the vendors—which were primarily rooted in transparency and security concerns—stalled execution of the contract for 15 months. However, because no other certified voting systems were available and no viable alternatives were emerging, San Francisco proceeded with the Sequoia procurement. From the standpoint of DOE, this was the prudent course of action: (a) it would bring the DOE into compliance with Federal law, and (b) it would serve its operational needs. Any additional consideration of security was unnecessary and superfluous to fulfillment of its legal obligations under HAVA and support to its operational mission.

2.3.3.1.2 Top-to-Bottom Review

In January 2007, Debra Bowen was sworn in as the California Secretary of State (CA SoS); on that day, she reiterated her campaign promise to assure transparency in the voting systems used in California.[58] She created a project known at the "Top-to-Bottom Review" (TTBR)[59] of the voting systems certified for use in California. The TTBR consisted of a review of software, accessibility, documentation, and a security evaluation. It eventually evidenced many security issues within California's voting systems, including the Sequoia system procured by San Francisco. Security issues were found with all systems that were tested, but we here focus on the Sequoia System used in San Francisco to provide some relevant and insightful specifics on

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[56]Federal Election Commission, "Help America Vote Act of 2002," http://www.fec.gov/hava/law_ext.txt.
[57]City and County of San Francisco government website, "RFP," (VSTF page, Appendix E) http://www.sfgov2.org/index.aspx?page=1869.
[58]California Secretary of State Debra Bowen government website, "Secretary of State Debra Bowen, Inaugural Speech" (Monday, January 8, 2007); http://www.sos.ca.gov/bowen_event/inaugural_speech.pdf.
[59]California Secretary of State Debra Bowen government website, "Top-to-Bottom Review"; http://www.sos.ca.gov/voting-systems/oversight/top-to-bottom-review.htm.

1   security flaws of existing voting systems. The "Source Code Review of the Sequoia Voting
2   System" of the TTBR's Executive Summary[60] pinpointed serious security issues concerning data
3   integrity, cryptography, access control, and software engineering.

4   *2.3.3.1.2.1 Data Integrity Flaws*

5   The review discussed how the Sequoia system "lacked effective safeguards against corrupted or
6   malicious data" that was injected into removable media. This was a particular issue with the
7   devices used by polls workers and other temporary staff with limited authority.

8   **Finding 3:** The Sequoia voting system's lacked effective safeguards against corrupted or
9   malicious data into removable data recording media.

10   *2.3.3.1.2.2 Cryptography Problems*

11   The review also stated that many of the security features of the Sequoia system—particularly
12   "those that protect the integrity of the precinct results"—employed cryptography. Every case that
13   the TTBR examined proved how simple it was to circumvent the cryptography. As the review
14   explained, many cryptography functions are not implemented correctly, are based on weak and
15   flawed algorithms, or are used in an ineffective or insecure manner. Because of these issues,
16   "virtually all cryptographic key material is permanently hardcoded into the system" and identical
17   in all of the hardware that was shipped off to other jurisdictions. In short, a person who is able to
18   hack into a similar hardware—within or outside of California—can then extract and obtain the
19   secret cryptographic key that were initially created to protect elections throughout every
20   California county that employs that system.

21   **Finding 4:** Sequoia's cryptography was poorly implemented, hard coded into the system,
22   and identical in all of the Sequoia systems used throughout California.

23   *2.3.3.1.2.3 Access Control and Security Mechanisms Issues*

24   The TTBR also discovered issues with access control and other computer security
25   mechanisms that were easily circumvented—despite being designed to protect against
26   "unauthorized use of central vote counting computers and polling place equipment." The
27   WinEDS back-up system was designed to be used for ballot preparation, voting machine
28   configuration, absentee ballot processing, and post-election vote counting. However, its
29   security features and audit logs were found to be ineffective against "inside attackers"
30   who may try to gain access to the WinEDS computers or the network to which these
31   computers are attached.

32   **Finding 5:** The security features and audit logs of the WinEDS back-up system
33   could have been easily comprised by insiders.

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[60]Blaze, Matt, Arel Cordero, Sophie Engle, Chris Karlof, Naveen Sastry, Micah Sherr, Till Stegers, and
Ka-Ping Yee (2007). "Source Code Review of the Sequoia Voting System," p. 2 (report, University of
California, Berkeley under contract to the California Secretary of State's TTBR);
http://www.sos.ca.gov/voting-systems/oversight/ttbr/sequoia-source-public-jul26.pdf.

1   *2.3.3.1.2.4 Software Engineering Weaknesses*

2   The software engineering of the Sequoia voting system was also found at fault by the
3   TTBR. According to the review, the software contained numerous programming errors,
4   many of which had the "high potential to introduce or exacerbate security weaknesses."
5   Basically, the software did not reflect "defensive software engineering practices normally
6   associated with high-assurance critical systems." The review also pointed out that there
7   were many examples of poor or absent error and exception handling and that there were
8   also many cases where the software behavior did not match its corresponding comments
9   and documentation. Some of the problems were the root of the many of the issues the
10   review identified, and even the problems discovered in the software that were not specific
11   to "an obvious vulnerability identified," the number of errors reduced the review's
12   "overall confidence in the soundness of the system as a whole."

13   **Finding 6:** The software for the Sequoia voting system contained serious
14   programming errors that reduced the overall trust in the reliability of the voting
15   system.

16   *2.3.3.1.2.5 "Red Team" Security Testing*

17   The CA SoS's security group "acted as a 'Red Team' [penetration testers] and performed a series
18   of security tests of both the hardware and the software,"[61] concluding that—although there was
19   not sufficient time to perform a complete evaluation of the Sequoia voting system—the number
20   of serious security issues that were exposed was cause for concern. Essentially, a determined
21   hacker could modify or invalidate the results of an election. The review impressed that several
22   types of attacks could be launched without any knowledge of the source code. In fact, the Red
23   Team was able to analyze the Edge's firmware binary representation and extend the firmware by
24   using binary patching. This technique allowed them to create a "'debugging' version of the
25   firmware, as well as several different 'malicious' versions"; again, access to the source code to
26   implement these attacks was not necessary.

27   **Finding 7:** Access to the source code was not necessary to attack the hardware and
28   software of the voting system.

29   **Finding 8:** Public concern over DOE's procurement of the Sequoia Voting Systems was
30   not unfounded.

31

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[61]Computer Security Group (2007). "Security Evaluation of the Sequoia Voting System Public Report,"
Dept. of Computer Science, University of California, Santa Barbara; http://www.sos.ca.gov/voting-systems/oversight/ttbr/red-sequoia.pdf.

1 **2.3.3.1.3 Security Mitigations Measures Required for Use of the Sequoia Voting System**

2 As a result of the TTBR's findings, on 25 October 2007 SoS Bowen issued the "Withdrawal of
3 Approval of Sequoia Voting Systems, Inc."[62] (updated version issued 1 October 2009)—a
4 document that also provides the requirements needed for re-approval of the system. The result
5 was the generation of the "Optech Insight, AVC Edge 5.0, & Optech 400C California
6 Procedures,"[63] deemed the "Sequoia 4.0 Approved Use Procedures" that allowed conditional
7 re-approval of the system and—with implementation of these procedures—the use of the system
8 in San Francisco.

9 San Francisco and Sequoia have implemented the mitigation plans approved by the CA SoS. San
10 Francisco DOE maintains a Voting System Security Plan[64] that addresses policies, practices, and
11 procedures for voting system security and that addresses specific requirements for continued
12 approval for use of Sequoia by the California Secretary of State.

13   **Finding 9:** The public interest would be served by raising awareness of (a) the Sequoia
14   system vulnerabilities identified in the TTBR, (b) the mitigation measures prescribed by
15   the CA SoS, and (c) the procedures that implement these measures in San Francisco.

16 ## 2.3.3.2 Current Voting System Security Posture

17 Based on optical scanning of paper ballots, the fundamental security posture of San Francisco's
18 existing counting methods consists of (1) implementing practices, policies and procedures to
19 meet legal requirements for security, and (2) validation of machine counts by conducting partial
20 hand counts of the vote a technology independent manner as required by California Election
21 Law. The security practices and requirements include reducing or eliminating exposure to attack
22 points such as connections to wireless devices or the Internet as well as using tamper-evident
23 seals, signature checks, and other chain-of-custody procedures that increase the chances of
24 detecting errors or tampering.

25 "Technology independent" validation (as the phrase applies in this section of the Report) means
26 that vote counts and election results are not produced by the sole reliance on the potentially
27 fallible software and hardware of a voting system, but instead they are produced by a
28 combination of the following:

29   1. Machine count of virtually 100 percent[65] of paper ballots

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[62]California Secretary of State Debra Bowen government website, "Withdrawal of Approval of Sequoia
Voting Systems, Inc., WinEDS v 3.1.012/AVC Edge/Insight/Optech 400-C DRE & Optical Scan Voting
System And Conditional Re-approval of Use of Sequoia Voting Systems, Inc., WinEDS v 3.1.012/AVC
Edge/Insight/Optech 400-C DRE & Optical Scan Voting System (December 31, 2009 Revision);
http://www.sos.ca.gov/voting-systems/vendors/sequoia/sequoia-31012-revision-1209.pdf.
[63]Optech Insight (August 2008), "AVC Edge 5.0, & Optech 400C California Procedures," (document
version 3.03); http://www.sos.ca.gov/voting-systems/vendors/use-procedures/sequoia-use-procedures.pdf.
[64]City and County of San Francisco government website, "VSTF Voting System Security Plan";
http://www.sfgov2.org/ftp/uploadedfiles/VotingSystemsTaskForce/VotingSystemSecurityPlan.pdf.
[65]Note: If Federal Write-in Absentee Ballots (FWAB) are cast, they must be hand counted.

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1   2. Audit of the machine counts via hand-count of a randomly selected subset of the
2   machine-counted ballots[66]

3   The audit procedure is intended to detect discrepancies in the vote count as tabulated by the
4   voting system versus a hand count of the ballot of record. This procedure should audit a
5   statistically significant sample relative to the number of races and voters, and it should provide a
6   threshold to expand the scope of the audit in the event that significant variances are detected.

7   As already discussed with respect to security, the audit approach is a forensic method for
8   "detection of errors" and could only discover exploitation of security vulnerabilities with
9   secondary investigation. "Prevention of errors" by exploitation of security vulnerabilities means
10 seeking to create a secure or trustworthy system. However, a perfectly secure system is an
11 impossible goal because all software is potentially fallible.

12   **Finding 10:** Basic, prudent security measures are already in practice including but not
13   limited to (a) keeping voting systems components disconnected from public networks,
14   and (b) checking the integrity of device firmware and/or software on voting systems
15   components through pre-election L&A tests.

16 ## 2.3.3.3 Security for San Francisco's Future Voting Systems

17 ### 2.3.3.3.1 Comprehensive Voting System Security Examination Not Attempted by VSTF

18 The VSTF did not attempt a comprehensive examination of information security as it applies to
19 voting systems. The threefold reasoning for this became clear during the course of our research:

20   1. The state of the voting systems industry is bleak: only two major vendors remain,
21   controlling some 87% of U.S. voting systems in use, with a few smaller vendors serving
22   small pockets of opportunity.
23   2. Voting technology experts concur that future voting systems design will require a
24   wholesale change in the technology model as well as testing and certification methods
25   and requirements for Federal certification in order for these systems to increase accuracy,
26   transparency, verification, security, and, above all, the voters' trust.
27   3. The prospective fourth version of the NIST/US EAC Voluntary Voting System
28   Guidelines (VVSG)—which provides the most extensive set of voting system
29   requirements, including both specifications and procedures for security—was expected to
30   be released in 2009, but it has yet to be adopted in a final form.

31   **Finding 11:** The VSTF found with regard to voting systems security considerations that a
32   more focused study by more qualified security experts is necessary.

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[66]Note: Precinct cast ballots on the Sequoia Edge Direct Recording Electronic (aka DRE) device do not
produce a paper record that is machine read. Instead, the vote data is recorded directly to the memory
pack that is then transported to a central location and loaded into the main tabulator along with the
memory pack from the Sequoia Eagle Optical Scan device. The DRE does produce a paper tape record of
the voter's selection by contest (Voter Verified Paper Audit Trail, aka VVPAT). This paper tape record
can be used for audit purposes.

2.3.4 Recommendations

2.3.4.1 Security Mitigations Measures Required for Use of the Sequoia Voting System

Accordingly, this Report recommends increased transparency of and communication about San Francisco's implementation of the CA SoS's-mandated mitigations. Specifically the City should create an online resource to complement voter information resources that describe the current system, features, and functions, complete with a walk-through of the steps taken to comply with the CA SoS mandates for the current voting system.

2.3.4.2 Near- to Mid-term Recommendations

Beyond the immediate security concerns specific to San Francisco's current voting system, there are also broader concerns about information security of voting systems. The Report's near- to mid-term recommendations are that San Francisco should increase (a) public awareness and education of the security posture of computer-based vote counting, and (b) transparency of operations with regard to this posture.

2.3.4.3 The Current Voting System Security Posture

Many basic security posture measures are specified as TTBR mitigations, L&A testing practices, and post-election operations reviews. With that in mind, in the interim period between the current state of San Francisco's voting system and any future system to be acquired, the Report advocates the following recommendations:

1. San Francisco should further public trust by increasing communication of the basic points of the security posture and, in particular, by impressing upon the voter that—
   a. The creation of a perfectly secure voting system software is impossible;
   b. Manual audits can provide assurance of a clean and accurate election, thus minimizing the voters' focus on the correctness and integrity of software.
2. San Francisco should continue to maintain the existing practices of L&A testing and TTBR mitigation.
3. San Francisco should increase the operational transparency and adequacy thresholds of statistical audit practices to include the following:
   a. Greater information on and availability of audit results;
   b. Voter education about auditing and results through online resources that complement existing voter information services.

San Francisco should consider various options for increasing the scope of audits beyond the minimum requirements of California Election Law. (See Section 2.1: Election Records and Post-Election Audit Procedures for further discussion and recommendations on this topic.)

2.3.4.4 Security for San Francisco's Future Voting Systems

Accordingly, this Report's overarching recommendation with regard to voting system security is that San Francisco collaborate with or create a new, highly qualified, agile team of 4-6 computer systems scientists to develop a set of guidelines for security aspects of any future voting system to be acquired.

For a procured system, these guidelines should comprise new security requirements to be incorporated into any future RFPs to be responded to by any provider of voting systems to San Francisco. Should San Francisco proceed with a decision to make a system to their requirements, these guidelines should be further developed to become requirements that are incorporated into overall systems design.

This new "Security Guidelines Team" could be a new Task Force or simply collaboration with both academia and computer industry professionals outside of the voting systems industry on a consultative basis. It is crucial, though, that these team members have demonstrated domain expertise in elections technology and related information security matters.[67]

2.3.4.5 Longer-Term Recommendations

Aside from assembling a team of digital security experts to develop RFP guidelines for future voting systems, this Report suggests several features that can support increased voting systems security and elections process integrity (many of which are discussed elsewhere in this Report):

4. Assuring a system that allows for hand marking and machine-assisted creation of marked paper ballots of like media versus providing VVPAT for ballots cast by voters with requirements for enhanced access

5. Continuing the use of precinct-count optical scan for in-person cast ballots and central-count optical scan for absentee and provisional ballots

6. Providing digital images of each counted ballot, with a cast-vote record for each that would be made available for examination

7. Establishing strong protections to assure that all actions that change or update the system are known and that only approved software and hardware are implemented and used in an election with documented, approved change management procedures during an update and deployment of the system

    a. Voting system capabilities for strong authentication, access, and logging of system events and operator actions with notification and audit procedures that assure only authorized access and approved actions were taken in any part of the system

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[67]Note: By way of example, but not limitation, three example sources of domain experts include: (a) the California Institute of Technology and Massachusetts Institute of Technology joint project known as the CalTech/MIT Voting Project (see http://vote.caltech.edu/drupal/); (b) ACCURATE: A Center for Correct, Usable, Reliable, Auditable, and Transparent Elections, the organization involved with the TTBR (see http://accurate-voting.org/); and (c) The OSDV Foundation's TrustTheVote Project (see http://www.osdv.org and http://www.trustthevote.org).

1   b. Logging that should involve actions executed with respect to the system hardware and
2   software and election data, including any change to vote records, such as resolution of
3   under-votes, over-votes, and identification and recording of write-ins

4   8. Utilizing election management system features and reporting system features for
5   publication of ballot definition data and vote count data as recorded by counting devices.

6   9. Using common data formats to facilitate publication of such data mentioned above

7   10. Establishing features related to voting system verification loops, testing practices, and
8   transparency of records of such practices, including (but not limited to) the following:

9   a. Straightforward and easily repeatable measures for testing software integrity of voting
10   system components

11   b. Election management system features and reporting system features for recording and
12   publishing both components of and results of L&A testing (e.g. test decks and test-
13   count results)

14   11. Providing a well-documented system that can be maintained and operated with
15   commonly and widely available skill sets (versus vendor dependence that is due to
16   proprietary elements and non-disclosure of system technology)

17   12. Maintaining transparency throughout the system hardware, firmware and software
18   life-cycle including system design, engineering, and manufacture as well as data formats,
19   encryption and communications protocols, and network security requirements

20   13. Having the ability to validate only authorized software used to execute the election in the
21   system

22 These capabilities and features should also be considerations of the proposed Security Guidelines
23 Team for when those team members prepare a set of security guidelines for future RFP and
24 competitive vendor bidding.

25

1 2.4 Ranked-Choice Voting

2 2.4.1 Introduction

3 Ranked-Choice Voting has been the law in San Francisco since 2002. In March of that year, San
4 Franciscans passed Proposition A,[68] amending the City Charter to make
5 Instant-Runoff Voting (IRV)—commonly referred to as Ranked-Choice Voting (RCV)—the
6 method of electing Mayor, Sheriff, District Attorney, City Attorney, Treasurer, Assessor-
7 Recorder, Public Defender, and members of the Board of Supervisors. This was codified in the
8 San Francisco Charter as Article XIII, Section 13.102.[69] Federal and California State provisional
9 certifications of the required changes to San Francisco's then current Elections Systems and
10 Software (ES&S) voting system were obtained by April 2004, and this method was first used in
11 November 2004 to elect seven supervisors.[70] RCV has also been implemented by more than a
12 dozen other U.S. cities—including three in the Bay Area (Berkeley, Oakland, and San
13 Leandro)—and some States for military and overseas voters; it is also in use in a number of other
14 countries.[71,72]

15 RCV is existing law in San Francisco. While there remains public debate about RCV as a voting
16 method, the VSTF has assumed its use in San Francisco as a given, and thus we have limited its
17 examination to certain aspects of RCV implementation in San Francisco that relate to voting
18 systems and public understanding of the election process.

19 2.4.2 Concepts and Definitions

20 • **Ranked-Choice Voting (RCV):** allows the voter to make multiple selections in a single
21   race in an order of preference. As currently implemented in San Francisco, voters are
22   allowed to vote for three choices among the candidates in an RCV race in a ranked order
23   of first choice, second choice, and third choice.

24 • **RCV Algorithm:** determines the RCV winner by tabulating votes in a series of rounds.
25   The first round of tabulation counts votes for the first choices in a race. If the top vote
26   getting candidate also has a majority of the votes, that candidate is declared the winner. If
27   no candidate has a majority, then the candidate with the fewest first-choice votes is
28   eliminated from the race. A new round of vote tabulation is then performed in which each
29   vote that had counted for an eliminated candidate is transferred to that ballot's most
30   preferred candidate who remains in the race and the votes are again tallied to see if the
31   top vote getting candidate has a majority of votes. If so, that candidate is declared the

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[68]For complete text of Proposition A, see http://www.smartvoter.org/2002/03/05/ca/sf/prop/A/.
[69]For complete text of Section 13.102—Instant Runoff Elections, see
http://library.municode.com/index.aspx?clientId=14130&stateId=5&stateName=California.
[70]Fair Vote: The Center for Voting and Democracy website, "San Francisco Successfully Uses Ranked
Choice Voting for Citywide Elections, Nov. 2005"; http://www.sfrcv.com.
[71]Fair Vote The Center for Voting and Democracy, "Where Instant Runoff Is Used";
http://www.fairvote.org/where-instant-runoff-is-used.
[72]*Wikipedia*, s.v. "Instant-runoff voting, Global Use," last modified 12 June 2011;
http://en.wikipedia.org/wiki/Instant-runoff_voting#Global_use.

| 1 | winner. If not, subsequent rounds of elimination and transfer are performed until a winner |
| 2 | is determined. |

- **Continuing and Exhausted Ballots:** A ballot is "continuing" if after a round of
  elimination the ballot has valid marked choices for a candidate who remains in the race.
  A ballot is "exhausted" if after an elimination round the ballot does not have marked
  choices for a candidate who remains in the race.

2.4.3 Findings

2.4.3.1 Public Understanding of RCV

In San Francisco's November 2010 elections there were contests for five County Supervisor seats that were RCV races as called for in the City Charter. In two of these contests, District 2 and 10, the ultimate winner did not receive the most first-choice votes and thus were not the front runners in the first RCV round. This also happened in Oakland's mayoral RCV race. All of these races were competitive and close. District 10 race was perhaps most exceptional. There were 21 candidates listed on the ballot. In a race where nearly 17,808 ballots were cast, there was only a 181 vote spread between the top five first-choice vote getting candidates. The winning candidate had placed third when first-choice votes were tallied in the first RCV round.

Since the November 2010 election cycle various sources—press accounts as well as statements from candidates and other organizations—have scrutinized the RCV elections process and outcome. Some are positive stating that RCV worked as expected and proved its benefits while others are critical claiming the method is undemocratic, or that RCV delivers surprise outcomes that voters do not understand.[73]

The San Francisco Department of Elections (DOE) is required by the City Charter Article XIII Section 13.102(g) to "conduct a voter education campaign to familiarize voters with the ranked-choice...method of voting." The DOE developed a training plan in advance of the first RCV election in November of 2004.[74] This has been a significant effort that produced hard copy and on-line educational materials on the RCV voting method and over 700 outreach events coordinated with 11 community-based organizations.[75] A study conducted by San Francisco State University after the November 2004 election concluded that 87% of voters understood

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[73]The following is an article that is representative of various perspectives: Zusha Elinson and Gerry Shih (11 November 2010), "The Winning Strategy in Oakland: Concentrate on Being 2nd or 3rd Choice"; http://www.nytimes.com/2010/11/12/us/politics/12bcvoting.html.

[74]Department of Elections Ranked Choice Voting Public Education Plan November 2, 2004 Consolidated General Election, http://politicalreform.newamerica.net/files/San%20Francisco%20Dept%20of%20Elections%20RCV%20 Education%20Outreach%20Plan.pdf.

[75]California Secretary of State Debra Bowen government website, "Implementation of Ranked-Choice Voting: The City and County of San Francisco: November 2, 2004 Municipal Election" (p. 4); http://www.sos.ca.gov/voting-systems/vendors/ess/rcv-final-report.pdf.

1 RCV "fairly well" or "perfectly well."[76] Though this indicates a high degree of understanding of
2 the process among most voters, that 13 % of voters had a lower understanding of the voting
3 system is significant; this group tended to be (1) lower income, minority voters and
4 (2) those who have a lower incidence of voting. In a considerably less exhaustive but more
5 recent study by the San Francisco Chamber of Commerce "55 percent of voters say they are
6 unsure whether or not their vote is counted if their first, second and third choice candidates are
7 eliminated."[77]

8 The voter education materials do still exist and can be found on the DOE's website. The level of
9 outreach and educational activity on RCV has not been at the levels they were in 2004.

10 **Finding 1:** Public understanding of the RCV election process may have declined since
11 the initial RCV education campaign starting in 2004.

12 2.4.3.2 Reporting Preliminary Early Election Results

13 Once votes are cast and captured in the election system as data, they are gathered into the
14 central database to determine the election outcome. For RCV races, the software and algorithms
15 for tabulating the election result are more complex than for elections where the outcome is
16 determined by simply summing the votes of the choices on the ballot. This may contribute to a
17 perception of some voters that they do not understand how RCV works. On the other hand,
18 computerization of the election process has made it easier to frequently produce preliminary
19 election results, and San Francisco DOE has set a very high standard for its frequency of
20 publishing preliminary election results. The DOE's schedule of results reporting for the
21 2 November 2010 election was the following:[78]

22 • **Election Night:** Preliminary results for early return, pre-processed vote-by-mail ballots
23 and precinct-counted ballots. The first preliminary results are reported approximately 45
24 minutes after the close of polls, and updates are reported approximately every half-hour
25 to an hour until midnight. For RCV contests, only first-choice totals are reported.

26 • **Subsequent Days:** Every day in which new votes are processed, the Department will
27 release updated results until all ballots have been counted and the results are certified.

28 • **Preliminary Ranked-Choice Results:** Release of preliminary results represent how
29 ranked-choice voting plays out on only the votes counted to date. The first of these
30 preliminary RCV results are released on the Friday after Election Day.

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[76]Public Research Institute website (December 2004), "An Assessment of Ranked-Choice Voting in the San Francisco 2004 Election: Preliminary Report" (p. 9); http://pri.sfsu.edu/reports/SFSU-PRI%20Ranked%20Choice%20Voting%20Preliminary%20Report.pdf.
[77]San Francisco Chamber of Commerce (February 2011), "2011 City Beat Poll Results"; http://www.sfchamber.com/2011CityBeatPoll/2011pollresults.pdf.
[78]City and County of San Francisco Department of Elections (November 2010), "Schedule of Results Reporting for November 2, 2010 Consolidated General Election"; http://www.sfelections.org/ec/?m=201011.

1 Release of results with this frequency is a good practice for transparency. However transparency
2 is reduced by not reporting the preliminary results with the full RCV algorithm applied,
3 involving eliminations and transfers and the detail cast vote records on election night or with
4 every daily update. It should be noted that in San Francisco's first RCV election in November
5 2004, the DOE had planned to produce a "preliminary and initial RCV Algorithm report the day
6 after the election at 4:00 p.m. as well as up to three times a week until results were final."[79]
7 However, during the first attempt to apply "the RCV algorithm, ES&S [the voting system
8 vendor] realized the system was not tabulating all of the processed ballots and could not produce
9 complete preliminary RCV results."[80] ES&S attributed the issue to a software limitation which
10 was removed and by "that Friday, ES&S isolated and removed this particular limitation on the
11 software."[81] DOE has continued to adhere to this practice of producing the first result with the
12 full RCV algorithm on the Friday after the election with the Sequoia voting system.

13 As seen in November 2010 RCV contests, second and third choices have a significant effect on
14 the outcome of an RCV contest. Not producing results with the full algorithm applied could
15 contribute to a perception on the part of the public that they do not understand RCV. Timely
16 disclosure of preliminary results with the full RCV algorithm applied will improve transparency
17 and give the public a better understanding of the ultimate election result. It is also important for
18 public monitoring of elections. Full reporting of RCV results avoids reliance on potentially
19 misleading vote totals based only on first choices.

20 Finally, a substantial area of findings and recommendations in this report is in Election Records
21 and Post-Election Audit Procedures (see Section 2.1). Early release of election results with a
22 fully run RCV algorithm is complementary to improved audit procedures.

23   **Finding 2:** The Department of Elections has a good practice of frequently releasing
24   preliminary vote counts, but it does not apply RCV algorithms at each release. And this
25   may contribute to a perception of lack of understanding and/or transparency in the RCV
26   election process.

27 ## 2.4.3.3 Three-Choice Limit

28 San Francisco Charter Section 13.102(b)[82] states that:

29   The ballot shall allow voters to rank a number of choices in order of preference equal to
30   the total number of candidates for each office;

31

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[79]California Secretary of State Debra Bowen government website, "Implementation of Ranked-Choice Voting: The City and County of San Francisco: November 2, 2004 Municipal Election" (p. 8); http://www.sos.ca.gov/voting-systems/vendors/ess/rcv-final-report.pdf.
[80]Ibid, p. 8.
[81]Ibid, p. 8.
[82]San Francisco, Calif., Charter, Article XIII, Section 13.102(b).

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1   It is clear that the intent is to allow the voter to be afforded the opportunity to rank all candidates
2   in a race, but the same passage goes on to state:

3   ...provided, however, if the voting system, vote tabulation system or similar or related
4   equipment used by the City and County cannot feasibly accommodate choices equal to
5   the total number of candidates running for each office, then the Director of Elections may
6   limit the number of choices a voter may rank to no fewer than three.

7   Thus, three choices is the minimum allowed, but this limitation should only be imposed if the
8   voting system is not able to accommodate more choices. San Francisco has been using RCV with
9   this minimum level of capability due to San Francisco's Sequoia voting system limitations.

10 However, the law says the voter should be able to rank all candidates for good reasons: the
11 three-choice limit imposed by the voting system limits voters full expression. In a recent court
12 decision, the U.S. 9th Circuit Court of Appeals concluded:

13   If aspects of the City's restricted IRV scheme...impose any burdens on the voters' rights
14   to vote, they are minimal at best. Moreover, the City has advanced valid, sufficiently-
15   important interests to justify using the system.[83]

16 So although San Francisco's current implementation of RCV does not violate the voters'
17 constitutional rights, "restricted IRV" does limit the voter's ability to fully express their choices
18 in an RCV election. In the case that voters would want to express more than three choices in an
19 RCV election and that the ballot and voting system could accommodate those choices (which is
20 the clear intent of Section 13.102[b] of the City Charter), the ability of voters to fully express
21 those choices could materially affect the outcome of an RCV election.

22 The November 2010 District 10 Supervisor election is an instructive example. In this race 17,808
23 valid ballots were processed in the first RCV round. The top five candidates were separated by
24 only 181 first-choice votes. The winner was finally determined in the 20th RCV round, winning
25 by only 442 votes of the 8200 continuing ballots.[84] By the 20th round, 4977 ballots (28%) were
26 exhausted with less than 3 valid choices; however, 4631 ballots[85] (26%) were exhausted with
27 three valid choices. It is highly conceivable that enough of the 4631 voters whose ballots were
28 exhausted due to the 3-choice limit would have wanted to express more than 3 choices, and—
29 given the spread of votes throughout the RCV elimination rounds—this expression could very
30 well have changed the outcome of the election.

31   **Finding 3:** San Francisco's Charter states that voters should be able to rank a number of
32   choices in order of preference equal to the total number of candidates in an RCV race but
33   may be limited to as few as 3 choices should it be infeasible, which it currently is due to

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[83]U.S. Courts for the 9th Circuit government website, "Court of Appeals: Dudum v. Arntz, No 10-17198, May 20, 2011" (p. 32); http://www.ca9.uscourts.gov/datastore/opinions/2011/05/20/10-17198.pdf.
[84]City and County of San Francisco Department of Elections website, "Official Ranked-Choice Results Report, November 2, 2010: Consolidated Statewide Direct Primary Election Board of Supervisors, District 10"; http://sfelections.org/results/20101102/data/d10.html.
[85]City and County of San Francisco government website, "Department of Elections, San Francisco 2010 District 10: Table of Involuntarily Exhausted Ballots" (pdf file produced by David Cary for the VSTF); http://www.sfgov2.org/Modules/ShowDocument.aspx?documentid=461.

1 San Francisco's existing Sequoia voting system. This "restricted IRV" has been
2 determined not to be a violation of a voter's constitutional right to vote. It does, however,
3 impair the ability of the voter to fully express their preferences for candidates and such
4 full expression of choices could change the outcome of RCV elections.

2.4.4 Recommendations

2.4.4.1 Public Understanding of RCV

7 1. San Francisco should reenergize its voter outreach and education efforts on RCV to better
8   assure that voters have a good understanding of how votes are to be cast and counted.
9   The Board of Supervisors should work with the Department of Elections to identify
10   options and resources for renewed education efforts as soon as possible—preferably in
11   advance of the November 2011 RCV elections. DOE has good, existing materials, and
12   social networking sites such as Facebook and You Tube could offer an opportunity for
13   low cost, high impact outreach. The VSTF encourages the Supervisors themselves to
14   assist in public outreach to individuals and organizations in their districts.

2.4.4.2 Reporting Preliminary Early Election Results

16 2. Continue to release preliminary results for RCV contests as frequently as they are
17   released for non-RCV contests. Include the full RCV algorithm and the supporting detail
18   cast vote records (aka "ballot images") as part of preliminary results.
19 3. Implement Recommendation 2 to the extent feasible with the current system. Make this
20   capability a requirement for any system to be acquired by San Francisco in the future.
21 4. Assure that RCV public awareness, outreach, and education includes the information on
22   what interim result reporting information is available as well as how to access it and use
23   it to track and understand the RCV election process and results.

2.4.4.3 Three-Choice Limit

25 5. Explore the possibility of increasing the number of choices with the existing Sequoia
26   voting system. Make the ability to rank more than three choices a strong preference for
27   any future voting system to be acquired by San Francisco with a preference for a system
28   that will allow the voter to rank all candidates in a race.
29

2.5 Acquisition Strategies

2.5.1 Introduction

This section considers the voting systems "marketplace," including the state and federal regulatory/certification environment, economic considerations, and models for acquiring or developing a next generation system. It examines obstacles to innovation as well as potential partnership approaches that could break through existing barriers. It examines legal licensing options, including (1) proprietary, (2) disclosed, and (3) open source software and hardware approaches. It also puts forth software best practices that should be adopted regardless of the development strategy selected.

2.5.2. Concepts and Definitions

Public domain license: the class of license that is not limited by copyright and therefore essentially has no single owner to grant licenses. Since the work is not protected by copyright, it can be used, modified, and distributed by anyone without limitation.

Open source software: a range of concepts—such as software development practices—along with licensing rules. In this document we are using the Open Source Initiative (OSI) definition[86] of open source software; our focus is on licensing.

Disclosed source license: in this document, refers to a license that gives the licensee permission to review all source code—including that of firm-ware—and the ability to share all source code with other parties. All requestors should be able to run the code for testing purposes. No one should be restricted from publishing his/her findings. The code, however, can have a proprietary license that would restrict some rights; for example, the copyright owners could require a fee to run the code in production.

2.5.3 Findings

2.5.3.1 Regulatory/Certification Environment

The existing regulatory environment offers significant barriers to innovation. The certification process is shifting and cumbersome; it is extremely costly and time-consuming to bring a voting system through existing regulatory channels.

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[86]Note: For the complete OSI definition for "open source software" that the VSTF is using, see http://opensource.org/docs/osd.

1   The State of California requires both state certification and federal certification by the U.S.
2   Elections Assistance Commission (EAC) before a direct-record election device (DRE) can be
3   used by a jurisdiction.[87] Testing is done by voting system test laboratories, which are labs
4   accredited by the EAC.[88]

5   In the federal certification process, any modification to a voting system requires a re-testing of
6   the entire system, even if the change is to an isolated part of the system. Therefore, even a small
7   change to a voting system (such as a fix of a software defect) requires a very significant
8   investment to achieve re-certification under the federal process. Estimates on the cost of federal
9   certification vary; however, most estimates are in the range of $3-4 million dollars. Only six
10   voting systems have been certified by the EAC. Congress is currently considering a proposal to
11   dissolve the EAC, further contributing to lack of certainty about the future regulatory
12   environment.

13   The following are some of the requirements for a new voting system to be certified by the
14   Secretary of State in California:[89]

15   • Review of the application and documentation of the system
16   • End-to-end functional examination and testing of the system
17   • Volume testing under election-like conditions of the system and/or all voting devices
18   with which the voter directly interacts
19   • Security testing that includes a full source code review and penetration (red-team) testing
20   of the system
21   • Accessibility examination and testing of the system
22   • Public hearing and public comment period

23   The VSTF interviewed several Bay Area registrars as part of its research for this report, and all
24   identified the regulatory process as a significant barrier to innovation/expansion of the
25   marketplace.

26   **Finding 1:** The existing regulatory environment creates obstacles to innovation in voting
27   systems.

28   **2.5.3.2 Business and Partnership Models**

29   The voting systems industry today is highly concentrated, and there are many barriers to entry:
30   regulatory/certification barriers (as described in the previous section); a fragmented marketplace
31   with varying systems requirements; and high development costs.

32

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[87]See http://www.sos.ca.gov/voting-systems/cert-and-approval/vsysapproval/vs-conditions.htm.
[88]See http://www.eac.gov/testing_and_certification/testing_and_certification_program.aspx.
[89]California Secretary of State Debra Bowen government website, "Requirements of New Voting
Systems"; http://www.sos.ca.gov/voting-systems/cert-and-approval/vsysapproval/vs-conditions.htm.

1   Currently, the State of California does not have consistent voting systems requirements across its
2   58 counties. Each jurisdiction must initiate an independent process for establishing its needs and
3   must negotiate independently with private vendors to acquire a voting system that satisfies those
4   needs. While it might be preferable for the State of California (i.e. the California Secretary of
5   State) to develop statewide voting systems requirements, no such effort is currently envisioned.

6   Therefore, today the dominant model for implementing elections is for jurisdictions to purchase
7   or lease proprietary voting systems from commercial vendors (see Sample Model A below).
8   While this is currently the prevailing course of action, other models for acquiring a voting system
9   warrant examination. Each possible approach brings a different set of economic and partnership
10   considerations.

11   A range of sample models includes the following:

12   **A. Purchase a Commercial Off-The-Shelf (COTS) Voting System**
13   A jurisdiction purchases a voting system (equipment and services) from a private vendor
14   that funded its development and certification. The code is proprietary and owned by the
15   vendor. San Francisco employs this model with Sequoia Voting Systems.
16   **B. Engineer to Order (Vendor Developed or Self-Developed)**
17   A jurisdiction establishes system requirements and either uses a Request for Proposals
18   (process to select a vendor to build the voting system) or employs a full development
19   team to build the voting system. In either case the jurisdiction owns the system. The
20   voting system may be based on existing software components or may be built entirely
21   from scratch. The jurisdiction funds the costs of development and certification.
22   **C. Public Partnership**
23   Jurisdictions with similar systems and regulatory requirements partner and share
24   resources to build and maintain a voting system. The jurisdictions pool their resources to
25   fund the costs of development and certification.
26   **D. Public/Private Partnership**
27   A jurisdiction seeks partners that may include academic institutions, non-profits, other
28   government entities, or even private sector technology companies willing to produce
29   non-proprietary components. Based on system requirements, the consortium develops
30   the code and component parts. However, the code is not proprietary and the jurisdiction
31   either owns the code outright or has the ability to make modifications. The potential
32   funding for this model could vary greatly depending on the specific solution, but it could
33   include a combination of money from jurisdictions and from donors/volunteers.

34   There are existing non-profits that are building open source voting systems that are in various
35   stages of readiness for elections. Two such organizations are the Open Voting Consortium
36   (OVC) and Open Source Digital Voting Foundation (OSDV). There are also myriad systems that
37   have been built by individuals and groups at academic institutions. Although many were built for
38   specific research purposes and aren't made to be extended, some have the potential to be the

1   basis for full voting systems. The Caltech/MIT Voting Technology Project[90] is a good source of
2   information on existing systems.

3   Los Angeles County is engaged in a robust effort (the Voting Systems Assessment Project or
4   VSAP) to modernize its voting systems and is considering a variety of models/partnerships
5   (including public/private partnerships) to acquire or develop such a system. Its goal, presented in
6   the VSAP Incremental Plan,[91] is to have a new system in place by the end of 2015. Los Angeles
7   is the largest and most diverse voting jurisdiction in the nation with 4.5 million registered voters.
8   While the outcome of their VSAP is unknown and while San Francisco's needs will differ from
9   those of Los Angeles County, their comprehensive effort has the potential to pioneer new
10   approaches that might bring innovation to this stagnant marketplace.

11   Closer to home, Alameda County shares similar systems requirements with San Francisco,
12   notably Ranked-Choice Voting.

13   It should be noted that, while all of the Bay Area registrars interviewed for this report were open
14   to innovation in the voting systems marketplace, they expressed concern about the complexity of
15   developing future voting systems using new acquisition models and getting them certified via the
16   existing regulatory process.

17   **Finding 2:** While there are barriers to moving away from the dominant model of
18   purchasing a voting system from a private vendor, other acquisition models are possible
19   and are being actively considered by other jurisdictions.

20 **2.5.3.3 Transparency, Source-Code Disclosure, Licensing, and Contingency**
21 **Planning**

22   Sequoia Voting Systems developed San Francisco's current voting system using the company's
23   proprietary system design and software development methodologies. The source code has been
24   reviewed by some voting experts (through the California Secretary of State's 2007 Top-to-
25   Bottom Review) and regulators, but the majority of the system is not open source and is not
26   available for the general public to inspect. This makes it difficult for voters to establish
27   confidence that the software is free of unknown software defects or design flaws. It is difficult to
28   replace any aspect of the current voting system because the code is neither open source nor
29   designed with clear modules.

30   The ability to review source code and systems design is an essential property of a trustworthy
31   voting system. By giving the public access to the source code of a voting system, there is an
32   increased chance that a defect will be found in a voting system, whether by the election

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[90]CalTech/MIT Voting Technology Project, last accessed on June 23, 2011;
http://vote.caltech.edu/drupal/.
[91]See http://www.lavote.net/General/PDFS/BOARD_CORRESPONDENCE/01272011-054459.pdf.

1   administrator or a member of the public. In his paper, Hall includes ideas for contingency plans
2   to address possible discoveries.[92]

3   **Finding 3:** Public review of source code increases the chance that defects will be
4   identified and addressed.

5   2.5.3.4 Innovation

6   Although many jurisdictions have expressed interest in using alternative voting systems, most
7   have not been able to go beyond researching and reporting on alternatives. Running a county-
8   wide election is very complex, so it can be risky to try out new technologies. Several
9   jurisdictions have tried out innovative solutions by initially testing redundant systems in limited
10   ways in order to independently verify the accuracy of election results from the jurisdiction's
11   proprietary voting systems.

12   Innovation can be done incrementally—it does not require a new elections system to be
13   implemented and can be achieved with innovative processes in addition to technologies. For
14   example, San Francisco is planning to open voting locations on Saturdays in the November 2011
15   election if the cost can be covered by private donations.[93] This is an innovation that has the
16   potential to increase voter turnout without requiring any new technologies.

17   While this section has primarily discussed innovation for a jurisdiction's official results, there are
18   several innovations for independently confirming the results of a jurisdiction's official system.
19   One example is Takoma Park, Maryland, which used an open source system called Scantegrity in
20   a municipal election (e.g. an election with no state or federal races).[94] Another is Humboldt
21   County, California, that has used a project called the Humboldt County Election Transparency
22   Project,[95] discussed in detail in Section 2.1: Election Records and Post-Election Audit.

23   **Finding 4:** Innovation is possible even in conjunction with existing systems, but
24   redundant methods of verifying the election result should be implemented whenever new
25   innovations are tested.

26 2.5.3.5 Software Best Practices

27   There are standard software engineering best practices that have been found to create more
28   reliable, maintainable software irrespective of the precise software development methodology
29   used.[96] These include making sure code has ample unit-tests and is built using well-defined
30   modules. An open source license does not ensure that code is high quality, so it is important to

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[92]Hall, Joseph (2006), "Transparency Access to Source Code in Electronic Voting" (unpublished paper). http://josephhall.org/papers/jhall_evt06.pdf.
[93]See http://www.sfgov2.org/index.aspx?page=2390 for details.
[94]See http://www.scantegrity.org/takoma/ for details on how Scantegrity was used in Takoma Park, MD.
[95]See http://humtp.com/.
[96]For a comprehensive overview of best practices, see http://www.ibm.com/developerworks/websphere/library/techarticles/0306_perks/perks2.html.

1   make sure that any voting system under consideration has been built using best practices that
2   have been accepted across the software industry.

2.5.4 Recommendations

2.5.4.1 Regulatory/Certification Environment

5   1. San Francisco should advocate with the California Secretary of State and the State
6   legislature for a new, comprehensive state certification process to replace the existing
7   requirement for federal certification. The state should aspire to a certification process that
8   is more agile, efficient, and cost effective to enable innovation. The new state
9   certification process should be sound enough to ensure that any new voting system would
10   still meet the minimum federal requirements.

2.5.4.2 Business and Partnership Models

12   2. The VSTF supports the stated intention of the San Francisco Department of Elections
13   (DOE) to renew its contract with Sequoia Voting Systems through 2013 with the
14   stipulation that the short-term recommendations contained in this report—particularly
15   concerning auditing—are implemented whenever feasible. We are also open to extending
16   this contract through 2015 if doing so would allow San Francisco to take advantage of
17   new technologies or partnership options that would be available in the middle term as a
18   result of Los Angeles County's VSAP project. DOE should use the intervening period to
19   consider a broad range of possibilities regarding the business and partnership model it
20   will pursue to acquire/develop San Francisco's next voting system, including
21   collaborating with other jurisdictions, academic institutions, or non-profit organizations.
22   3. To leverage its negotiating position, the DOE should consider reaching across the bay to
23   Alameda County, which shares some similar requirements—notably Ranked-Choice
24   Voting.
25   4. The DOE should take current academic research, including research on risk-limiting
26   audits and end-to-end voting, into account to ensure that this work is considered in the
27   selection of the City's next voting system.[97]
28   5. The DOE should closely monitor innovations in the voting systems vendor marketplace
29   to determine if new products that meet the minimum requirements outlined in this report
30   may be available in the required time frame.

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[97]The Caltech/MIT Voting Project (http://vote.caltech.edu/) is a good resource for current academic
research.

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2.5.4.3 Transparency, Source Code Disclosure, Licensing, and Contingency Planning

6. The DOE should give strong preference to a voting system licensing structure that gives San Francisco all of the rights provided by an OSI-approved license,[98] even if the system is maintained by an external party.

   If an open source model is used, we recommend that the City of San Francisco work with other jurisdictions and organizations to develop and manage the code-base in order to leverage additional resources and expertise. The City of San Francisco should participate during the requirements gathering stage of development so that its unique requirements can be incorporated into the system design and implementation.

   If circumstances dictate that a solution that provides an OSI-approved license cannot be implemented by the time the contract for the City's current system expires, San Francisco should purchase voting equipment and services from a vendor who will provide a system that moves toward the following goals, irrespective of the other details of the license, so that any member of the public can perform the following tasks:

   - Review the source code of the entire system
   - Run code for testing
   - Distribute changes to code (i.e. documentation on defects and defect fixes can be distributed openly)

7. The DOE should set up a contingency plan in case a defect is found in the source code of the voting system. The contingency plan should include a volunteer committee of experts that can rapidly address any discovered defects and recommend procedures that can address those defects. The committee of experts should include computer scientists with expertise in voting systems and security and members of the DOE with deep knowledge on the voting systems and procedures in San Francisco.

8. San Francisco should be an active participant in the movement toward more open and transparent voting systems. We acknowledge the complexity of moving from the existing marketplace toward more innovative voting systems and urge San Francisco to move steadily toward the goal of transparency—even if it must do so in incremental steps. We encourage the City to be a strong advocate in the private sector marketplace for more transparent systems and to be open as well to new collaborative development models.

2.5.4.4 Innovation

9. It should be the policy of San Francisco to conduct pilot projects of alternative election technologies and procedures in municipal elections. This could initially involve a small number of precincts. These pilot projects would provide opportunities to learn how well alternative approaches work, such as using open source systems and hand counting paper

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[98]For an alphabetical list of OSI-approved licenses, see http://www.opensource.org/licenses/alphabetical.

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1   ballots at the polling places. All results of a pilot project should be confirmed using
2   hand-counting.

3 **2.5.4.5 Software Best Practices**

4 10. All voting systems software should be designed and implemented using the following
5   modern, high-quality industry methodologies:

6   a. Peer reviews of source code should be done throughout development of the new
7   voting system.

8   b. All source code should include extensive unit tests.

9   c. The system should be modular in design with open data formats for exchanging data.

10   d. There should be well-documented code, a clear technical architecture, and a detailed
11   database design.

12   e. The system should be delivered with extensive administrative (i.e. election workers)
13   and end-user documentation (e.g. how system will be used by voters, including voters
14   with different accessibility requirements).

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Section 3: Appendices

3.1 Appendix A: San Francisco's RCV Manual Tally Process

This appendix shows that the RCV manual tally process currently used in San Francisco does not audit the outcome of an election. Consider the following example of an RCV contest with three candidates (A, B, and C) and two precincts (5 ballots in Precinct 1, and 4 ballots in Precinct 2):

Precinct 1

first choice | A | A | C | C | C |
second choice | B | B | | | |

Manual precinct tally results:
A has 2 first-choice votes.
B has 2 second-choice votes.
C has 3 first-choice votes.
RCV: C wins in first round (3 to 2).

Precinct 2

first choice | B | B | B | C |
second choice | | | | |

Manual precinct tally results:
A has no votes.
B has 3 first-choice votes.
C has 1 first-choice vote.
RCV: B wins in first round (3 to 1).

When all 9 ballots are counted together, no candidate has a majority of first-choice votes. Candidate A is eliminated, transferring 2 votes to Candidate B. In the second round of counting, Candidate B now has a majority (5 out of 9 votes) and wins the election.

Compare this to an alternate scenario with slightly different votes cast:

Precinct 1

first choice | A | A | C | C | C |
second choice | | | B | B | |

Manual precinct tally results:
A has 2 first-choice votes.
B has 2 second-choice votes.
C has 3 first-choice votes.
RCV: C wins in first round (3 to 2).

Precinct 2

first choice | B | B | B | C |
second choice | | | | |

Manual precinct tally results:
A has no votes.
B has 3 first-choice votes.
C has 1 first-choice vote.
RCV: B wins in first round (3 to 1).

When all 9 ballots are counted together, again no candidate has a majority of first-choice votes, and Candidate A is eliminated. In the second round of counting, Candidate C now has a majority (4 out of 7 votes) and wins the election.

Notice that in both scenarios, manual tallies *within each precinct* produce exactly the same results. The total number of first-choice and second-choice votes for each candidate is the same. The RCV procedure, carried out within each precinct, produces the same result. So, even a 100% manual tally, using the current procedure, cannot distinguish these two scenarios—yet they yield different winners. This demonstrates that the current manual tally procedure does not correctly assure the RCV election outcome.

3.2 Appendix B: Summary of Outreach

In addition to welcoming public comment at its regular public meetings, the Voting Systems Task Force conducted the following research and outreach:

- Roger Donaldson and Jody Sanford met with John Arntz, Director of the Department of Elections for the City and County of San Francisco. (Fall 2009)

- Roger Donaldson, Jim Soper, and Ka-Ping Yee met with Lowell Finley, California Deputy Secretary of State. (9 October 2009)

- VSTF member Roger Donaldson (with Jim Soper) organized and attended a demonstration of the Prime III voting system (http://www.primevotingsystem.com) created by Dr. Juan Gilbert of Clemson University. This system is designed to address accessibility issues of concern to the disabled. (January 2010)

- A public comment period on "Draft VSTF Recommendations Under Consideration" document was held. (February 2010)

- Roger Donaldson (by phone) and Ka-Ping Yee met with San Francisco DOE staff members Nataliya Kuzina and Crispin Tirso on post-election audit procedures. (23 July 2010)

- VSTF members organized and attended a demonstration of the Trachtenberg Election Verification System (http://www.tevsystems.com) at San Francisco City Hall. (15 September 2010)

- Roger Donaldson, Ka-Ping Yee, and Jody Sanford met with Richard Matthews, Commissioner, San Francisco Elections Commission. (November 2010)

- Beth Mazur and Jody Sanford met with Dave MacDonald, Alameda County Registrar/Chief Information Officer. (27 January 2011)

- A public comment period on "Draft Recommendations on Voting Systems for the City and County of San Francisco" document was held. (February/March 2011)

- Beth Mazur and Jody Sanford met with Elaine Ginnold, Marin County Registrar. (1 March 2011)

- Jim Soper and Jody Sanford met with Stephen Weir, Contra Costa Elections Clerk. (22 March 2011)

Section 4:
About the VSTF

4.1 Membership of the VSTF

The Voting Systems Task Force has seven members with backgrounds in good government, computer science/software development, and accommodations serving persons with disabilities. Members serve as individuals and represent no other organization or group. The VSTF members are:

Jody Sanford, Chair
Ka-Ping Yee, Vice-Chair
Roger Donaldson
Tim Mayer
Beth Mazur
Gregory Miller
Jim Soper

Further information about the VSTF can be found at www.sfgov.org/vstf.

4.2 Biographies of VSTF Members

Roger Donaldson is currently a senior director at the Oracle Corporation where he has been employed since 1995. He began working on elections integrity and voting systems issues as a monitor with Election Protection during the 2004 Presidential election. He has served in nine San Francisco elections as a precinct inspector and field election deputy working for the San Francisco Department of Elections. He holds a Bachelor's degree in Economics and a Master's degree in Public Administration from the University of Southern California, and a Certificate in Government Contracts Administration from the University of California Los Angeles.

Tim Mayer is CEO of a business services company in San Francisco. He began his voter advocacy work in 2006. He has met with numerous county registrars and various voter advocacy groups, and he attended many government and private research and information meetings. He has observed and participated in precinct and county Election Day activities. Tim has observed several demonstrations of prototypical election systems developed by both for-profit and non-profit organizations. In 2008 he participated in the Open Voting Consortium[99] demonstration of open source/paper ballot printing voting systems developed by, amongst others, VSTF member Ka-Ping Yee.

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[99] See http://www.openvotingconsortium.org/.

1   **Beth Mazur** is a technology consultant with extensive experience in open-source software and
2   product management. She has held consulting and Product Management positions at a variety of
3   software companies and non-profit organizations including Jaspersoft and Grameen Foundation.
4   She has a longstanding interest in the use of technology for the improvement of the U.S. political
5   process. Beth holds a Bachelor's of Science in Computer Science and Electrical Engineering
6   from MIT.

7   **Gregory Miller** is the CEO for the Open Source Digital Voting Foundation. He has 28 years of
8   technical and business experience in development and eventual commercialization of the
9   Internet. He is a trained computer scientist with graduate business education and a law degree
10   focused on intellectual property, technology law, and public policy. He is also active in the
11   American Bar Association addressing technology law and public policy issues—including
12   Cyberlaw, Information Privacy & Security, and Internet Governance. Greg is a member of the
13   Congressional Internet Caucus Advisory Committee and a sustaining member of the Internet
14   Society.

15   **Jody Sanford** served on the Board of the League of Women Voters of San Francisco from 2004
16   to 2009 and was its president from 2005 to 2007. She is a communications manager with the
17   Presidio Trust, the agency leading the transformation of the Presidio of San Francisco from a
18   military post to an innovative urban national park.

19   **Jim Soper** is a senior software consultant and the author of CountedAsCast.com. He is a
20   co-chair of the Voting Systems Task Force in Alameda County, California, and a member of the
21   California Election Protection Network's steering committee. Jim has been active in
22   programming since the 1980s and in election integrity issues since 2005.

23   **Ka-Ping Yee** received his Ph.D. in Computer Science at University of California, Berkeley, for
24   research in usability, security, and electronic voting. He served as a source code reviewer on the
25   California Secretary of State Debra Bowen's "Top-to-Bottom Review of Voting Systems" in
26   2007. His dissertation, "Building Reliable Voting Machine Software,"[100] examines issues of
27   security and verifiability, and proposes simplification as the path toward high-assurance voting
28   machines. Ka-Ping joined Google.org as a software engineer in 2008.

29   *This Report was edited by Lisa McFarren, www.mcfarrenwritingandediting.com.*

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[100]See http://zesty.ca/voting.

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CHAPTER 602

An act to amend Section 19100 of, to amend the heading of Article 1 (commencing with Section 19200) of Chapter 3 of Division 19 of, to amend the headings of Chapter 3 (commencing with Section 19200) and Chapter 3.5 (commencing with Section 19260) of Division 19 of, to amend the heading of Division 19 (commencing with Section 19001) of, to amend and renumber Sections 19103, 19200.5, 19202, 19203, 19204, 19207, 19209, 19210, 19211, 19212, 19212.5, 19213, 19214, 19214.5, 19215, 19216, 19217, 19220, 19221, 19222, 19223, 19225, 19226, 19227, 19227.5, 19228, 19229, 19229.5, 19230, 19231, 19232, 19233, 19234, 19234.5, 19235, 19236, 19237, 19238, 19239, 19240, 19241, 19242, 19243, 19244, 19245, 19250, 19251, 19252, 19253, 19254, 19255, 19260, 19261, 19262, 19263, 19264, 19267, 19269, 19270, 19271, 19272, 19273, 19274, and 19275 of, to amend and renumber the headings of Article 2 (commencing with Section 19220), Article 2.5 (commencing with Section 19225), Article 3 (commencing with Section 19230), and Article 4 (commencing with Section 19250) of Chapter 3 of Division 19 of, to amend, renumber, and add Sections 19101, 19102, and 19201 of, to add Sections 19006, 19282, 19283, and 19286 to, to add Article 2 (commencing with Section 19220) to Chapter 3 of Division 19 of, to repeal Sections 19205, 19208, 19265, 19266, and 19268 of, and to repeal and add Section 19206 of, the Elections Code, relating to voting systems.

LEGISLATIVE COUNSEL'S DIGEST

SB 360, Padilla. Certification of voting systems.

(1) Existing law establishes various procedures and criteria for the approval by the Secretary of State of voting systems, including ballot marking systems, to be used in elections.

This bill would recast and revise those provisions by changing the term "approval" to the term "certification" and would authorize the Secretary of State to certify, conditionally approve, as specified, or withhold approval of a voting system. The bill would provide that it is the intent of the Legislature that a local jurisdiction be authorized to use available public funds to research and develop a nonproprietary voting system, as specified, for use in a pilot program or for submission to the Secretary of State, and that the Secretary of State certify all voting systems before they are used in future elections, adopt and publish testing standards, and encourage the development of voting systems that are easy to audit. The bill would require the Secretary of State to adopt and publish voting system standards and

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regulations, as specified, and would require the Secretary of State to study the performance of the voting systems in use in the state.

This bill would additionally require the Secretary of State to publish requirements for the approval of state-approved testing agencies, as defined, that are authorized to conduct the testing and examination of voting systems and to approve and publish a list of authorized testing agencies. The bill also would provide that the person, corporation, or public agency applying for certification of a voting system is responsible for all costs associated with the testing of the voting system.

(2) Existing law prohibits the use of a voting system unless it has received the approval of the Secretary of State, as specified.

This bill would provide that a voting system that has been tested and approved for use in all elections by the Secretary of State before January 1, 2014, would be deemed to be certified or conditionally approved by the Secretary of State and would be authorized for use in elections, as specified. The bill would authorize a vendor or county that has submitted a voting system for federal qualification before August 1, 2013, to request approval of the voting system from the Secretary of State, as specified. The bill also would prohibit a jurisdiction from purchasing or contracting for a voting system unless the voting system has been certified or conditionally approved by the Secretary of State, except as specified. The bill would further authorize the Secretary of State to grant conditional approval to a voting system or part of a voting system under specified circumstances.

(3) Existing law provides that a person or corporation owning or being interested in a voting system or a part of a voting system may apply to the Secretary of State to examine it and report on its accuracy and efficiency to fulfill its purpose. As part of its application, existing law requires the vendor of a voting system or the part of a voting system to notify the Secretary of State in writing of any known defect, fault, or failure of the version of the hardware, software, or firmware of the voting system or a part of the voting system submitted, and the Secretary of State is required to notify the United States Election Assistance Commission or its successor entity of the problem as soon as practicable so as to present a reasonably complete description of the problem, as specified.

This bill would delete the requirement that the Secretary of State notify the United States Election Assistance Commission or its successor entity of any known defect, fault, or failure of the version of the hardware, software, or firmware of the voting system or a part of the voting system submitted by the applicant.

(4) Existing law requires the Secretary of State to provide for a 30-day public review period and conduct a public hearing prior to publishing his or her decision to certify, conditionally approve, or withhold certification of a voting system, part of a voting system, or a ballot marking system. Under existing law, the Secretary of State is required to transmit notice of the hearing at least 30 days prior to the public review period and hearing, as specified.

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This bill would instead require the Secretary of State to transmit notice of the hearing at least 14 days prior to the public review period and hearing.

(5) Within 30 days after completing the examination of any voting system, existing law requires the Secretary of State to file a report stating whether the voting system can safely be used, as specified.

This bill would instead require the Secretary of State to file a report within 60 days after the completion of the examination of the voting system, as specified.

(6) Existing law authorizes a governing board to adopt any kind of voting system, any combination of voting systems, or any combination of a voting system and paper ballots for use at elections, as specified. Provisions of existing law authorize the use of the voting systems at any or all elections held in any county, city, or any of their political subdivisions for voting, registering, and counting votes cast, and prohibit candidates for a single office from being split between voting systems or between a voting system and paper ballots.

This bill would delete those provisions.

(7) Existing law authorizes a governing board to provide for the experimental use of a voting system in one or more precincts without formally adopting the system and provides that the experimental use of the system at the election is valid for all purposes as if it were lawfully adopted.

This bill would authorize a governing board to conduct a pilot program for the experimental use of voting systems, as specified, and would require the Secretary of State to adopt and publish regulations governing voting system pilot programs. No later than 9 months before the election at which a pilot program is proposed to be conducted, the bill would require the governing board to submit to the Secretary of State a plan for the proposed pilot program, and would require the Secretary of State to approve or reject the plan within 3 months of receipt of the plan. The bill would require votes cast on a voting system during a pilot program, as specified, to be subject to risk-limiting audits, as defined. Upon completion of the pilot program, the bill would require the governing board to notify the Secretary of State in writing of any defect, fault, or failure in the hardware, software, or firmware of the voting system.

(8) Upon examination of a voting system or a ballot marking system, existing law provides that if a report is issued that states that the voting system or ballot marking system can be used, it is deemed approved by the Secretary of State for use at elections.

This bill would delete the above provision and would make conforming changes.

(9) The Voting Modernization Bond Act of 2002 authorizes the issuance of bonds in the amount of $200,000,000 pursuant to the State General Obligation Bond Law for the purpose of assisting counties in the purchase of updated voting systems.

This bill would authorize a county to use fund moneys to contract and pay for research and development of a new voting system that has not been certified or conditionally approved by the Secretary of State, as specified,

and for the manufacture of the minimum number of voting system units, as specified.

(10) Existing law prohibits the Secretary of State, on and after January 1, 2005, from approving a direct recording electronic voting system unless the system has received federal qualification and includes an accessible voter verified paper audit trail.

This bill would prohibit a city or county from contracting for or purchasing a direct recording electronic voting system unless the system has been certified by the Secretary of State, and would require all direct recording electronic voting systems in use as of January 1, 2006, to have received federal qualification and include an accessible voter verified paper audit trail, as specified.

This bill would incorporate additional changes to be operative only if Assembly Bill 214 and this bill are both chaptered and become effective January 1, 2014.

The people of the State of California do enact as follows:

SECTION 1. The heading of Division 19 (commencing with Section 19001) of the Elections Code is amended to read:

DIVISION 19. CERTIFICATION OF VOTING SYSTEMS

SEC. 2. Section 19006 is added to the Elections Code, to read:
19006. It is the intent of the Legislature that:
(a) All voting systems be certified or conditionally approved by the Secretary of State, independent of voluntary federal qualification or certification, before they are used in future elections to ensure that the voting systems have the ability to meet accuracy, accessibility, and security standards.

(b) The Secretary of State adopt and publish testing standards that meet or exceed federal voluntary standards set by the United States Election Assistance Commission or its successor agency.

(c) The Secretary of State study and encourage the development of voting systems that use nonproprietary source code and that are easy to audit.

(d) A local jurisdiction may use available public funds to purchase and maintain any certified or conditionally approved voting system or part of a voting system.

(e) California receive the benefits of the publicly funded development of a nonproprietary voting system in the state.

(f) A local jurisdiction may use available public funds to research and develop a nonproprietary voting system that uses disclosed source codes, including the manufacture of a limited number of voting system units, for use in a pilot program or for submission to the Secretary of State for certification.

SEC. 3. Section 19100 of the Elections Code is amended to read:

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19100. The Secretary of State shall study and adopt regulations governing the use of voting machines, voting devices, vote tabulating devices, and ballot marking systems, and shall be responsible for certifying voting systems for use in this state.

SEC. 4. Section 19101 of the Elections Code is amended and renumbered to read:

19103. The Chairperson of the Senate Standing Committee on Elections and Constitutional Amendments and the Chairperson of the Assembly Standing Committee on Elections and Redistricting shall meet with the Secretary of State and assist the Secretary of State to the extent that the participation is not incompatible with their positions as Members of the Legislature. For purposes of this division, the chairpersons of the committees named shall constitute a joint interim legislative committee on the subject of this chapter and Chapter 3 (commencing with Section 19200) and shall have the powers and duties imposed upon those committees by the Joint Rules of the Senate and Assembly.

SEC. 5. Section 19101 is added to the Elections Code, to read:

19101. (a) The Secretary of State shall adopt and publish voting system standards and regulations governing the use of voting systems. The Secretary of State shall adopt standards that meet or exceed federal voluntary voting system guidelines set forth by the United States Election Assistance Commission or its successor agency. Until state standards are adopted, the Voluntary Voting System Guidelines Draft Version 1.1, as submitted to the United States Election Assistance Commission on August 31, 2012, shall be used as state standards to the extent that they do not conflict with this code. The Secretary of State may require additional testing to ensure that voting systems meet the requirements of this code.

(b) Voting system standards adopted by the Secretary of State pursuant to subdivision (a) shall include, but not be limited to, all of the following requirements:

(1) The machine or device and its software shall be suitable for the purpose for which it is intended.

(2) The system shall preserve the secrecy of the ballot.

(3) The system shall be safe from fraud or manipulation.

(4) The system shall be accessible to voters with disabilities pursuant to Section 19242 and applicable federal laws.

(5) The system shall be accessible to voters who require assistance in a language other than English if the language is one in which a ballot or ballot materials are required to be made available to voters pursuant to Section 14201 and applicable federal laws.

SEC. 6. Section 19102 of the Elections Code is amended and renumbered to read:

19104. The Secretary of State may investigate any alleged violation of this code or the Secretary of State's regulations with the power to subpoena all necessary persons and records.

SEC. 6.5. Section 19102 of the Elections Code is amended and renumbered to read:

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19105. The Secretary of State may investigate any alleged violation of this code or the Secretary of State's regulations with the power to subpoena all necessary persons and records.

SEC. 7. Section 19102 is added to the Elections Code, to read:

19102. The Secretary of State shall study the performance of voting systems in use in the state.

SEC. 8. Section 19103 of the Elections Code is amended and renumbered to read:

19212. (a) (1) No later than 10 business days after the Secretary of State certifies or conditionally approves the use of a new or updated voting system, the vendor or county seeking certification or approval of the voting system shall cause an exact copy of the approved source code for each component of the voting system, including complete build and configuration instructions and related documents for compiling the source code into object code, to be transferred directly from either the United States Election Assistance Commission or the voting system testing agency that evaluated the voting system and is approved by the Secretary of State, and deposited into an approved escrow facility.

(2) No later than 10 business days after the Secretary of State certifies or conditionally approves a new or updated ballot marking system, the vendor or county seeking certification or approval of the ballot marking system shall cause an exact copy of the approved source code for each component of the ballot marking system, including complete build and configuration instructions and related documents for compiling the source code into object code, to be deposited into an approved escrow facility.

(b) The Secretary of State shall adopt regulations relating to all of the following:

(1) The definition of source code components of a voting system or ballot marking system, including source code for all firmware and software of the voting system or ballot marking system. Firmware and software shall include commercial off-the-shelf or other third-party firmware and software that is available and able to be disclosed by the vendor or county seeking certification or approval of a voting system or ballot marking system.

(2) Specifications for the escrow facility, including security and environmental specifications necessary for the preservation of the voting system or ballot marking system source codes.

(3) Procedures for submitting voting system or ballot marking system source codes.

(4) Criteria for access to voting system or ballot marking system source codes.

(5) Requirements for the applicant to include in the materials deposited in escrow build and configuration instructions and documents so that a neutral third party may create, from the source codes in escrow, executable object codes identical to the code installed on certified or conditionally approved voting systems or ballot marking systems.

(c) The Secretary of State shall have reasonable access to the materials placed in escrow, under any of the following circumstances:

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(1) In the course of an investigation or prosecution regarding vote counting or ballot marking equipment or procedures.

(2) Upon a finding by the Secretary of State that an escrow facility or escrow company is unable or unwilling to maintain materials in escrow in compliance with this section.

(3) In order to fulfill the provisions of this chapter related to the examination and certification or conditional approval of voting systems or ballot marking systems.

(4) In order to verify that the software on a voting system is identical to the certified or conditionally approved version.

(5) For any other purpose deemed necessary to fulfill the provisions of this code or Section 12172.5 of the Government Code.

(d) The Secretary of State may seek injunctive relief requiring the elections officials, approved escrow facility, or any vendor or manufacturer of a voting system or part of a voting system to comply with this section and related regulations. Venue for a proceeding under this section shall be exclusively in Sacramento County.

(e) This section applies to all elections.

SEC. 9. The heading of Chapter 3 (commencing with Section 19200) of Division 19 of the Elections Code is amended to read:

CHAPTER 3. CERTIFICATION OF VOTING SYSTEMS

SEC. 10. The heading of Article 1 (commencing with Section 19200) of Chapter 3 of Division 19 of the Elections Code is amended to read:

Article 1. Procedures for Certification of Voting Systems

SEC. 11. Section 19200.5 of the Elections Code is amended and renumbered to read:

19204. The Secretary of State shall not certify or conditionally approve any voting system that includes features that permit a voter to produce, and leave the polling place with, a copy or facsimile of the ballot cast by the voter at that polling place.

SEC. 12. Section 19201 of the Elections Code is amended and renumbered to read:

19202. (a) Except as authorized by Section 19209, a voting system, in whole or in part, shall not be used unless it has been certified or conditionally approved by the Secretary of State prior to any election at which it is to be used.

(b) A voting system that has been tested and approved for use in all elections by the Secretary of State before January 1, 2014, shall be deemed certified or conditionally approved by the Secretary of State and may be used in an election subject to any conditions placed on the use of the voting system by the Secretary of State before January 1, 2014, including conditions imposed in the reapproval documents issued by the Secretary of State in

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2007 and 2008 following the Top-to-Bottom Review, and its subsequent revisions. The voting systems described in this subdivision shall remain subject to review and decertification by the Secretary of State at any time pursuant to Section 19232.

(c) A vendor or county that has submitted a voting system for federal qualification before August 1, 2013, upon obtaining federal qualification before January 1, 2015, may request approval of the voting system from the Secretary of State based on the examination and review requirements in place before January 1, 2014.

(d) A jurisdiction shall not purchase or contract for a voting system unless it has been certified or conditionally approved by the Secretary of State.

(e) Notwithstanding subdivision (d), a local jurisdiction may contract and pay for the following:

(1) Research and development of a new voting system that has not been certified or conditionally approved by the Secretary of State and uses only nonproprietary software and firmware with disclosed source code, except for unmodified commercial off-the-shelf software and firmware, as defined in paragraph (1) of subdivision (a) of Section 19209.

(2) Manufacture of the minimum number of voting system units reasonably necessary for either of the following purposes:

(A) To test and seek certification or conditional approval of the voting system pursuant to Sections 19210 to 19214, inclusive.

(B) To test and demonstrate the capabilities of the voting system in a pilot program pursuant to paragraph (2) of subdivision (b) of, and subdivision (c) of, Section 19209.

SEC. 13. Section 19201 is added to the Elections Code, to read:

19201. (a) The Secretary of State may grant conditional approval to a voting system or part of a voting system under either of the following circumstances:

(1) A voting system or part of a voting system was decertified as a result of a review by the Secretary of State pursuant to Section 19232.

(2) A certified voting system or part of that voting system is modified to comply with voting system standards or changes in statute.

(b) The Secretary of State may withdraw conditional approval at any time pursuant to Section 19232.

SEC. 14. Section 19202 of the Elections Code is amended and renumbered to read:

19210. (a) A person, corporation, or public agency owning or having an interest in the sale or acquisition of a voting system or a part of a voting system may apply to the Secretary of State for certification that includes testing and examination of the applicant's system by a state-approved testing agency or expert technicians and a report on the findings, which shall include the accuracy and efficiency of the voting system. As part of its application, the applicant shall notify the Secretary of State in writing of any known defect, fault, or failure of the version of the hardware, software, or firmware of the voting system or a part of the voting system submitted. The Secretary of State shall not begin his or her certification process until he or she receives

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a completed application. The applicant shall also notify the Secretary of State in writing of any defect, fault, or failure of the version of the hardware, software, or firmware of the voting system or a part of the voting system submitted that is discovered after the application is submitted and before the Secretary of State submits the report required by Section 19213. The Secretary of State shall complete his or her certification process without undue delay.

(b) The Secretary of State shall publish and make publicly available on his or her Internet Web site a quarterly report of regulatory activities related to voting systems.

(c) As used in this article:

(1) "Defect" means any flaw in the hardware or documentation of a voting system that could result in a state of unfitness for use or nonconformance to the manufacturer's specifications or applicable law.

(2) "Failure" means a discrepancy between the external results of the operation of any software or firmware in a voting system and the manufacturer's product requirements for that software or firmware or applicable law.

(3) "Fault" means a step, process, or data definition in any software or firmware in a voting system that is incorrect under the manufacturer's program specification or applicable law.

SEC. 15. Section 19203 of the Elections Code is amended and renumbered to read:

19223. The Secretary of State shall use a state-approved testing agency or expert technicians to examine and test voting systems or parts of voting systems proposed for use or sale in this state. He or she shall furnish a complete report of the findings of the examination and testing to the Governor and the Attorney General.

SEC. 16. Section 19204 of the Elections Code is amended and renumbered to read:

19211. (a) Prior to publishing his or her decision to certify, conditionally approve, or withhold certification of a voting system or part of a voting system, the Secretary of State shall provide for a 30-day public review period and conduct a public hearing to give persons interested an opportunity to review testing and examination reports and express their views for or against certification or conditional approval of the voting system.

(b) The Secretary of State shall give notice of the public review period and hearing in the manner prescribed in Section 6064 of the Government Code in a newspaper of general circulation published in Sacramento County. The Secretary of State shall also provide notice of the hearing on his or her Internet Web site. The Secretary of State shall transmit written notice of the hearing, at least 14 days prior to the public review period and hearing, to each county elections official, to any person that the Secretary of State believes will be interested in the public review period and hearing, and to any person who requests, in writing, notice of the public review period and hearing.

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(c) The decision of the Secretary of State to certify, conditionally approve, or withhold certification of a voting system or part of a voting system shall be in writing and shall state the findings of the Secretary of State. The decision shall be open to public inspection.

SEC. 17. Section 19205 of the Elections Code is repealed.

SEC. 18. Section 19206 of the Elections Code is repealed.

SEC. 19. Section 19206 is added to the Elections Code, to read:

19206. Except as authorized by Section 19209, both of the following apply:

(a) If more than one voting system is used to count ballots, the names of candidates shall, insofar as possible, be placed on the primary voting system.

(b) If more than one voting system or a combination of a voting system and paper ballots is used to count ballots, a single ballot measure or the candidates for a single office may not be split between voting systems or between a voting system and paper ballots.

SEC. 20. Section 19207 of the Elections Code is amended and renumbered to read:

19213. Within 60 days after the completion of the examination of a voting system, the Secretary of State shall make publicly available a report stating whether the voting system has been certified or conditionally approved, or whether certification has been withheld. The report shall also contain a written or printed description and drawings and photographs that clearly identify the machine or device and its mechanical operation.

SEC. 21. Section 19208 of the Elections Code is repealed.

SEC. 22. Section 19209 of the Elections Code is amended and renumbered to read:

19214. Within 10 days after issuing and filing a certification decision and associated testing reports, the Secretary of State shall make available to the public a full and complete copy of the certification report and all associated documentation, except that portions of the report or documentation that contain information that the Secretary of State determines to be confidential or proprietary shall not be made publicly available. The Secretary of State shall also notify the board of supervisors and elections official of each county of the availability of the report and associated documentation.

SEC. 23. Section 19210 of the Elections Code is amended and renumbered to read:

19207. The governing board may adopt for use at elections any kind of voting system, any combination of voting systems, or any combination of a voting system and paper ballots, provided that the voting system or systems involved have been certified or conditionally approved by the Secretary of State or specifically authorized by law pursuant to Section 19209.

SEC. 24. Section 19211 of the Elections Code is amended and renumbered to read:

19209. (a) For purposes of this section, the following terms have the following meanings:

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(1) "Commercial off-the-shelf" means mass-produced, readily available hardware devices, including card readers, printers, or personal computers, and their firmware or software products, including operating systems, programming language compilers, or database management systems.

(2) "Incorrect in part" means a full manual tally of the votes cast on the pilot system would reveal rates of error in the pilot system tally that, if extrapolated to the entire contest, would alter the electoral outcome.

(3) "Partial risk-limiting audit" means a procedure that guarantees a large minimum chance of a full manual tally of the votes cast on the pilot system if the electoral outcome is incorrect in part.

(4) "Risk-limiting audit" means a procedure that ensures a large, predetermined minimum chance of requiring a full manual tally whenever a full manual tally would show an electoral outcome that differs from the outcome reported by the voting system for the audited contest.

(b) The governing board, without formally adopting a voting system, may provide for the experimental use of the voting system in a pilot program held in one or more precincts at a single election or, in the case of a special election, the special primary election and the special general election, if the voting system complies with either of the following:

(1) The voting system is certified or conditionally approved prior to its experimental use.

(2) The voting system meets all of the following requirements:

(A) Uses only software and firmware with disclosed source code, except for unmodified commercial off-the-shelf software and firmware.

(B) Meets the requirements of subdivision (b) of Section 19101.

(C) Meets the requirements of the regulations adopted by the Secretary of State pursuant to subdivision (g).

(D) Implements risk-limiting audits.

(c) A voting system that meets all of the requirements of paragraph (2) of subdivision (b) need not be certified or conditionally approved prior to its experimental use in a pilot program if the number of voting system units deployed in the pilot program is limited to the number necessary to test and demonstrate the capabilities of the voting system in a limited number of precincts or locations, including a prudent number of reserve units to ensure that sufficient working units will be available to conduct the pilot program. In no event shall the number of voting system units exceed 50 percent of the estimated number of units that would be required for full deployment of the voting system at every polling place and early voting site in a statewide election throughout the jurisdiction. Capabilities that may be taken into account in determining the number of voting system units reasonably necessary to test and demonstrate the capabilities of the voting system include, but are not limited to, all of the following:

(1) The capability of the voting system to accommodate voting in all languages in which the jurisdiction is required to provide ballots under applicable state and federal laws.

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(2) The capability of the voting system to accommodate voting by persons with a broad range of physical and cognitive disabilities, as required by applicable state and federal laws.

(3) The current and projected number of voting-eligible individuals in the jurisdiction.

(4) The geography and distribution of the population in the jurisdiction.

(d) No later than nine months before the election at which the pilot program of a voting system is proposed to be conducted, the governing board shall submit to the Secretary of State a plan for the pilot program. The Secretary of State shall approve or reject the plan no later than three months after receipt of the plan.

(e) The votes cast on a voting system during a pilot program pursuant to subdivision (b) shall be subject to risk-limiting audits.

(1) For each contest conducted entirely on the pilot voting system, the jurisdiction conducting the pilot program shall conduct a risk-limiting audit with at least a 90-percent chance of requiring a full manual tally of the contest whenever a full manual tally would show an outcome that differs from the outcome reported by the pilot voting system.

(2) For each contest conducted partially on the pilot voting system, the jurisdiction conducting the pilot program shall conduct a partial risk-limiting audit of the portion of the contest in which the voters cast their votes on the pilot voting system, with at least a 90-percent chance of requiring a full manual tally of all votes cast using the pilot voting system whenever the outcome is incorrect in part.

(3) (A) If a risk-limiting audit of a contest leads to a full manual tally of all of the ballots cast in the contest, then the contest outcome according to that manual tally shall become the official result.

(B) If a partial risk-limiting audit of a contest leads to a full manual tally of the ballots cast using the pilot voting system, the vote counts according to that manual tally shall replace the vote counts reported by the pilot voting system for the purpose of determining the official contest results.

(4) Risk-limiting audit procedures shall comply with all other requirements in regulations adopted by the Secretary of State pursuant to subdivision (g).

(f) Upon completion of the pilot program, the governing board shall notify the Secretary of State in writing of any defect, fault, or failure of the hardware, software, or firmware of the voting system or a part of the voting system.

(g) A voting system pilot program shall not be conducted in a legally binding election without the prior approval of the Secretary of State. The Secretary of State shall adopt and publish regulations governing voting system pilot programs.

SEC. 25. Section 19212 of the Elections Code is amended and renumbered to read:

19208. The governing board may provide for the payment of the cost of the voting system equipment in any manner and by any method as it deems best for local interests, and also may for that purpose issue bonds,

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certificates of indebtedness, or other obligations that shall be a charge on the county or city. The bonds, certificates, or other obligations may be issued with or without interest, payable at any time as the authorities may determine, but shall not be issued or sold at less than par. The governing board may enter into lease agreements or lease-purchase agreements for the use of equipment.

SEC. 26. Section 19212.5 of the Elections Code is amended and renumbered to read:

19215. (a) If a voting system or a part of a voting system has been certified or conditionally approved by the Secretary of State or has been federally qualified, the vendor or, in cases where the system is publicly owned, the jurisdiction shall notify the Secretary of State and all local elections officials who use the system in writing of any defect, fault, or failure of the hardware, software, or firmware of the voting system or a part of the voting system within 30 calendar days after the vendor learns of the defect, fault, or failure.

(b) After receiving written notification of a defect, fault, or failure pursuant to subdivision (a), the Secretary of State shall notify the United States Election Assistance Commission or its successor agency of the problem as soon as practicable so as to present a reasonably complete description of the problem. The Secretary of State shall subsequently submit a report regarding the problem to the United States Election Assistance Commission or its successor agency. The report shall include any report regarding the problem submitted to the Secretary of State.

SEC. 27. Section 19213 of the Elections Code is amended and renumbered to read:

19216. If a voting system or a part of a voting system has been certified or conditionally approved by the Secretary of State, it shall not be changed or modified until the Secretary of State has been notified in writing and has determined that the change or modification does not impair its accuracy and efficiency sufficient to require a reexamination and recertification, or conditional approval, pursuant to this article. The Secretary of State may adopt rules and regulations governing the procedures to be followed in making his or her determination as to whether the change or modification impairs accuracy or efficiency.

SEC. 28. Section 19214 of the Elections Code is amended and renumbered to read:

19217. The Secretary of State may seek injunctive and administrative relief if a voting system or a part of a voting system has been compromised by the addition or deletion of hardware, software, or firmware without prior approval or is defective due to a known hardware, software, or firmware defect, fault, or failure that has not been disclosed pursuant to Section 19210 or 19215.

SEC. 29. Section 19214.5 of the Elections Code is amended and renumbered to read:

19218. (a) The Secretary of State may seek all of the following relief for an unauthorized change in hardware, software, or firmware in a voting system certified or conditionally approved in California:

(1) A civil penalty from the offending party or parties, not to exceed ten thousand dollars ($10,000) per violation. For purposes of this subdivision, each voting system component found to contain the unauthorized hardware, software, or firmware shall be considered a separate violation. A penalty imposed pursuant to this subdivision shall be apportioned 50 percent to the county in which the violation occurred, if applicable, and 50 percent to the office of the Secretary of State for purposes of bolstering voting systems security efforts.

(2) Immediate commencement of proceedings to withdraw certification or conditional approval for the voting system in question.

(3) Prohibiting the manufacturer or vendor of a voting system from doing elections-related business in the state for one, two, or three years.

(4) Refund of all moneys paid by a local agency for a voting system or a part of a voting system that is compromised by an unauthorized change or modification, whether or not the voting system has been used in an election.

(5) Any other remedial actions authorized by law to prevent unjust enrichment of the offending party.

(b) (1) The Secretary of State may seek all of the following relief for a known but undisclosed defect, fault, or failure in a voting system or part of a voting system certified or conditionally approved in California:

(A) Refund of all moneys paid by a local agency for a voting system or part of a voting system that is defective due to a known but undisclosed defect, fault, or failure, whether or not the voting system has been used in an election.

(B) A civil penalty from the offending party or parties, not to exceed fifty thousand dollars ($50,000) per violation. For purposes of this subdivision, each defect, fault, or failure shall be considered a separate violation. A defect, fault, or failure constitutes a single violation regardless of the number of voting system units in which the defect, fault, or failure is found.

(C) In addition to any other penalties or remedies established by this section, the offending party or parties shall be liable in the amount of one thousand dollars ($1,000) per day after the applicable deadline established in Section 19215 until the required disclosure is filed with the Secretary of State.

(2) A penalty imposed pursuant to subparagraph (B) or (C) of paragraph (1) shall be deposited in the General Fund.

(c) Before seeking any measure of relief under this section, the Secretary of State shall hold a public hearing. The Secretary of State shall give notice of the hearing in the manner prescribed by Section 6064 of the Government Code in a newspaper of general circulation published in Sacramento County. The Secretary of State also shall transmit written notice of the hearing, at least 30 days prior to the hearing, to each county elections official, the

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offending party or parties, a person that the Secretary of State believes will be interested in the hearing, and a person who requests, in writing, notice of the hearing.

(d) The decision of the Secretary of State to seek relief under this section shall be in writing and state his or her findings. The decision shall be open to public inspection.

SEC. 30.   Section 19215 of the Elections Code is amended and renumbered to read:

19219.   (a) The Secretary of State may seek injunctive relief requiring an elections official, or any vendor or manufacturer of a voting machine, voting system, or vote tabulating device, to comply with the requirements of this code, the regulations of the Secretary of State, and the specifications for voting machines, voting devices, vote tabulating devices, and any software used for each, including the programs and procedures for vote tabulating and testing.

(b) Venue for a proceeding under this section shall be exclusively in Sacramento County.

SEC. 31.   Section 19216 of the Elections Code is amended and renumbered to read:

19203.   The Secretary of State shall not certify or conditionally approve a voting system or a part of a voting system that uses paper ballots unless the paper used for the ballots is of sufficient quality that it maintains its integrity and readability throughout the retention period specified in Chapter 4 (commencing with Section 17300) of Division 17.

SEC. 32.   Section 19217 of the Elections Code is amended and renumbered to read:

19205.   A voting system shall comply with all of the following:

(a) No part of the voting system shall be connected to the Internet at any time.

(b) No part of the voting system shall electronically receive or transmit election data through an exterior communication network, including the public telephone system, if the communication originates from or terminates at a polling place, satellite location, or counting center.

(c) No part of the voting system shall receive or transmit wireless communications or wireless data transfers.

SEC. 33.   The heading of Article 2 (commencing with Section 19220) of Chapter 3 of Division 19 of the Elections Code is amended and renumbered to read:

Article 3. Inspection of Certified and Conditionally Approved Voting
Systems

SEC. 34.   Section 19220 of the Elections Code is amended and renumbered to read:

19230.   The elections official of any county or city using a voting system shall inspect the machines or devices at least once every two years to

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determine their accuracy. Any county or city using leased or rented equipment shall determine if the equipment has been inspected for accuracy within the last two years before using it for any election. The inspection shall be made in accordance with regulations adopted and promulgated by the Secretary of State. The elections official shall certify the results of the inspection to the Secretary of State.

SEC. 35. Article 2 (commencing with Section 19220) is added to Chapter 3 of Division 19 of the Elections Code, to read:

Article 2. Voting System Testing Agencies

19220. For purposes of this division, "state-approved testing agency" means a person or entity that is authorized by the Secretary of State to conduct the testing and examination of a voting system in connection with certification or conditional approval of the voting system pursuant to this division.

19221. The Secretary of State shall do all of the following:

(a) Publish requirements for the approval of state-approved testing agencies that are authorized to conduct the testing and examination of voting systems. Until the requirements are published, federally accredited voting system laboratories shall be used to conduct testing and examination.

(b) Approve and publish a list of authorized state-approved testing agencies.

19222. The person, corporation, or public agency applying for certification of a voting system is responsible for all costs associated with the testing of the voting system.

SEC. 36. Section 19221 of the Elections Code is amended and renumbered to read:

19231. (a) If the Secretary of State has reason to believe that a local inspection of equipment is not adequate, he or she may cause the equipment to be reexamined, at any time prior to six months before a statewide election, to ensure that the voting system or parts of the voting system perform to adopted standards and tabulate votes accurately.

(b) For the purpose of reexamining voting equipment, the Secretary of State may use state-approved testing agencies or expert technicians at the cost of the elections official.

(c) The Secretary of State shall furnish a complete report of the findings to the Governor, to the Attorney General, to each county elections official, to the chairpersons of the elections committees of the Assembly and Senate, and to the manufacturer of the equipment.

SEC. 37. Section 19222 of the Elections Code is amended and renumbered to read:

19232. The Secretary of State shall review voting systems periodically to determine if they are defective, obsolete, or otherwise unacceptable. The Secretary of State has the right to withdraw his or her certification or conditional approval previously granted under this chapter of any voting

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system or part of a voting system should it be defective or prove unacceptable after such review. Six months' notice shall be given before withdrawing certification or conditional approval unless the Secretary of State for good cause shown makes a determination that a shorter notice period is necessary. Any withdrawal by the Secretary of State of his or her previous certification or conditional approval of a voting system or part of a voting system shall not be effective as to any election conducted within six months of that withdrawal.

SEC. 38. Section 19223 of the Elections Code is amended and renumbered to read:

19233. The Secretary of State shall conduct random audits of the software installed on direct recording electronic voting systems, as defined in Section 19271, to ensure that the installed software is identical to the software that has been approved for use on that voting system. The Secretary of State shall take steps to ensure that the process for conducting random audits does not intentionally cause a direct recording electronic voting system to become more vulnerable to any unauthorized changes to the software that has been approved for its use.

SEC. 39. The heading of Article 2.5 (commencing with Section 19225) of Chapter 3 of Division 19 of the Elections Code is amended and renumbered to read:

Article 4. Accessible Voting Systems

SEC. 40. Section 19225 of the Elections Code is amended and renumbered to read:

19240. It is the intent of the Legislature that California voting system standards and elections comply with the provisions of the federal Help America Vote Act of 2002 (42 U.S.C. Sec. 15301 et seq.) that require voting systems be accessible for individuals with disabilities, including nonvisual accessibility for the blind and visually impaired, in a manner that provides the same opportunity for access and participation, including privacy and independence, as provided to other voters who are not disabled.

SEC. 41. Section 19226 of the Elections Code is amended and renumbered to read:

19241. As used in this article:

(a) "Access" means the ability to receive, use, select, and manipulate data and operate controls included in voting technology and systems.

(b) "Nonvisual" means synthesized speech, braille, and other output methods that do not require sight.

SEC. 42. Section 19227 of the Elections Code is amended and renumbered to read:

19242. (a) The Secretary of State shall adopt and publish rules and regulations governing any voting technology and systems used by the state or any political subdivision that provide voters with disabilities the access

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required under the federal Help America Vote Act of 2002 (42 U.S.C. Sec. 15301 et seq.).

(b) At each polling place, at least one voting unit certified or conditionally approved by the Secretary of State shall provide voters with disabilities the access required under the federal Help America Vote Act of 2002 (42 U.S.C. Sec. 15301 et seq.).

(c) A local agency is not required to comply with subdivision (b) in an election in which a candidate for federal office does not appear on the ballot unless sufficient funds are available to implement that provision. Funds received from the proceeds of the Voting Modernization Bond Act of 2002 (Article 5 (commencing with Section 19250)), from federal funds made available to purchase new voting systems, or from any other source except the General Fund, shall be used for that purpose.

SEC. 43. Section 19227.5 of the Elections Code is amended and renumbered to read:

19243. In requiring access for voters with disabilities pursuant to this article, the Secretary of State shall obtain recommendations from representatives of blind consumer organizations, experts in accessible software and hardware design, and any other individual or organization the Secretary of State determines to be appropriate.

SEC. 44. Section 19228 of the Elections Code is amended and renumbered to read:

19244. Compliance with this article in regard to voting technology and systems purchased prior to the effective date of this article shall be achieved at the time of procurement of an upgrade or replacement of existing voting equipment or systems.

SEC. 45. Section 19229 of the Elections Code is amended and renumbered to read:

19245. (a) A person injured by a violation of this article may maintain an action for injunctive relief to enforce this article.

(b) An action for injunctive relief shall be commenced within four years after the cause of action accrues.

(c) For purposes of this section, a cause of action for a continuing violation accrues at the time of the latest violation.

SEC. 46. Section 19229.5 of the Elections Code is amended and renumbered to read:

19246. This article does not apply to voting by vote by mail ballot.

SEC. 47. The heading of Article 3 (commencing with Section 19230) of Chapter 3 of Division 19 of the Elections Code is amended and renumbered to read:

Article 5. Voting Modernization Bond Act of 2002 (Shelley-Hertzberg Act)

SEC. 48. Section 19230 of the Elections Code is amended and renumbered to read:

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19250. This article shall be known and may be cited as the Voting Modernization Bond Act of 2002 (Shelley-Hertzberg Act).

SEC. 49. Section 19231 of the Elections Code is amended and renumbered to read:

19251. The State General Obligation Bond Law (Chapter 4 (commencing with Section 16720) of Part 3 of Division 4 of Title 2 of the Government Code), except as otherwise provided herein, is adopted for the purpose of the issuance, sale, and repayment of, and otherwise providing with respect to, the bonds authorized to be issued by this article, and the provisions of that law are included in this article as though set out in full.

SEC. 50. Section 19232 of the Elections Code is amended and renumbered to read:

19252. As used in this article:

(a) "Board" means the Voting Modernization Board, established pursuant to Section 19256.

(b) "Bond" means a state general obligation bond issued pursuant to this article adopting the provisions of the State General Obligation Bond Law.

(c) "Bond act" means this article authorizing the issuance of state general obligation bonds and adopting the State General Obligation Bond Law by reference.

(d) "Committee" means the Voting Modernization Finance Committee, established pursuant to Section 19253.

(e) "Fund" means the Voting Modernization Fund, created pursuant to subdivision (b) of Section 19254.

(f) "Voting system" means any voting machine, voting device, or vote tabulating device that does not use prescored punch card ballots.

SEC. 51. Section 19233 of the Elections Code is amended and renumbered to read:

19253. (a) The Voting Modernization Finance Committee is hereby established for the purpose of authorizing the issuance and sale, pursuant to the State General Obligation Bond Law, of the bonds authorized by this article.

(b) The committee consists of the Controller, the Director of Finance, and the Treasurer, or their designated representatives, all of whom shall serve without compensation, and a majority of whom shall constitute a quorum. The Treasurer shall serve as chairperson of the committee. A majority of the committee may act for the committee.

(c) For purposes of this article, the Voting Modernization Finance Committee is "the committee" as that term is used in the State General Obligation Bond Law.

SEC. 52. Section 19234 of the Elections Code is amended and renumbered to read:

19254. (a) The committee may create a debt or debts, liability or liabilities, of the State of California, in the aggregate amount of not more than two hundred million dollars ($200,000,000), exclusive of refunding bonds, in the manner provided herein for the purpose of creating a fund to assist counties in the purchase of updated voting systems.

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(b) The proceeds of bonds issued and sold pursuant to this article shall be deposited in the Voting Modernization Fund, which is hereby established.

(c) A county is eligible to apply to the board for fund money if it meets all of the following requirements:

(1) The county has purchased a new voting system after January 1, 1999, and is continuing to make payments on that system on the date that this article becomes effective.

(2) The county matches fund moneys at a ratio of one dollar ($1) of county moneys for every three dollars ($3) of fund moneys.

(3) The county has not previously requested fund money for the purchase of a new voting system. Applications for expansion of an existing system or components related to a previously certified or conditionally approved application shall be accepted.

(d) (1) Fund moneys shall only be used to purchase systems certified or conditionally approved by the Secretary of State.

(2) A county may use fund moneys to contract and pay for the following:

(A) Research and development of a new voting system that has not been certified or conditionally approved by the Secretary of State and uses only nonproprietary software and firmware with disclosed source code, except for unmodified commercial off-the-shelf software and firmware, as defined in paragraph (1) of subdivision (a) of Section 19209.

(B) Manufacture of the minimum number of voting system units reasonably necessary for either of the following purposes:

(i) To test and seek certification or conditional approval for the voting system pursuant to Sections 19210 to 19214, inclusive.

(ii) To test and demonstrate the capabilities of the voting system in a pilot program pursuant to paragraph (2) of subdivision (b) of, and subdivision (c) of, Section 19209.

(3) Fund moneys shall not be used to purchase a voting system that uses prescored punch card ballots.

(e) Any voting system purchased using bond funds that does not require a voter to directly mark on the ballot must produce, at the time the voter votes his or her ballot or at the time the polls are closed, a paper version or representation of the voted ballot or of all the ballots cast on a unit of the voting system. The paper version shall not be provided to the voter but shall be retained by elections officials for use during the 1 percent manual recount or other recount, audit, or contest.

SEC. 53. Section 19234.5 of the Elections Code is amended and renumbered to read:

19255. The Legislature may amend subdivisions (c) and (d) of Section 19254 and Section 19256 by a statute, passed in each house of the Legislature by rollcall vote entered in the respective journals, by not less than two-thirds of the membership in each house concurring, if the statute is consistent with, and furthers the purposes of, this article.

SEC. 54. Section 19235 of the Elections Code is amended and renumbered to read:

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19256. The Voting Modernization Board is hereby established and designated the "board" for purposes of the State General Obligation Bond Law, and for purposes of administering the Voting Modernization Fund. The board consists of five members, three selected by the Governor and two selected by the Secretary of State. The board shall have the authority to reject any application for fund money it deems inappropriate, excessive, or that does not comply with the intent of this article. A county whose application is rejected shall be allowed to submit an amended application.

SEC. 55.   Section 19236 of the Elections Code is amended and renumbered to read:

19257. (a) All bonds authorized by this article, when duly sold and delivered as provided herein, constitute valid and legally binding general obligations of the State of California, and the full faith and credit of the state is hereby pledged for the punctual payment of both principal and interest thereof. The bonds issued pursuant to this article shall be repaid within 10 years from the date they are issued.

(b) There shall be collected annually, in the same manner and at the same time as other state revenue is collected, a sum of money, in addition to the ordinary revenues of the state, sufficient to pay the principal of, and interest on, the bonds as provided herein. All officers required by law to perform any duty in regard to the collection of state revenues shall collect this additional sum.

(c) On the dates on which funds are remitted pursuant to Section 16676 of the Government Code for the payment of the then maturing principal of, and interest on, the bonds in each fiscal year, there shall be returned to the General Fund all of the money in the fund, not in excess of the principal of, and interest on, any bonds then due and payable. If the money so returned on the remittance dates is less than the principal and interest then due and payable, the balance remaining unpaid shall be returned to the General Fund out of the fund as soon as it shall become available, together with interest thereon from the dates of maturity until returned, at the same rate of interest as borne by the bonds, compounded semiannually. This subdivision does not grant any lien on the fund or the moneys therein to holders of any bonds issued under this article. However, this subdivision shall not apply in the case of any debt service that is payable from the proceeds of any refunding bonds. For purposes of this subdivision, "debt service" means the principal (whether due at maturity, by redemption, or acceleration), premium, if any, or interest payable on any date to any series of bonds.

SEC. 56.   Section 19237 of the Elections Code is amended and renumbered to read:

19258. Notwithstanding Section 13340 of the Government Code, there is hereby continuously appropriated from the General Fund, for purposes of this article, a sum of money that will equal both of the following:

(a) That sum annually necessary to pay the principal of, and the interest on, the bonds issued and sold as provided herein, as that principal and interest become due and payable.

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(b) That sum necessary to carry out Section 19259, appropriated without regard to fiscal years.

SEC. 57. Section 19238 of the Elections Code is amended and renumbered to read:

19259. For purposes of this article, the Director of Finance may, by executive order, authorize the withdrawal from the General Fund of a sum of money not to exceed the amount of the unsold bonds that have been authorized by the committee to be sold pursuant to this article. Any sums withdrawn shall be deposited in the fund. All moneys made available under this section to the board shall be returned by the board to the General Fund, plus the interest that the amounts would have earned in the Pooled Money Investment Account, from the sale of bonds for the purpose of carrying out this article.

SEC. 58. Section 19239 of the Elections Code is amended and renumbered to read:

19260. The board may request the Pooled Money Investment Board to make a loan from the Pooled Money Investment Account, in accordance with Section 16312 of the Government Code, for the purpose of carrying out this article. The amount of the request shall not exceed the amount of unsold bonds which the committee has, by resolution, authorized to be sold for the purpose of carrying out this article. The board shall execute whatever documents are required by the Pooled Money Investment Board to obtain and repay the loan. Any amounts loaned shall be deposited in the fund to be allocated by the board in accordance with this article.

SEC. 59. Section 19240 of the Elections Code is amended and renumbered to read:

19261. Upon request of the board, supported by a statement of its plans and projects approved by the Governor, the committee shall determine whether to issue any bonds authorized under this article in order to carry out the board's plans and projects and, if so, the amount of bonds to be issued and sold. Successive issues of bonds may be authorized and sold to carry out these plans and projects progressively, and it is not necessary that all of the bonds be issued or sold at any one time.

SEC. 60. Section 19241 of the Elections Code is amended and renumbered to read:

19262. (a) The committee may authorize the Treasurer to sell all or any part of the bonds authorized by this article at the time or times established by the Treasurer.

(b) Whenever the committee deems it necessary for an effective sale of the bonds, the committee may authorize the Treasurer to sell any issue of bonds at less than their par value, notwithstanding Section 16754 of the Government Code. However, the discount on the bonds shall not exceed 3 percent of the par value thereof.

SEC. 61. Section 19242 of the Elections Code is amended and renumbered to read:

19263. Out of the first money realized from the sale of bonds as provided by this article, there shall be redeposited in the General Obligation Bond

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Expense Revolving Fund, established by Section 16724.5 of the Government Code, the amount of all expenditures made for purposes specified in that section, and this money may be used for the same purpose and repaid in the same manner whenever additional bond sales are made.

SEC. 62. Section 19243 of the Elections Code is amended and renumbered to read:

19264. Any bonds issued and sold pursuant to this article may be refunded in accordance with Article 6 (commencing with Section 16780) of Chapter 4 of Part 3 of Division 2 of Title 2 of the Government Code. The approval of the voters for the issuance of bonds under this article includes approval for the issuance of bonds issued to refund bonds originally issued or any previously issued refunding bonds.

SEC. 63. Section 19244 of the Elections Code is amended and renumbered to read:

19265. Notwithstanding any provision of the bond act, if the Treasurer sells bonds under this article for which bond counsel has issued an opinion to the effect that the interest on the bonds is excludable from gross income for purposes of federal income tax, subject to any conditions which may be designated, the Treasurer may establish separate accounts for the investment of bond proceeds and for the earnings on those proceeds, and may use those proceeds or earnings to pay any rebate, penalty, or other payment required by federal law or take any other action with respect to the investment and use of bond proceeds required or permitted under federal law necessary to maintain the tax-exempt status of the bonds or to obtain any other advantage under federal law on behalf of the funds of this state.

SEC. 64. Section 19245 of the Elections Code is amended and renumbered to read:

19266. The Legislature hereby finds and declares that, inasmuch as the proceeds from the sale of bonds authorized by this article are not "proceeds of taxes" as that term is used in Article XIII B of the California Constitution, the disbursement of these proceeds is not subject to the limitations imposed by Article XIII B.

SEC. 65. The heading of Article 4 (commencing with Section 19250) of Chapter 3 of Division 19 of the Elections Code is amended and renumbered to read:

Article 6. Direct Recording Electronic Voting Systems

SEC. 66. Section 19250 of the Elections Code is amended and renumbered to read:

19270. (a) The Secretary of State shall not certify or conditionally approve a direct recording electronic voting system unless the system includes an accessible voter verified paper audit trail.

(b) On and after January 1, 2006, a city or county shall not contract for or purchase a direct recording electronic voting system unless the system

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has been certified or conditionally approved for use by the Secretary of State.

(c) As of January 1, 2006, all direct recording electronic voting systems in use on that date, regardless of the date it was contracted for or purchased, shall have received federal qualification and include an accessible voter verified paper audit trail. If the direct recording electronic voting system does not include an accessible voter verified paper audit trail, the system shall be replaced or modified to include an accessible voter verified paper audit trail.

(d) All direct recording electronic voting systems shall include a method by which a voter may electronically verify, through a nonvisual method, the information that is contained on the paper record copy of that voter's ballot.

(e) A paper record copy that is printed by a voter verified paper audit trail component shall be printed in the same language that the voter used when casting his or her ballot on the direct recording electronic voting system. For languages that lack a written form, the paper record copy shall be printed in English.

SEC. 67. Section 19251 of the Elections Code is amended and renumbered to read:

19271. As used in this article:

(a) "Accessible" means that the information provided on the paper record copy from the voter verified paper audit trail mechanism is provided or conveyed to voters via both a visual and a nonvisual method, such as through an audio component.

(b) "Direct recording electronic voting system" means a voting system that records a vote electronically and does not require or permit the voter to record his or her vote directly onto a tangible ballot.

(c) "Voter verified paper audit trail" means a component of a direct recording electronic voting system that prints a contemporaneous paper record copy of each electronic ballot and allows each voter to confirm his or her selections before the voter casts his or her ballot.

(d) "Federal qualification" means the system has been certified, if applicable, by means of qualification testing by a nationally recognized test laboratory and has met or exceeded the minimum requirements set forth in the Performance and Text Standards for Punch Card, Mark Sense, and Direct Recording Electronic Voting Systems, or in any successor voluntary standard document, developed and promulgated by the Federal Election Commission, the Election Assistance Commission, or the National Institute of Standards and Technology.

(e) "Paper record copy" means an auditable document printed by a voter verified paper audit trail component that corresponds to the voter's electronic vote and lists the contests on the ballot and the voter's selections for those contests. A paper record copy is not a ballot.

(f) "Parallel monitoring" means the testing of a randomly selected sampling of voting equipment on election day designed to simulate actual election conditions to confirm that the system is registering votes accurately.

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SEC. 68. Section 19252 of the Elections Code is amended and renumbered to read:

19272. To the extent that they are available for expenditure for the purposes of this article, federal funds or moneys from the Voting Modernization Fund, created pursuant to subdivision (b) of Section 19254, shall be used. No moneys from the General Fund shall be expended for the purposes of this article.

SEC. 69. Section 19253 of the Elections Code is amended and renumbered to read:

19273. (a) On a direct recording electronic voting system, the electronic record of each vote shall be considered the official record of the vote, except as provided in subdivision (b).

(b) (1) The voter verified paper audit trail shall be considered the official paper audit record and shall be used for the required 1-percent manual tally described in Section 15360 and any full recount or post-election audit.

(2) The voter verified paper audit trail shall govern if there is any difference between it and the electronic record during a 1-percent manual tally, full recount, or post-election audit.

SEC. 70. Section 19254 of the Elections Code is amended and renumbered to read:

19274. The Secretary of State shall not certify or conditionally approve a direct recording electronic voting system unless the paper used for its voter verified paper audit trail is of sufficient quality that it maintains its integrity and readability throughout the retention period specified in Chapter 4 (commencing with Section 17300) of Division 17.

SEC. 71. Section 19255 of the Elections Code is amended and renumbered to read:

19275. (a) For each statewide election, the Secretary of State shall conduct parallel monitoring of each direct recording electronic voting system on which ballots will be cast. This section shall only apply to precincts that have more than one direct recording electronic voting system.

(b) The results of the parallel monitoring shall be made available prior to the certification of the election.

SEC. 72. The heading of Chapter 3.5 (commencing with Section 19260) of Division 19 of the Elections Code is amended to read:

CHAPTER 3.5. CERTIFICATION OF BALLOT MARKING SYSTEMS

SEC. 73. Section 19260 of the Elections Code is amended and renumbered to read:

19280. The Secretary of State shall not certify or conditionally approve a ballot marking system, or part of a ballot marking system, unless it fulfills the requirements of this code and the regulations of the Secretary of State.

SEC. 74. Section 19261 of the Elections Code is amended and renumbered to read:

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19281. (a) A ballot marking system, in whole or in part, shall not be used unless it has been certified or conditionally approved by the Secretary of State prior to the election at which it is to be first used.

(b) All other uses of a ballot marking system shall be subject to the provisions of Section 19202.

SEC. 75. Section 19262 of the Elections Code is amended and renumbered to read:

19284. (a) A person, corporation, or public agency owning or having an interest in the sale or acquisition of a ballot marking system or a part of a ballot marking system may apply to the Secretary of State for certification or conditional approval that includes testing and examination of the applicant's system and a report on the findings, which shall include the accuracy and efficiency of the ballot marking system. As part of its application, the applicant of a ballot marking system or a part of a ballot marking system shall notify the Secretary of State in writing of any known defect, fault, or failure of the version of the hardware, software, or firmware of the ballot marking system or a part of the ballot marking system submitted. The Secretary of State shall not begin his or her certification process until he or she receives a completed application from the applicant of the ballot marking system or a part of the ballot marking system. The applicant shall also notify the Secretary of State in writing of any defect, fault, or failure of the version of the hardware, software, or firmware of the ballot marking system or a part of the ballot marking system submitted that is discovered after the application is submitted and before the Secretary of State submits the report required by Section 19288. The Secretary of State shall complete his or her examination without undue delay.

(b) After receiving an applicant's written notification of a defect, fault, or failure, the Secretary of State shall notify the United States Election Assistance Commission or its successor entity of the problem as soon as practicable so as to present a reasonably complete description of the problem. The Secretary of State shall subsequently submit a report regarding the problem to the United States Election Assistance Commission or its successor entity. The report shall include any report regarding the problem submitted to the Secretary of State by the applicant.

(c) As used in this chapter:

(1) "Defect" means any flaw in the hardware or documentation of a ballot marking system that could result in a state of unfitness for use or nonconformance to the manufacturer's specifications or applicable law.

(2) "Failure" means a discrepancy between the external results of the operation of any software or firmware in a ballot marking system and the manufacturer's product requirements for that software or firmware or applicable law.

(3) "Fault" means a step, process, or data definition in any software or firmware in a ballot marking system that is incorrect under the manufacturer's program specification or applicable law.

SEC. 76. Section 19263 of the Elections Code is amended and renumbered to read:

19285. The Secretary of State shall use a state-approved testing agency or expert technicians to examine ballot marking systems proposed for use or sale in this state. He or she shall furnish a complete report of the findings of the examination and testing to the Governor and the Attorney General.

SEC. 77. Section 19264 of the Elections Code is amended and renumbered to read:

19287. (a) Prior to publishing his or her decision to certify, conditionally approve, or withhold certification of a ballot marking system, the Secretary of State shall provide for a 30-day public review period and conduct a public hearing to give interested persons an opportunity to review testing and examination reports and express their views for or against certification or conditional approval of the ballot marking system.

(b) The Secretary of State shall give notice of the public review period and hearing in the manner prescribed in Section 6064 of the Government Code in a newspaper of general circulation published in Sacramento County. The Secretary of State shall also provide notice of the hearing on his or her Internet Web site. The Secretary of State shall transmit written notice of the hearing, at least 14 days prior to the public review period and hearing, to each county elections official, to any person that the Secretary of State believes will be interested in the public review period and hearing, and to any person who requests, in writing, notice of the public review period and hearing.

(c) The decision of the Secretary of State to certify, conditionally approve, or withhold certification of a ballot marking system shall be in writing and shall state the findings of the Secretary of State. The decision shall be open to public inspection.

SEC. 78. Section 19265 of the Elections Code is repealed.

SEC. 79. Section 19266 of the Elections Code is repealed.

SEC. 80. Section 19267 of the Elections Code is amended and renumbered to read:

19288. Within 60 days after the completion of the examination of a ballot marking system, the Secretary of State shall make publicly available a report stating whether the ballot marking system has been certified or conditionally approved, or whether certification has been withheld.

SEC. 81. Section 19268 of the Elections Code is repealed.

SEC. 82. Section 19269 of the Elections Code is amended and renumbered to read:

19289. Within 10 days after issuing and filing a certification decision and associated testing reports, the Secretary of State shall make available to the public a full and complete copy of the certification report and all associated documentation, except that portions of the report or documentation that contain information that the Secretary of State determines to be confidential or proprietary shall not be made publicly available. The Secretary of State shall notify the board of supervisors and elections official of each county of the availability of the report and associated documentation.

SEC. 83. Section 19270 of the Elections Code is amended and renumbered to read:

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19290. (a) If a ballot marking system has been certified or conditionally approved by the Secretary of State, the vendor or, in cases where the system is publicly owned, the jurisdiction shall notify the Secretary of State and all local elections officials who use the system in writing of any defect, fault, or failure of the hardware, software, or firmware of the system or a part of the system within 30 calendar days after the vendor or jurisdiction learns of the defect, fault, or failure.

(b) After receiving written notification of a defect, fault, or failure pursuant to subdivision (a), the Secretary of State shall notify the United States Election Assistance Commission or its successor entity of the problem as soon as practicable so as to present a reasonably complete description of the problem. The Secretary of State shall subsequently submit a report regarding the problem to the United States Election Assistance Commission or its successor entity. The report shall include any report regarding the problem submitted to the Secretary of State.

SEC. 84. Section 19271 of the Elections Code is amended and renumbered to read:

19291. If a ballot marking system has been certified or conditionally approved by the Secretary of State, it shall not be changed or modified until the Secretary of State has been notified in writing and has determined that the change or modification does not impair its accuracy and efficiency sufficient to require a reexamination and recertification or reapproval pursuant to this chapter. The Secretary of State may adopt rules and regulations governing the procedures to be followed in making his or her determination as to whether the change or modification impairs accuracy or efficiency.

SEC. 85. Section 19272 of the Elections Code is amended and renumbered to read:

19292. The Secretary of State may seek injunctive and administrative relief if a ballot marking system has been compromised by the addition or deletion of hardware, software, or firmware without prior approval or is defective due to a known hardware, software, or firmware defect, fault, or failure that has not been disclosed pursuant to Section 19284 or 19290.

SEC. 86. Section 19273 of the Elections Code is amended and renumbered to read:

19293. (a) The Secretary of State may seek all of the following relief for an unauthorized change in hardware, software, or firmware in a ballot marking system certified or conditionally approved in California:

(1) A civil penalty from the offending party or parties, not to exceed ten thousand dollars ($10,000) per violation. For purposes of this subdivision, each ballot marking system component found to contain the unauthorized hardware, software, or firmware shall be considered a separate violation. A penalty imposed pursuant to this subdivision shall be apportioned 50 percent to the county in which the violation occurred, if applicable, and 50 percent to the office of the Secretary of State for purposes of bolstering ballot marking system security efforts.

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(2) Immediate commencement of proceedings to withdraw certification or conditional approval for the ballot marking system in question.

(3) Prohibiting the manufacturer or vendor of a ballot marking system from doing elections-related business in the state for one, two, or three years.

(4) Refund of all moneys paid by a local agency for a ballot marking system or a part of a ballot marking system that is compromised by an unauthorized change or modification, whether or not the ballot marking system has been used in an election.

(5) Any other remedial actions authorized by law to prevent unjust enrichment of the offending party.

(b) (1) The Secretary of State may seek all of the following relief for a known but undisclosed defect, fault, or failure in a ballot marking system or part of a ballot marking system certified or conditionally approved in California:

(A) Refund of all moneys paid by a local agency for a ballot marking system or part of a ballot marking system that is defective due to a known but undisclosed defect, fault, or failure, whether or not the ballot marking system has been used in an election.

(B) A civil penalty from the offending party or parties, not to exceed fifty thousand dollars ($50,000) per violation. For purposes of this subdivision, each defect, fault, or failure shall be considered a separate violation. A defect, fault, or failure constitutes a single violation regardless of the number of ballot marking system units in which the defect, fault, or failure is found.

(C) In addition to any other penalties or remedies established by this section, the offending party or parties shall be liable in the amount of one thousand dollars ($1,000) per day after the applicable deadline established in Section 19290 until the required disclosure is filed with the Secretary of State.

(2) A penalty imposed pursuant to subparagraph (B) or (C) of paragraph (1) shall be deposited in the General Fund.

(c) Before seeking any measure of relief under this section, the Secretary of State shall hold a public hearing. The Secretary of State shall give notice of the hearing in the manner prescribed by Section 6064 of the Government Code in a newspaper of general circulation published in Sacramento County. The Secretary of State also shall transmit written notice of the hearing, at least 30 days prior to the hearing, to each county elections official, the offending party or parties, any persons that the Secretary of State believes will be interested in the hearing, and any persons who request, in writing, notice of the hearing.

(d) The decision of the Secretary of State to seek relief under this section shall be in writing and state his or her findings. The decision shall be open to public inspection.

SEC. 87. Section 19274 of the Elections Code is amended and renumbered to read:

19294. (a) The Secretary of State may seek injunctive relief requiring an elections official, or any vendor or manufacturer of a ballot marking

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system, to comply with the requirements of this code, the regulations of the Secretary of State, and the specifications for the ballot marking system and its software, including the programs and procedures for vote marking and testing.

(b) Venue for a proceeding under this section shall be exclusively in Sacramento County.

SEC. 88. Section 19275 of the Elections Code is amended and renumbered to read:

19295. A ballot marking system or part of a ballot marking system shall not do any of the following:

(a) Have the capability, including an optional capability, to use a remote server to mark a voter's selections transmitted to the server from the voter's computer via the Internet.

(b) Have the capability, including an optional capability, to store any voter identifiable selections on any remote server.

(c) Have the capability, including the optional capability, to tabulate votes.

SEC. 89. Section 19282 is added to the Elections Code, to read:

19282. The Secretary of State shall not certify or conditionally approve any ballot marking system that includes features that permit a voter to produce, and leave the polling place with, a copy or facsimile of the ballot cast by the voter at that polling place.

SEC. 90. Section 19283 is added to the Elections Code, to read:

19283. (a) The Secretary of State shall adopt and publish standards and regulations governing the use of ballot marking systems. The Secretary of State may also adopt, in whole or in part, voluntary federal ballot marking voting system standards established by the United States Election Assistance Commission or its successor agency.

(b) Ballot marking system standards adopted by the Secretary of State pursuant to subdivision (a) shall include, but not be limited to, all of the following requirements:

(1) The machine or device and its software shall be suitable for the purpose for which it is intended.

(2) The ballot marking system shall preserve the secrecy of the ballot.

(3) The ballot marking system shall be safe from fraud or manipulation.

(4) The ballot marking system shall be accessible to voters with disabilities and to voters who require assistance in a language other than English if the language is one in which a ballot or ballot materials are required to be made available to voters.

SEC. 91. Section 19286 is added to the Elections Code, to read:

19286. The person, corporation, or public agency applying for certification of a ballot marking system is responsible for all costs associated with the testing and examination of the ballot marking system.

SEC. 92. Section 6.5 of this bill shall only become operative if (1) this bill and Assembly Bill 214 are both enacted and become effective on or before January 1, 2014, and (2) Assembly Bill 214 adds Section 19104 to

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the Elections Code, in which case Section 6 of this bill shall not become operative.

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California Association of Voting Officials

1477 Sanchez St. San Francisco, Ca 94131 Phone: 650-726-1133
http://cavo-us.org   cavocontact@gmail.com

Honorable Board of Supervisors,

In 2008 the City and County of San Francisco Board of Supervisors established the Voting Systems Task Force to make recommendations to the Board about voting systems standards, design, and development. At the time and currently, the San Francisco Department of Elections was under a Board approved contract with Dominion Voting Systems, formerly Sequoia Voting systems, for voting systems/services; one of only two vendors that responded to a Request for Proposal to procure of a new voting system.

The report issued by the Voting Systems Task Force in 2011 recommended that San Francisco "be an active participant in the movement toward more open and transparent voting systems. We acknowledge the complexity of moving from the existing marketplace toward more innovative voting systems and urge San Francisco to move steadily toward the goal of transparency—even if it must do so in incremental steps. We encourage the City to be a strong advocate in the private sector marketplace for more transparent systems and to be open as well to new collaborative development models."

Significant changes have occurred to improve the voting system certification process in California since the Voting System Task Force was convened in 2008, primarily with the support of Secretary of State-elect Alex Padilla. Senator Padilla worked with Los Angeles County to author Senate Bill 360, passed in 2013 by the California legislature. This law created needed wholesale changes in technology models for new innovative systems to be certified in California. Additionally, this bill provided an incentive for counties to develop non-proprietary voting systems by allowing pilots of

publicly owned/non-proprietary software systems by counties whereas the initial federal and state voting system certification processes did not contemplate for publicly owned voting systems.

Research has shown that open source code provides, in many cases, a reasonable or even superior approach to using proprietary competitive software and is now being adopted by government agencies such as the Department of Defense and National Security Agency. Open source software, run on commodity-off-the-shelf (COTS) hardware, is the lowest cost, most reliable alternative to current voting systems. Reducing hardware costs from $5,000 single use machines to $500 commercially available computers is just one example of the cost savings that can be achieved with this technology model. As equipment and software costs go down, capital is freed up to allocate to others areas of election administration.

In addition to reducing costs, open source systems will increase transparency, another key recommendation of the Voting System Task Force. As pointed out in the report: "Numerous independent investigations have discovered serious security weaknesses and design errors in widely used electronic voting equipment." By designing software in an open environment, there is an increased chance that defects will be identified and addressed.

On December 23, 2013 the California Association of Voting Officials (CAVO) was launched for the purpose of providing a mechanism for counties to pool resources to invest in the development and use of open voting systems for public elections, as well as to provide training, education, and management practices to election officials for the effective use of open source technologies.

CAVO is a California nonprofit non-stock mutual benefit corporation and is owned by the public for the mutual benefit of its members, which include individuals, voting jurisdictions, academic and research organizations, technologists, and service providers.

Joining CAVO can further San Francisco's goals of collaborating with other jurisdictions, academic institutions, and non-profit organizations to develop and manage the next generation of voting systems. By joining now, while development is still underway, San Francisco County can ensure that their unique election needs are incorporated into the system design and implementation.

Today, I ask you to join CAVO and our efforts to build better voting systems. Well into the 21st century, our technology advances should provide us the opportunity to ensure that everyone's vote is counted accurately and securely without being tied to a single private vendor or aging, outdated infrastructure. Innovation through open source development will provide us the capacity and certainty to administer elections for this century and keep the promise of our democracy namely that your vote will always, if cast, count.

Thank you for your time and consideration.

Sincerely,

Kammi Foote
President, CAVO

THE CASE OF THE DISAPPEARING VOTES: LESSONS FROM THE *JENNINGS V. BUCHANAN* CONGRESSIONAL ELECTION CONTEST

Jessica Ring Amunson & Sam Hirsch*

The November 2006 congressional balloting in Florida's Thirteenth District was a model for how not to conduct an election. The final margin was less than 400 votes out of nearly a quarter million total ballots cast.[1] But the candidate who officially "lost" came up short only because 18,000 congressional ballots cast on paperless electronic touchscreen voting machines in her home county turned up blank.[2] The ensuing litigation, both in state court and in the U.S. House of Representatives, demonstrated that about 14,000 of those 18,000 Sarasota County congressional "undervotes"—ballots with no vote for either congressional candidate—were likely unintentional, and that had those ballots been counted as they had been intended, the candidate who officially lost by nearly 400 votes would instead have triumphed by about 3,000.[3]

That is no way to run an election.

This Article, however, focuses not on the substantive outcome, but rather on the procedures used during the "election contest" litigation that followed the voting. That litigation dragged on through more than half of the congressional term; even if it ultimately had led to a reversal of the election result, the less popular candidate still would have represented the district for most of the 110th Congress.[4] Even worse, the litigation ultimately was utterly inconclusive as to the reason for the 18,000 electronic undervotes because discovery targeting the defective voting system was thwarted when the voting machines' manufacturer successfully invoked the trade-secret

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[1] Jeremy Wallace, *Democrats Seize House; Crist In; Buchanan Leads; Slim 368-Vote Margin Will Trigger a Recount for the 13th District*, SARASOTA HERALD-TRIB. (Fla.), Nov. 8, 2006, at A1 [hereinafter Wallace, *Slim Margin*].

[2] Bob Mahlburg & Maurice Tamman, *Dist. 13 Voting Analysis Shows Broad Problem; Sarasota County Vote Review Indicates 13% Undercount*, SARASOTA HERALD-TRIB. (Fla.), Nov. 9, 2006, at A1.

[3] COMM. ON HOUSE ADMIN., DISMISSING THE ELECTION CONTEST RELATING TO THE OFFICE OF REPRESENTATIVE FROM THE THIRTEENTH CONGRESSIONAL DISTRICT OF FLORIDA, H.R. REP. NO. 110-528, pt. 1, at 7 (2008) [hereinafter H.R. REP. NO. 110-528].

[4] *See id.* at 15–17 (providing a time line of the litigation).

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Jessica Ring Amunson & Sam Hirsch, *The Case of the Disappearing Votes: Lessons from the Jennings v. Buchanan Congressional Election Contest*, 17 WM. & MARY BILL RTS. J. 397 (2008).

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privilege to block any investigation of the machines or their software by the litigants.[5] Today, all we know with any degree of certainty is that the electorate's second choice was awarded the congressional seat.[6] We will never know why.

That is no way to run an election contest.

Part I of this Article recounts what happened on election day in Florida's Thirteenth Congressional District. Part II describes and analyzes the state-court election contest, and Part III does the same for the election contest filed in the House of Representatives, which is the ultimate arbiter of all contested House elections. Because this Article's co-authors represented the plaintiff in those election contests, the discussion reflects first-hand experience litigating the cases. Building on the problems encountered in Parts II and III, Part IV of this Article addresses several specific areas ripe for procedural reform. Enacting these reforms, some at the state level, others at the federal, would help ensure that the citizens of other states and congressional districts do not suffer the same mistreatment that befell the voters of Florida's Thirteenth District.

I. THE NOVEMBER 2006 ELECTION FOR CONGRESS IN FLORIDA'S THIRTEENTH DISTRICT

The November 2006 contest for Representative in Congress from Florida's Thirteenth District was one of the most hard-fought in the country.[7] Indeed, with expenditures totaling more than $13 million, the campaign was the most expensive House contest in the nation in 2006, and one of the most expensive ever.[8] Democrat Christine Jennings and Republican Vern Buchanan engaged in a fight to the finish for the open seat, previously held by the infamous Katherine Harris, who in 2000 had presided over the Bush/Gore dispute as Florida's Secretary of State.[9] Given the fierceness of the 2006 battle, few were shocked when the election night results showed that the victor, Vern Buchanan, had squeaked by with a razor-thin margin—only 369 votes.[10] What was surprising, however, was that the election-night numbers showed more than 18,000 voters apparently had not voted in this hotly contested race.[11] Most of

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[5] *Id.* at 3.

[6] *See* discussion *infra* Part IV.

[7] *See* Wallace, *Slim Margin*, *supra* note 1.

[8] *See* Jeremy Wallace, *District 13 Costliest Race at $13.1 M; The Congressional Race Brings New Calls for a Law to Limit Spending*, SARASOTA HERALD-TRIB. (Fla.), Jan. 18, 2007, at A1.

[9] *See* Peter Whoriskey, *Vote Disparity Still a Mystery in Fla. Election for Congress*, WASH. POST, Nov. 29, 2006, at A3.

[10] *See* Wallace, *Slim Margin*, *supra* note 1. The original count showed a 368-vote margin in the race and was later certified on Nov. 20, 2006, as a 369-vote margin after the recount. *See Official Certificate of the State Elections Canvassing Comm'n of the Gen. Election Held on the Seventh Day of Nov., A.D. 2006, reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 2, at 1877–92.

[11] Mahlburg & Tamman, *supra* note 2.

these voters cast choices for every other contest on the ballot—from United States Senator to hospital board.[12] Yet, somehow, these voters reportedly registered no choice at all in the high-profile Jennings-Buchanan congressional race.[13]

The numbers were not a complete surprise, however. Florida allows early voting, and during the early-voting period, reports had already begun to surface of voters encountering difficulties getting their choices for Congress to register on the electronic touchscreen voting machines.[14] Attorneys for the Jennings campaign had sent a letter to the Supervisor of Elections for Sarasota County, where all of the reports had originated, before election day, citing problems some voters were having casting their ballots in the congressional race.[15] In response, Supervisor Kathy Dent instructed all poll workers to warn voters to look out for the congressional race on the touchscreen's electronic ballot.[16] And as more reports poured in on election day, the Jennings campaign held a midday press conference to highlight the issue.[17] Yet it was clear that for thousands of Sarasota County voters, this had not been enough.

A. The Undervote

Sarasota County, where the enormous undervote occurred, is one of the five counties that constitute Florida's Thirteenth Congressional District.[18] To put these 18,000 undervotes in perspective, this figure corresponds to undervote rates of 13.9% for those who voted on touchscreen machines in Sarasota County on election day and 17.6% for those who did so during the early-voting period. Overall, more than one out of every seven votes cast on Sarasota County's touchscreen machines turned up blank for the congressional race.[19] In contrast, the undervote rate for those who voted via paper absentee ballots in Sarasota County was a mere 2.5%.[20] And the

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[12] Indeed, in Sarasota County more voters made choices in the hospital-board race than in the congressional race. See id.

[13] Id.

[14] See Todd Ruger, *Voting Glitch Prompts Warning*, SARASOTA HERALD-TRIB. (Fla.), Nov. 5, 2006, at B1 (noting that, during early voting, voters reported to the Supervisor of Elections office that "they picked Jennings, but the 13th Congressional District had no vote registered for either Jennings or Republican Vern Buchanan when a screen reviewing their votes came up").

[15] Letter from Kendall Coffey, Partner, Coffey & Wright, L.L.P., to Kathy Dent, Supervisor of Elections, Sarasota County Dep't of Elections (Nov. 2, 2006), *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 2, at 3185–93.

[16] See Bob Mahlburg, *Election Day Trouble Was Widespread; Many Officials Said the Congressional Race Was Their Biggest Headache*, SARASOTA HERALD-TRIB. (Fla.), Nov. 14, 2006, at A1.

[17] See Wallace, *Slim Margin*, *supra* note 1.

[18] See H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 6–7 (listing the other counties that make up the Thirteenth Congressional District).

[19] Id.

[20] Id.

undervote rate was also historically anomalous: in 2002, the last midterm election, the congressional undervote rate in Sarasota County had been only 2.2%.[21] Sarasota County's 2006 undervote rate also stood in stark contrast to that of the other four counties in the Thirteenth District in the same 2006 congressional election: 2.5% in Charlotte County, 2.1% in DeSoto County, 5.8% in Hardee County, and 2.2% in Manatee County.[22] So Sarasota County, Jennings's political stronghold, accounted for just over half of the district's total congressional votes, but fully 86% of the district's congressional undervotes.[23]

Three theories quickly emerged to explain the outsized undervote.[24] The first, espoused by Sarasota County Election Supervisor Dent, was that voters deliberately chose not to vote in the congressional race because they were turned off by the two candidates.[25] The second theory, championed by the maker of the touchscreen voting machines, Election Systems & Software, Inc. (ES&S) of Omaha, Nebraska, was that the ballot had been poorly designed by Dent's staff and that despite admonitions from poll workers, voters (especially senior citizens) were simply confused by the ballot design and, therefore, missed making a choice in the congressional matchup.[26] The third theory, argued by Jennings and others, was that the touchscreen voting system had malfunctioned, misrecording actual votes cast for one candidate or the other as undervotes, likely because of a software "bug" or a hardware defect (or the interaction of both).[27] So Jennings claimed that the machines malfunctioned, ES&S claimed that the voters malfunctioned, and Dent claimed that the candidates malfunctioned.

B. The iVotronic System

At the time, Sarasota County used the ES&S iVotronic voting system, which is a direct recording electronic (DRE) system.[28] For the iVotronics, local election

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[21] *Id.*

[22] *Id.*

[23] *Id.* at 1200.

[24] *See* Whoriskey, *supra* note 9 (summarizing the three main theories used to explain the undervote).

[25] *See, e.g.,* Wallace, *Slim Margin, supra* note 1 ("We had a real heated race in the primary, and I think it turned people off." (quoting Supervisor Dent)).

[26] *See* Defendant Election Systems & Software, Inc.'s Answer to Plaintiff Jennings's First Amended Complaint to Contest Election at 5, Jennings v. Elections Canvassing Comm'n of the State of Fla., No. 2006-CA-2973, 2006 WL 4404531 (Fla. Cir. Ct. Nov. 21, 2006), *cert. denied,* 958 So. 2d 1083 (Fla. Dist. Ct. App. 2007). For a screenshot showing the page of the ballot with the congressional race, see U.S.GOV'T ACCOUNTABILITY OFFICE, GAO-08-425T, RESULTS OF GAO'S TESTING OF VOTING SYSTEMS USED IN SARASOTA COUNTY IN FLORIDA'S 13TH CONGRESSIONAL DISTRICT 10 (2008) [hereinafter RESULTS OF GAO'S TESTING], *available at* http://www.gao.gov/new.items/d08425t.pdf.

[27] *See* Complaint to Contest Election 1–3, *Jennings,* No. 2006-CA-2973, 2006 WL 4404531 [hereinafter Jennings Complaint].

[28] For a more detailed overview of how the iVotronic system works, see RESULTS OF GAO'S TESTING, *supra* note 26, at 6–11.

officials design a multi-screen electronic ballot, which is stored on a device called a personal electronic ballot (PEB).[29] For each voter, the PEB is then inserted into an iVotronic machine, and the voter makes her choices using a pressure-sensitive touchscreen.[30] The voter can "page" through the ballot using buttons at the bottom of the screen.[31] At the end of the ballot, the voter sees all of her selections on a summary screen.[32] If she failed to vote in a particular contest, the touchscreen displays in bright red letters, "No selection made."[33] Only after the voter confirms her choices on the summary screen, including any race displaying the words "No selection made," can she record the votes by pressing the "Vote" button on the iVotronic.[34] The voter's choices are then recorded to three internal flash memories.[35] The iVotronic system has no paper trail; all data is stored electronically only.[36]

Unbeknownst to the public until well into 2007, the state and county election officials had been aware of serious problems with the iVotronic system three months before election day, but had done nothing to fix them.[37] An August 15, 2006 letter from ES&S to Florida elections officials described a problem ES&S had discovered with the touchscreens' "smoothing filter" that resulted in a "delayed response to touch."[38] ES&S noted that this problem "may vary from terminal to terminal and also may not occur every single time a terminal is used."[39] The manufacturer further informed state and county officials that this problem would require "an update to the [source code] and state-level certification" and stated that it planned to complete the needed repairs "in time for use for the November, 2006 General Election."[40] But the update and certification were never completed.[41] When asked about this, Sarasota County Elections Supervisor Dent claimed that "[i]t wasn't any big deal."[42]

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[29] *Id.* at 6–10.

[30] *Id.*

[31] *Id.*

[32] *Id.*

[33] *Id.* at 18.

[34] *Id.*

[35] *Id.*

[36] *See* Paul Quinlan & Jeremy Wallace, *Call for Paper Trail, New Election; Democratic U.S. Lawmakers Condemn the Way Sarasota's Election Was Run*, SARASOTA HERALD-TRIB. (Fla.), Nov. 16, 2006, at A1.

[37] *See* Anita Kumar, *Sarasota Officials Ignored Warning About Voting Machines*, ST. PETERSBURG TIMES (Fla.), Mar. 15, 2007, at A1.

[38] Letter from Linda Bennett, Reg'l Account Manager, Election Systems & Software, Inc., to Fla. [iVotronic] Users (Aug. 15, 2006), *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 2, at 2637–38.

[39] *Id.*

[40] *Id.*

[41] Kumar, *supra* note 37.

[42] *Id.; see also* Memorandum Responding to the Honorable Charles A. Gonzalez's April 3, 2007 Letter Regarding the Investigation of the Election for Representative in the One

For Sarasota County voters, however, problems with the iVotronics were a very big deal. Ironically, the November 2006 ballot also included an initiative sponsored by a citizens group called the Sarasota Alliance for Fair Elections (SAFE) requiring the county to get rid of the paperless iVotronic machines.[43] The ballot measure passed overwhelmingly,[44] but it was too late for those disenfranchised by the iVotronics in the 2006 congressional election.[45]

C. The "Recount"

Under Florida law, the Jennings-Buchanan race automatically required a "manual" recount because the margin of victory had been less than one-quarter of one percent.[46] But with no paper trail, the "manual" recount of electronic undervotes was a mean-ingless exercise.[47] There was simply nothing to manually recount. The "recount" consisted of the county officials again adding up the numbers that the iVotronic ma-chines told them to add.[48] So, it was hardly surprising that the electronic vote totals remained unchanged.[49]

The Jennings campaign therefore began preparing to challenge the election re-sults under both Florida and federal law. It was clear that the only way to determine what had happened to these 18,000 votes was to look at the iVotronic machines and software.

Hundred Tenth Congress from Florida's Thirteenth Congressional District (Apr. 13, 2007), *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 2, at 2570–73.

[43] *See* Dale White, *Sarasota Favors a Paper Ballot*, SARASOTA HERALD-TRIB. (Fla.), Nov. 7, 2006, at A18.

[44] *Id.*

[45] Due largely to the Jennings-Buchanan controversy and Governor Charlie Crist's leader-ship, paperless electronic voting systems have now been banned statewide in Florida. *See* FLA. STAT. § 101.56075 (2008).

[46] *See* FLA. STAT. § 102.166(1) (2006) ("If . . . a candidate for any office was defeated or eliminated by one-quarter of a percent or less of the votes cast for such office . . . the board responsible for certifying the results of the vote on such race or measure shall order a manual recount of the overvotes and undervotes cast in the entire geographic jurisdiction of such office or ballot measure.").

[47] *See* Quinlan & Wallace, *supra* note 36.

[48] *Id.*

[49] Buchanan's lead increased from 368 to 369 votes after recounting all of the ballots, including paper ballots from military and overseas voters. *See* Jeremy Wallace, *Buchanan Wins Recount; Legal Action Looms; Jennings Might Challenge Her 369-Vote Loss After a Significant Undervote in Sarasota County*, SARASOTA HERALD-TRIB. (Fla.), Nov. 18, 2006, at A1.

II. THE STATE-COURT ACTION

The purpose of Jennings's state-court action was threefold: first, to find out why the congressional undervote rate was so high for Sarasota County's electronic ballots; second, to find out whether that abnormally high rate changed the election's outcome; and third, to prevent Buchanan from taking office in early January 2007 if, in fact, his election victory reflected voting-machine malfunction, rather than the will of the electorate.[50] If Buchanan were seated when the new 110th Congress convened in early January, the focus inevitably would shift from the state court to the United States House of Representatives, so speed was critically important.

The "primary consideration in an election contest is whether the will of the people has been effected."[51] But under the Florida election-contest law, there are only four grounds upon which a candidate or voter can challenge the result of an election:

> (a) [m]isconduct, fraud, or corruption on the part of any election official ... sufficient to change or place in doubt the result of the election[;] (b) [i]neligibility of the successful candidate for the nomination or office in dispute[;] © [r]eceipt of a number of illegal votes or rejection of a number of legal votes sufficient to change or place in doubt the result of the election; [or] (d) [p]roof that any elector, [or] election official ... was given or offered a bribe or reward [or] ... anything of value for the purpose of procuring the successful candidate's nomination or election ....[52]

A. The State-Court Complaint

On November 20, 2006, within hours of the state certifying the vote totals, Jennings filed an election-contest complaint in Florida state court.[53] The complaint

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[50] *See* Jennings Complaint, *supra* note 27.

[51] Boardman v. Esteva, 323 So. 2d 259, 269 (Fla. 1975), *cert. denied*, 425 U.S. 967 (1976); *see also* Barber v. Moody, 229 So. 2d 284, 286 (Fla. Dist. Ct. App. 1969) ("There [is] no doubt that the purpose of the statutes permitting election contests is to prevent the thwarting of the will of the electors either by fraud or by common mistakes honestly made."), *cert. denied*, 237 So. 2d 753 (Fla. 1970); COMM. ON HOUSE ADMIN., EXAMINATION AND RECOUNT OF THE VOTES CAST FOR REPRESENTATIVE IN CONGRESS, FIFTH CONGRESSIONAL DISTRICT OF INDIANA, AT THE GENERAL ELECTION OF NOVEMBER 8, 1960, H.R. REP. NO. 87-513, at 22 (1961).

[52] FLA. STAT. § 102.168(3)(a)–(d) (2006). After the 2000 presidential election, the Florida legislature eliminated a fifth, "catch-all" provision allowing for an election contest based on "[a]ny other cause or allegation which, if sustained, would show that a person other than the successful candidate was the person duly nominated or elected to the office in question." *See* 2001 Fla. Sess. Law Serv. 40 (West) (amending FLA. STAT. § 102.168 by deleting section 3(e)).

[53] *See* Jennings Complaint, *supra* note 27.

alleged that a malfunction of the iVotronic machines had caused the rejection of a
number of legal votes sufficient to change or place in doubt the result of the election.[54]
Jennings named the state and county election officials as defendants, as well as Vern
Buchanan, as Florida's election-contest statute required.[55] Along with her complaint,
Jennings moved for expedited discovery and requested access to the ES&S hardware,
software, and source code in the possession of the state and county.[56] Jennings re-
quested an immediate hearing on her motion, citing the provision of the election-
contest statute that entitled her to expeditious treatment.[57]

In her complaint, Jennings quoted the sworn affidavits of numerous voters who
came forward during or immediately following the election to describe the difficulties
they had encountered in registering their votes on the touchscreen machines.[58] These
citizens attested that they had voted for Jennings, but when they reached the end of
the ballot, the summary screen showed that no vote had been recorded in the congres-
sional race.[59] Jennings's complaint also quoted contemporaneous "incident report"
forms kept by the Supervisor of Elections that reflected problems with the iVotronics.[60]
According to the county's own records, multiple iVotronic machines "were taken out
of service on Election Day because they were 'slow to respond to touch,' or 'required
a hard/extended touch before [a] vote was recognized,' or because they were 'not
recording some votes [and] the touchscreen was not working properly.'"[61] Later, in

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[54] *Id.* at 8–9.

[55] *See* FLA. STAT. § 102.168(4) (2006); Jennings Complaint, *supra* note 27, at 4.

[56] *See* Plaintiff's Request for Production of Documents and for Inspection of Tangible
Things at 6–7, Jennings v. Elections Canvassing Comm'n of the State of Fla., No. 2006-CA-
2973, 2006 WL 4404531 (Fla. Cir. Ct. Nov. 21, 2006); Plaintiff's Motion to Compel Expedited
Discovery, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531.

[57] *See* FLA. STAT. § 102.168(7) (2006) ("Any candidate, qualified elector, or taxpayer
presenting such a contest to a circuit judge is entitled to an immediate hearing.").

[58] *See* Jennings Complaint, *supra* note 27, at 10–17.

[59] For example, one Sarasota County voter filed an affidavit stating:

> I went through the ballot making my selections on the iVotronic touch-
> screen voting machine and took my time making sure that I voted in
> every race. I am certain that I cast a vote for Christine Jennings. When
> I reviewed the ballot at the end of the voting process, I noted that the race
> for the 13th Congressional District . . . indicated that I had made no
> selection. . . . I have more than 15 years experience in selling computer
> systems, five of those years are in selling touch screen systems. Based
> on my experience, I believe there was a software "bug" in the voting
> machine software causing the software not to register the touch.

Affidavit of Alisa Janette Behne, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531; *see also*
H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 2641–654 (providing examples of other affidavits
submitted by voters).

[60] Jennings Complaint, *supra* note 27, at 17–18.

[61] H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 465–66; *see also id.*, pt. 2, at 3024–50
(providing examples of log sheets kept by the supervisor of elections).

discovery, Jennings learned that even Buchanan's wife reported difficulty voting for her husband, apparently pressing the "Vote" button three times before her vote would register.[62]

In addition to these eyewitness accounts and official reports, Jennings attached to her complaint two expert declarations.[63] As to whether there were a number of legal votes "sufficient to change or place in doubt the result of the election," the first expert was Professor Charles Stewart III, the chair of the political-science department at the Massachusetts Institute of Technology (MIT).[64] Professor Stewart examined data regarding undervote rates in Sarasota and surrounding counties and concluded that about 14,000 of the 18,000 undervotes were unintentional.[65] Using the actual "ballot-image logs" for each individual ballot to examine voters' preferences in other races, Professor Stewart later determined that if the 14,000 unintended undervotes had been properly recorded, Jennings would have won the election by more than 3,000 votes.[66] Professor Stewart further found that even if only 1,500 of the 18,000 undervotes were due to a malfunction of the iVotronics, the results of the race would have been reversed, with Jennings rather than Buchanan prevailing.[67]

As to whether the rejection of these thousands of legal votes had been caused by a malfunction of the iVotronics, Jennings also attached to her complaint the declaration of Professor Dan S. Wallach of the Computer-Science Department at Rice University.[68] Professor Wallach postulated that the cause of the anomalous undervote rate might be a software bug in the iVotronics and proposed rigorous testing of the iVotronic system, including its source code, to determine whether such a bug existed.[69]

B. The Thwarted Discovery Process

The election contest was assigned to Florida Circuit Judge William L. Gary in Tallahassee.[70] The day after the complaint was filed, Judge Gary held a non-evidentiary

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[62] See Memorandum from Sally Tibbetts to Ron Turner (Dec. 26, 2006), *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 2, at 3069 ("Mrs. Buchanan indicated that she had to hit the button more than once, I think she said three times—to record her vote for Mr. Buchanan.").

[63] See Declaration of Charles Stewart III on Excess Undervotes Cast in Sarasota County, Florida for the 13th Congressional District Race, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531 [hereinafter Declaration of Stewart]; Declaration of Dan S. Wallach, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531 [hereinafter Declaration of Wallach].

[64] Declaration of Stewart, *supra* note 63, at 1.

[65] *Id.* at 2–3.

[66] *Id.*

[67] *Id.* at 2–3, 24–35.

[68] See Declaration of Wallach, *supra* note 63.

[69] *Id.* at 4–5.

[70] See Hearing Transcript, Jennings v. Elections Canvassing Comm'n of the State of Fla., No. 2006-CA-2973, 2006 WL 4404531 (Fla. Cir. Ct. Nov. 21, 2006), *reprinted in* H.R. REP.

hearing on Jennings's request for expedited discovery.[71] He denied the request and instead granted the state and county defendants fifteen days to file written responses.[72] Judge Gary also stated that ES&S, the manufacturer of the iVotronic system, must be given "an opportunity to be heard" before he would consider granting any request for access to the system's source code.[73] Given Judge Gary's admonition that he would not allow access to the iVotronic source code without hearing from ES&S, Jennings amended her complaint to name ES&S as a defendant.[74]

Jennings's request for the source code was critical because the code is what allows a computer scientist to "read" electronic-voting-system software and determine whether a bug exists that could have caused a voter's choices to be incorrectly recorded, or not to be recorded at all.[75] "Without access to the source code that runs the [electronic voting machine], auditing becomes a pointless endeavor because all an auditor has to work with is potentially flawed election data produced by a black box in which it is impossible to see how it created that data."[76] Under Florida law, ES&S was required to keep a copy of the source code for the iVotronic system in escrow with the state.[77] Jennings, therefore, filed a motion to compel the state to produce the escrowed source code, reiterating that although ES&S may have an interest in the litigation, the discovery she sought was in the state's possession.[78] Jennings also sought to compel the county to produce eight actual iVotronic machines and related equipment used in the election.[79]

The state and county defendants objected to producing the vast majority of the materials requested (including all of Jennings's requests for hardware, software, and

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No. 110-528, *supra* note 3, pt. 1, at 895. Under Florida law, election-contest complaints for multi-county races must be filed in Leon County. FLA. STAT. § 102.1685 (2006).

[71] *See* Hearing Transcript at 42, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 896.

[72] *See* Response of Elections Canvassing Comm'n, Secretary of State Sue M. Cobb, and Dawn K. Roberts to Plaintiff's Motion to Compel Expedited Discovery at 2–3, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531.

[73] *See* Hearing Transcript at 42, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 896.

[74] *See* First Amended Complaint to Contest Election at 1–2, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531.

[75] *See* Andrew Massey, *"But We Have to Protect Our Source!": How Electronic Voting Companies' Proprietary Code Ruins Elections*, 27 HASTINGS COMM. & ENT. L.J. 233, 234 (2004).

[76] *Id.* at 243.

[77] *See* FLA. STAT. § 101.5607(1)(a) (2006); FLA. ADMIN. CODE ANN. r. 1S-2.015(5)(f) (2006).

[78] *See* Plaintiff Jennings's Motion to Compel Production of Items Within the Custody and Control of the State Under Fla. Stat. § 101.5607 and Fla. Admin. Code Rule 1S-2.015(5)(f) at 1, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531.

[79] *See* Plaintiff's Motion to Compel Expedited Discovery at 3, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531.

source code), claiming that these were "trade secrets" belonging to ES&S.[80] Florida's evidence code provides for a trade-secret privilege, granting that "[a] person has a privilege to refuse to disclose, and to prevent other persons from disclosing, a trade secret owned by that person if the allowance of the privilege will not conceal fraud or otherwise work injustice."[81] The evidence code further notes that "[w]hen the court directs disclosure, it shall take the protective measures that the interests of the holder of the privilege, the interests of the parties, and the furtherance of justice require."[82]

Invoking the trade-secret privilege to prevent scrutiny of a contested election was apparently unprecedented. The privilege is typically invoked either in commercial disputes, for example when competitors are engaged in a lawsuit over theft of intellectual property and access to the property is at issue, or in products-liability cases, for example when plaintiffs seek to discover how the product that harmed them was made.[83] Never before had state and county election officials hidden behind a voting-machine manufacturer's invocation of the trade-secret privilege to avoid investigating a disputed election.

Nonetheless, recognizing that the defendants were unwilling to provide the requested discovery due to the trade-secret privilege, Jennings took two unusual steps that she believed would expedite the discovery process and more speedily resolve the election contest. First, she conceded—solely for purposes of her motion—that the materials she had requested could be deemed trade secrets, thereby relieving the defendants of the potentially time-consuming burden of proving that the privilege did apply in this situation.[84] Second, Jennings proposed that her experts would be bound by a stringent protective order that would accommodate any interest ES&S might have in protecting its proprietary information from business competitors, while ensuring that Jennings's experts could access the evidence needed to test the allegations of her complaint.[85] After some delay (fostered by the judge's unwillingness to hold a case-management conference, issue a scheduling order, or accord the case priority status

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[80] *See* Defendant Dent's Response to Plaintiff's Request for Production of Documents and for Inspection of Tangible Things at 3–4, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531; State Defendants' Response to Plaintiff Jennings's Request for Production of Documents and for Inspection of Tangible Things, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531.

[81] *See* FLA. STAT. ANN. § 90.506 (2006).

[82] *Id.*

[83] *See, e.g.*, Seta Corp. of Boca v. Office of Attorney Gen., 756 So. 2d 1093, 1094 (Fla. Dist. Ct. App. 2000) (ordering discovery because the party seeking trade secrets was "not a competitor" and protections could be taken to prevent disclosure to non-party business competitors); Freedom Newspapers, Inc. v. Egly, 507 So. 2d 1180, 1184 (Fla. Dist. Ct. App. 1987) ("The likelihood of [any] abuse of the discovery process is lessened where, as here, the party seeking discovery appears to have no real interest in the business techniques of the [party invoking the trade-secret privilege].").

[84] *See* Plaintiff Jennings's Motion for Entry of a Protective Order at 2, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531.

[85] *See* [Proposed] Protective Order, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 860.

as required by Florida law), ES&S eventually responded by requesting an evidentiary hearing to determine whether Jennings actually needed these discovery items.[86]

Under Florida law, the test for determining whether trade secrets should be disclosed is whether the plaintiff has a "reasonable necessity for the requested materials."[87] But the "burden is on the party resisting discovery to show 'good cause' for protecting or limiting discovery by demonstrating that . . . disclosure may be harmful."[88] It seemed obvious that in a case alleging voting-machine malfunction, one would of course have a "reasonable necessity" to access the voting machines themselves, and their software. Equally obvious is that a stringent protective order, backed by the power to hold anyone who violated the order in contempt of court, would prevent any harmful disclosure of trade secrets. Moreover, neither Jennings nor her experts were competitors to ES&S, so the whole *raison d'être* for the privilege did not apply here. But the Florida state courts did not ultimately see it this way.[89]

C. Jennings's Day in Court

A full month after Jennings filed her state-court complaint and discovery requests, with the December holidays rapidly approaching, the trial judge finally held an evidentiary hearing to determine if Jennings had a "reasonable necessity" to access the iVotronic system to determine whether defects in that system had cost her the election.[90] At the hearing, Jennings presented testimony from Professors Stewart and Wallach.[91] Neither Buchanan nor the governmental defendants who were the targets of Jennings's motion to compel presented any witnesses.[92] ES&S presented one expert on elections and voting patterns, Professor Michael C. Herron of Dartmouth College's Government Department.[93]

Consistent with the declaration he had filed in support of Jennings's complaint, Professor Stewart testified that the undervote rate in Sarasota County was far above normal, that Jennings would have won the election had the undervote rate been any-

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[86] *See* Defendant Election Systems & Software, Inc.'s Motion Requesting Fifteen (15) Days to Respond to Plaintiff's Request for Production, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 884.

[87] Sheridan Healthcorp, Inc. v. Total Health Choice, Inc., 770 So. 2d 221, 222 (Fla. Dist. Ct. App. 2000).

[88] Am. Express Travel Related Services, Inc. v. Cruz, 761 So. 2d 1206, 1209 (Fla. Dist. Ct. App. 2000).

[89] *See infra* note 107 and accompanying text.

[90] *See* Evidentiary Hearing Transcript at 6, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 1155.

[91] *See* Evidentiary Hearing Transcript at 25–168, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 1160–95.

[92] *See* Evidentiary Hearing Transcript at 4, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 1154.

[93] *See infra* note 97 and accompanying text.

where near normal, and that machine malfunction had likely altered the election's outcome.[94] Stewart's expert statistical analyses of the election returns, on a machine-by-machine basis, showed that the undervote problem was worst on touchscreens that were set up and "calibrated" on days when the county election staff was busiest—which strongly suggested that the undervote rates were tied to machine malfunction, not voter confusion or some other factor.[95] Also consistent with his declaration, Professor Wallach testified that machine malfunction could have caused the abnormal undervote rate and described the investigation of the hardware, software, and source code needed to test that hypothesis.[96]

ES&S's political science expert Professor Herron testified—without ever having examined the iVotronic hardware, software, or source code and with no computer-science expertise whatsoever—that poor ballot design was the sole cause of the elevated undervote rate.[97] According to Professor Herron, because the congressional race appeared on the same page as the gubernatorial race, voters simply "skipped" the former.[98] Professor Herron's theory also posited that each of these voters must have missed the summary page's bright red warning, telling the voter there had been "No Selection Made" in the congressional race.[99] But Professor Herron agreed with Professor Stewart that the undervote rate in Sarasota County was not normal and that had it been normal, Jennings would have won the election by roughly 3,000 votes.[100]

ES&S also introduced into evidence a "Parallel Test Summary Report," which the state defendants produced the night before the evidentiary hearing.[101] The report

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[94] *See* Evidentiary Hearing Transcript at 25–72, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 1160-71.

[95] *See* Evidentiary Hearing Transcript at 68–71, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 1170–71; *see also* Evidentiary Hearing Transcript at 155–56, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 1192.

[96] *See* Evidentiary Hearing Transcript at 148–56, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 1190–92.

[97] *See* Evidentiary Hearing Transcript at 257–389, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 1236–69.

[98] *See* Evidentiary Hearing Transcript at 277, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 1241.

[99] *See supra* text accompanying notes 29–34 (discussing how the iVotronic voting system works).

[100] *See* Evidentiary Hearing Transcript at 330–31, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 1255 (stating that Jennings would have won if one attributed the undervote to machine malfunction); *see also* Laurin Frisina, Michael C. Herron, James Honaker & Jeffrey B. Lewis, *Ballot Formats, Touchscreens, and Undervotes: A Study of the 2006 Midterm Elections in Florida*, 7 ELECTION L.J. 25, 25 (2008) ("[T]here is essentially a 100 percent chance that the 13th Congressional District election result would have been reversed in the absence of the large Sarasota undervote.").

[101] *See* Parallel Test Summary Report, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, at 1285.

described the state's post-election testing of ten iVotronic machines, five of which had not even been used during the election.[102] In the test, the state used "mock voters," who were permanent employees of the State's Division of Elections, to carefully enter their selections into the iVotronic machines using pre-set scripts.[103] These scripts assumed that those who undervoted did so intentionally.[104] The report concluded that because these ten iVotronic machines recorded the scripts correctly, the "parallel tests were successful in demonstrating 100% accuracy in recording the vote selections as indicated on the review screens."[105] The report was introduced over Jennings's objection that it was hearsay and that she should be allowed the opportunity to cross-examine its author.[106]

D. The Ruling and the Appeal

Nine days after the evidentiary hearing on Jennings's "reasonable necessity" for discovery, Judge Gary issued an order denying her requests for access to the iVotronic hardware, software, and source code.[107] The court stated that granting Jennings's motions to compel "would require [it] to find that it is reasonably necessary for the Plaintiffs to have access to the trade secrets of [ES&S] based on nothing more than speculation and conjecture, and would result in destroying or at least gutting the protections afforded those who own the trade secrets."[108] Thus, Judge Gary held that ES&S's trade-secret privilege trumped the public's right to know what had gone so very wrong in the 2006 congressional election.[109]

Jennings immediately appealed the trial court's ruling by filing an emergency petition for a writ of certiorari in Florida's First District Court of Appeal.[110] Given that the term of the contested office was a mere two years and that Buchanan was about to be sworn into the office while Jennings still had not even gained access to basic dis-

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[102] *See* Parallel Test Summary Report at 4, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, at 1288.

[103] *See* Parallel Test Summary Report at 6, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R, REP. NO. 110-528, *supra* note 3, at 1290.

[104] *See* Parallel Test Summary Report at 2–3, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, at 1286–87.

[105] *See* Parallel Test Summary Report at 8, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, at 1292.

[106] *See* Evidentiary Hearing Transcript at 253–56, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 1235–36.

[107] *See* Order on Motions at 2–4, *Jennings*, No. 2006-CA-2973, 2006 WL 4404531.

[108] *Id.* at 3.

[109] *See id.* at 4.

[110] *See* Emergency Petition for a Writ of Certiorari, Jennings v. Elections Canvassing Comm'n of the State of Fla., 958 So. 2d 1083 (Fla. Dist. Ct. App. 2007), *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 535.

covery, she also requested expedited consideration of her appeal.[111] Paradoxically, the appellate court granted Jennings's petition for expedited consideration,[112] but then waited five months to issue a ruling.[113] On June 18, 2007, the appellate court issued a terse two-page opinion concluding that "an order denying discovery is ordinarily not reviewable by certiorari because the harm from such orders, as a general rule, can be rectified on plenary appeal."[114] The order stated that Jennings had not met the "extraordinary burden to demonstrate that the trial court departed from the essential requirements of law, resulting in irreparable, material injury for the remaining trial proceedings that cannot be rectified on direct appeal."[115] In other words, Jennings should proceed with her case, without the key discovery, inevitably lose in the trial court, and then bring a second appeal from that unfavorable final judgment—just to raise precisely the same issues she already had raised in her "expedited" emergency appeal.[116] Jumping through those additional hoops would take months or even years. Jennings's state-court case was effectively finished.

III. THE FEDERAL PROCEEDINGS

At the same time that Jennings was pursuing her state-court suit, she also initiated an action in the United States House of Representatives.[117] Under Article I, Section 5 of the United States Constitution, "[e]ach House shall be the Judge of the Elections, Returns and Qualifications of its own Members."[118] The House of Representatives, therefore, bears the ultimate constitutional responsibility to adjudicate disputed House elections, regardless of any state-court action.[119]

Successful House election contests are rare, but hardly unprecedented.[120] In contested-election cases, the House has found the contestant to be entitled to the seat

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[111] *See* Emergency Petition for a Writ of Certiorari at 24–25, *Jennings*, 958 So. 2d 1083, *reprinted in* H.R. REP. No. 110-528, *supra* note 3, pt. 1, at 565–66.

[112] Court Order, *Jennings*, 958 So. 2d 1083 (No. 1007-11).

[113] *See Jennings*, 958 So. 2d 1083 (denying certiorari).

[114] *Id.* at 1084 (quoting Ruiz v. Steiner, 599 So. 2d 196, 197 (Fla. Dist. Ct. App. 1992)).

[115] *Id.*

[116] *Id.*; *see supra* note 114 and accompanying text.

[117] *See infra* text accompanying note 134.

[118] U.S. CONST. art. 1, § 5, cl. 1; *see* Morgan v. United States, 801 F.2d 445, 447 (D.C. Cir. 1986), *cert. denied*, 480 U.S. 911 (1987) (explaining that the Constitution provides not just that "each House 'may Judge' [congressional elections], but that each House 'shall be *the* Judge'"); McIntyre v. Fallahay, 766 F.2d 1078, 1081 (7th Cir. 1985) ("The House is not only 'Judge' but also final arbiter.").

[119] U.S. CONST. art 1, § 5, cl. 1.

[120] *See* Jeffrey A. Jenkins, *Partisanship and Contested Election Cases in the House of Representatives, 1789–2002*, 18 STUD. IN AM. POL. DEV. 112, 115 (2004) ("There have been 601 contested election cases in the House [from 1789–2002], or an average of 5.6 per Congress.").

on 128 occasions; and the election has been voided, and the seat vacated, in another 66 cases.[121] Most of these successful contests, however, took place many decades ago, with the greatest concentration in the last quarter of the nineteenth century.[122]

To discharge its constitutional responsibilities, the House generally employs the procedures outlined in the Federal Contested Elections Act (FCEA).[123] The FCEA is largely a procedural statute. It sets forth rules about who may contest an election, the form of a notice of contest, service of such notice, and deadlines for various motions and discovery processes, as well as for final briefing.[124] But the statute says almost nothing about the substantive standards for judging a notice of contest.[125] Under the FCEA, the candidate contesting the election must file a notice of contest within thirty days of state certification of the election results.[126] The only substantive require- ments for the notice are that the contestant must "state grounds sufficient to change [the] result of [the] election" and must "claim [the] right to [the] contestee's seat" in Congress.[127] The contestee then has thirty days either to file an answer or to move for dismissal.[128] Under the FCEA, the burden of proof rests with the contestant, who "must overcome the presumption of the regularity of an election, and its results, evi- denced by the certificate of election presented by the contestee."[129] The FCEA also sets forth procedures for an adversarial system of taking depositions and other discovery.[130]

Traditionally, the Committee on House Administration appoints a bipartisan three- member task force to investigate and report on an FCEA proceeding.[131] Generally, the task force investigates the contest and makes a recommendation to the Committee on House Administration, which then issues a report and sends a resolution to the full House regarding the disposition of the contest.[132] "The committee may recommend, and the House may approve by a simple majority vote, a decision affirming the right

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[121] *Id.* at 120; *see also* H.R. Res. 231, 73d Cong., 78 CONG. REC. 1510 (1934) (agreeing to a House resolution stating that there had been no valid election, that the state certified winner was not entitled to a seat, and that the Speaker of the House should notify the Governor of the vacancy).

[122] For a general description of these successful contests, see Jenkins, *supra* note 120.

[123] 2 U.S.C. §§ 381–96 (2006).

[124] 2 U.S.C. §§ 381–93.

[125] 2 U.S.C. § 383(b).

[126] 2 U.S.C. § 382(a).

[127] 2 U.S.C. § 383(b).

[128] 2 U.S.C. § 382(a).

[129] JACK MASKELL & L. PAIGE WHITAKER, CONG. RES. SERVICE, PROCEDURES FOR CONTESTED ELECTION CASES IN THE HOUSE OF REPRESENTATIVES, at Summary (2008) [hereinafter CRS REPORT]; *see also* 2 U.S.C. § 385 (2006) (stating that "the burden is upon [the] contestant to prove that the election results entitle him to contestee's seat").

[130] CRS REPORT, *supra* note 129; *see* 2 U.S.C. §§ 386–93 (2006).

[131] *See* CRS REPORT, *supra* note 129, at CRS-14 (noting an election contest in the 99th Congress in which the House Administration Committee "appointed a three-person Task Force composed of two Democrats and one Republican").

[132] *Id.* at Summary.

of the contestee to the seat, may seat the contestant, or find that neither party is entitled to be finally seated and declare a vacancy."[133]

A. Jennings's FCEA Complaint

On December 20, 2006, Jennings filed an FCEA Notice of Contest stating that the pervasive malfunctioning of the iVotronic system in Sarasota County, as recounted by numerous eyewitnesses, provided grounds sufficient to change the result of the election.[134] As to her entitlement to the seat, Jennings noted the consensus among political scientists and statisticians that (1) the vast majority of the undervote was unintended and (2) had the votes been counted as they were intended, Jennings would have beaten Buchanan by approximately 3,000 votes.[135] Within the statutorily required thirty days, Buchanan filed a motion to dismiss the contest.[136]

On January 4, 2007, while Jennings's state-contest proceeding was still pending in the Florida appellate court and her federal notice of contest was pending before the House, Vern Buchanan was sworn in as the Representative in the 110th Congress for Florida's Thirteenth District.[137] At that time, then-Chairwoman of the House Administration Committee Juanita Millender-McDonald hoped that the state courts would still allow Jennings the discovery necessary to determine whether the iVotronic machines had malfunctioned.[138] To that end, the Chairwoman wrote to the Florida appellate court to express her desire that the discovery matters be expeditiously resolved by the state judiciary.[139] The appellate court, however, refused to consider or even docket her letter.[140] And, as recounted above, the court then sat on Jennings's appeal for five months before ultimately denying further discovery.

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[133] *Id.*

[134] *See* Notice of Contest Regarding the Election for Representative in the One Hundred Tenth Congress From Florida's Thirteenth Congressional District, *reprinted in* H.R.REP.NO. 110-528, *supra* note 3, pt. 1, at 1626–37.

[135] Notice of Contest Regarding the Election for Representative in the One Hundred Tenth Congress From Florida's Thirteenth Congressional District at 1–24, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 1626–38.

[136] *See* Congressman Buchanan's Motion to Dismiss Election Contest, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 1655.

[137] *See* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 4.

[138] *See* Letter from Juanita Millender-McDonald, Chairwoman, Comm. on House Admin., to Jon S. Wheeler, Clerk, Fla. First Dist. Court of Appeal, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 25.

[139] *Id.*

[140] Court Order, Jennings v. Elections Canvassing Comm'n of the State of Fla., 958 So. 2d 1083 (Fla. Dist. Ct. App. 2007) (No. 2006-CA-2973).

B. The FCEA Task-Force Investigation

Because there had been some hope that the discovery issues might be resolved in the state courts, the three-member task force appointed to investigate the Jennings-Buchanan contest was not established until March 23, 2007,[141] and did not officially meet for the first time until May 2, 2007,[142] four months into the twenty-four-month congressional term.[143] The delay was also due in part to the recalcitrance of the House Republicans to nominate anyone to the task force: the Ranking Member of the House Administration Committee stated that he felt "organizing the task force while Ms. Jennings's case is under careful consideration in the Florida Circuit and Appeals Courts is an inappropriate interference of the federal legislative branch in state judicial proceedings."[144] This theme was echoed in Buchanan's motion to dismiss Jennings's FCEA case, which accused Jennings of bringing the action while failing to exhaust all state remedies.[145]

Nonetheless, the Republicans eventually nominated a member to the task force, and at its first official meeting the panel voted unanimously to retain the Government Accountability Office (GAO) to investigate the election.[146] The GAO was thereby engaged "to design and propose testing protocols to determine the reliability of the equipment used in the FL-13 election."[147]

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[141] H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 15.

[142] *Id.* at 16.

[143] Prior to its first official meeting, the task force held a closed-door briefing with counsel for Jennings and Buchanan. At that briefing session, counsel were asked to address four issues: (1) whether there were compelling reasons for the task force not to proceed with an investigation at that time; (2) what discovery the parties anticipated undertaking if the task force were to authorize discovery in the FCEA proceeding; (3) whether the task force could rely on any of the testing of the iVotronic system that had been done to date by the State or county; and (4) how the task force could protect the proprietary interests of ES&S if discovery would entail an examination of trade secrets. *See* Letter from Charles A. Gonzalez, Chairman, Task Force, to Hayden R. Dempsey, Counsel (Apr. 3, 2007), *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 59–60.

[144] Letter from Vernon J. Ehlers, Ranking Member, Comm. on House Admin., to Juanita Millender-McDonald, Chairwoman, Comm. on House Admin. (Apr. 16, 2007), *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 61; *see also* Jeremy Wallace, *GOP, Seeking 'Clarity,' Holds Up Task Force*, SARASOTA HERALD-TRIB. (Fla.), Mar. 28, 2007, at A1.

[145] Congressman Vern Buchanan's Motion to Dismiss Election Contest, *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 2, at 1655–97.

[146] Congressman Kevin McCarthy, the task force's Republican member, first voted not to initiate any investigation into the election. But once the task force voted 2-to-1 to commence an investigation, he voted in favor of retaining GAO to conduct it. H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 21.

[147] *Id.*

Neither Jennings nor Buchanan had recommended retaining the GAO. Instead, Buchanan had argued that no investigation was necessary,[148] while Jennings had set forth a specific proposal for an adversarial process, consistent with the adversarial nature of the FCEA statute, allowing each side's experts to undertake specific testing, with deadlines that would ensure completion of their investigation into the iVotronic system within forty-five days.[149] Jennings recommended that the task force sub-poena the key evidence (the iVotronic hardware, software, and source code), divide it between the two parties' expert teams, ask the parties' experts to analyze the evidence and submit reports and counter-reports under oath, assess those reports, and then resolve the case on an expedited basis.[150] The task force rejected this forty-five-day plan in favor of retaining the GAO.[151]

The task force then let forty-three more days pass before approving the GAO's proposed "engagement plan" on June 14, 2007.[152] The GAO advised the task force that it expected its "engagement" would not be completed until at least September 2007.[153] Unlike Jennings's proposal, which the task force had rejected, the GAO's plan did not involve securing or testing any of the voting machines that Sarasota County actually had used in the 2006 election.[154] Rather, in this initial engagement, the GAO proposed simply to study the testing that had already been completed by the State and county to determine whether any further testing of the iVotronic system was warranted.[155] By that time, the state had issued a second report exonerating the iVotronic machines based on an investigation in which a team of academics performed a static "reading" of the iVotronic source code, but did not perform any hands-on testing of the code on actual iVotronic machines.[156]

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[148] *See* Congressman Vern Buchanan's Motion to Dismiss Election Contest, *reprinted in* H.R. REP. No. 110-528, *supra* note 3, pt. 2, at 1655.

[149] Memorandum Responding to the Honorable Charles A. Gonzalez's April 3, 2007 Letter Regarding the Investigation of the Election for Representative in the One Hundred Tenth Congress from Florida's Thirteenth Congressional District (Apr. 13, 2007), *reprinted in* H.R. REP. No. 110-528, *supra* note 3, pt. 2, at 2604-07.

[150] *Id.*

[151] H.R. REP. No. 110-528, *supra* note 3, pt. 1, at 21.

[152] *Id.* at 16.

[153] GAO Engagement Plan 4 (June 14, 2007), *reprinted in* H.R. REP. No. 110-528, *supra* note 3, pt. 1, at 81.

[154] GAO Engagement Plan 1-4 (June 14, 2007), *reprinted in* H.R. REP. No. 110-528, *supra* note 3, pt. 1, at 78-81.

[155] GAO Engagement Plan 1(June 14, 2007), *reprinted in* H.R. REP. No. 110-528, *supra* note 3, pt. 1, at 78.

[156] ALEC YASINSAC ET AL., SOFTWARE REVIEW AND SECURITY ANALYSIS OF THE ES&S IVOTRONIC 8.0.1.2 VOTING MACHINE FIRMWARE (2007), *reprinted in* H.R. REP. No. 110-528, *supra* note 3, pt. 2, at 3071-137. For a detailed critique of this report, pointing out its many shortcomings, see DAVID L. DILL & DAN S. WALLACH, STONES UNTURNED: GAPS IN THE INVESTIGATION OF SARASOTA'S DISPUTED CONGRESSIONAL ELECTION (2007), *reprinted in* H.R. REP. No. 110-528, *supra* note 3, pt. 2, at 2618-35.

As it turned out, it took the GAO the next four months to determine "[t]o what extent were tests conducted on the voting systems in Sarasota County prior to the general election and what were the results of those tests" and, "[c]onsidering the tests that were conducted on the voting systems from Sarasota County after the general election, [whether] additional tests [were] needed to determine whether the voting systems contributed to the undervote[.]"[157] On October 2, 2007, nine months into the twenty-four-month term of office, the GAO presented its findings in a report carefully titled "Further Testing Could Provide Increased But Not Absolute Assurance That Voting Systems Did Not Cause Undervotes in Florida's 13th Congressional District."[158] Thus, almost a full year after the election, the GAO finally decided to test the actual iVotronic machines and to look at the source code—steps that Jennings had proposed undertaking within days of the election.[159]

The GAO did not, however, undertake the battery of tests that Jennings's computer science experts had recommended. Instead, the GAO conducted just three limited tests: (1) a firmware verification test conducted on 115 of the 1,500 iVotronic machines that Sarasota County had deployed in the 2006 elections; (2) parallel testing on ten iVotronics; and (3) calibration testing on two iVotronic machines.[160] On February 8, 2008, after another four months had passed and with the congressional term more than half over, the GAO finally issued its findings that the iVotronic system did not contribute to the undervote and further testing was not necessary.[161] The GAO report did not analyze whether voter confusion caused by poor ballot design contributed significantly to the undervote, much less whether poor ballot design alone could explain the entirety of the abnormal undervote. Nor did the report offer any other explanation of what caused thousands of Sarasota County votes to "disappear."[162]

Shortly thereafter, the Committee on House Administration, and then the full House, approved a resolution dismissing Jennings's case.[163] Jennings's election contest was finished.

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[157] GAO Engagement Plan 1(June 14, 2007), *reprinted in* H.R. REP. No. 110-528, *supra* note 3, pt. 1, at 78.

[158] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-08-97T, FURTHER TESTING COULD PROVIDE INCREASED BUT NOT ABSOLUTE ASSURANCE THAT VOTING SYSTEMS DID NOT CAUSE UNDERVOTES IN FLORIDA'S 13TH CONGRESSIONAL DISTRICT (2008), *available at* http://www .gao.gov/new.items/do897t.pdf.

[159] *Id.* at 17.

[160] *See* RESULTS OF GAO'S TESTING, *supra* note 26, at 1-2.

[161] *Id.* at 3-4.

[162] *See* Verified Voting Foundation, GAO Report Not a Clean Bill of Health for Voting Machines 1-4, http://www.verifiedvotingfoundation.org/downloads/VVF-Statement-GAO.pdf (last visited Dec. 1, 2008).

[163] H.R. RES. 989, 110th Cong. (2008) (enacted).

IV. LESSONS FROM THE FLORIDA CONGRESSIONAL DEBACLE

The injustice of the outcome of the election contest for Florida's Thirteenth Congressional District is obvious: despite the consensus view of experts on both sides of the dispute that about 3,000 more voters attempted to vote for Jennings than for Buchanan, the seat was awarded to Buchanan.[164] So, for two years, the people of Florida's Thirteenth District have been "represented" in Congress not by the candidate of their choice, but by the runner-up.

Even setting aside the substantive unfairness of the outcome, the Jennings-Buchanan election contest reveals a striking set of procedural problems. The case took more than fifteen months to be "resolved," by which time most of the congressional term had expired.[165] And even then, the litigation never came even remotely close to answering *why* Sarasota County's iVotronic system recorded 14,000 excess under-votes.[166] When an election contest neither answers the fundamental questions about what went wrong nor results in the correct candidate being seated, something has gone seriously awry.

So, what lessons are to be learned from this case? The most obvious reforms are substantive ones—demanding tougher tests before certifying voting machines, insisting on paper trails or other means for independently verifying votes, and perhaps replacing paperless electronic touchscreens with precinct-based optical-scan systems or ballot-marking devices, just to mention a few.[167] And undoubtedly, stricter requirements for ballot design should be enacted in most states.[168]

But those reforms are not the focus of this Article. Rather, here the focus is on how to conduct election contests, not elections. Our suggestions for reform fall into four categories: (1) the discovery of alleged trade secrets, (2) the timing of state-

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[164] *Id.*

[165] *See* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 15–17.

[166] *See* Verified Voting Foundation, *supra* note 162, at 4.

[167] For a readable, nontechnical, and opinionated discussion of some of these topics, see AVIEL D. RUBIN, BRAVE NEW BALLOT: THE BATTLE TO SAFEGUARD DEMOCRACY IN THE AGE OF ELECTRONIC VOTING (2006). *See generally* Susan M. Boland & Therese Clarke Arado, *O Brave New World? Electronic Voting Machines and Internet Voting: An Annotated Bibliography*, 27 N. ILL. U. L. REV. 313 (2007).

[168] *See* LAWRENCE NORDEN ET AL., BRENNAN CTR. FOR JUSTICE, BETTER BALLOTS (2008), *available at* http://brennan.3cdn.net/d6bd3c56be0d0cc861_hlm6i92vl.pdf; *see also id.* at 24–27 (recommending that, unlike Sarasota County's 2006 congressional and gubernatorial ballots, two contests should never be placed on one screen). *But see* FRANKLIN COUNTY, OHIO BD. OF ELECTIONS, HELPING FRANKLIN COUNTY VOTE IN 2008: WAITING LINES 4 (2008), *available at* http://vote.franklincountyohio.gov/assets/pdf/2008/general/gen2008-voting-machine-allocation.pdf (arguing that the "one-page-per-item" rule slows down the average voter by about seventy-five seconds, dramatically lengthens lines at polling places, and does not significantly diminish voter confusion).

court actions, (3) the relationship between state-court actions and FCEA cases, and (4) the process for adjudicating FCEA claims.

A. Discovery of Alleged Trade Secrets

If the Florida courts had properly applied the trade-secret privilege in the Jennings-Buchanan election contest, the defendants would have been forced to hand over the iVotronic hardware, software, and source code, subject to a protective order.[169] This case, however, highlights the need for express statutory guidance on this issue. Legislatures should declare unambiguously that the trade-secret privilege has only limited application to voting technology and cannot be invoked to hide defects in our electoral processes. If a voting-machine manufacturer invokes the privilege in an election contest, the solution is not to block discovery entirely, but rather to order appropriate protective measures.[170] In some circumstances, there may be risks to the electoral system itself if voting-machine source code becomes widely available.[171] But those concerns are best addressed through protective measures, backed by the courts' contempt power, not by outright denial of discovery.[172]

More generally, election-contest statutes should emphasize the need for liberal discovery. Georgia law, for example, expressly grants trial judges in contested-election cases the power to do everything "necessary and proper" to expeditiously hear and resolve the dispute, including "to compel the production of evidence which may be required at such hearing."[173] And Illinois law allows plaintiffs in contests involving statewide elections to request the examination of "records and equipment under the control of an election authority."[174] To deter the filing of frivolous requests, the Illinois statute requires the posting of a bond.[175]

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[169] As the Supreme Court has noted, "orders forbidding any disclosure of trade secrets or confidential commercial information are rare. More commonly, the trial court will enter a protective order restricting disclosure to counsel or to the parties." Fed. Open Mkt. Comm. of the Fed. Reserve Sys. v. Merrill, 443 U.S. 340, 362 n.24 (1979) (internal citations omitted).

[170] *See* David S. Levine, *Secrecy and Unaccountability: Trade Secrets in Our Public Infrastructure*, 59 FLA. L. REV. 135, 180–83, 187–93 (2007).

[171] *See* Joseph Lorenzo Hall, Transparency and Access to Source Code in Electronic Voting, http://josephhall.org/papers/jhall_evt06.pdf (last visited Nov. 19, 2008). *But cf.* N.C. GEN. STAT. ANN. § 163-165.7(a)(6), (d)(9) (West 2007) (requiring companies that sell voting machines in North Carolina to make their source code available for inspection, merely upon request, to a wide group of potentially interested individuals, including the state chairs of every recognized political party and up to three persons designated by each party chair).

[172] *Cf.* CONG. RESEARCH SERV., RL 31836 CONGRESSIONAL INVESTIGATIONS: SUBPOENAS AND CONTEMPT POWER 7 (2003) (noting that "legislative needs" embodied in a congressional subpoena can override a private party's asserted "need to protect confidential trade secrets").

[173] GA. CODE ANN. § 21-2-525(b) (2008).

[174] 10 ILL. COMP. STAT. ANN. 5/23-1.6a (West 2003).

[175] *See id.*

B. Timing of State-Court Actions

In *Jennings v. Buchanan*, the trial court did not even rule on the key discovery request—let alone the election contest itself—until nearly two months after the election.[176] And the appellate decision on that discovery ruling, although denominated an "expedited" proceeding, took more than five additional months.[177] Especially where the office at stake has a term of only twenty-four months, these sorts of delays should not be tolerated.

The goal of a state-court election contest should be to resolve the question of which candidate is entitled to the seat *before* the seat is actually filled. In the case of Congress, members typically are seated during the first week of January, following the November general election.[178] Therefore, state election codes should set a general deadline for completing discovery and trial-court proceedings in these contests by some point in December, roughly a month after the official certification of the election results, and well before the date on which the winning candidate is to be sworn into office. To ensure some degree of flexibility, the deadline should take the form of a rebuttable presumption, offering the trial judge the opportunity to file a written opinion justifying any extension that would prevent entering the final judgment before the presumptive December deadline, for example, when discovery is proceeding expeditiously but some extra time is needed.

This approach is not unrealistically speedy. Indeed, California law requires trial courts to decide election contests and to file findings of fact and conclusions of law within *ten days* of the evidentiary hearing.[179] At a minimum, states should follow New York's lead in telling trial judges to give election-contest proceedings "preference over all other causes in all courts."[180] Similarly, in Pennsylvania, the election code instructs courts to "proceed without delay" and to postpone all other business "if necessary ... to the hearing and determination of [an election] contest."[181]

Furthermore, as *Jennings v. Buchanan* amply illustrates, it is important for the state-court appellate processes also to be expedited (and not just nominally). For appeals in primary-election contests, California law requires the appellate court to give "precedence over all other appeals" and to act within ten days after the appeal is filed;[182] the same approach could be applied to general-election contests, too. And, at least for contests involving federal or statewide offices, states also should

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[176] H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 15.

[177] *Id.* at 16.

[178] *Id.* at 15.

[179] *See* CAL. ELEC. CODE § 16603 (West 2003).

[180] N.Y. ELEC. LAW § 16-116 (Consol. 1986).

[181] 25 PA. CONS. STAT. ANN. § 3404 (West 2007); *see also* GA. CODE ANN. § 21-2-525(a), (b) (2008) (requiring the judge to set a hearing within twenty days and then "to proceed without delay" and even to "postpon[e] ... all other business").

[182] CAL. ELEC. CODE § 16920 (West 2003).

consider granting "pass-through" appellate jurisdiction, which would allow the state supreme court to review the trial court's judgment, bypassing any ruling on the merits from the intermediate appellate court. Illinois law provides that trial-court findings go immediately to the state supreme court, where the parties can file objections; the court then can accept, reject, or modify the findings, and can even take more evidence if needed.[183]

C. Relationship Between State-Court Actions and FCEA Cases

A rebuttable presumption that state trial-court proceedings will conclude in December, followed by highly expedited review by the state supreme court, also would alleviate the current tensions that exist between state litigation and federal cases under the FCEA. In *Jennings v. Buchanan*, the House's desire to defer to the state judiciary contributed to months of delay.[184] This desire was predicated in part on the House Democrats' hope that the state courts would allow Jennings to undertake the necessary discovery, thus rendering a separate House investigation unnecessary, but also in part on the insistence of the House Republicans that "initiating Committee involvement in this case prior to the full pursuit of state remedies by the contestant [would be] premature and risky."[185] During this delay, Buchanan was serving in Congress, but under a cloud. And for that entire time, Jennings's 2008 campaign was effectively on ice, as she continued to pursue victory in the mangled 2006 election. Had Jennings actually succeeded in state court after the 110th Congress commenced in January 2007, there might well have been an additional layer of controversy over whether the state judiciary had the power to effectively unseat a sitting Member of Congress. That could have become a heated constitutional fight that would be best avoided.

To the extent that states adopt the sort of timing reforms suggested here, thus ensuring full judicial review before the first day of the new Congress, the House of Representatives could adjust its practice under the FCEA. First, the House could have far more confidence that the correct candidate is in fact being seated. Second, at the very beginning of the new Congress, without delay, the House Administration Committee could empanel the three-judge task force to review the FCEA case. And third, that panel usually would not need to await the outcome of pending state-court litigation, since that litigation would be finished already. Therefore, it could immediately move forward with its own review of the findings of fact and conclusions of law in the now-completed state-court case, and could also, if need be, commence its

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[183] *See* 10 ILL. COMP. STAT. ANN. 5/23-1.10a (West 2003).

[184] Letter from Vernon J. Ehlers, Ranking Member, Comm. on House Admin., to Juanita Millender-McDonald, Chairwoman, Comm. on House Admin. (Apr. 16, 2007), *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 1, at 61.

[185] *Id.*

own independent investigation of the facts. The months of sitting around and waiting that plagued the Jennings-Buchanan case would thus be circumvented.

D. Process for Adjudicating FCEA Claims

To accomplish this reform, Congress should amend the FCEA to provide for quicker action, at least where state-court litigation has concluded before the new Congress convenes. As currently drafted, the FCEA simply cannot fulfill its mission of "provid[ing] efficient, expeditious processing of the cases and a full opportunity for both parties to be heard."[186]

Under the current FCEA, for example, the contestee has a full thirty days to file a motion to dismiss.[187] But once that motion has been filed, the statute sets no deadline for ruling on the motion.[188] Curiously, the FCEA sets deadlines for various parts of the process—for example, the filing of final briefs by both parties[189]—but other parts, such as rulings on dismissal motions, are left to the unfettered discretion of the House Administration Committee or its three-member task force.[190] And even aside from those schedule gaps in the statutory scheme, if all the time periods enumerated in the statute are totaled up, it is hard to imagine any hotly contested FCEA case taking less than six or eight months. Clearly, that is too long.

Instead, each step of the adjudication should be mapped out in the statute, with a specific, and relatively short, deadline. As with the state election contests discussed earlier, it probably would be wise to express most of these deadlines as rebuttable presumptions that can be extended only when justified in a written order. In amending the FCEA, the goal should be to keep the entire proceeding short, commensurate with the key fact (which was given such short shrift in *Jennings v. Buchanan*) that House terms last only twenty-four months.[191] An election contest that consumes most of those twenty-four months is nearly worthless. The goal should be to resolve these contests in a matter of weeks, not months. After all, Congress made the FCEA applicable to House, but not Senate, contests in part because two-year terms present much greater urgency than six-year terms.[192] When a House seat is at stake, every week, much less every month, really counts.

Finally, in addition to imposing a series of deadlines for each phase of an FCEA case, Congress should reiterate that the statute calls for an adversarial process. It is

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[186] COMM. ON HOUSE ADMIN., FEDERAL CONTESTED ELECTION ACT, H.R. REP. No. 91-569, at 3 (1969).

[187] 2 U.S.C. § 383 (2006).

[188] *See id.*

[189] *Id.* § 392(d)–(f) (allowing up to eighty-five days for briefing—forty-five days for contestant's initial brief, thirty for contestee's answer brief, and ten for contestant's reply brief).

[190] *See supra* discussion Part III.

[191] U.S. CONST. art. 1, § 2, cl. 1.

[192] 2 U.S.C. §§ 381–382 (2006).

fundamentally unfair to "penalize contestants who cannot fully support their credible allegations because the proof of their claims is in the hands or minds of those who have committed the errors or violations at issue."[193] In *Jennings v. Buchanan*, the three-member task force strayed from that principle. The task force called on the GAO to conduct an independent investigation, behind closed doors, and with no direct input from the two parties, while denying Jennings's request that both sides' experts be given access to the iVotronic hardware, software, and source code.[194] In the end, the GAO conducted only a partial investigation that encompassed far less testing and analysis than the parties' experts would have done.[195] And the GAO took far longer to do it.[196] It would be better, in such circumstances, to give both the contestant and the contestee immediate access to the critical evidence, and then let the adversarial process work its course. The two candidates for the House seat, after all, have the greatest incentive to dig out the truth (or, presumably, at least one of them has such an incentive). At a minimum, the parties' efforts would likely sharpen the areas of factual disagreement; at best, they might resolve the case entirely. Even assuming, as at least one task-force member predicted in *Jennings v. Buchanan*, that the result of an adversarial process would be an inconclusive "battle" of conflicting experts, it would be best to allow such a battle, subject to reasonably tight time constraints, and only thereafter bring in the GAO or some other independent investigative entity to resolve whatever factual disputes remain.

CONCLUSION

Reaffirming the centrality of the adversarial process to resolving federal contested elections—in combination with setting a series of precise deadlines for adjudicating FCEA cases, establishing a tight but realistic timetable for state-court litigation, and ensuring liberal discovery untainted by excessive protection of trade secrets—would go a long way toward preventing repetition of the mistakes that plagued *Jennings v. Buchanan*. The next time voting machines fail in a close House election and thousands of votes "disappear," these reforms would help ensure that key questions do not go unanswered as the congressional term slips away. And perhaps these reforms will even ensure that, next time, the candidate who attracts the most voters will actually be allowed to represent those voters in Congress.

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[193] COMM. ON HOUSE OVERSIGHT, DISMISSING THE ELECTION CONTEST AGAINST CHARLIE ROSE, H.R. REP. NO. 104-852, at 6–7 (1996).

[194] *See supra* notes 151–52 and accompanying text.

[195] *Compare* RESULTS OF GAO'S TESTING, *supra* note 26, *with* Memorandum Responding to the Honorable Charles A. Gonzalez's April 3, 2007 Letter Regarding the Investigation of the Election for Representative in the One Hundred Tenth Congress from Florida's Thirteenth Congressional District (Apr. 13, 2007), *reprinted in* H.R. REP. NO. 110-528, *supra* note 3, pt. 2, at 2604–07.

[196] *Id.*

December 2, 2014

FROM: Chris Jerdonek
TO: Rules Committee

cc: San Francisco Board of Supervisors

SUBJECT: Three Documents re: Open Source Voting Systems Resolution (7 pages)

The purpose of this memo is to provide for the record certain information related to the resolution sponsored by Supervisor Wiener on the subject of "Open Source Voting Systems and New Models of Voting System Development."

I also wish to state my support for the resolution.

The information in this memo consists of one hyperlink and three documents.

Here is the link to the official web page of the Los Angeles County Voting Systems Assessment Project (VSAP):

- http://rrcc.lacounty.gov/VOTER/VSAP/

And here are three documents with additional information relevant to the resolution:

1. A brief interview with Los Angeles County Registrar Dean Logan re: VSAP (Governing magazine, "L.A. County Designs a Whole New Voting System," J.B. Wogan; July 7, 2014; 2 pages). Source link: http://www.governing.com/topics/politics/gov-why-los-angeles-county-wants-to-design-a-new-voting-system.html

2. An article re: open-source voting system efforts in California and Travis County, Texas (National Association of Counties – NACO, County News, "California, Texas serve as testing grounds for open-source voting technology," Charlie Ban; August 25, 2014; Vol. 46, No. 16, 3 pages). Source link: http://www.naco.org/newsroom/countynews/Current%20Issue/8-25-2014/Pages/California,-Texas-serve-as-testing-grounds-for-open-source-voting-technology.aspx

3. The text of a resolution passed by the San Francisco Elections Commission on May 16, 2007 re: "Transparency in Voting Systems Technologies" (1 page). Source link: http://www.sfgov2.org/index.aspx?page=1438

For convenience, I am also attaching the three documents after this page.

Thank you.

L.A. County Designs a Whole New Voting System

The nation's largest election jurisdiction is designing a voting system unlike any around the country. The administrator in charge of county elections explains why.

BY: J.B. Wogan | July 7, 2014

Local election administrators across the country say the hardware they're using is outdated and in need of either repairs or outright replacement. As *Governing* reported in the July issue, public officials are delaying the necessary updates due to cost, regulatory barriers and limited options on the marketplace.

But Los Angeles County is bucking that trend. Dean Logan, the registrar-recorder/county clerk, is overseeing a process to design a new voting system unlike anything currently being used around the country. *Governing* spoke by phone with Logan on May 20 to discuss the Los Angeles County project.

The conversation transcript has been edited for clarity and length.

Would you start by explaining a little about the existing elections model that you're trying to get away from?

The traditional model of voting systems procurement is that jurisdictions contract with a vendor for a system that has been designed, built and certified by that vendor. So there is a profit relationship. In many cases, the equipment remains owned by the vendor and it's serviced by the vendor, with oversight by the jurisdiction.

Los Angeles County is somewhat unique in that we have a very old voting system that was developed by L.A. County government back in the late 1960s with punch-card voting. We have different contracts for the components of our voting system, but we're not tied to a single relationship to one commercial vendor operating and supporting the whole voting system.

We see value in that. There isn't a voting system that meets our needs, so that takes us out of the market in the first place. But we also believe that it's important that the voting system be publically owned and operated and that it has transparency and security provisions to ensure that voters have confidence that their vote is being cast as intended and counted as intended.

Why are you taken out of the market right off the bat?

First of all, we are the largest jurisdiction in the country, so we have 4.8 million registered voters. We have 5,000 polling places and we employ over 25,000 poll workers on election day. To scale the distribution of voting equipment over a large geographic area, to numerous locations, and to get those ballots back to a central location and have them counted and reported in a timely manner -- the current systems that have been on the market just don't have that ability. Add to that that we have to provide our voting materials in 11 different languages other than English under the Voting Rights Act. That's another requirement or design feature that none of current voting systems contemplated.

We also have a very diverse electorate and we are economically diverse. So we serve areas that are very affluent and conditioned to options with technology; we also serve areas that are dependent on public transportation. We have a homeless population that needs to be served in order to vote. It's just really a unique jurisdiction in terms of the combination of all of those elements.

Ok. Scalability and multiple languages are two features that you would like in a new system. Are there other features you would like to add as well? What about security features?

We've had by and large the same voting system for more than 40 years here. We're going to make a sizeable public investment in a new voting system and we want to be sure that is a modernized voting system, not just a rebuild of the previous model.

When you talk about security, we want to leverage off-the-shelf hardware. We want open-source software for the interface. We want to separate the process of marking the ballot from the process of counting the ballot. With the existing voting systems, that's an all-in-one system.

We want to build a ballot-marking process that has flexibility and is adaptable to the electorate we serve, for those voters who vote by mail, for those voters who might want to go to a vote center, or vote early or at neighborhood polling places. We want to give them a ballot to mark that is both intuitive and accessible. But then we want that to produce a uniform paper-based, human-readable ballot that is tabulated on an entirely different system that has no physical relationship to the device where the ballot was marked. That's a security feature that doesn't exist today.

Both you and Dana DeBeauvoir in Travis County have mentioned creating some kind of open-source election software. What are the main differences between what the two jurisdictions are doing?

We've worked closely with Dana and the project in Travis County. It's another model that I think will be useful in moving the nation toward the more modernized approach to voting systems. We're both still in development, so things are still undefined. I think the main distinctions between the L.A. County project and the Travis County project is that in L.A. County we started by designing around the voter experience rather than starting with designing a technological solution. We wanted to get the voter experience right and then to have the technology respond to what ends up being defined as the ideal voting experience. In Travis County, I think they started with a technology team that put together a technology solution. I think they put together something that will still be more a one-entity system from marking the ballot to tabulating the votes. It will be an all-in-one system. We're looking at separating those things. I think what's common to the two projects is the desire for transparency, looking at open-source code and looking at off-the-shelf hardware components.

When you say "off-the-shelf hardware components," what do you mean?

So, for instance, if the touch-screen interface is a tablet-based process and there's a commercially available tablet that meets those specifications, rather than have a company build customized tablets that are just for the voting system that will age out and have to be replaced over time, we could leverage the use of existing tablet components, printer components, all of that, and we would then load them with secure software interface and we would some disable features -- they would still require some customization -- but we don't need somebody to go out and develop a tablet or a touch screen. Those are components that exist on today's market and in fact are constantly being improved upon. We want to be sure that as those hardware components continue to advance and get better, that we have the ability to upgrade and integrate them into our voting system, rather than having to start over and build an entire new voting system every time there's new technology available.

Will you still make use of private contractors?

Our project does contemplate private contractor engagement. What we're trying to do is to develop the system and specifications for the system, separate from the manufacturing. So, instead of a vendor that will build the system, designing it around its business model and its ability to make a profit on it, we want to design it. We get the specifications and then we put it out to bid for a competitive process to determine who wants to build it, but according to the specifications that are already adopted.

This article was printed from: **http://www.governing.com/topics/politics/gov-why-los-angeles-county-wants-to-design-a-new-voting-system.html**

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California, Texas serve as testing grounds for open-source voting technology

By Charlie Ban
STAFF WRITER

With counties staring down eventual replacement of their election management systems, some in California and Texas are leading the charge for an alternative that could save counties a lot of money and change an industry.

Open-source voting would use software designed by counties, which could run on inexpensive computer terminals to design, print and count paper ballots. All of which purportedly increases transparency and security, Most of the savings would come from eliminating the software license fees charged for management system vendors' proprietary programs.

Twelve years after the Help America Vote Act (HAVA) mandated new voting technology, the machines and software are reaching the end of their usable lives in counties nationwide, and voting officials are feeling pressure.

Travis County, Texas' machines have generally been reliably operational — though a few have begun freezing — but County Clerk Dana DeBeauvoir said she is worried they won't remain in working order for long. HAVA's $3.5 billion that helped fund the new election management systems will likely not be replenished to help replace them.

"It's the same urgency we all feel in counties everywhere," she said. "We all bought new

voting systems at the same time and now we're all watching them approach their ends-of-life at the same time. Counties just don't have multi-millions to pay for new voting systems."

Inyo County, Calif., with fewer than 19,000 residents, doesn't have the money. Kammi Foote, the county's clerk-recorder and registrar of voters, serves as the president of the California Association of Voting Officials and National Association of Voting Officials, which advocate for the use of open source-voting systems in public elections. Inyo is partnering with several other small California counties to release a request for proposals to build an open-source system for their use.

"The voting machine vendors were helpful when every voting district in the country needed to buy new machines in a hurry, but election officials don't like to be rushed," she said. "We need options so that doesn't happen again."

The key to open-source voting systems' savings is that the software could be run on any computer, and Foote estimates that the $4,000 to $5,000 price tag for Inyo's voting machines, with the voting system license and terminal, could be cut to a $200 to $300 cost for a tablet computer. Likewise, DeBeauvoir compared wholesale replacement of Travis County's election management systems — cost $14 million — to an estimated $8 million to put an open-source system in place. Of that $8 million, $5 million would go toward software development, and $3 million would pay for computers and tablets.

"It's the most cost effective and sustainable solution," Foote said. "This could affect every voting jurisdiction in the United States, and many are little tiny counties like mine. They need to have a solution they can actually afford."

How this could happen varies by state. Travis County did not need any statutory changes to pursue its system in Texas, but the California Assembly had to pass Senate Bill 360 for Inyo and Los Angeles counties to pursue theirs. Now, only the secretary of state needs to approve new voting systems, eliminating required approval from state regulators and the U.S. Election Assistance Commission.

The secretary of state's requirements are similar to the federal approval process, so Foote said the change eliminated extra layers of bureaucracy while retaining attention to security.

The phrase "open source" raises questions about the method's security, but DeBeauvoir said the reality is more complicated than the term makes it seem.

"Most of the time people talk about 'open source,' it refers to the general public being able to improve a program, but with election software, it's a much smaller group that's involved, just election officials," she said. "There won't be any 13-year-old programmers at home tweaking the software."

Foote said the normal security measures common to county government systems — cryptography for example — could be added on top of the new election management system.

"The transparency that the system affords goes a long way to ensuring its accuracy," she said. "Everyone who needs to know how the system works, does, because it's not a proprietary system that's a mystery to anyone besides the developer."

All of this puts counties in a position to change an entire industry. As administrators of the country's elections, the direction counties take will determine the fate of the election management system vendors.

Efrain Escobedo, manager of governmental and legislative affairs for Los Angeles County's registrar-recorder, said the county's election system has been subject to its vendor's whims with little room for change.

"We spend $1.8 million annually on maintenance for our systems, and we can't find another firm to do the work that's cheaper," he said. Los Angeles County is hoping to release an RFP for its open-source system in the next few months.

"It's safe to say we'll have more ability to negotiate savings by the sheer reality that we won't be tied to a single vendor," Escobedo added.

Though the county-vendor relationship would change as more counties adopt open-source voting systems, it would not necessarily end the relationship. Vendors aren't expendable, DeBeauvior said, and she expected many of them to respond to various RFPs from different counties.

"We'll still need someone to take over management of upgrades and testing," she said. "You can't just remove the vendor. We don't want to throw away that base of knowledge."

Foote said it rearranges the power dynamic in holding elections.

"There are only a few vendors that were selling voting machines when HAVA went into effect," she said. "They were building systems and hoping election districts bought them, they were looking for a return on investment. Now we'll be in a position where we'll be part of a fee-for-service model and dictating what we need. Government can be in a leadership role in how those systems operate."

-END-

San Francisco Elections Commission Resolution

Re: Transparency in Voting Systems

[Passed by San Francisco Elections Commission on May 16, 2007.

Resolution text from: http://www.sfgov2.org/index.aspx?page=1438]

COMMISSION GENERAL POLICY STATEMENT REGARDING TRANSPARENCY
IN VOTING SYSTEMS TECHNOLOGIES AS WELL AS PROVIDING FOR VOTING
SYSTEMS SECURITY

Whereas California Secretary of State Debra Bowen has expressed strong support for a
move towards open source election software;

Whereas members of the San Francisco Board of Supervisors have recently raised concerns
about ratifying a contract for voting machines which did not allow for open source software;

Pursuant to Section 13.105.5, San Francisco Charter which authorizes the Election
Commission to establish general policies for the Elections Department, the Elections
Commission establishes the following general policies;

First, the Elections Commission endorses the policy of using voting system technologies and
software that maximize voting system security while at the same time providing the maximum
level of transparency possible to assure voters that their votes will be counted as cast.

Specifically, to ensure the integrity of our elections and to increase public confidence in our
government, the Commission endorses the policy that the Department of Elections should
make reasonable efforts to select and use voting systems technology, including hardware and
software, that at a minimum, is publicly disclosed.

In this context, public disclosure means that members of the public should have at least the
right to inspect, test, and comment on such technology in a procurement process and as
configured for a specific election independent of the San Francisco Department of Elections
or other government agency of the City and County of San Francisco,

Second, the Commission adopts as policy that the Election Department shall endeavor in
contracting to prioritize and select if possible, voting systems and vendors which provide the
maximum level of security and transparency possible consistent with the principles of public
disclosure. This policy will enable the citizenry to understand the methodology involved in the
election process, in a manner consistent with ensuring secret ballot protection and voting
system security.

-END-
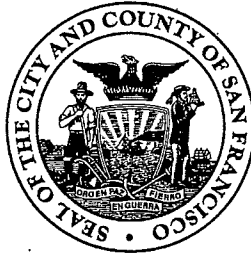
City Hall
Dr. Carlton B. Goodlett Place, Room 244
San Francisco 94102-4689
Tel. No. 554-5184
Fax No. 554-5163
TDD/TTY No. 554-5227

MEMORANDUM

TO: John Arntz, Director, Department of Elections

FROM: Alisa Somera, Clerk, Rules Committee
            Board of Supervisors

DATE: November 26, 2014

SUBJECT: LEGISLATION INTRODUCED

The Board of Supervisors' Rules Committee has received the following **substitute** legislation, introduced by Supervisor Wiener on November 25, 2014. This matter is being referred to your department for informational purposes.

File No. 141105-2

Resolution committing the City and County of San Francisco to work with the California Association of Voting Officials and other jurisdictions and organizations to create new voting systems using open source software; and to study the feasibility of the City and County of San Francisco developing and using a new voting system, either whole or in part, through a collaborative model like the Los Angeles County Voting Systems Assessment Project.

If you wish to submit any reports or documentation to be considered with the legislation, please send those to me at the Board of Supervisors, City Hall, Room 244, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102.

MEMORANDUM

TO: John Arntz, Director, Department of Elections

FROM: Alisa Somera, Clerk, Rules Committee
            Board of Supervisors

DATE: October 28, 2014

SUBJECT: LEGISLATION INTRODUCED

The Board of Supervisors' Rules Committee has received the following proposed legislation, introduced by Supervisor Campos on October 21, 2014. This matter is being referred to your department for informational purposes.

File No. 141105

Resolution committing the City and County of San Francisco to become a member of the California Association of Voting Officials and pledging to join efforts with participating jurisdictions to create new voting systems utilizing free open source software for elections.

If you wish to submit any reports or documentation to be considered with the legislation, please send those to me at the Board of Supervisors, City Hall, Room 244, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102.

Somera, Alisa (BOS)

From: Lim, Victor (BOS)
Sent: Wednesday, December 03, 2014 4:47 PM
To: Somera, Alisa (BOS); Pagoulatos, Nickolas (BOS); Lauterborn, Peter (BOS)
Subject: RE: Add Mar as Co-Sponsor? Open Source Resolution

Yes, please add Supervisor Mar as a co-sponsor. Thanks!

Sincerely,

Victor Wai Ho Lim, Legislative Aide
Office of Supervisor Eric Mar, District 1
San Francisco Board of Supervisors
City Hall, Room 284
San Francisco, CA 94102
Direct: (415) 554-7413
Fax: (415) 554-7415

林偉浩
立法助理
馬兆光市參事辦公室
三藩市市參事會 第一區
市政廳 284室
直綫：415-554-7413
傳真：415-554-7415

From: Somera, Alisa (BOS)
Sent: Wednesday, December 03, 2014 3:37 PM
To: Pagoulatos, Nickolas (BOS); Lauterborn, Peter (BOS); Lim, Victor (BOS)
Subject: Add Mar as Co-Sponsor? Open Source Resolution

Hey all,

During today's Rules Committee hearing Supervisor Wiener made a comment that Supervisor Mar would be co-sponsoring the resolution on open source voting (File No. 141105). Should I add him?

Introduction Form

By a Member of the Board of Supervisors or the Mayor

I hereby submit the following item for introduction (select only one):

☐　　1. For reference to Committee.

　　　　　An ordinance, resolution, motion, or charter amendment.

☐　　2. Request for next printed agenda without reference to Committee.

☐　　3. Request for hearing on a subject matter at Committee.

☐　　4. Request for letter beginning "Supervisor [＿＿＿＿＿＿＿＿＿＿＿] inquires"

☐　　5. City Attorney request.

☐　　6. Call File No. [＿＿＿＿＿＿] from Committee.

☐　　7. Budget Analyst request (attach written motion).

☒　　8. Substitute Legislation File No. [141105]

☐　　9. Request for Closed Session (attach written motion).

☐　　10. Board to Sit as A Committee of the Whole.

☐　　11. Question(s) submitted for Mayoral Appearance before the BOS on [＿＿＿＿＿＿]

Please check the appropriate boxes. The proposed legislation should be forwarded to the following:

☐ Small Business Commission　　☐ Youth Commission　　☐ Ethics Commission

☐ Planning Commission　　☐ Building Inspection Commission

Note: For the Imperative Agenda (a resolution not on the printed agenda), use a Imperative

Sponsor(s):

Wiener

Subject:

Supporting the Creation of Open Source Voting Systems and Studying New Models of Voting System Development

The text is listed below or attached:

Resolution committing the City and County of San Francisco to work with the California Association of Voting Officials and other jurisdictions and organizations to create new voting systems using open source software and to study the feasibility of the City and County of San Francisco developing and using a new voting system, either whole or in part, through a collaborative model like the Los Angeles County Voting Systems Assessment Project (VSAP).

Signature of Sponsoring Supervisor: _Scott Wiener_

For Clerk's Use Only:

Introduction Form

By a Member of the Board of Supervisors or the Mayor

I hereby submit the following item for introduction (select only one):

☒ 1. For reference to Committee.

An ordinance, resolution, motion, or charter amendment.

☐ 2. Request for next printed agenda without reference to Committee.

☐ 3. Request for hearing on a subject matter at Committee.

☐ 4. Request for letter beginning "Supervisor [＿＿＿＿＿＿＿＿＿＿] inquires"

☐ 5. City Attorney request.

☐ 6. Call File No. [＿＿＿＿＿＿] from Committee.

☐ 7. Budget Analyst request (attach written motion).

☐ 8. Substitute Legislation File No. [＿＿＿＿＿＿＿＿＿＿]

☐ 9. Request for Closed Session (attach written motion).

☐ 10. Board to Sit as A Committee of the Whole.

☐ 11. Question(s) submitted for Mayoral Appearance before the BOS on [＿＿＿＿＿]

Please check the appropriate boxes. The proposed legislation should be forwarded to the following:

☐ Small Business Commission   ☐ Youth Commission   ☐ Ethics Commission

☐ Planning Commission   ☐ Building Inspection Commission

Note: For the Imperative Agenda (a resolution not on the printed agenda), use a Imperative
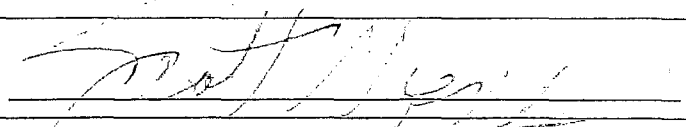
Sponsor(s):

Wiener

Subject:

Resolution Joining the California Association of Voting Officials in Support of Open Source Software for Elections

The text is listed below or attached:

Resolution committing San Francisco to become a member of the California Association of Voting Officials and pledging to join efforts with participating jurisdictions to create new voting systems utilizing free open source software for elections.

Signature of Sponsoring Supervisor: _____

For Clerk's Use Only:

14/105