

**UNISYN EMS/INKAVOTE PBC**

**ELECTION SYSTEMS & SOFTWARE, INC.**  
**Unisyn Voting Solution Election Management System**  
**Version 1.1,**  
**Inkavote Precinct Ballot Counter Version 1.10**

**Staff Review and Analysis**

**Prepared by:**  
**Secretary of State Office of**  
**Voting Systems Technology Assessment**

**February 22, 2006**

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## I. SUMMARY OF THE APPLICATION

Procedures, hardware, firmware and software jointly developed by Election Systems Software, Inc. and International Lottery & Totalizator Systems, Inc. for use with the Unisyn Voting Solution Election Management System software, version 1.1 and the Inkavote Precinct Ballot Counter, version 1.10. This system is new to the State of California.

## II. SUMMARY OF THE SYSTEM

The application consists of two components.

### **1. Unisyn Voting Solution Election Management System (Unisyn EMS) v1.1**

The Unisyn EMS is a Windows XP-based suite of software applications that work together to define and configure an election; program and configure the Inkavote Precinct Ballot Counters (PBC); compile and tabulate vote results recorded on the PBCs; and ultimately report the vote results in an election. The individual software applications that comprise the Unisyn EMS are:

- **Ballot Generator, v. 1.1-** This application, together with the accompanying Database Setup utility allows the jurisdiction to: set up the database for district types, languages and political parties; define an election, including contests, candidates, precinct assignment; define ballot and generate ballot layout, including candidate rotation, audio ballot information and alternative language support. This data is then exported to a single, encrypted XML file for use by the Election Converter.
- **Election Converter, v. 1.1-** The Election Converter allows the jurisdiction to combine actual audio voting files with the election information produced from Ballot Generator. Additionally, configuration options for the PBC are set within this application. Finally, the Converter is used to create an export Election CD that is actually used to program the PBCs for an election.
- **Election Loader, v. 1.1-** This application uses Election CD produced by the Election Converter to program the PBCs over a secure local area network.
- **Vote Converter, v. 1.1-** The Vote Converter is used to upload vote results from each PBC into the database.
- **Vote Tabulator, v. 1.1-** The Vote Tabulator is used to monitor the progress of vote results collection, as well as to generate reports on the election. The application includes a very basic set of non-customizable reports. For more complex reporting, including the Supplement to the Statement of Vote, a read-

only account provides access to the database for reporting via a third-party report generation tool.

## **2. InkaVote Precinct Ballot Counter (PBC), version 1.10**

The InkaVote PBC is a mark-sense ballot reader and ballot box for the InkaVote optical-scan ballots. The PBC is programmed and configured for an election using the Election Loader application over a secure local area network. Voted InkaVote ballots are fed into the ballot slot one at a time. If configured for precinct use, the PBC will initially reject a ballot that is over-voted in one or more contests, and will print out a slip for the voter detailing the errors on the ballot. The PBC can also be programmed to provide similar warnings if any or all contests are under-voted. At the conclusion of vote counting, the vote results are saved to a USB memory device, called the Transport Media (TM) in this system. The vote results are then uploaded from the TMs into the Unisyn EMS for tabulation and reporting.

The InkaVote PBC can also be configured for tabulation of absentee ballots prior to and after Election Day. System security features prevent reporting of these results prior to the close of the polls.

For blind voters, the PBC features an attached voting booth that allows audio voting. Audio instruction is provided through a headset. A detachable 5-key keypad records the voter's vote choices. After the voter finalizes the ballot, the vote choices are printed on an InkaVote formatted slip of paper from the booth's printer. This slip of paper is then inserted into the PBC for tabulation in the same manner as are other ballots.

For security, the PBC runs on a Linux operating system and is designed to detect and shut down the PBC if an invalid TM is inserted.

## **III. Testing Information and Results**

### **1. Federal Testing**

Wyle Laboratories has successfully completed federal qualification testing of the InkaVote Precinct Ballot Counter, v. 1.10 to the 2002 Federal Voting System Standards. We have received a copy of the draft report from that testing, dated December 20, 2005. A final report must be received from Wyle upon report acceptance from NASED and prior to State certification of this system.

Ciber, Inc. has successfully completed federal qualification testing of the Unisyn EMS, as well as end-to-end testing of the entire system, to the 2002 Federal Voting System Standards. We have received a copy of the draft report from that testing, dated February 21, 2006. A final report must be received from Cyber upon report acceptance from NASED and prior to State certification of this system.

Federal qualification of the system by NASED is still pending and must be issued prior to State certification of this system.

## **2. State Testing by the Secretary of State and Consultant**

### **Testing Overview**

State examination and functional testing of this system was conducted by Secretary of State staff in conjunction with the State's technical consultants, Mr. Steve Freeman and Mr. Paul Craft, at the International Lottery and Totalizator (ILTS) office in Carlsbad, California from January 23<sup>rd</sup> through January 27<sup>th</sup>, 2006. The test plan for that examination is included as an appendix to this document.

At the request of Los Angeles County, on January 27<sup>th</sup> a "pre-volume test" of the InkaVote PBC was conducted at the ILTS offices. This test was performed on five prototype machines due to the unavailability of sufficient quantities of production PBCs to conduct a full volume test according to the State's protocol. Throughout the day, over 2,400 ballots from predetermined test decks were fed into each of the PBC units to appraise their accuracy and reliability over a large number of ballots.

In accordance with Secretary of State McPherson's requirements, a full volume test must be conducted on the PBCs prior to State certification of this system.

### **General Testing Results**

Testing of the Unisyn Election Management System (Unisyn EMS), version 1.1 and the InkaVote Precinct Ballot Counter with the audio ballot booth (PBC), version 1.10 was generally completed successfully. During that testing, installation of the trusted software build was verified. Sufficient ballots were processed for the standard state primary and general test elections to verify features of the system, as well as to test the system's capability to conduct elections in accordance with California law.

However, during testing the following issues were noted:

1. The system presented does not incorporate any vote recorder devices for physically marking the InkaVote ballots. While such devices were employed and tested as part of the examination, the applicant had no legal right to present these devices as part of the system. Therefore, if this system is certified, it must be used without such devices until a subsequent application that incorporates vote recorders is presented, successfully tested and certified.
2. The PBC is designed to read the standard InkaVote ballot with or without the write-in stub attached. During testing, it was discovered that the PBC will also accept a ballot with the stub that traditionally includes the ballot serial number attached. This stub is normally detached and given to the voter prior to insertion of the ballot into the ballot box. Under California law, if the ballot is accepted with this unique identifier, the ballot must be discarded and not counted. Since the InkaVote PBC is designed for voters to insert the ballot themselves, this issue must be addressed in the system's Use Procedures. In the long term, the vendor should modify the system to prevent ballots from being inserted while still having the serialized stub attached.

3. On the PBC units tested, there was no mechanism to physically secure and lock the network port. In the short-term, this must be addressed with a requirement in the official Use Procedures that this cap be sealed with a serialized tamper-evident seal. Future versions of the PBC should include a means of physically preventing access to this port, such as a locking door to cover the port.
4. During testing, it was discovered that it was possible to physically insert a ballot into the ballot box, bypassing the PBC ballot reader. The vendor assured us that production models of the PBC will include a foam gasket on the ballot box to prevent this.
5. During testing, it was determined that the software utility for reporting Supplement to the Statement of Vote detail had not been examined by the ITA during its testing. After minor modifications to the software, a witness build of this software was created by Paul Craft and submitted to the ITA for examination and review. That version of the utility was also incorporated in the State testing we conducted.

### **“Pre-Volume Testing” Results**

Because the vendor could not produce the required fifty production PBC units, a full-scale volume test in accordance with the established Secretary of State protocols has not yet been conducted. As noted above, at the request of Los Angeles County, the Secretary of State conducted a “pre-volume” test on the five available PBC units on January 27<sup>th</sup> at the ILTS offices in Carlsbad, CA in an attempt to get an initial appraisal of the accuracy and reliability of the PBC.

For this test, the vendor was required to create five complete test decks of InkaVote ballots, pre-marked in accordance with the specifications for the standard California primary test election. This test election incorporates the logic of split precincts, non-partisan voting in partisan contests, and contests where the voter votes for more than one candidate. The standard test deck incorporates 846 ballots in sixty-six distinct ballot styles. During the course of this test, the first half of the test deck was processed into each PBC and then the “election” was closed and results uploaded into the EMS and reported. Next, the second half of each deck was processed into each PBC. Again, the “election” was closed and results were uploaded into the EMS and reported. Finally, each deck was fed into a PBC twice in succession. Following this, each of the test voters was asked to vote ten audio ballots according to a script and these ballots were fed into the PBC. At the conclusion of this activity, the “elections” were closed a final time and results uploaded into EMS for tabulation and reporting.

To conduct the actual test, five temporary employees were secured by an independent employment agency under contract with the Secretary of State. Further, the entire test was documented on videotape for public inspection. The modified protocol for this test is incorporated as an appendix to this report.

The results from each pass of ballots on each machine continue to be reconciled. While there were deviations from the anticipated baseline, so far these have all been traced and resolved to human errors in the manual construction of the test decks.

During the actual voting, there were twenty-five incident reports completed. The vast majority of these (18) were attributed to human errors in hand marking the ballots in the test deck. These errors included incorrect coding of the party or precinct in the footer of the ballot, handwritten ballot labeling on ballot header that extended into the timing channel, and stray markings in the timing channel or the ballot footer that prevented the ballot from being properly read.

There were three incidents where the ballot jammed in the intake chute of the PBC for no apparent reason. In each of the occasions, the ballot was pulled back out and successfully reinserted with a different orientation. In the final instance of a jam, the vendor disassembled the PBC to determine that food particles had clogged in the feed throat. After removal of the particles, the PBC operated correctly.

In one instance, a ballot was rejected by the PBC for no apparent reason. The error message indicated an “invalid ballot.” When the ballot was reinserted with a different orientation, it was successfully accepted and read.

During the upload of vote results from the first phase of the test, the Vote Converter application had difficulty reading the vote results from one of the TMs. After two unsuccessful attempts, the TM was successfully read on the third attempt. In a real election situation, a failure to read the TM would not constitute a loss of actual vote results as they could always be recovered from the actual ballots in the ballot box.

Finally, one of the keyboards in the ADA audio ballot booth was found to be defective during the final phase of the test. The vendor noted that this unit was the first prototype for the keyboard. (It should be noted that the serial number for ADA booth was UNI000001.) The vendor explained that the first prototype returned the key code “1” when the ‘enter’ key was pressed. This was revised in a later version to return the key code for carriage return. When the vendor replaced the keyboard with a later model, audio voting was successfully resumed in a normal manner.

None of the errors recorded in this test rose to the level that the record of the vote was permanently affected.

#### **IV. COMPLIANCE WITH STATE AND FEDERAL LAWS AND REGULATIONS**

The Secretary of State of California has developed and promulgated a procedure for approving, certifying, reviewing, modifying, and decertifying voting systems, vote tabulating systems, election observer panel plans, and auxiliary equipment, materials and procedures.

Four sections of this procedure, Sections 103, 104, 504, and 601, describe in detail the requirements any voting system must meet in order to be approved for use in California elections. These sections are described in detail and the system is analyzed for compliance in this Administrative Review and Analysis of the system.

1. **§103 (a) (1): The machine or device and its software shall be suitable for the purpose for which it is intended.**

The system meets this requirement except as noted under Section III. In the case of the ability to improperly insert ballots in the ballot box, this should be correct in the production models as noted. The remaining exceptions can and should be addressed in the system's Use Procedures.

2. **§103 (a) (2): The system shall preserve the secrecy of the ballot.**

Because the audio ballots are distinctly different from the normal InkaVote ballots, Use Procedures for the system should require that once one ballot is voted using the ADA booth, at least two more voters should be required to use the booth to vote an audio ballot and protect the confidentiality of the initial ballot. In all other respects, the system preserves the secrecy of the ballot.

3. **§103 (a) (3): The system shall be safe from fraud or manipulation.**

The system meets this requirement. It features several unique security features not often found in other voting systems. For example: the PBC is designed to shut down if an invalid TM is inserted into the PBC. Strict business rules prevent invalid operations: the PBC cannot be operated outside of election day; provisional ballots cannot be read until after election day.

The only potential vulnerability was the network port that is not in a lockable compartment. A cover to this port is provided. This should be sealed with a serialized tamper-evident seal. Future versions of the PBC should resolve this with a lockable cover over the port.

4. **§103 (a) (4): The system shall be auditable for the purposes of an election recount or contest procedure.**

The system meets these requirements. Because the system is paper ballot based, the ballots themselves serve as an audit trail for a recount or contest procedure.

5. **§103 (a) (5): The system shall comply with all appropriate federal and California laws and regulations.**

The system meets this requirement.

6. **§103 (a) (6): The system shall have been certified, if applicable, by means of qualification testing by a Nationally Recognized Test Laboratory (NRTL) and shall meet or exceed the minimum requirements set forth in the Performance and Test 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 system has successfully completed federal qualification testing to the 2002 Federal Voting System Standards.

7. **§103 (b): In addition to the requirements of subdivision (a) of this section, voting systems, procedures, and equipment approved and certified by the Secretary of**

**State shall promote accessible voting opportunities for persons with physical disabilities.**

The InkaVote PBC includes an ADA voting booth supporting audio mode voting for blind voters. Currently, no other disability modalities are supported by this system.

**8. §104 (a): Certification consists of three separate levels of testing: qualification, certification and acceptance.**

Federal qualification testing has been successfully completed on this system. A NASED qualification number is anticipated, but has not yet been issued. The system cannot be certified until that number is issued.

Staff in conjunction with a technical consultant to the Secretary of State successfully performed state certification testing.

The county elections official will conduct acceptance testing as each county takes receipt of the system. Procedures for that acceptance testing are specified in the official Use Procedures.

**9. §104 (b): Certification tests shall include functional tests and qualitative assessment to ensure that the system operates in a manner that is acceptable under federal and state law and regulations.**

It is the opinion of the State's expert technical consultants that the scope of the certification test was adequate to make basic recommendations and observations about the logical accuracy, some user friendliness issues, and compliance with state law.

**10. §104 (c): Certification tests shall enhance public confidence by assuring that the system protects the secrecy of the ballot and the security of the voting process, and records and counts votes accurately.**

In the tests performed, this system recorded and counted votes accurately. With the procedures noted above, the secrecy of the ballot is protected for all voters.

**11. §104 (d): Certification tests shall promote public confidence that the system is easy to use or 'voter friendly.'**

The proposed system increases the user friendliness of the existing InkaVote voting system by assuring the ballot is successfully read while the voter is present in the precinct, as well as providing warning for ballots that are incorrectly marked as an over-vote for one or more contests.

**12. §104 (e): Certification testing shall demonstrate that the system creates an audit trail showing both that the voter was able to vote for the candidate or for or against a measure of his or her choice and that the system correctly and consistently interpreted the voter's votes.**

The system meets this requirement. In addition to printing audit trails from both the PBC and the Unisyn EMS, the paper ballots themselves provide an unequivocal audit trail of the votes actually cast.

**13. §504: The Evaluation shall include a review of California Elections Code sections, which address the application.**

A review of the appropriate Elections Code sections was conducted.

**§15360. During the official canvass of every election in which a voting system is used, the official conducting the election shall conduct a public manual tally of the ballots tabulated by those devices cast in 1 percent of the precincts chosen at random by the elections official. If 1 percent of the precincts should be less than one whole precinct, the tally shall be conducted in one precinct chosen at random by the elections official.**

**In addition to the 1 percent count, the elections official shall, for each race not included in the initial group of precincts, count one additional precinct. The manual tally shall apply only to the race not previously counted.**

The system meets this requirement.

**§19300 permit the voter to vote for all the candidates of one party or in part for the candidates of one party and in part for the candidates of one or more other parties.**

The system meets this requirement.

**§19301. A voting machine shall provide in the general election for grouping under the name of the office to be voted on, all the candidates for the office with the designation of the parties, if any, by which they were respectively nominated.**

**The designation may be by usual or reasonable abbreviation of party names.**

The system meets this requirement.

**§19302. The labels on voting machines and the way in which candidates' names are grouped shall conform as nearly as possible to the form of ballot provided for in elections where voting machines are not used.**

The system meets this requirement.

**§19303. If the voting machine is so constructed that a voter can cast a vote in part for presidential electors of one party and in part for those of one or more other parties or those not nominated by any party, it may also be provided with: (a) one device for each party for voting for all the presidential electors of that party by one operation, (b) a ballot label therefore containing only the words "presidential electors" preceded by the name of the party and followed by the names of its candidates for the offices of President and Vice President, and (c) a registering device therefore which shall register the vote cast for the electors when thus voted collectively.**

**If a voting machine is so constructed that a voter can cast a vote in part for delegates to a national party convention of one party and in part for those of one or more other parties or those not nominated by any party, it may be provided with one device for each party for voting by one operation for each group of candidates to national conventions that may be voted for as a group according to the law governing presidential primaries.**

**No straight party voting device shall be used except for delegates to a national convention or for presidential electors.**

The system complies with these requirements.

**§19304. A write-in ballot shall be cast in its appropriate place on the machine, or it shall be void and not counted.**

The system complies with these requirements.

**§19320. Before preparing a voting machine for any general election, the elections official shall mail written notice to the chairperson of the county central committee of at least two of the principal political parties, stating the time and place where machines will be prepared. At the specified time, one representative of each of the political parties shall be afforded an opportunity to see that the machines are in proper condition for use in the election.**

**The party representatives shall be sworn to perform faithfully their duties but shall not interfere with the officials or assume any of their duties. When a machine has been so examined by the representatives, it shall be sealed with a numbered metal seal. The representatives shall certify to the number of the machines, whether all of the counters are set at zero (000), and the number registered on the protective counter and on the seal.**

The system meets this requirement.

**§19321. The elections official shall affix ballot labels to the machines to correspond with the sample ballot for the election. He or she shall employ competent persons to assist him or her in affixing the labels and in putting the machines in order. Each machine shall be tested to ascertain whether it is operating properly.**

The system meets this requirement.

**§19322. When a voting machine has been properly prepared for an election, it shall be locked against voting and sealed. After that initial preparation, a member of the precinct board or some duly authorized person, other than the one preparing the machines, shall inspect each machine and submit a written report. The report shall note the following: (1) Whether all of the registering counters are set at zero (000), (2) whether the machine is arranged in all respects in good order for the election, (3) whether the machine is locked, (4) the number on the protective counter, (5) the number on the seal. The keys shall be delivered to the election board together with a**

**copy of the written report, made on the proper blanks, stating that the machine is in every way properly prepared for the election.**

The system meets this requirement.

**§19340. Any member of a precinct board who has not previously attended a training class in the use of the voting machines and the duties of a board member shall be required to do so, unless appointed to fill an emergency vacancy.**

The system meets this requirement.

**§19341. The precinct board shall consist of one inspector and two judges who shall be appointed and compensated pursuant to the general election laws. One additional inspector or judge shall be appointed for each additional voting machine used in the polling place.**

The system meets this requirement.

**§19360. Before unsealing the envelope containing the keys and opening the doors concealing the counters the precinct board shall determine that the number on the seal on the machine and the number registered on the protective counter correspond to the numbers on the envelope.**

**Each member of the precinct board shall then carefully examine the counters to see that each registers zero (000). If the machine is provided with embossing, printing, or photography devices that record the readings of the counters the board shall, instead of opening the counter compartment, cause a “before election proof sheet” to be produced and determined by it that all counters register zero (000).**

**If any discrepancy is found in the numbers registered on the counters or the “before election proof sheet” the precinct board shall make, sign, and post a written statement attesting to this fact. In filling out the statement of return of votes cast, the precinct board shall subtract any number shown on the counter from the number shown on the counter at the close of the polls.**

The system meets this requirement.

**§19361. The keys to the voting machines shall be delivered to the precinct board no later than 12 hours before the opening of the polls. They shall be in an envelope upon which is written the designation and location of the election precinct, the number of the voting machine, the number on the seal, and the number registered on the protective counter. The precinct board member receiving the key shall sign a receipt.**

**The envelope shall not be opened until at least two members of the precinct board are present to determine that the envelope has not been opened.**

**At the close of the polls the keys shall be placed in the envelope supplied by the official and the number of the machine, the number written on the envelope.**

The system meets this requirement.

**§19362. The exterior of the voting machine and every part of the polling place shall be in plain view of the election precinct board and the poll watchers.**

**Each machine shall be at least four feet from the poll clerk's table.**

The system meets this requirement.

**§19363. Voters shall not remain in or occupy the booths or compartments longer than is necessary to mark their ballots, which shall not exceed five minutes. However, where no other voter would be inconvenienced, a longer period shall be allowed.**

The system meets this requirement.

**§19370. As soon as the polls are closed, the precinct board, in the presence of the watchers and all others lawfully present, shall immediately lock the voting machine against voting and open the counting compartments, giving full view of all counter numbers. A board member shall in the order of the offices as their titles are arranged on the machine, read and distinctly announce the name or designating number and letter on each counter for each candidate's name and the result as shown by the counter numbers. He or she shall also in the same manner announce the vote on each measure.**

**If the machine is provided with a recording device, in lieu of opening the counter compartment the precinct board shall proceed to operate the mechanism to produce the statement of return of votes cast record in a minimum of three copies, remove the irregular ballot, if any, record on the statement of return of votes cast record. The irregular ballot shall, be attached to the statement of result record of votes cast for the machine and become a part thereof. One copy of the statement of return of votes cast for each machine shall be posted upon the outside wall of the precinct for all to see. The statement of return of votes cast for each machine for the precinct shall constitute the precinct statement of result of votes cast.**

The system meets this requirement.

**§19371. Before adjourning, the precinct board shall seal the operating lever with the seal provided and lock the machine so that the voting and counting mechanism may not be operated.**

**It shall remain locked and sealed against operation until the time for filing a contest of election has expired, which shall not exceed a period of 30 days following the declaration of the result of the election by the body canvassing the returns.**

Does not apply.

**§19380. During the reading of the result of votes cast, any candidate or watcher who may desire to be present shall be admitted to the polling place. The proclamation of the result of the votes cast shall be distinctly announced by the precinct board who shall read the name of each candidate, or the designating number and letter of his or her counter, and the vote registered on the counter. The board shall also read the vote cast for and against each measure submitted. The board shall not count votes cast for write-in candidates, but shall have these counted by the elections official. During the proclamation, many opportunities shall be given to any person lawfully present to compare the result so announced with the counter dials of the machine, and any necessary corrections shall immediately be made by the precinct board, after which the doors of the voting machine shall be closed and locked.**

**If the machine is provided with a recording device, the alternate procedures in Section 19370 may be used.**

The system meets this requirement.

**§19381. In each election district where voting machines are used, statements of the results of the vote cast shall be printed to conform with the type of voting machine used.**

**The designating number and letter on the counter for each candidate shall be printed next to the candidate's name on the statements of result of the vote cast. Two such statements shall be used in each election district.**

The system meets this requirement.

**§19382. The statement of the result of votes cast, which shall be certified by the precinct board, shall contain:**

- (a) The total number of votes cast.**
- (b) The number of votes cast for each candidate and measure as shown on the counter.**
- (c) The number of votes for persons not nominated.**
- (d) Printed directions to the precinct board for their guidance before the polls are opened and when the polls are closed.**
- (e) A certificate, which shall be signed by the election officers before the polls are opened, showing:
  - (1) The delivery of the keys in a sealed envelope.**
  - (2) The number on the seal.**
  - (3) The number registered on the protective counter.**
  - (4) Whether all of the counters are set at zero (000).**
  - (5) Whether the public counter is set at zero (000).**
  - (6) Whether the ballot labels are properly placed in the machine.****
- (f) A certificate that shall be filled out after the polls have been closed, showing:
  - (1) That the machine has been locked against voting and sealed.****

- (2) The number of voters as shown on the public counter.
- (3) The number on the seal.
- (4) The number registered on the protective counter.
- (5) That the voting machine is closed and locked.

The system meets this requirement.

**§19383. A member of the precinct board shall enter the vote, as registered, on the statements of result of votes cast, in the same order on the space that has the same name or designating number and letter, after which another member shall verify the figures by calling them off in the same manner from the counters of the machine.**

**The counter compartment of the voting machine shall remain open until the official returns and all other reports have been fully completed and verified by the precinct board.**

**If the machine is provided with a recording device, the alternate procedures in Section 19370 may be used.**

The system meets this requirement.

**§19384. The precinct board shall, before it adjourns, post conspicuously on the outside of the polling place a copy of the result of the votes cast at the polling place. The copy of the result shall be signed by the members of the precinct board.**

**If the machine is provided with a recording device, the statement of result of vote's cast produced by operating its mechanism may be considered the "result of the votes cast" at the polling place.**

The system meets this requirement.

**§19385. The precinct board shall immediately transmit unsealed to the elections official a copy of the result of the votes cast at the polling place, the copy shall be signed by the members of the precinct board, and shall be open to public inspection.**

The system meets this requirement.

**§19386. Before proceeding to canvass the returns of an election at which voting machines have been used to register the votes cast, the board authorized to canvass returns shall open the counter compartment and compare the records of votes cast for the several candidates voted for and for and against the several measures voted upon shown on each machine with those recorded on the statement of results of votes cast prepared from that machine by the precinct board. Any errors found on the statement shall be corrected by crossing out the recorded incorrect number, and recording the correct number nearby.**

The system meets this requirement.

**14. §504 (b): A review of federal statutes or regulations, which address the application.**

**The Voting Rights Act of 1965, as amended (42 U.S.C. 1973), requires all elections in certain covered jurisdictions to provide registration and voting materials and oral assistance in the language of a qualified language minority group in addition to English. Currently in California, there are six VRA languages (Spanish, Chinese, Japanese, Vietnamese, Korean and Tagalog) as prescribed under the law.**

The system fully meets this requirement. The Unisyn EMS can print sample ballots in any of the required languages to guide a voter in marking his InkaVote ballot. The ADA audio voting booth will support audio instruction in any of the required languages.

**The National Voter Registration Act of 1993 (42 U.S.C. 1973gg and 11 CFR 8) allows for the casting of provisional ballots through Fail-Safe Voting procedures.**

The system meets this requirement.

**The Voting Accessibility for the Elderly and Handicapped Act of 1984 (42 U.S.C. 1973ee through 1973ee-6) requires each political subdivision conducting elections within each state to assure that all polling places for federal elections are accessible to elderly and handicapped voters, except in the case of an emergency as determined by the state's chief election officer or unless the state's chief election officer: (1) determines, by surveying all potential polling places, that no such place in the area is accessible or can be made temporarily accessible, and (2) assures that any handicapped voter assigned to an inaccessible polling place will, upon advance request under established state procedures, either be assigned to an accessible polling place or be provided an alternative means of casting a ballot on election day.**

The system is at least as accessible as the previously certified version.

**The Retention of Voting Documentation (42 U.S.C. 1974 through 1974e) statute applies in all jurisdictions and to all elections in which a federal candidate is on a ballot. It requires elections officials to preserve for 22 months all records and papers which came into their possession relating to an application, registration, payment of a poll tax, or other act requisite to voting. Note: The US Department of Justice considers this law to cover all voter registration records, all poll lists and similar documents reflecting the identity of voters casting ballots at the polls, all applications for absentee ballots, all envelopes in which absentee ballots are returned for tabulation, all documents containing oaths of voters, all documents relating to challenges to voters or absentee ballots, all tally sheets and canvass reports, all records reflecting the appointment of persons entitled to act as poll officials or poll watchers, and all computer programs used to tabulate votes electronically.**

**In addition, it is the Department of Justice’s view that the phrase “other act requisite to voting” requires the retention of the ballots themselves, at least in those jurisdictions where a voter’s electoral preference is manifested by marking a piece of paper or by punching holes in a computer card.**

The system meets this requirement.

**15. §504 (c): A copy of the approved Qualification Test results released directly to the Secretary of State by a Nationally Recognized Test Laboratory (NRTL).**

Draft copies of the ITA reports have been received. Final copies of those reports will be secured before the system is certified.

**16. §504 (d): A review, if applicable, of transcripts or other materials from prior meetings or hearings on the proposed system, procedure, or modification, either in whole or in part.**

The relevant documentation has been reviewed.

**17. §504 (e): A review, if applicable, of any procedures manuals, guidelines or other materials adopted for use with the system addressed by the application.**

The proposed procedures for use and other relevant materials for this system have been reviewed. The system use procedures will not be finalized until final State certification of the system to allow for incorporation of any conditions that are imposed on the system as part of the certification.

**18. §504 (f): A review of any effect the application will have on the security of the election system.**

The application was reviewed for any potential effect on the security of the election system.

**19. §504 (g): A review of any effect the application will have on the accuracy of the election system.**

The system was tested by federal and state testers and deemed to record votes accurately.

**20. §504 (h): A review of any effect the application will have on the ease and convenience with which voters use the system.**

This system is no less voter-friendly than the existing InkaVote system. Further, this system adds the InkaVote PBC to provide a voter warning of over-voted contest on the ballot. It also adds an audio interface to allow blind voters and voters with special language requirements to vote privately and unassisted.

**21. §504 (i): A review of any effect the application will have on the timeliness of vote reporting.**

The proposed system will not delay the reporting of election results relative to the currently certified system.

**22. §504 (j): A review of any effect the application will have on the overall efficiency of the election system.**

The proposed system should slightly improve the overall efficiency of the election system by providing warning to voters of improperly marked ballots, as well as tabulation of vote results at the precinct.

**23. §504 (k): A Description of Deposit Materials showing that the Ballot Tally Software Source Code has been deposited in Escrow with an Escrow Company approved pursuant to Chapter 6, Division 7, Title 2 of the California Administrative Code, beginning with Section 20630.**

The vendor must deposit the source code in compliance with this requirement before this system can be used.

**24. §601: The Secretary of State shall not approve a proposed item without a finding that the item conforms to all applicable laws, procedures and regulations, including the right to a secret ballot, does not compromise the accuracy, security or integrity of the election process, nor interferes with the voter's ease and convenience in voting.**

As noted above, with procedures in place, the proposed system is at least as effective in maintaining the secrecy of the ballot, the accuracy, security and integrity of the elections process, and voter ease and convenience as the currently certified InkaVote system.

## **V. PUBLIC COMMENT**

On February 17, 2006, an "open house" style demonstration of this system was held at the Secretary of State headquarters for invited representatives of the accessibility community, as well as county elections officials and members of the VSTAAB to observe and review this system with Secretary of State and vendor staff. Participants included:

- twelve elections staff representing six counties,
- eleven representatives of the accessibility community,
- one representatives of the VSTAAB, and
- various members of the Secretary of State staff.

Several participants in this event were asked to submit written comments on the system. While none have yet been received, all such comment will be submitted to the Secretary of State for his review.

## **VI. RECOMMENDATION**

Staff recommends the certification of the Election Systems & Software, Inc. Unisyn Voting Solution Election Management System software, version 1.1 and the Inkavote Precinct Ballot Counter, version 1.10. with the following conditions:

1. A final version of the Use Procedures for the system is submitted to and approved by the Secretary of State. These Use Procedures must address all the issues raised in this report.
2. No additional software developed by the Vendor other than that specifically listed in this certification shall be installed on a computer running the Unisyn EMS, version 1.1
3. No substitution or modification of the voting systems shall be made with respect to any component of the voting systems, including the Procedures, until the Secretary of State has been notified in writing and has determined that the proposed change or modification does not impair the accuracy and efficiency of the voting systems sufficient to require a re-examination and approval.
4. The Secretary of State reserves the right, with reasonable notice to Vendor and to the counties using any of the voting systems, to modify the Procedures used with any of the voting systems and to impose additional requirements with respect to the use of any of the systems if the Secretary of State determines that such modifications or additions are necessary to enhance the accuracy, reliability or security of any of the voting systems. Such modifications or additions shall be deemed to be incorporated herein as if set forth in full.
5. Any county using any voting system shall, prior to such use, file with the California Secretary of State a copy of its Election Observer Panel plan.
6. Pursuant to this (application, agreement, contract, etc.) and by order of the Secretary of State, voting systems certified for use in California shall comply with all applicable state and federal statutes, regulations, rules and requirements, including, but not limited to, those voting system requirements set forth in the California Elections Code and the Help America Vote Act of 2002, and those requirements incorporated by reference in the Help America Vote Act of 2002, that are in effect as of the date of this (application, agreement, contract, etc). Further, voting systems shall also comply with all applicable state and federal voting system guidelines, standards, regulations and requirements that derive authority from or are promulgated pursuant to and in furtherance of the California Elections Code or the Help America Vote Act of 2002 or other applicable state or federal law when appropriate, that are in effect as of the date of this (application, agreement, contract, etc), including but not limited to, the 2002 Voting System Standards/Guidelines, developed by the Federal Election Commission and adopted by the Election Assistance Commission (EAC) and EAC Advisory 2005-004, dated July 20, 2005. This does not include future final

court interpretations of existing state or federal law not in effect as of the date of this (application, agreement, contract, etc.).

7. Voting system manufacturers and/or their agents shall assume full responsibility for any representation that a voting system complies with all applicable state and federal requirements as referenced above. In the event such representation is determined to be false or misleading, voting system manufacturers or their agents shall be responsible for the cost of any upgrade, retrofit or replacement, of any voting system or its component parts, found to be necessary for certification or to otherwise be in compliance.
8. Any voting system purchased with funds allocated by the Secretary of State's Office shall meet all applicable state and federal standards, regulations and requirements, including, but not limited to, those voting system requirements as set forth in the California Elections Code and the Help America Vote Act of 2002 and those requirements incorporated by reference in the Help America Vote Act of 2002 that are in effect as of the date of this (application, agreement, contract, etc), including but not limited to, the 2002 Voting System Standards/Guidelines, developed by the Federal Election Commission and adopted by the Election Assistance Commission (EAC) and EAC Advisory 2005-004, dated July 20, 2005.
9. The vendor must establish a California County User Group and hold at least one annual meeting where all California users and Secretary of State staff are invited to attend and review the system and ensure voter accessibility.
10. In addition to depositing the source code in an approved escrow facility, the vendor must deposit a copy of the system source code and binary executables with the Secretary of State. The Secretary of State reserves the right to perform a full independent review of the source code.
11. The vendor must provide printing specifications for paper ballots to the Secretary of State. The Secretary of State will certify printers to print ballots for this system based upon their demonstrated ability to do so. The vendor may not require exclusivity in ballot printing and must cooperate fully in certification testing of ballots produced by other ballot printers.

## Appendix A- ESS Unisyn EMS/InkaVote PBC Daily Examination Plan

### Monday (Jan 23) & Tuesday (Jan 24)

1. Kick-off Meeting
2. Review system modifications since last examination
3. Document testing platform (all equipment used in testing)
4. Verified installation of software
  - a. Verify virgin servers
  - b. Installation of software from trusted builds
  - c. Capture and document baseline
5. Verify test decks conform to State specifications
6. Review of system documentation (compare operating instructions and other documentation against actual system)
7. Prepare system for test primary election.

### Wednesday (Jan 25)

8. Conduct test primary election
  - a. System configuration:

<i>PBC #</i>	<i>Config (Pct assignment)</i>	<i>Voting activity</i>
1	Polling Place (1, 2-1, 2-2)	Test deck: precincts 1, 2-1, 2-2 DAU pattern voting
2	Early Voting (2-1, 2-2)	Test deck: precincts 2-1, 2-2
3	Polling Place (3, 4, 5)	Test deck: precincts 3, 4, 5 DAU pattern voting
4	Absentee (1, 2-1, 2-2)	Test deck: precincts 1, 2-1, 2-2
5	Absentee (3, 4, 5)	Test deck: precincts 3, 4, 5

- b. Open Polls
  - i. Open polls on PBCs according to specified procedures
  - ii. Print and verify zero tapes from all PBCs
- c. Voting:
  - i. Test deck – run ballots according to above configuration plan
  - ii. DAU pattern voting : cast one manual ballot using DAU for each ballot style (party/precinct combination)
  - iii. Manually marked Inkavote ballots for absentee
- d. Tabulation and reconciliation
  - i. Close Polls according to procedures
    1. Print closing results tape from each PBC for tabulation verification.
  - ii. Upload and consolidate vote results from PBCs into Unisyn EMS

- iii. Generate reports and capture election data
  - 1. SOV
  - 2. SSOV
  - 3. Audit logs
  - 4. Misc Reports
- iv. Proof all vote results for accuracy
  - 1. PBC tapes
  - 2. EMS system vote reports
- v. Backup election data
- 9. Continued review of system documentation (from #6, above)
- 10. Configure system for test general election.

**Thursday (Jan 26)**

11. Conduct test general election

a. System configuration:

<i>PBC #</i>	<i>Config (Pct assignment)</i>	<i>Voting activity</i>
1	Polling Place (1, 2-1, 2-2)	Test deck: precincts 1, 2-1, 2-2 Vote Recorder marked ballots DAU Pattern Voting
2	Polling Place (3, 4, 5)	Test deck: precincts 3, 4, 5 DAU Pattern Voting Accessibility evaluation ballots
3	Polling Place (2-1, 2-2, 3)	Test deck: precincts 2-1, 2-2, 3 DAU pattern voting
4	Provisional (all precincts)	“provisional” ballots
5	Absentee (all precincts)	Test deck: all precincts

b. Open Polls

- i. Open polls on PBCs according to specified procedures
- ii. Print and verify zero tapes from all PBCs

c. Voting:

- i. Test deck – run ballots according to above configuration plan
- ii. Vote manual ballots on vote recorders
- iii. DAU pattern voting: cast multiple ballots using DAU for each precinct
- iv. Exercise & evaluate accessibility support on DAU (languages, audio ballot logic)
- v. Cast “Provisional Ballots”- Generate ballots on DAU, tabulate on PBC #4.

d. Tabulation and reconciliation

- i. Close Polls according to procedures
  - 1. Print closing results tape from each PBC for tabulation verification.
- ii. Upload and consolidate vote results from PBCs into Unisyn EMS

- iii. Generate reports and capture election data
    - 1. SOV
    - 2. SSOV
    - 3. Audit logs
    - 4. Misc Reports
  - iv. Proof all vote results for accuracy
    - 1. PBC tapes
    - 2. EMS system vote reports
  - v. Backup election data
12. Continued review of system documentation (from #6, above)
13. Configure system for “pre-stress” test

## **Appendix B- Modified Protocol for “pre-Volume Test” of ES&S Unisyn EMS/Inkavote PBC**

Due to the limited availability of prototype Inkavote Precinct Ballot Counter (PBC) units, the SOS has agreed to perform a modified “pre-volume test” on January 27, 2007, based on available equipment. A complete volume test with fifty PBCs will still be required prior to final certification of the voting system.

For this pre-volume test, five PCB units will be tested. The standard volume test protocol for precinct optical scan tabulators will be employed, with the following modifications to the protocol:

- The test will be conducted on five PBCs. Each will be programmed for the standard California primary test election with all ballot styles (six precincts, 11 ballot styles each precinct.)
- The vendor will prepare five complete test decks based on the California primary test election specifications.
- The actual test will be conducted in the following manner:

### **First pass**

1. Polls will be opened, with zero tapes printed for each PBC.
2. Precincts 1, 2-1 & 2-2 will be run through each PBC.
3. Polls will be closed and result tapes printed on each PBC.
4. Election results will be uploaded from each PBC to the Unisyn Election Management System (EMS).
5. Election results will be printed and verified from the EMS for all PBCs.
6. Discrepancies will be resolved. (If due to errors in construction of the test decks, the decks will be corrected.)

### **Second pass**

7. Steps 1 through 6 will be completed, running Precincts 3, 4 & 5 through the PBCs.

### **Third pass**

8. Polls will be opened, with zero tapes printed for each PBC.
9. The entire test deck (precincts 1 through 5) will be run through each PBC twice, in succession, without interruption.
10. Using the audio interface, twenty ballots will be manually printed and voted on each PBC using a pattern prescribed by the SOS.
11. Polls will be closed and result tapes printed on each PBC.

12. Election results will be uploaded from each PBC to the Unisyn Election Management System (EMS).
13. Election results will be printed and verified from the EMS for all PBCs.

## Appendix C - Incident Summary for “pre-Volume Test” of ES&S Unisyn EMS/Inkavote PBC

<i>Incident#</i>	<i>Time</i>	<i>Machine #</i>	<i>Ballot #</i>	<i>Incident Report</i>	<i>Photos</i>	<i>Video</i>	<i>Error</i>	<i>Critical (Vote Record Lost)</i>	<i>Machine Error</i>	<i>User Error</i>	<i>Mis-marked Test Ballot</i>	<i>Error reading TM memory device</i>	<i>Ballot incorrectly rejected</i>	<i>Ballot feed problem (ballot jams)</i>	<i>Malfunction of ADA keyboard</i>	<i>Incorrectly marked test ballot</i>
<b><i>1st pass of ballots (test deck, precincts 1, 2-1, 2-2)</i></b>																
1	9:27	2	16	X	X		Bad ballot - rejected multiple times				1					1
2	9:42	2	61	X	X		Bad ballot - rejected multiple times				1					1
3	9:59	5	271	X	X		Ballot stuck on insert		1				1			
4	10:07	3	325	X	X		Bad ballot - rejected multiple times				1					1
5	10:17	1	324	X	X		Bad ballot - rejected multiple times				1					1
6	10:21	2	266	X	X		Ballot stuck on insert		1				1			
7	10:26	1	374	X	X		Ballot rejected: "Invalid ballot" (reinserted successfully with different orientation)		1			1				
8	10:29	2	285	X	X		Bad ballot - rejected multiple times				1					1
9	10:31	1	390	X	X		Bad ballot - rejected multiple times				1					1
10	10:36	1	405	X	X		Bad ballot - rejected multiple times				1					1
11	10:59	5	N/A	X			Error in reading TM (USB memory device)		1			1				
<b><i>2nd pass of ballots (test deck, precincts 3, 4 &amp; 5)</i></b>																
12	11:45	4	11	X	X		Bad ballot - rejected multiple times				1					1
13	11:57	1	148	X	X		Bad ballot - rejected multiple times				1					1
14	12:03	4	139	X	X		Bad ballot - rejected multiple times				1					1

<i>Incident#</i>	<i>Time</i>	<i>Machine #</i>	<i>Ballot #</i>	<i>Incident Report</i>	<i>Photos</i>	<i>Video</i>	<i>Error</i>	<i>Critical (Vote Record Lost)</i>	<i>Machine Error</i>	<i>User Error</i>	<i>Mis-marked Test Ballot</i>	<i>Error reading TM memory device</i>	<i>Ballot incorrectly rejected</i>	<i>Ballot feed problem (ballot jams)</i>	<i>Malfunction of ADA keyboard</i>	<i>Incorrectly marked test ballot</i>		
15	12:10	1	234	X	X	X	Bad ballot - rejected multiple times				1					1		
16	12:18	5	380	X	X	X	Ballot stuck on insert		1					1				
17	12:20	2	234	X			Bad ballot - rejected multiple times				1					1		
18	12:30	2	283	X	X		Bad ballot - rejected multiple times				1					1		
19	12:38	2	313	X	X		Bad ballot - rejected multiple times				1					1		
20	12:47	2	350	X	X		Bad ballot - rejected multiple times				1					1		
<b>3rd pass of ballots (Entire test deck x2)</b>																		
21	2:30	4	266	X	X		Bad ballot - rejected multiple times				1					1		
22	3:00	2	369	X			Ballot stuck on insert		1					1				
23	3:07	1	591	X			Bad ballot - rejected multiple times				1					1		
24	4:50	2	1181	X			Bad ballot - rejected multiple times				1					1		
25	5:47	5	1578	X	X		"Enter" key on ADA booth not working		1						1			
								0	7	0	18	1	1	4	1	0	18	0

**Machines with Errors: Count = 3 (1, 2 & 5)**

**Error reading TM memory device**

- In attempting to upload the vote results from machine #5, the Vote Converter was unsuccessful trying to read the TM on the first two attempts. On the third attempt, the results were successfully uploaded. (In a real election, if the TM failed the vote results could be covered by re-reading the original ballots.)

### **Ballot incorrectly rejected**

- In one incident, a ballot was repeatedly rejected with the error message: "Invalid Ballot". Inspection of the ballot showed no apparent reason for the reject. Ballot was successfully accepted when reinserted with a different orientation.

### **Ballot feed problem**

- On three occasions (incidents #3, 6 & 22), the ballot jammed in the intake chute. After pulling the ballot from the chute and reinserting, the ballot was accepted and successfully read.
- On one occasion (incident #16), a ballot would not feed into the PBC. The vendor disassemble the PBC and discovered that a piece of fool had lodged in the feed throat.

### **Malfunction of the ADA keyboard**

- When the voter tried to cast a ballot on the ADA booth, the "Enter" key was non-responsive. When the vendor inspected the voting booth, the vendor determined that the booth had inadvertently been set up with the first prototype of the keyboard. Per the vendor, this keyboard was programmed to return the key code "1" when the "Enter" key was pressed. Later versions were designed to return a carriage return instead. Vendor swapped out the keyboard for a newer model and audio voting was successfully resumed.

### **Incorrectly marked test ballots**

- There were nineteen errors related to improper marking of the test deck that caused the ballots to be properly rejected. These included invalid coding of the party or precinct on the ballot footer, handwritten marks that extended into the timing channel, stray marks in the footer and timing channel, and invalid voted positions for the ballot style. In these cases, the ballot was typically corrected or remade.