

OPTICAL VOTE-TRAKKER

**Avante International Technology, Inc. Optical Vote-
Trakker v. 1.5.0 and Vote-Trakker Ballot Preparation
and Tally Software v. 4.7.5**

Administrative Review and Analysis

**Prepared by:
Secretary of State Elections Division
September 3, 2004**

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I. SUMMARY OF THE APPLICATION

Procedures, hardware, firmware and software developed by Avante International Technology, Inc. for use with the Vote-Trakker v. 1.5.0.

II. SUMMARY OF THE SYSTEM

This proposed system would be a new optical scan voting system. The application consists of two voting system components.

1. Vote-Trakker Ballot Preparation and Tally Software v. 4.7.5

The Vote-Trakker ballot preparation and tally software is an election Management software package. Before an election, the software is used by a jurisdiction to create and manage the ballot definition for an election. The software is then used to transfer the database between the various hardware components. After an election, the software is used to consolidate vote tallies.

The software consists of several subcomponents, the following of which are necessary to the operation of the Optical Vote-Trakker and were included in the California testing:

- Manage Ballot Data v. 3.8.1
- Generate VID v. 4.0.5
- Generate Ballot Data v. 5.1.1
- Event Log 4.0.0
- Tally 4.0.2

Most of these components are shared with Avante's Vote-Trakker 308SPR Direct Recording Electronic (DRE) voting system. That system however requires additional components not included in the California testing.

2. Optical Vote-Trakker v. 1.5.0

Optical Vote Trakker v.1.5.0 is an optical scan voting system. The voting system is designed to run on a commercial off-the-shelf (COTS) computer and scanner. The vendor claims the system is designed to work with any COTS scanner; however, only the Canon DR5020 was part of the federal and state testing and therefore part of the certification application.

Before an election, the software package is used to create paper ballots from the ballot database. The scanner is then used to capture a ballot image from each ballot. After an election, the software is used to tally the votes.

III. TESTING INFORMATION AND RESULTS

1. Federal Testing

All of the system components covered in the application have been federally qualified under NASED # *N-1-12-22-12-002*. The system was qualified against the 2002 standards.

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

The system was tested in Sacramento, California on June 30, 2004 through July 2, 2004 by Secretary of State staff in conjunction with the state's technical expert, Mr. Steve Freeman.

The system was tested only as a central count voting system. The ballot on demand and precinct count operations were not fully tested.

The results of the state testing identified several problems and conflicts with the California Elections Code and California certification requirements. Each of these would need to be corrected prior to a recommendation for certification:

- A. Procedures: The submitted use procedures from the vendor failed to accurately describe the use and operation of the voting system. During testing, the Freeman and Secretary of State staff attempted to follow the procedures in using the system. However, at several points the operation of the system as described in the procedures either failed to mirror the actual operation of the system or omitted critical steps.
- B. The printed ballots contain an intentional undervote choice "Skip Contest." Such a choice is not permitted under Division 13, Chapter 3 of the election code.
- C. The system did not demonstrate the ability to meet California requirements relating to the counting of provisional ballots. Specifically, the system does not allow for the counting of the vote in only the contests for which the voter is eligible.
- D. The vendor was not able to demonstrate the ability of the system to generate either zero, semi-official or official results by precinct. Only cumulative results could be generated.
- E. The system was not able to meet the reporting requirements for a California primary. The system could not generate reports that would show the total vote counts from declared partisan voters, "decline to state" voters voting in a partisan race and the aggregate of those votes.

In addition, several issues were identified that, while not directly conflicting with a California code or requirement, were of concern and worthy of note:

- A. The ballot definition function is sometimes cumbersome and requires a significant amount of manual effort. Specifically, races have to be assigned

each precinct individually and contests need to be entered into the system in the order in which they are desired to be printed on the reports.

- B. The system proofing on the system is difficult and presents several potential points of failure. Specifically, the system cannot generate a report of which races are assigned to which precinct. The only method for proofing the report is the check a copy of each ballot style.
- C. As the system does allow for a ballot on demand feature, it does allow a county to expedite ballot-printing needs. However, the ballot generation function is slow and could result in delays, especially in a larger jurisdiction. This is particularly important, as these ballots are needed to proof the system as described above.
- D. Security features in the system are extensive and encompass many recommended security practices. However, at several points, the processes used would allow for simple errors or the loss of passwords to damage or delay the operation of the system. Recovery routes for these types of problems were either not clear or may not be viable in an election situation.

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 will be described in detail and the system will be 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 has several deficiencies discussed in section III of the staff report.

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

The system meets this requirement.

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

As noted in section III of the staff report, the system does contain many strong security features but is potentially vulnerable to “denial of service” attacks.

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

The system did not demonstrate the ability to generate reports by precinct.

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

The system conflicts with several California laws and regulations as identified above.

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 was qualified against the 2002 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 system is no more or less accessible than other similar optical scan type systems.

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

Qualification was completed to the 2002 qualification standards.

A technical consultant to the Secretary of State performed state certification testing.

The county elections official would conduct acceptance testing once a county takes receipt of the modifications.

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 expert technical consultant 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.

The technical consultant concluded that the system does not meet all required state laws and regulations as detailed in his report.

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.**

As noted in section III of the staff report, the system does contain many strong security features.

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

The proposed system is not any less voter friendly than other similar optical scan voting systems

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 basic audit trail is lacking as detailed above.

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 did not demonstrate the ability to produce results by precinct.

§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 systems allows for write-in votes.

§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 complies with 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 complies with 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 complies with 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 complies with 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 complies with 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 complies with 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 complies with 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 complies with 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 complies with 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 complies with 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 procedures submitted comply with 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 complies with 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 complies with 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 complies with 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 complies with 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 procedures submitted comply with 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 complies with 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.

Information can be printed in additional languages as required by the jurisdiction for all required languages. The system was federal tested with the following languages: English, Spanish, Chinese, Japanese, Korean, Tagalog and Vietnamese.

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 ability to allow for the counting of a ballot only in the contests in which the voter was eligible was not demonstrated during testing.

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 no more or less accessible than similar optical scan voting systems.

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 allows for the retention of the paper record of the ballots.

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).

The system was qualified against the 2002 standards. All needed reports have been submitted.

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 procedures for use with this system have been reviewed.

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

As noted in section III of the staff report, the system does contain many strong security features but is potentially vulnerable to "denial of service" attacks.

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.

The proposed system is not any less voter friendly than similar optical scan voting systems.

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

The proposed system would not result in any relative delays in the timeliness of reporting relative to other similar types of voting systems.

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

The proposed system contains several potentially negative effects on the efficiency of the election system as detail in section III of the staff report.

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.

Proof of Escrow documents have been received by the Secretary of State's office.

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.

The proposed system does not comply with all applicable laws, procedures and regulations.

V. PUBLIC COMMENT

In response to the public meeting notice being issued and allowing for written submissions, we have received one correspondences specific to this application. The correspondence related to questions about the ability of the system to handle instant runoff voting and cumulative voting. A copy of the correspondence is attached.

VI. RECOMMENDATION

Staff does not recommend certification of Avante International Technology, Inc.'s Optical Vote-Trakker v. 1.5.0 and Vote-Trakker Ballot Preparation and Tally Software v. 4.7.5 until the problems identified in this report have been corrected, the vendor is ready

to submit a system capable of meeting all California voting system requirements, any necessary federal and state testing of system modifications have been tested and revised use procedures have been submitted and reviewed.