STATE OF TEXAS

REPORT OF EXAMINATION OF I-MARK SYSTEMS
ELECTRONIC PRECINCT SYSTEM
PRELIMINARY STATEMENT

On September 17, 1996, I-MARK Systems (the "Vendor") presented its Electronic Precinct System for examination and certification. The examination was conducted in Austin, Texas. Pursuant to sections 122.035(a) and (b) of the Texas Election Code, the Secretary of State appointed the following examiners:

1. Mr. Peter Vogel, an expert in electronic data communication systems and election law and procedure;
2. Mr. Tom Watson, an expert in electronic data communication systems;
3. Mr. Barney Knight, an expert in election law and procedure; and
4. Mr. Bob Peeples, an expert in electronic data communication systems.

Pursuant to section 122.035(a), the Texas Attorney General appointed Dr. Michael Shamos, an expert in electronic data communication systems, as his examiner.

The Vendor demonstrated its system, and the examiners examined the system and cast ballots. Each examiner has filed a written report as required by section 122.036 of the Texas Election Code. Their reports are attached hereto and incorporated herein by this reference.

BRIEF DESCRIPTION OF THE I-MARK ELECTRONIC PRECINCT SYSTEM

The I-MARK Electronic Precinct System is a complete system for elections consisting of three subsystems: the Electronic Precinct Manager, the Electronic Reporting Manager, and the Electronic Ballot Station.

The Electronic Precinct Manager has the ability to create ballots and ballot envelopes for early voting by mail. It also scans returned mail ballots. It runs on a Pentium based PC running Microsoft's Windows 95.

The Electronic Reporting Manager also runs on a Pentium based PC running Windows 95. The Reporting Manager tabulates ballots received from ballot stations (which are stored on optical disk) and from the Electronic Precinct Manager.

The Electronic Ballot Station is a DRE (Direct Recording Electronic) machine for voting at the precinct level. The voter uses a light pen to indicate his or her choices on the ballot, which is displayed on the station's monitor. Voter access to the station is controlled by use of smart cards, which contain the specific ballot information for the voter's precinct. After the ballot has been cast, the smart card is disabled and can be used again only after it has been reactivated by an election official.

FINDINGS

The following are my independent findings, based on oral evidence presented at the examination, written evidence submitted by the Vendor in support of its application for certification, and the findings of the five examiners as set out in their written reports.

The I-MARK election system, subject to the conditions stated below:

1. Preserves the secrecy of the ballot;
2. Is suitable for the purpose for which it is intended;
3. Operates safely, efficiently, and accurately;
4. Is safe from fraudulent or unauthorized manipulation;
5. Permits voting on all offices and measures to be voted on at the election;
6. Prevents counting votes on offices and measures on which the voter is not entitled to vote;
7. Prevents counting votes by the same voter for more than one candidate for the same office or, in elections in which a voter is entitled to vote for more than one candidate for the same office, prevents counting votes for more than the number of candidates for which the voter is entitled to vote;
8. Prevents counting a vote on the same office or measure more than once;
9. Permits write-in voting;
10. Is capable of permitting straight-party voting; and
11. Is capable of providing records from which the operation of the system may be audited.

CONDITIONS

The Electronic Ballot Station's internal modem must be disabled on systems marketed or used in the state of Texas. The software must be rewritten so that it takes complete control over the central count personal computer during an election. A printer with continuous form paper must be added to the Electronic Reporting Manager to provide a real-time log of each event in the tabulation of votes for an election.

CONCLUSION

Each of the examiners recommended certification of the I-Mark Electronic Precinct System. Accordingly, I hereby certify the I-Mark Electronic Precinct System for use in elections in Texas under the conditions described herein.

Certified under my hand and seal of office, this 30th day of December, 1996.

Antonio O. Garza, Jr.
Secretary of State

To: The Secretary of State of Texas

From: PETER VOGEL, Examiner of Computer Election Systems

Date: September 25, 1996

Re: **I-Mark Electronic and Postal Election System**

Recommendation: Certification only on the following conditions:

A. During an election the software system must take complete control of the central count personal computer so that no interruption can be made.

B. An on-line log printer with continuous form paper must be attached to create a paper real-time log.

C. All modems and RJ-11 modem plugs must be removed from the devices.

Review Process: On September 17, 1996 an examination of the **I-Mark Electronic and Postal Election System** was conducted in the offices of the Secretary of State in Austin as follows:

1. Representatives of I-Mark explained how the **I-Mark Electronic and Postal Election System** operated.

2. The **I-Mark Electronic and Postal Election System** uses a smart card with a personal computer monitor with a light pen to install software, and cast ballots. Each **I-Mark Electronic and Postal Election System** has a optical disk to record ballots, and the optical disk is removed and taken to the central site for counting. At the central site another personal computer is used to count ballots, produce log history, and election results.

3. The **I-Mark Electronic and Postal Election System** uses the central site personal computer to make paper ballots to send to voters for early voting. A scanner reads the paper ballots back into the central site personal computer at election time.

4. Election set-up for the **I-Mark Electronic and Postal Election System** also uses the central site personal computer and utilizes smart cards and optical disks to load the elections on to the devices for casting ballots.

5. A demonstration of how the **I-Mark Electronic and Postal Election System** with sample votes was conducted.

6. The test ballots were cast and the **I-Mark Electronic and Postal Election System** appeared to count the ballots properly.

By_____
PETER VOGEL,
Examiner of Computer Election Systems

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September 30, 1996

Ann McGeehan
Deputy Assistant
Secretary of State
P.O. Box 12060
Austin, Texas 78711-2060

Re: I-Mark Systems Electronic Ballot Station; Electronic Election System

Dear Ms. McGeehan:

Pursuant to my appointment as an examiner under §122.035 of the Texas Election Code, I examined the I-Mark Systems Electronic Ballot Station (for convenience the "Station") and Electronic Voting System (the "System") submitted for examination by I-Mark (the "Vendor").

I examined the Station and System with respect to Texas Election Law and procedure on September 17, 1996. In that examination, I observed a demonstration and the operation and use of the Station and System and relied on representations of the Vendor concerning their use and operation. Those representations were made during an extended examination and were considered together with those contained in the handbook and material distributed by the Vendor.

This report is concerned solely with the ability of the Station and the System to operate and comply with Texas Election Law and procedure. No opinion is expressed regarding the suitability of the system for the purposes of or use by any jurisdiction.

The System requires includes a personal computer and the software required for ballot set-up and design. A table top smart card reader and various levels of card authorization are provided, including a master card for use in making cards for subordinate levels. At the voter level all the information required for a specific voter to receive the correct ballot is electronically encoded on a smart card, i.e. ward, precinct, block, party affiliation, etc. The voter registration number can be included in the card but I recommend that, if the Station and System are certified, such action is contingent on I-Mark programming the smart card readers in a manner that the voter's registration number not be able to be put on the card or transfer to the Station.

The Station includes is a direct recording electronic apparatus on which voters select their candidate of choice, etc. by "touch screen"; the Station utilizes an electronic ballot system; a "smart card" for use by the election judge in opening, testing and clearing the Station; and uses a "smart card" to enable each individual voter to "open" the Station and cast a vote (the card is deactivated on use and may not be used again except upon again being activated by election officials); a hard disk to record votes case; and an optical disk for recording votes cast and ballot images. The Station does not tabulate votes. The Station logs all actions on the Station with respect to opening the polls, etc. and the casting of individual ballots. The Station also includes a telephone modem which should be required to be removed if the Stations are to be certified and marketed in Texas.

The optical disks from the precinct Stations are loaded directly into the personal computer that is used to count and tabulate ballots. The count and tabulation process is accomplished by directly counting from the ballot images. However, although including an electronic audit log the tabulation function does not include a real-time audit log printer. If this System is certified, I recommend the certification be contingent upon a real-time, time stamped audit log printer, that produces a paper copy of the real-time audit log, being required and provided.

In summary, the election judge opens the Station using a supervisors "smart card" and each such action is logged by the Station. As each voter reports and qualifies, rather than a ballot the voter is given a "smart card" (available in either English or Spanish) that when inserted in the Station causes the proper ballot for that voter to appear on the screen. The voter uses a pen and touch screen to record his/her vote. Upon completing the voter casts the ballot by touch screen and turns in the "smart card" which cannot be used again until reactivated by an election official. The votes/ballot images are recorded on the hard disk and an optical disk. At the close of voting, the optical disk is transported to election central for counting and tabulation. Personal computers at election central count and tabulate ballots by scanning the ballot images on the optical disk. Both the Station and the System appeared to efficiently perform the required tasks.

1. The Station and the System are included within the definition of voting system, electronic voting system, and voting system equipment as defined in §121.003.

2. The personal computer, software and smart card reader used for ballot preparation and tabulation are within the definition of voting system, electronic voting system, voting system equipment and automatic tabulating equipment as defined in §121.003.

3. The Station is not a voting machine within the definition provided in §121.003.

All questions concerning accuracy, security, control and access were satisfactorily answered and resolved during the examination. However, the following are noted:

(1) Certification of the Station should be contingent upon the telephone modem not being included within any Station sold, delivered or used within Texas.

(2) The device and software for encoding smart cards at the polling place should be modified so that the voter's registration number is not included on the card issued to the voter for activation of the Station.

(3) A printer should be required for the tabulation system and such printer should create a real-time paper log of each event, instruction, intervention, action, etc. in the reading of optical disks from precincts, counting and tabulating votes.

Sincerely,

Barney L. Knight

I-MARK SYSTEMS

The I-MARK system were examined, in Austin, on September 17, 1996. The system presented was the Electronic Precinct System Version 1.0.

Overview

The system is nicely designed and easy to use. It is comprised of 3 basic sub-systems: the Electronic Precinct Manager, the Electronic Reporting Manager, and the Electronic Ballot Station. The system was developed with industry standard hardware and software. The Precinct and Reporting sub-systems run on a Pentium-based PC running Microsoft's Windows-95 operating system. The Ballot Station is a Direct Recording Electronic (DRE) precinct voting machine. The Ballot Station and the SmartCard access control is what make this voting system stand out.

SmartCard

Access to the system is controlled by a credit-card sized SmartCard. Without the proper SmartCard, and the correct Personal Identification Number (PIN) you cannot gain access to the various sub-systems. There is a Master Admin Card which has access to the entire system. This card is used to grant access rights to other cards. The Data Entry Card provides access to the Precinct Manager allowing someone to define the ballot and manage the accumulation on election night at the central site. The EBS Admin Card is used only at the polling sites to administer the Ballot Stations. The Read-Only Card lets someone preview ballots or print reports, but not modify anything. This degree of access control allows election duties to be divided so that no one person, other than the election supervisor with the Master Admin Card, who has access to all modules of the system.

The most important card however is the Voter Access Card. This card permits a voter to activate the Ballot Station with the appropriate ballot for their precinct. It can only be used once per voter since the Ballot Station disables it after the ballot has been cast. The card can be reused only when a precinct official enables it for the next voter.

Ballot Station

The Ballot Station, a DRE machine, meets the statutory requirements of a voting machine. A light-pen is used to select the votes. It is easy to use and works effectively. The voter is asked in which language the ballot should be presented to them. The ballot presentation is clear. Write-in votes are "typed" directly into the system. The election setup is loaded via an optical disk which is generated by the Precinct Manager PC. Since the Ballot Station has all ballot styles for an election, the voting machine is not initiated

specifically for a particular precinct. However, when an optical disk is inserted into the machine, the machine's internal serial # is recorded on the disk and the audit log. The Ballot Stations also have a public-counter which is set to zero before the polls open, and a private-counter which cannot be reset. These number are recorded in the audit log.

As noted above, the appropriate ballot style is presented to the voter based on the SmartCard. This prevents a voter from voting a race which they are not allowed. However, the ability of the Ballot Station to present the valid ballot style for any voter, is ideal for early-voting locations.

The ballots voted on the DRE are stored as ballot images on the optical disk. The optical disks are taken to the central-count PC and are accumulated using the Reporting Manager sub-system. Results are encrypted using the Data Encryption Standard.

CONCLUSION

The system examined is capable of performing effectively and accurately. However, the following should be corrected:

- the accumulation process is not logged real-time to paper as required.
- the Ballot Station is capable of transmitting votes to the central-count PC by modem - this must be disabled.
- the Summary Report does not include the write-in votes when calculating percentages.

If the problems noted are corrected I would recommend certification.

Tom Watson
Examiner