

September 22, 2004

NIST / Information Technology Laboratory
Attn : EAC Technical Guidelines Committee
100 Bureau Drive
Gaithersburg, MD 20899-8900

EAC Technical Guidelines Development Committee
Human Factors and Privacy – “Ensuring Access to Voting”

Ladies and Gentlemen:

Thank you for the opportunity to share our experiences on ensuring access to voting for all voters. We at AutoMARK Technical Systems believe that once you hear and read our testimony you will be as excited as we are about empowering all voters to vote privately and independently on an optical scan ballot.

The AutoMARK™ Voter Assist Terminal is a ballot marking system designed to provide privacy, accessibility, and independence to voters who are blind, vision impaired, or have a disability or condition that would make it difficult or impossible to mark an optical scan or paper ballot manually. The AutoMARK Voter Assist Terminal can work along with any optical scan ballot created from any manufacturer in the voting systems industry and is the only system that provides a true voter verifiable paper audit trail.

In addition to our testimony I am enclosing a summary of technical features that demonstrates the capabilities of the AutoMARK voter assist terminal.

Very truly yours,

AutoMARK Technical Systems, LLC

“Ensuring access to voting”

**How do we ensure access to the secret ballot to all citizens, including those with disabilities, older voters, or those with other special needs?*

The AutoMARK™ Voter Assist Terminal is a ballot marking system designed to provide privacy, accessibility, and independence to voters who are blind, vision impaired, or have a disability or condition that would make it difficult or impossible to mark an optical scan or paper ballot manually. The AutoMARK voter assist terminal has been developed with input from election authorities and disability organizations, and meets the requirements of “The Help America Vote Act of 2002.”

To use the AutoMARK, voters insert their standard optically scanned ballot (punch-card width or standard page width) into the slot, and the AutoMARK reads the ballot style. There is no need for a special ballot. Voters can use the navigational buttons or the touch screen to scroll through the options and make their selections. The AutoMARK then marks the ballot according to their selections, and the ballot is returned to the voter to be cast in the regular fashion.

The AutoMARK was designed to ensure access to the secret ballot to all citizens by allowing all voters to vote on the same voting system. With the AutoMARK, all voters use the same ballot whether they mark it by hand or mark it by using the AutoMARK. When the disabled voter uses a DRE and other voters vote on Optical Scan it becomes clear how the disabled voted since the DRE votes are tallied separately from the Optical Scan votes. The two separate totals would need to be manually combined at the end of the night. This could become an invasion of privacy especially if there is only one disabled voter or a small number in a precinct.

By using the AutoMARK the disabled voter can guarantee that they are voting secretly and independently. If the voter is sight impaired they can listen to the audio and navigate with the directional keypad to make their selections. They listen to a summary screen before marking the ballot. Once the ballot is marked the sight impaired voter can re-insert the ballot into the AutoMARK to audibly verify (listen) that their ballot is marked according to their intent. The voter also has the option to turn the display screen off to maintain further privacy. The voter is also given the option of using a privacy sleeve for the ballot so that they can be sure that their privacy is maintained. The AutoMARK is the only voting system that can verify for the sight-impaired voter that their ballot is marked according to their intent.

Older voters may not be able to see as clearly or control their hands (Parkinson’s disease / arthritis) as well as in the past. By using the AutoMARK they could magnify the screen thereby increasing the font size or put the touch screen into a high contrast mode (white type on black background) so that they can see the fonts more clearly. The older voter could also use the navigational keypads to navigate on the screen. They may not be able to control their hand movement as well as in the past but by using the keypad they could capture their intent accordingly.

Voters may have special needs such as dyslexia or illiteracy that prevent them from being able to read the ballot and make their choices accordingly. The AutoMARK can aid both of these conditions by allowing the voter to listen to the voice through the provided headphones and visually navigate on the touch screen. As the voter navigates the screen they see their position with the gold highlighted cursor marking their exact location on the ballot. This combination of the voice reading to them concurrent with the location on the screen gives the voter the confidence to recognize the correct candidate or issue they are selecting. The AutoMARK is the only system that will allow a voter to listen to the audio ballot and see the visual ballot on the screen concurrently. For voters with Attention Deficit Disorder or a short memory we provide a repeat button that will read back to the voter the most recent phrase read to them. Voters who are not able to use the touch screen or navigational keypad use a sip/puff tube.

** What ballot or voting systems designs provide access effectively?*

The optical scan / AutoMARK combination is a voting system that provides access effectively for all voters. The AutoMARK gives all voters access to the optical scan ballot and enables all voters to have the benefit of verifying their own ballot before it is counted in the tabulator. The AutoMARK / optical scan voting system satisfies three challenges in providing access effectively; 1) All voters are empowered and given access to vote private, independently, and in their language of choice 2) All voters are voting on the same system 3) All voters' ballots are verified and tabulated seamlessly with a countable receipt. The AutoMARK even allows voters to do write-in votes. The DRE as the ADA device for the optical scan tabulator does not give the voter the opportunity to verify his or her own ballot. The only way for a voter to verify the receipt on a DRE would be if the verification summary was printed in Braille. The DRE disenfranchises the sight-impaired voter by not verifying how the vote will be counted.

In developing the AutoMARK voter assist terminal we consulted with and developed input from election authorities and disability organizations. The current DRE systems were designed to eliminate paper in the polling place as a result of the punch-card systems in relation to the 2000 election. The AutoMARK Voter Assist Terminal was designed as an ADA device from its inception in order to provide access to the optical scan ballot for all voters and to protect the municipalities' investment in their legacy optical systems. We asked what type of features the disability groups would like to see on a voting system. AutoMARK Technical Systems, LLC took these recommendations and developed the AutoMARK with the following features above and beyond the capabilities of current DREs:

- magnify the screen bringing the type closer to the voter
- choice between eloquence synthesized speech with variable speed or a recorded voice .wav file
- listen to a synthesized voice or a human recorded voice
- change between high contrast and standard contrast for color blindness or tunnel vision

- repeat button, repeats the most recently read phrase
- distinctly shaped buttons to help in navigating the ballot
- listen to the voice and view the contests on the screen concurrently which can help conditions of dyslexia or illiteracy, audio/video ballot
- verify their own ballot by listening to how the ballot is actually marked; the marked ballot can be re-inserted into the AutoMARK allowing the voter to listen how the ballot is in fact marked
- voter is not forced to listen to everything, they can interrupt the voice and move at their own pace
- all features reset to default for the next voter

The Michigan Commission for the Blind gave many of these suggested features. With each build of the AutoMARK we went back to the commission to show our progress. They were so pleased with the product that they invited us to conduct their annual election of directors for the Commission. We conducted the election in April of 2004 with Elections Systems and Software (ES&S), who is also our distributor, using the M100 tabulator. Many members of the Commission were overheard saying that this was the first time that they were able to vote independently and in private by themselves without having another individual or election official read the ballot to them. The election was a huge success for the Commission and for the AutoMARK voter assist terminal.

** What can we do to help older voters, those who speak languages other than English, those with lower literacy, and those with disabilities have a more usable voting experience?*

A very large part of helping all voters to have a usable voting experience is voter education. We must make our voting systems available to the general public so that they can accommodate themselves in getting used to new equipment. This is of particular importance when using any system for the first time. First time users of the AutoMARK are very pleased at how intuitive it is and its ease of use. Everything from the navigational keypad to the synthesized voice is very familiar to the disabled voter because many other appliances that they use employ the same technology. Many sight-impaired individuals listen to their e-mail using the synthesized voice at a high rate of speed.

We can help older voters have a more usable voting experience by asking them if they need assistance during any step in the voting process. If they are having trouble seeing or marking the ballot we can instruct them that using the AutoMARK voter assist terminal will aid them in marking their own ballot. An election official can demonstrate how to zoom the screen or put it in a high contrast to aid tunnel vision or color blindness or simply make the screen more easily readable for the voter. If the older voter cannot hold a pen steady enough to mark the ballot they can use the navigational keypad on the AutoMARK to mark the ballot.

The alternative language speaking voter is also accommodated by the AutoMARK. The AutoMARK was designed with 7 primary languages: 5 supported by Elequence for synthesized speech (English, Spanish, Chinese, Japanese, and Korean), Tagalog and Vietnamese would have a wave file or recorded human voice. All languages can be supported via a recorded voice.

Voters with lower literacy can run the AutoMARK in both the audio and video mode. Running both the audio and video ballot gives the voter the ability to recognize words by sound that they may not have been able to recognize by reading. The AutoMARK also confirms each selection that is made by the voter so they have the extra confidence that they are in fact selecting the candidate or choice that they had intended. The voter also gets to listen and see a summary screen that compiles all of their choices allowing for last minutes changes if needed before the ballot is marked.

The overall goal of the design of the AutoMARK voter assist terminal is to empower all voters to vote independently and privately by themselves. The AutoMARK protects the municipalities' investment and protects the right of all voters to mark an optical scan ballot in private independently.

AutoMARK™

Voter Assist Terminal

SYSTEM FUNCTIONALITY



Presented to:
EAC Technical Guidelines Committee
22 September 2004

CONTENTS

1. INTRODUCTION	7
A. PURPOSE.....	7
B. SCOPE.....	7
1. <i>CONTENT AND FORMAT</i>	7
2. <i>PRIMARY USE</i>	7
3. <i>PROPRIETARY INFORMATION</i>	7
C. REFERENCE DOCUMENTS.....	7
D. DEFINITIONS.....	7
2. SYSTEM OVERVIEW	8
3. SYSTEM FUNCTIONALITY	8
A. BASIC FUNCTIONALITY.....	8
B. OVERALL CAPABILITIES.....	9
1. <i>SECURITY</i>	9
2. <i>ACCURACY</i>	9
3. <i>ERROR RECOVERY</i>	9
4. <i>INTEGRITY</i>	9
5. <i>SYSTEM AUDIT</i>	10
6. <i>ELECTION DATABASE</i>	10
7. <i>ACCESSIBILITY</i>	10
8. <i>VOTE TABULATING PROGRAM</i>	10
9. <i>BALLOT COUNTER</i>	10
10. <i>TELECOMMUNICATIONS</i>	11
11. <i>DATA RETENTION</i>	11
C. PRE-VOTING CAPABILITIES.....	11
D. VOTING CAPABILITIES.....	11
1. <i>ALTERNATIVE LANGUAGE CAPABILITY</i>	11
2. <i>WRITE-IN CANDIDATES CAPABILITY</i>	11
3. <i>OVER-VOTING CAPABILITY</i>	11
4. <i>UNDER-VOTING CAPABILITY</i>	11
E. POST-VOTING CAPABILITIES.....	11
F. MAINTENANCE, TRANSPORTATION AND STORAGE CAPABILITIES.....	12
4. REVISION HISTORY	

1. INTRODUCTION

A. PURPOSE

The information contained in this document is used to describe the functional capabilities of the AutoMARK Voter Assist Terminal (FVSS Vol. II, Section 2.3).

B. SCOPE

1. Content and Format

This document contains an overview of the AutoMARK Voter Assist Terminal functional capabilities and is written in compliance with Federal Election Commission (FEC) Federal Voting System Standards (FVSS Vol. II, Section 2.1 thru 2.3),

Where applicable, references to specific FVSS requirements are indicated (as indicated in the previous paragraph) throughout this document.

2. Primary Use

This document is a working specification for discussion and analysis. Information in this document is subject to change.

3. Proprietary Information

The AutoMARK system concepts, as well as many implementation and construction details described in this document, are considered proprietary information protected by a series of U.S. and foreign patents pending.

C. REFERENCE DOCUMENTS

FEC Voting System Standards, Vol. II, Sec. 2	Technical Data Package
--	------------------------

D. DEFINITIONS

Term	Definition
VAT	Voter Assist Terminal

2. SYSTEM OVERVIEW

The AutoMARK Voter Assist Terminal is designed to help voters mark their election ballots when they are visually impaired, physically disabled, or more comfortable reading or hearing instructions and choices in an alternative language. Refer to the System Overview in this section of the Technical Data Package for information regarding system hardware and software components. (FVSS Vol. II, Section 2.2)

3. SYSTEM FUNCTIONALITY

The AutoMARK Voter Assist Terminal is a ballot marking system designed to provide privacy and accessibility to voters who are blind, vision-impaired, or have a disability or condition that would make it difficult or impossible to mark a ballot in the usual way. It also provides language assistance to voters who are more comfortable speaking an alternative language or who have reading difficulties.

A. BASIC FUNCTIONALITY

The AutoMARK Voter Assist Terminal performs the following functions:

1. Prompts voter to insert his/her unmarked ballot into the AutoMARK machine paper tray.
2. Scans the ballot to determine whether the ballot style and format is readable, unmarked and consistent with the ballots available in the election database.
3. Activates touch screen command buttons and keypad command keys.
4. Displays or reads voting instructions and election choices in a selected language.
5. Responds to voter input and touch screen or keypad commands.
6. Displays a summary of the selections made by the voter for final approval before the ballot is marked.
7. Marks selections on the ballot.
8. Returns marked ballot to the voter.
9. If a pre-marked ballot is inserted, AutoMARK provides a Verification Summary.

Note: The system is a ballot marking device. It does not store, count or tabulate votes in any way.

AutoMARK™ Voting Assist Terminal functional capabilities are categorized by the phase of election activity in which they are required (FVSS Vol. II, Section 2:2.1).

B. OVERALL CAPABILITIES

The following functional capabilities are system-wide in nature and not unique to pre-voting, voting, and post-voting operations. (FEC VSS Vol. II, Section 2:2.2)

1. Security

The AutoMARK Operating Software provides security access controls to limit or detect access to critical system components and to guard against loss of system integrity, availability, confidentiality, and accountability. It also provides system functions that are only executable in the manner and order intended, and only under the intended conditions. Refer to the AutoMARK Operating Software Design Specifications in Section 4 for more information.

The system's control logic is used to prevent the ballot marking function from executing if any preconditions to this function have not been met.

The system unit (hardware) is designed with safeguards to protect the unit against tampering during system repair, or interventions in system operations, in response to system failure. Refer to the AutoMARK System Hardware Specifications in Section 3 for more information.

System access during equipment preparation, testing and operation is provided by the appropriate Automark Technical Systems, system administrator prior to delivery of the system, or by election officials upon delivery. Refer to the AutoMARK System Security Specification in Section 5 for more information.

(FEC VSS Vol. II, Section 2:2.2.1)

2. Accuracy

The system's memory hardware is designed to provide protection against mechanical, thermal and electromagnetic stresses that could impact system accuracy. Refer to the AutoMARK System Hardware Specifications in Section 3 in this Technical Data Package for more information. (FEC VSS Vol. II, Section 2:2.2.2)

3. Error Recovery

Refer to the Election Officials Guide in Section 7 for error recovery procedures. (FEC VSS Vol. II, Section 2:2.2.3)

4. Integrity

AutoMARK is equipped with battery power capability that is used to protect against interruption of electronic power. The hardware unit is protected against electromagnetic radiation and ambient temperature and humidity fluctuations.

AutoMARK Memory Management is used to protect resident memory against the failure of any data input or any attempt at improper data entry or retrieval.

AutoMARK Diagnostic Log is used to record and report the date and time of normal and abnormal events, the system's status, and degree of operability. **The diagnostic log only used for hardware and software diagnosis. It is not designed to indicate election results or to be used in any recount consideration.**

Refer to the AutoMARK System Hardware Specifications in Section 3 and the Software Design Specifications in Section 4 for more information. (FEC VSS Vol. II, Section 2:2.2.4)

5. **System Audit**

The AutoMARK Diagnostic Log records the lifetime number of paper ballots printed by the AutoMARK. **The diagnostic log only used for hardware and software diagnosis. It is not designed to indicate election results or to be used in any recount consideration.**

Refer to the Embedded Object Interface Specifications in Section 4 in this Technical Data Package for more information. (FEC VSS Vol. II, Section 2:2.2.5)

6. **Election Database**

The entire election database is contained on a flash memory card (FMC) that is inserted into the AutoMARK hardware. The FMC database is not created by the AutoMARK system, nor can the AutoMARK modify it. AutoMARK Operating Software accesses the FMC database. (FEC VSS Vol. II, Section 2:2.2.6)

7. **Accessibility**

The AutoMARK hardware is designed to meet the accessibility needs of voters with disabilities in accordance with the FEC VSS requirements. Refer to the AutoMARK System Hardware Specifications in Section 3 for more information.

The touch screen monitor displays instructions and election choices in readable font and provides "zoom" capability for visually impaired voters.

For blind voters, the AutoMARK audio system is used to provide the instructions and election choices displayed, and the unit keypad or remote keypad is used to input the voter selections and commands.

An ADA port is also provided for connection with DSA devices (such as Puff-Sip or pedals), for those voters who are unable to use a keypad or the touch screen to enter ballot selections. (FEC VSS Vol. II, Section 2:2.2.7)

8. **Vote Tabulating Program**

AutoMARK does not store, count, or tabulate ballots in any fashion. (FEC VSS Vol. II, Section 2:2.2.8)

9. **Ballot Counter**

The AutoMARK has a lifetime counter of the number of ballots printed. (FEC VSS Vol. II, Section 2:2.2.9) **The diagnostic log only used for hardware and software diagnosis. It is not designed to indicate election results or to be used in any recount consideration.**

10. Telecommunications

The AutoMARK is designed as a standalone terminal and does not telecommunicate with any other system. (FEC VSS Vol. II, Section 2:2.2.10)

11. Data Retention

The AutoMark System does not retain any information except a lifetime count of the number of ballots printed and a Diagnostic Log. The compact flash memory card (FMC) contains all setup information and can be retained by the election jurisdiction for 22 months after an election or longer. (FEC VSS Vol. II, Section 2:2.2.11)

C. PRE-VOTING CAPABILITIES

Not applicable.

D. VOTING CAPABILITIES

Voters who are disabled or visually impaired use the ballot marking capability of the AutoMARK Voter Assist Terminal at the polling place to mark and verify their ballot selections. If a pre-marked ballot is inserted into the AutoMARK, a summary of the marked selections is displayed for verification purposes. After using the AutoMARK, voters cast their marked ballots in the same fashion as other voters by inserting their marked ballots into a ballot box or tabulator. Refer to Section 4 - *Software Design and Specifications* in this Technical Data Package for additional information. (FVSS Vol. 1, Section 2.4)

1. Alternative Language Capability

The jurisdiction can provide the ability for voters to select an alternative language to the default language (English) if they are more comfortable viewing or listening to instructions and election choices in another language.

2. Write-In Candidate Capability

Voters are able to write in a candidate name (using touch screen or keypad functions) whenever the voter is allowed to write-in a candidate on the ballot.

3. Over-Voting Capability

The voter is alerted when they attempt to select more candidates or choices than are permitted in a contest. The voter is not allowed to over-vote.

4. Under-Voting Capability

The jurisdiction can choose to have the AutoMARK alert the voter when he/she has selected fewer candidates or choices than are allowed for each particular contest.

E. POST-VOTING CAPABILITIES

Not applicable. (FVSS Vol. I, Section 2.5)

F. MAINTENANCE, TRANSPORTATION AND STORAGE CAPABILITIES

A custom transportation and storage case is provided with the AutoMARK.
(FVSS Vol. I, Section 2.6)