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To: vss@FEC
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Subject: Trace Center Comments on VSS

Please accept the attached comments on the Voting Systems Standards on behalf of the Trace R&D Center, University of Wisconsin-Madison.

- TraceCenterCommentsVSS.doc

February 1, 2002

TO: Ms. Penelope Bonsall
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Voluntary Standards For Computerized Voting Systems

These comments are submitted by the Trace Research and Development Center at the University of Wisconsin-Madison. The Trace Center is the national Rehabilitation Engineering Research Center designated to work on access to information technology. The Center has worked with or for the Access Board on all recent regulations dealing with access to electronic devices including the telecommunication regulations, the Electronic Information Technology Access Advisory Committee and access to automated teller machines. The Trace Center developed the first set of accessibility guidelines for the worldwide web and its "Unified Accessibility Guidelines" were selected by the Worldwide Web Consortium at the basis from which they built their web accessibility guidelines. The Trace Center has worked in the area of technology and disability for over thirty years and has worked with a wide range of companies including computer, software, ATM and voting technology companies. Accessibility features developed by the Trace Center are built into the Macintosh and Windows operating systems as well as into some releases of Unix. The Trace Center is a part of the University of Wisconsin, Madison College of Engineering and it is part of the Industrial Engineering Department Human Factors program.

OVERVIEW OF COMMENTS

We would first like to congratulate the Federal Election Commission (FEC) on the inclusion and the quality of the accessibility guidelines in the draft of the Voting System Standards. The guidelines address the major issues required for cross disability access to Voting Systems and do so in a way that gives flexibility to venders in how they design and implement voting technologies.

These comments cover six key points.

1. The fact that there is not a clear division between "general voters" and "disabled voters"

2. The need to make these requirements mandatory for Direct Record Electronic voting technologies – in order to allow the increasing number of older voters to be able to accurately and privately cast their vote.

3. The commercial practicality of making these requirements mandatory

4. The resulting need to have accessible voting available to all voters where they vote.

5. The inclusion of accessibility in testing and certification

6. Revisions to the accessibility guidelines.

1. Human ability – and disability - is a continuum and there is no clear line between voters with disabilities and voters without disabilities.

In the standards there are a number of places where "disabled voters" are discussed as being distinct from the "general voting public". For example, page 6 of the overview discusses accessibility standards for disabled voters and usability standards for the general voting public independently. It is good and necessary that special attention be paid to voters with disabilities to ensure that they are no longer excluded from the process of voting privately and independently. However, it is also important to note that many people who would not consider themselves to be disabled (or be considered disabled by others) have trouble meeting the visual and physical demands placed on them by some current voting technologies. Creating separate "accessible" voting technologies or facilities will not address the ability of these voters to be able to successfully and accurately cast their votes.

Consider the following data from the US Census showing the increase in functional limitations with age. It can be seen that an increasing portion of our population acquires disabilities as they age.

Percentage of US Population with Functional Limitations – as a Function of Age[1]

Age 18 - 24	**9.5 %**
Age 24 - 34	**10.0 %**
Age 35 - 44	**14.4 %**
Age 45 - 54	**21.2 %**
Age 55 - 64	**34.0 %**
Age 65 - 74	**42.3 %**
Over 75	**64.0 %**

(A pie chart showing these data visually can be found at http://trace.wisc.edu/docs/function_aging)

Furthermore, the types of disabilities experienced by people as they age directly impact their ability to operate voting equipment.

Type of disability	**Age**	**Percent**[2]
Arthritis & Bursitis	<45	4 %
	1-69	36 %
	70-84	53 %
	85+	53 %
Visual Impairments	<45	3 %
	1-70	10 %
	70-84	34 %
	85+	63 %
Hearing Impairments	<45	4 %
	1-71	17 %
	70-84	32 %
	85+	48 %

(A chart showing these data visually can be found at http://trace.wisc.edu/docs/function_aging)

[1] Source: U.S. Census Bureau Report on Americans with Disabilities: 1994-95, P70-61 (August 1997)
Based on Survey of Income and Program Participation, Oct. 1994-Jan. 1995

[2] Survey: National Health Interview Surveys, 1983-1985: tabulations from public use tapes. Based on data from LaPlante (1988)

There are two important things to note in this regard

a. There is no clear line between individuals who have disabilities and those who do not. People's abilities vary along a continuum. The ability to use voting equipment, if it is not properly designed, will also vary across this continuum. Individuals with functional limitations, even minor limitations, may experience difficulty during the voting process if the voting equipment cannot accommodate their needs. This can lead to errors and mistakes in the voting process.

b. It is important that all voting stations be designed to accommodate variation in the abilities of voters. Even those individuals who do not consider themselves to be disabled or to have a disability can experience problems in operating equipment that has not been designed with the wide variation in voter abilities in mind.

2. Voters in general need a flexible, usable interface. Therefore, the requirement that Direct Record Electronic voting be accessible should not be optional or implemented on only some machines. Voters need to be able to use the voting machines they encounter at their voting location.

Making only some DRE machines accessible or providing accessible machines at only some locations will result in large numbers of voters casting their ballots on machines that they are not able to use reliably and accurately. In come cases, this will be because the person is not aware that they have to go to a special location to vote or they may be unable to get to that location. In other cases, the voting experience may be unsuccessful because many people do not consider themselves to have a disability or are unaware of the problems they will have until they are in the voting booth and realize that they are unable to use the "standard" technology. Once at a polling location, voters may not want to admit to experiencing difficulty in using the technology, or they may be unaware that they are making errors. One group of users who could benefit from the use of a voting system with access features but who may not be identified has having a disability is individuals with low literacy skills.

3. Creating accessible DRE voting systems is commercially practical

Although creating accessible voting systems in the past has been difficult due to the nature of the voting technologies, this is no longer true with DRE voting systems. Ten dollar toys and $3.50 greeting cards that talk are now available. Ten dollar text to speech chips are available. The technology to play back clear recorded speech or to increase the font size is already present in most DRE system being designed today – even those that do not have access built in. If access features were mandatory, the incremental cost for hardware in order to accommodate the access features would be negligible. In fact most costs today are related to redesigning a system to include accessibility that was not

included in the original design or related to the fact that the access features are sold as a separate unit rather than incorporated into the system.

There are already over half a dozen manufacturers that have voting technologies with varying levels of accessibility, including most of the leading manufacturers of DRE equipment. Consistent guidelines for accessibility are needed to ensure effectiveness in this area. Mandating the incorporation of access features into voting systems can make these features as ubiquitous and low cost as closed captioning has become on televisions sets. The cost for the closed caption feature has not only plummeted to the point that it is negligible, but the feature is widely used by people who do not have disabilities too.

4. The inclusion of accessibility in testing and certification

Because the current Voting System Standard has been developed over time and is undergoing continual edits, there are a number of places where the language is not consistent. For example, in the testing area, accessibility provisions do not appear to be listed in a way that would imply that they are required. Yet in other places they seem to be. Also, as mentioned previously, accessibility will need to be included in the usability standards when they are developed.

5. Revisions to the accessibility guidelines.

Section 2.2.7.1 Reach Requirements

In appears as though the current standards do not include reach requirements for those situations where a user may be required to approach a voting system from the front. If voting systems are placed within physical dividers a front approach may be necessary. Also, due to the nature of their disability, some individuals who use wheelchairs may only be able to make a forward approach.

Note that in cases where the location and position of the voting system can be changed for individual voters, the need for forward and parallel reach requirements is diminished. For example, if the voting machine is portable an individual may be able to place the system directly on his or her lap.

Section 2.2.7.2

1. Adjust contrast settings;

It is advantageous to provide the user with the ability to adjust device settings to suit his or her needs. However, the ability to adjust the contrast settings may not be required in systems that already provide a high contrast default setting.

2. Adjust color settings, when color is used;

Likewise, the ability to adjust color settings is useful. However, all information conveyed through the use of color should be available to the user in a manner that does not require the use of color.

If a voting system is designed so that high contrast is maintained even for those individuals with color deficiencies, then adding the ability to change the system colors in a voting situation may add unnecessary complexity. If high contrast can be maintained, color adjustability could be an option.