

Election Technology Council  
*Comments on*  
*Help America Vote Act Amendments*

The Election Technology Council (ETC) consists of companies that offer voting system technology hardware products, software and services to support the electoral process. These companies have organized as an Industry Trade Association to work together to address common issues facing our industry. Membership in the ETC is open to any company in the election systems marketplace.

The historic General Election of 2000 led to the largest election reform legislation in the nation's history, "The Help America Vote Act" of 2002 (HAVA). At the very core of this sweeping legislation was one goal, "*to ensure that every vote counts*". Currently Congress has indicated a willingness to amend the original act to further ensure that the original goals are realized. In order to further this worthy goal, this paper is intended to provide informative responses from the ETC to proposed federal legislation regarding voting system technology requirements.

The members of the ETC have provided election services and products to thousands of voting jurisdictions over the past several years. In addition to providing equipment and services, ETC member companies invest millions of dollars in research and development every year to help improve the quality, accuracy and credibility of elections. Collectively we serve more than 90 percent of all election jurisdictions in the U.S. We believe that elections should be accurate, secure, accessible and transparent and are dedicated to continuous improvement and the evolution of our products and services to continue in the achievement of our goals. The 2006 general election demonstrated the effective utilization of electronic voting stations (many with voter-verifiable paper audit trail printers) and optical scanners. The members of the ETC are committed to continuing to serve as partners with election officials to ensure that the mandates of HAVA are complied with in full. To achieve that goal, we wish to offer a number of observations and recommendations concerning key items that have been proposed in various items of legislation designed to amend HAVA.

Congress and many State legislatures have indicated a strong desire to increase the availability of early voting. Voters have also expressed their support of early voting and the trend today is to expand this service as well as the concept of "vote centers" whereby an individual is not locked into voting at a certain precinct but rather may vote at a more convenient location. If the requirements placed on electronic voting become too onerous, many jurisdictions will simply replace their existing electronic voting equipment with optical scan ballots.

While optical scan technology presents a perfectly acceptable form of voting, in many instances it makes early voting impractical and expensive for many jurisdictions, as the need to have all ballot styles on hand in a paper form and in sufficient quantities for all required languages required in the jurisdiction for an early voting location is not always feasible. In fact, many jurisdictions adopted electronic voting as an alternative to paper balloting long before HAVA was legislated to solve the many complexities of early voting using a paper-based system.

### **Voter Verifiable Paper Audit Trails (VVPAT)**

The ETC supports the addition of technology that promotes voter confidence. Many jurisdictions already utilize voting systems that include paper audit trails and these systems have proven effective and reliable when correctly used by the jurisdiction.

While we support the concept of requiring VVPAT for all electronic voting systems, there are certain specifics regarding the usage of VVPAT that must be considered when developing legislative changes.

### **VVPAT as the Official Ballot Record**

VVPAT is an effective audit tool that allows voters to independently review their ballot selections prior to officially casting their ballots. VVPAT also serves as an independent verifiable record of the total number of ballots and votes cast on an individual machine, within a specific polling place or throughout an entire jurisdiction. Proposed language that requires the VVPAT to be the “official ballot of record” should be carefully weighed to determine the effect such a requirement may have on the electoral process. Consideration should be given to instances of improper handling of the paper by poll workers, the occasional instance of paper jams or other mechanical issues that may arise as well as the logistical complexities of obtaining an accurate hand count of hundreds of millions of ballot selections made across the country in every election. If a single piece of paper is not readable, regardless of the reason, and the VVPAT is the official record of the ballot, the potential is high that the voter involved will not have his or her vote counted. That result would be contrary to the original intent and purpose of HAVA to avoid having even one vote go uncounted. While these instances may be limited in scope, there is also a large potential for the wrong candidate to be officially declared the winner in the event of an extremely close election if the paper record is utilized as the official record and it is subsequently determined that even so much as one paper record was damaged.

## **Manual Audits**

The “A” in VVPAT stands for “Audit” and as such it should serve as an important audit tool. Decision makers must approach the design of such audits with an eye toward practicality. Technology does exist to make these audits robust and accurate through the use of products designed to read the VVPAT record in a system separate from the voting platform. This technology is in the form of bar code reading and image scanning. Currently legislative drafts call for hand counts of the VVPAT when conducting audits. While these drafts specifically relate to federal races only, it is certain that state legislatures in crafting their own HAVA compliant legislation will include all races on the ballot for audit purposes and not limit such counts to merely federal races.

Many jurisdictions have conducted hand counts of VVPAT records. It would be prudent to review the results of these audits as well as the processes they undertook to determine if hand count audits are feasible in today’s automated world of tightly scheduled election timelines. In a federal election, tens of millions of ballots are printed with an average of 20 contests per ballot and multiple candidates per contest. With intersecting district boundaries, multiple languages and multiple party primary elections, it is not unusual to have several hundred different ballot styles in a single county for one election.

According to an Electionline.com briefing issued in October of 2005, the State of Nevada reported that it took a four-person team a total of four hours to manually audit just one paper roll at a rate of four minutes per ballot. Nevada was conducting this study as part of the required one percent manual audit required by their state.

More recently, a pilot project conducted in Cobb County, Georgia revealed that it took 312 person-hours (five working days) to do a manual hand audit of 967 votes cast for all races on a ballot in a single precinct at an average of three - eleven minutes per ballot. As a comparison point, in 2004 Cobb County had to recount a statewide Court of Appeals race. There were 91,301 ballots cast in that race in Cobb County. Based upon the pilot project it would have taken approximately .63 minutes per ballot to count that one race. By using ten counting teams the task would have been complete in twelve days or 958 person-hours.

One often-overlooked fact is the tight elections calendar that many states and local jurisdictions face. For example, in Georgia, a candidate must receive at least 50 percent of the vote to avoid a runoff election. Due to the high number of

candidates who generally qualify, runoff elections are the norm rather than the exception. Runoffs are required to be held in just mere weeks after the election. In order to prepare ballots and ready equipment for a runoff, results of an election must be officially certified as expeditiously as possible thereby mandating a time frame for certification of no more than 10 and in many cases just 7 days. Using the above two examples of Nevada and Georgia, a required hand counted audit (even in only one race) would cause chaos with runoff election schedules.

In addition to manual audits, there are several commonly accepted methods for conducting software audits. These tools and processes should not be overlooked as an alternative to hand counts. If the purpose of the hand count is to audit the electronic voting device, then there also exist ways to review machine internal audit logs and software code to assure that there exist no anomalies in a given election.

### **Disclosure of Source Code**

“Disclosed Source Code” is different from “Open Source Software.” Disclosed Source Code is software source code that is made available for review and Open Source Software is a development methodology where individuals from the public are invited to contribute to the development of the software product. Current voting systems undergo certification, inspection and review processes which provide authorized reviewers with access to software source code and reports on system performance, in a form of “disclosed source.”

**To enhance the transparency of source code, ETC member companies support the development, by the Election Assistance Commission, of a program designed to allow qualified reviewers an opportunity to review the source code of the manufacturer’s proprietary software.** This review should be conducted under an established set of rules and regulations designed to ensure security of voting systems while also protecting vendors from copyright infringement.

Source code is currently provided or “disclosed” in a number of ways. First, it is provided to the Voting System Testing Laboratories (who are accredited by the EAC) for use in testing and certifying voting systems. Many states also require the manufacturer’s source code as part of their certification and review process; in every instance that source code is provided. Some customers and states require the manufacturer’s source code be escrowed and the source code is provided under escrow agreements. The EAC also requires that the executable software compiled from the certified source be submitted to the National Institute of Standards and Technology (NIST) for the generation and public

posting of digital signatures (“hash codes”).<sup>1</sup> Jurisdictions can use these hash codes in performing tests on the voting system software to verify that they have the correct version of certified software.

Should source code be disclosed to anyone who desires to obtain access to it? Certainly it should be made available in a number of instances and circumstances, but careful thought needs to be given to full unfettered disclosure. The common goal is secure voting systems and to improve the public’s confidence in those voting systems. To reach this goal it is important to ask the question, “What is the potential risk involved or unintended consequences?” Individual reviewers with personal agendas or insufficient knowledge of voting technology or the vagaries of election law in multiple jurisdictions may raise a red flag on a voting system without warrant and with little or no time for election officials to react prior to an election. These actions would only serve to undermine the public’s confidence in the voting system, possibly for legitimate reasons, but also possibly for nefarious political purposes.

It is possible that full disclosure to any person could result in providing a potential hacker with the ability to defraud an election. Recently someone claimed to have created a key to a Diebold voting unit’s compartment by simply printing a picture of the key from a web site and subsequently created a key made from the design. Many of those who are adamantly calling for full disclosure, to any person, are the very same people who called the release of this key a security flaw. The key merely opens a compartment that contains the printer and/or battery compartment. The key is just one layer of the defense provided on the devices, just as keeping the source code confidential is a layer of defense. It is not the only defense in the software; however, providing the source code to the public removes that layer of security and could make it easier for someone to attempt to defraud an election.

Finally, one important aspect of this discussion that is often overlooked -- current legislative proposals make no distinction between disclosure of source code created by the voting system manufacturers versus the source code of third party software such as Microsoft Windows CE which is used as an operating system for parts of some voting systems. These third party packages are useful in designing robust products, as the manufacturers don’t have to re-invent a wheel that has been tried and true by other developers. Voting systems utilize small quantities of these third party software programs compared to the volume that the third party software manufacturer sells. Legally, manufacturers cannot provide source code for these third party software programs or provide the names of the programmers involved in the creation of the third party software.

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<sup>1</sup> <http://www.nsrl.nist.gov/votedata.html>

## **Paper of Durable and Archival Quality**

Some previous legislative proposals called for a ban on the use of thermal paper to produce a VVPAT. Current proposals say that the paper must be of durable and archival quality that can meet federal retention requirements. There are many myths surrounding the use of thermal paper. Thermal paper has vastly improved and evolved from the early years when it was first developed. The facts are that the thermal paper used in voting systems can easily be maintained in a readable form for the required retention period for federal election records. In fact, the paper used by many voting equipment manufacturers will last for at least 5 years, if not longer, when stored properly. There are many grades of thermal paper available on the market, however, the thermal paper used in voting systems and ATMs is of a much higher quality than the paper used by some retail store cash registers. Tests on ATMs have shown that *thermally printed receipts last longer* than those printed using printers with ink ribbons, even when exposed to direct sunlight. The ink from the ribbon fades while the thermal image does not.

There are other methods of printing to paper, however, by comparison: laser printers are large, very heavy and do not readily support battery back-up; Ink Jet printers contain fragile parts and the cartridges are often prone to clogging; Inked ribbon printers are fairly inexpensive but they rely on the use of ribbons which dry out quickly and the readability is substandard in comparison to thermal paper.

When first introduced, many years ago, thermal printers and thermal paper experienced problems. The chemicals used to make the paper sensitive to heat would degrade over time thereby making the paper dark and unreadable. *Like all emerging technologies those problems have long since been solved and thermal paper has become an industry standard for quality print.*

Even with great technology, if the thermal paper is loaded incorrectly, then there is no text printed on the VVPAT. In an effort to reduce that human error, some manufacturers have added grayed text to the backside of the paper that warns the poll worker with the following language "WRONG SIDE PLEASE RELOAD CORRECTLY". These and other efforts can further ensure that the best possible paper record will be produced.

## **Accessible Voting Equipment**

HAVA opened doors for voters with disabilities by providing the means to allow every voter to cast his or her ballot independently. In states and jurisdictions all

over America we have heard moving testimonials from voters who cast a private and independent ballot for the very first time. Proposed amendments to HAVA are designed to strengthen this accessibility and ETC member companies firmly support the rights of all Americans to cast ballots privately and independently.

It must be noted, however, that legislative language which requires the disabled community to verify a VVPAT record independently is currently problematic: there are many issues of feasibility and usability that require more thought and supporting research to identify solutions to these concerns. It may be easy to state that an automated reader can be used to convert the text on the paper to an audio output, but that will only help for those languages that are supported by common text to speech readers. There are concerns that graphical languages, such as Cantonese cannot be so easily accommodated.

For verifying the VVPAT with audio, there are usability concerns. If the text to speech reader is to be a separate independent system, then the voter must transfer his or her headset to that independent system. Considering the general capabilities of human memory retention, verifying anything but a short ballot would involve transferring the headset back and forth between the voting device and the independent verification system. This process would greatly decrease the usability of the voting system for the voter.

This requirement is a good idea, and one day there may be a solution that is practical, usable and cost effective, but there needs to be more meaningful dialogue and supporting research in this area before it is made a statutory a requirement. This requirement for an accessible VVPAT can be met through alternative systems. This will require jurisdictions to provide extra voting systems at each polling location where the use of electronic voting is the chosen method of voting.

### **Reel-to-Reel VVPAT**

Proposed language requires that *"The voting system shall not preserve the voter-verifiable paper ballots in any manner that makes it possible, at any time after the ballot has been cast, to associate a voter with the record of the voter's vote."* Clarification needs to be provided regarding the intent and meaning of this language. Is it designed to eliminate the use of reel-to-reel canister paper rolls? If so, this language would effectively eliminate the use of most existing electronic voting systems that produce a VVPAT. Jurisdictions have successfully administered elections using the reel-to-reel form of VVPAT by ensuring that administrative procedures are implemented to guarantee that a voter's ballot remains secret. Many VVPAT devices are treated as locked ballot boxes and deny access to

inspection until the lock is opened, thus detecting any tampering or inappropriate inspection.

While future systems may evolve through research and development that provide for cut sheets or individual paper trails, today's current VVPAT voting systems in the field today rely heavily on the use of paper rolls. There are many reasons for using this form, including ease of use by poll workers, ease of auditability, and for the simple reason of providing and archiving the paper records in a compact form for storage and retention.

Research and development should continue in this area; caution should be urged in eliminating the type of technology currently employed by hundreds of jurisdictions. If new products are to be implemented to accommodate this new form of VVPAT, it could take anywhere from a total of three to five years to bring such devices to market after standards have been approved. The development time is not the only consideration in this assessment. The time required to federally test and certify the product will take several months. In addition, state testing requirements and certifications could take from one month to a year before procurement, delivery and implementation could take place. Delivery would depend on manufacturing capacities to meet the demands and the time to implement would depend on the quantity of machines that required upgrade or replacement, and the resources available to perform the implementation. Election official and poll worker training is an additional consideration, as a local jurisdiction would require about three to six months for preparing to use the devices in an election.

Security of the vote is often handled as a procedural matter. Millions of ballots are cast in this country as absentee by mail ballots. The path to tie a voter's ballot to the voter is actually quite simple in this method of voting; yet voting officials rely on procedures to separate the voter from his or her ballot for anonymity. Such a process for VVPAT is certainly at least as secure as absentee mail balloting.

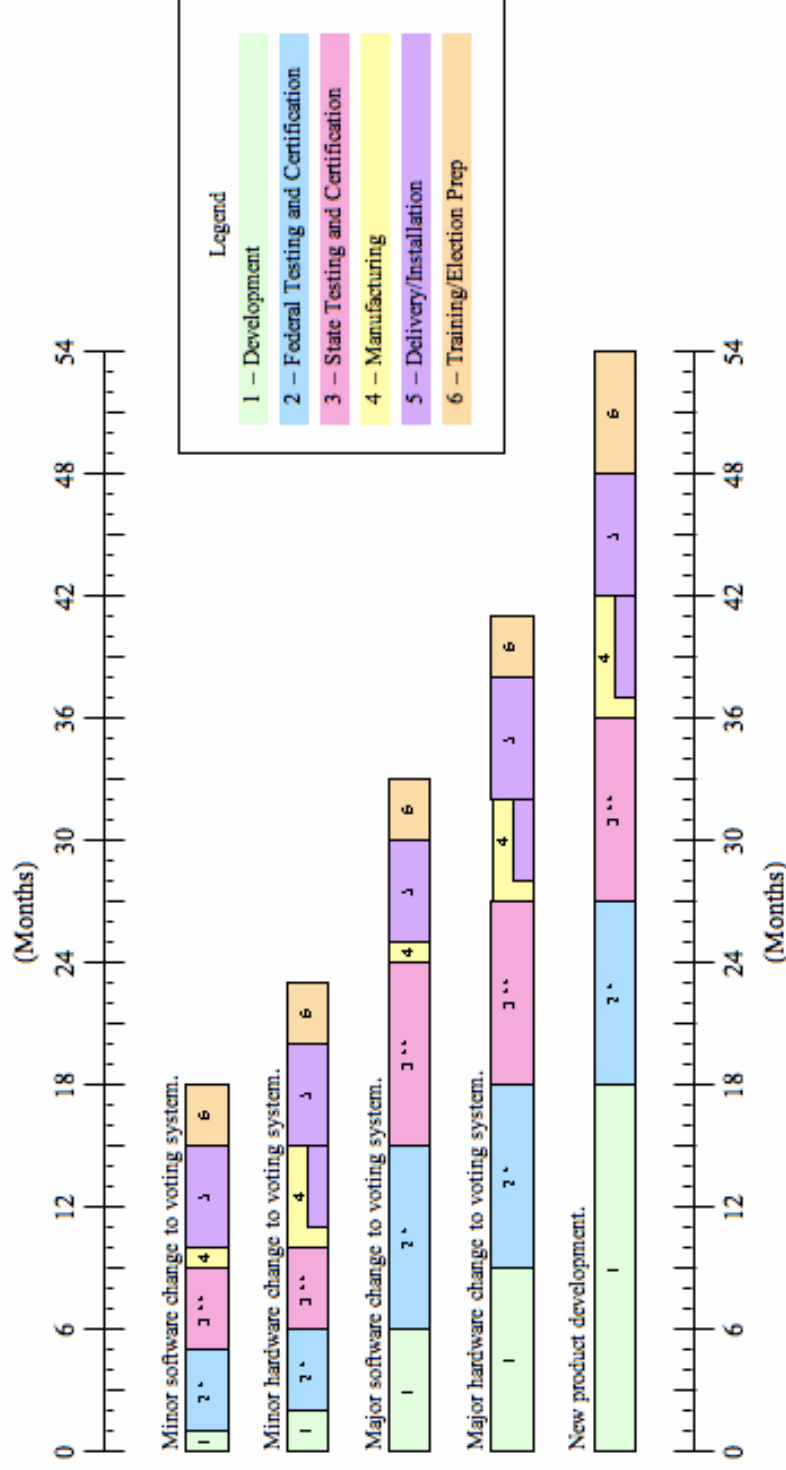
### **EFFECTIVE DATE OF STATUTORY CHANGES**

In the context of implementing technological changes to voting systems currently in use, the effective date of statutory changes to HAVA need to be carefully considered. The 2008 presidential primaries are moving forward on the calendar every week and February 2008 primaries are less than one year away. Even assuming swift passage of HAVA legislation in 2007, it is too late to implement change in time for the 2008 federal elections. Changes to voting systems can take anywhere between eighteen months to four and a half years to finally deploy into the field, depending on the complexity of the changes. Based on experience



with certifying voting systems, below is an example of the anticipated timelines for implementing any changes to voting system configurations.

## Timelines to Implement Changes to Voting Systems



\* Note: The EAC's program for certifying voting systems is a new program. There is currently no historical data to use as a basis for estimating timelines. The time required for Federal Certification may be shorter than projected above or longer based on the test plan for the proposed change. The time frames noted above include voting system testing at an EAC accredited laboratory.

\*\* Note: State Certification time frames also vary from state to state.

## WIRELESS TECHNOLOGY

Wireless transmission capabilities exist in some electronic voting systems and related components in the field today and have been in use successfully and securely for many years and are particularly beneficial for large jurisdictions so they can transmit preliminary, unofficial voting system results in an expedient manner.

For example, in the case of one piece of voting equipment in use today, a version of Sequoia Voting Systems' HAAT, the results from both precinct electronic voting units and optical scanners are consolidated, consolidated reports are generated, and consolidated results are transmitted via telephone networks or wireless cellular networks to a central count system.

This approach is secure because the transmission hardware components employed by the HAAT do not respond to data transfer requests from outside entities. The software running on the HAAT lacks the capability to respond to these requests. This has been confirmed by source code audits done by independent third party auditors. In addition, the HAAT transmission process has a very specific and highly secure protocol. If any step in the protocol is skipped, interrupted or otherwise manipulated, transmission will be unsuccessful.

The HAAT's transmission scheme and that of other wireless devices used in the election environment today has been implemented to provide a level of top security equivalent to that used in reputed Internet banking systems. Whether transmission occurs via PSTN lines or wireless cellular networks, it is executed in a very secure manner.

We believe that specific technology should not be limited or abolished, but should adhere to appropriate federal guidelines for security as well as state requirements.

It should also be noted that this secure wireless transfer occurs only AFTER the polls on the system have been closed. Closing of polls on the systems LOCKS the units from further additional balloting. It should also be noted that the electronic transfer is not the official record of the vote. All individual device memory devices, results tapes, and audit records are then collected, and accumulated as the official record of the vote. Any discrepancies are easily noted by a comparison of results from electronic/wireless modem transfers to the physical accumulation of the actual voting device memory devices, precinct results tapes, and audit records.

## SUMMARY

The members of the ETC fully support any reasonable proposals that increase voter confidence and ensure accuracy, auditability and reliability in elections. This paper is designed to point out areas that need careful review and attention to ensure that Congress's focus on providing more confidence in elections is not overshadowed by unintended consequences.

Congress and many State legislatures have indicated a strong desire to increase the availability of early voting. Voters have also expressed their support of early voting and the trend today is to expand this service as well as the concept of "vote centers" whereby an individual is not locked into voting at a certain precinct but rather may vote at a more convenient location. If the requirements placed on electronic voting become too onerous, many jurisdictions will simply replace their existing electronic voting equipment with optical scan ballots. While optical scan technology presents a perfectly acceptable form of voting, in many instances it makes early voting impractical and expensive for many jurisdictions, as the need to have all ballot styles on hand in a paper form and in sufficient quantities for all required languages required in the jurisdiction for an early voting location is not always feasible. In fact, many jurisdictions adopted electronic voting as an alternative to paper balloting long before HAVA was legislated to solve the many complexities of early voting using a paper-based system.

Much of the focus of the proposed legislation has been directed at electronic voting. However, any type of voting system used in this country has been found to be imperfect when appropriate procedures and processes are not established and followed. Accordingly, it is the view of the ETC that what is at issue is not the technology per se, but rather the implementation and use of the technology. Technology is certainly a useful tool in improving elections, but it cannot by itself assure perfect election. Election integrity is comprised of people, processes and technology, not just the technology so all must be considered.

Electronic voting has proven in numerous studies to dramatically reduce undervotes and eliminate overvotes. The huge number of recorded undervotes in Florida's 2000 election is what started the catalyst toward election reform. This is one area in which no one can dispute the facts. In the state of Georgia in 2000, over 94,000 votes or 3.9% of the total votes cast for the office of President were not recorded. In 2004, after the introduction of state wide electronic voting, the unrecorded total dropped to just 0.39 percent. The state of Maryland's undervote rate has improved by 40 percent and is now ranked as the best in the nation. The results are a testimonial to the original intent of HAVA - to make every vote count.