Testimony of Juan E. Gilbert
Before the U.S. Senate Committee on Rules and Administration
July 30, 2008

Chairman Feinstein, ranking member Bennett and members of the committee, thank you for having me here today. My name is Juan E. Gilbert. I have been a faculty member in the Computer Science and Software Engineering Department at Auburn University since 2000. I am also a Fellow in the Center for Governmental Services at Auburn University. I have an extensive research background in the design, implementation and evaluation of human-centered computing applications. With respect to electronic voting, my research team at Auburn University has developed a functioning prototype of an electronic voting system called Prime III. As a result of our research efforts, I have much to contribute to the discussion of the proposed bill.

I will be addressing sections 2, 3, 4, 6 and 10 of the Bipartisan Electronic Voting Reform Act of 2008 and I will comment on existing research that has been conducted by my research team.

Let me begin by congratulating you all on the proposed bill. After careful review, I strongly feel the proposed bill covers the much needed areas of verification, security, audits and research and development. This bill is broad reaching in its impact with respect to defining a set of goals and providing future innovation to achieve those goals.

Section 2 of the proposed bill addresses methods of independent verification. The bill proposes that independent verification will be required on every device used in elections. All citizens need the ability to independently verify their ballot. The bill continues on to require that the verification device is actually independent of the voting device. I completely support this notion of an independent device that does the verification. In our banks, stores, and other public areas, we have video cameras and other devices that are independent of the transaction environment. Thus, it is only appropriate that a similar model is used in our election systems. When the voting device generates the verification record this presents an opportunity for manipulation. The verification record should be independent of the voting device. Section 2 contains a list of possible verification mediums, which include paper. I know there are strong supporters of paper verification and this bill supports them, yet it also provides for future innovation. In addition to paper, electronic records, audio, video, and pictorial records, the bill states, "permits verification through the use of (VI) another independently produced record". This is a critical point in section 2 because it provides for future innovations that may not exist today.

Section 2 also provides for independent verification for individuals with disabilities using the same verification devices specified under paragraph (A) of section 2. This section not only requires that people with disabilities be able to verify their ballots using the same devices as those without disabilities, it also requires that they can do so privately and independently. Empowering all disabled citizens is critical to the fabric of our society. If you are born with a disability or you acquired a disability later in life, you will have equal access to voting under the proposed bill, as it should be. Through technology and innovation, we can provide this type of access to every citizen. Keep in mind, people are living longer. As the senior population grows, so will the need for accessibility in all areas of society. Our wounded veterans that have sacrificed their bodies for our freedom deserve the ability to privately and independently participate in our electoral process as well.

Section 3 of the bill describes audit requirements with respect to the independent verification records. The bill requires that audits be conducted in a public and transparent manner. The bill also requires for manual audit capability with respect to the independent verification records created by the devices specified under paragraph (A) of section 2. These requirements are necessary goals that support the development of protocols and processes that enable more accurate and open election audits. The bill set the goals and provides a mechanism for achieving them through research and shared knowledge of best practices. This is a much needed requirement in order to achieve voter confidence in the results of our elections.

Section 4 discusses election security and this is probably the most controversial area of the bill. The bill requires chain of custody protocols and software disclosure through a testing and certification process, which is discussed in detail in section 5. The chain of custody protocols are a necessity for building confidence in our elections. The proposed State approved chain of custody protocols are a step in the right direction towards building voter confidence in our electronic voting technologies. The bill also provides protection for the vendors' intellectual property through proposed safe guards with respect to conflicts of interest and full disclosure of the software. This is a good approach to get the vendors to openly participate in the improvement of software for our elections. Voting system software has been brought into question in several of the recent past elections. Requiring software testing and certification through full disclosure should reduce this issue as well. However, I must express my concern for appropriate pricing models for testing and certification. There must be competition in the market place or some price structure set in order to allow vendors to participate in the testing and certification process. For example, if a vendor passes testing and certification, yet a new development occurs that will improve the voting software, the pricing structure for testing cannot be set such that the cost to re-certify outweighs the benefit of the improvement. I don't think the bill should control the pricing structure, but I think this needs to part of the discussion and the public record for implementation purposes if the bill is approved. It is very important that we encourage vendor participation in the testing and certification process.

Section 6 deals with research and development. I want to applaud your efforts to provide funding for research and development. Independent verification, audits, security, accessibility, and all aspects of electronic voting need to be informed by research. This bill provides a solid set of goals for electronic voting and through research and development those goals can be reached. A great deal of research has been done on existing electronic voting technologies and paper based approaches. The new funding needs to support innovations in voting technologies and protocols that aim to provide support for the goals set forth in this bill. A reexamination of current technologies is only necessary to compare them to proposed innovations. The bill makes it clear that pilot testing is necessary as well. I foresee funding that will result in new voting innovations that can be pilot tested with vendors prior to the final testing and certification of the newly developed system. If this process is done correctly, we could see voting system components that are approved or certified in such a way that voting systems can be engineered using certified components much like automobiles and airplanes.

Section 10 makes a recommendation for ballot design. Ballot design is a major problem in voting regardless of the technology medium. Ballot designs should be held to the same level of evaluation as the actual systems. In 2000, the infamous butterfly ballot was a design issue. In 2006, the large under votes in the Florida Sarasota County election was attributed to a ballot design flaw. Bad ballot design can be just as harmful as a computer virus. A process should be defined to test and certify ballot designs, to eliminate this threat. The results of such a process

will yield a group of best practices for ballot designs that can be used by vendors and State officials with confidence. This can be accomplished through research and development funding as described in section 6.

Now I will briefly talk about my research as it relates to this bill. It was within the spirit of equal access for every citizen regardless of ability or disability that my research team developed Prime III. Prime III allows voters to cast their ballots using their voice and/or touch. People that cannot see, hear, read, those with limited mobility and even people without hands can privately and independently vote using our multimodal user interface. Prime III also uses an independent voter verified video audit trail that creates a video record of all the transactions that occurred on each voter's machine. Our approach does not use video cameras. Instead, we directly connect video recorders to each machine such that the voter's identity is not captured on video. Our voter verified video audit trail is an example of an independent verification system that adheres to the goals within this bill. Voters with disabilities and those without can all verify their ballots on the same system using the Prime III approach. We have conducted studies with funding from the National Science Foundation on our multimodal user interface; however, more studies are needed to validate our approach. For example, the public administration program at Auburn University is part of the Prime III team. They would like to investigate election administration models for systems like Prime III. Researchers at UC-Berkeley, Rice University and Stanford University are also interested in doing studies on Prime III. To date, one electronic voting company has adopted the Prime III multimodal user interface and others are evaluating Prime III. Innovations like Prime III need to undergo user testing, software verification, system integration and pilot testing with vendors' existing platforms. Our research project demonstrates the potential impact of federally funded research and the need for innovation.

In summary, I strongly support this bill. It provides a set of attainable goals that will stimulate innovation through research and development giving equal access for all Americans to participate in our electoral process.

I urge the committee to work diligently to pass this bill and provide the necessary funding to improve our elections technologies.

I thank you all for the opportunity to testify here today.

Biography of Juan E. Gilbert

Juan E. Gilbert is the TSYS Distinguished Associate Professor in the Computer Science and Software Engineering Department and he is a Center for Governmental Services Fellow at Auburn University. He also directs the Human Centered Computing Lab. He is the creator of Prime III, an innovative electronic voting system that allows people to cast their ballots using touch and/or voice. Prime III also implements an independent voter-verified video audit trail.

Dr. Gilbert received his B.S. degree in systems analysis from Miami University in Oxford, Ohio and his M.S. and Ph.D. in computer science from the University of Cincinnati.

Further information is available at http://www.juangilbert.com