Testimony, Maryland House Ways and Means Committee

Dr. Aviel D. Rubin
Professor of Computer Science, Johns Hopkins University
President, Independent Security Evaluators
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My name is Avi Rubin. I am a Professor of Computer Science and Technical Director of the Information Security Institute at Johns Hopkins University. I am the director of ACCURATE, a $7.5 million National Science Foundation Center for Correct, Usable, Reliable, Auditable, and Transparent Elections. I am also an election judge in Baltimore County. I am author or co-author of several widely used books on the subject of computer and network security including the upcoming *Brave New Ballot* (Random House, 2006). I received my Ph.D. in Computer Science from the University of Michigan in 1994 in the specialization of Computer Security. I have been researching security issues related to electronic voting since 1997.

I have been invited to testify on House Bill 244 that deals with voting systems and in particular voter-verified paper records.

Why DREs are inadequate:
There are serious security and auditability problems with the DREs currently in use in Maryland:

- There is no way for voters to verify that their votes were recorded correctly.
- There is no way to publicly count the votes.
- In the case of a controversial election, meaningful recounts are impossible.
- The machines must be completely trusted. They must be trusted not to fail, not to have been programmed maliciously, and not to have been tampered with at any point prior to or during the election.

The defenders of the DREs do not account for the ease with which a malicious programmer could rig an election. It is much easier to hide malicious code in software than it is to detect it. Without an external check on the system, a fully electronic voting machine cannot be properly audited. Research needs to be done on how to design auditable and voter verifiable elections. The best way to achieve this today is with a paper ballot that voters can verify. There is no reason why touchscreen machines cannot be used to generate ballots, but they should not be used to tally votes.

In support of HB244
I believe that the provisions of this bill, if enacted into law, will lift Maryland from having one of the worst voting systems in the country to one of the best and most transparent.

Voting systems such as those described in HB244, with voter verified paper records and random audits do not lend themselves easily to wholesale fraud by the voting equipment. Furthermore, any voting system that qualifies under this bill would produce a tangible and verified record of the votes in the election, so public verification can be performed. In the case of highly disputed elections, voting systems under HB244 would enable even the loser to have confidence in the final result.

I feel strongly that the requirements in this bill to make public all irregularities and voting system failures will enhance voter confidence. I applaud the requirements for transparency that HB244 provides.

I believe this bill is well thought out and addresses all of the important issues with respect to voter verified paper records.

As a Maryland poll worker, I acknowledge that adhering to the provisions of HB244 will make elections more difficult to manage. Thus, it is likely that this bill will face resistance from some members of the Maryland election community. However, the purpose of elections is not to optimize for ease of administration, but to maximize the chance of a correct outcome that is representative of the will of the people. I do not think that HB244 places an unreasonable burden on the running of elections.

Paper verification is the best there is today. It is the most transparent technology – easy to explain to anyone. It is countable and recountable. Retail fraud is possible with paper, as with any technology, but wholesale fraud is not.

Recommendations
In several places (pg 4, lines 23-26, page 6, lines 1-6, page 7, lines 12-14, the bill states that if there is an irregularity, the paper record shall be the true and correct record. In each of these sections I would end by adding the following text: "unless a court of competent jurisdiction finds clear and convincing evidence of substantial fraud in the paper records."

On page 5, line 20, add the words, "and will not be changed after being certified." This has been a problem in past elections in California.

On page 6, line 27, change "those polling places" to "additional randomly selected polling places". If a discrepancy is found, then more polling places need to be audited.

I would also recommend stating in the bill that the random selection of polling places, chosen for manual audit, be done after the polls close. For security reasons, it should not be known to anyone at the time of the election which polling places will be audited.

My final recommendation is not necessarily for this bill, but I think it is important that any systems that are part of the voting process that uses software should be required to have publicly viewable source code and binaries.

Conclusion
HB244 would make elections in Maryland more transparent, more secure, and more easily audited. I give this bill my full support, and I sincerely hope that it becomes law.

Biography

Dr. Aviel D. Rubin is Professor of Computer Science and Technical Director of the Information Security Institute at Johns Hopkins University. He is also the director of the NSF ACCURATE center. Prior to joining Johns Hopkins Rubin was a research scientist at AT&T Labs. Rubin is author of several books including *Brave New Ballot* (Random House, 2006), *Firewalls and Internet Security*, *second edition* (with Bill Cheswick and Steve Bellovin, Addison Wesley, 2003), *White-Hat Security Arsenal* (Addison Wesley, 2001), and *Web Security Sourcebook* (with Dan Geer and Marcus Ranum, John Wiley & Sons, 1997). He is Associate Editor of IEEE Security & Privacy, and an Advisory Board member of Springer's Information Security and Cryptography Book Series. Rubin serves on the board of directors of the USENIX Association and is a member of the DARPA Information Science and Technology Study Group. He is co-author of a report showing security flaws in a widely used electronic voting system that focused a national spotlight on the issue. Rubin also co-authored an analysis of the governments planned SERVE system for Internet voting for military and overseas civilians, which led to the cancellation of that dangerous project. In January, 2004 Baltimore Magazine name Rubin a *Baltimorean of the Year* for his work in safeguarding the integrity of our election process, and he is also the recipient of the 2004 Electronic Frontiers Foundation *Pioneer Award*. Rubin has a B.S, ('89), M.S.E ('91), and Ph.D. ('94) from the University of Michigan.