

December 5, 2012

The Honorable Barack Obama  
President of the United States  
The White House  
1600 Pennsylvania Avenue, N.W.  
Washington, DC 20500

Dear President Obama:

We agree wholeheartedly with your call to eliminate long lines in voting. Citizens should not have to choose between waiting for hours to exercise their right to vote or being disenfranchised. However, our nation was lucky. The Presidential election results could have been much closer, and there could have been disputes about who rightfully won. Since many swing states still use computerized direct-recording electronic voting machines (DREs – typically touch screens) that produce results that cannot be independently verified, recounts would have been impossible. Well-designed voting systems allow verification of the results without reliance on software.

The use of paper ballots counted by optical scan machines has proven to be effective at avoiding the problems that resulted in long lines in many states. If a voter is required to mark his or her entire ballot on a DRE, and if there is an insufficient number of DREs, long lines such as those that occurred in the recent election are inevitable. Adding privacy booths for marking paper ballots is far less expensive than purchasing new DREs.

As equipment ages, any electronic voting technology will experience failures ranging from power problems to breakdowns. Such failures of DREs in many polling places in the 2012 election were additional factors in creating long lines. Precinct-based optical scan systems, however, need not create excessive delays, because many voters can mark their paper ballots simultaneously. It takes very little time to feed a paper ballot into an optical scanner. If the scanner is not working because of a technical failure or a power outage, voters can still deposit their paper ballots into ballot boxes for later counting.

Voting systems in current use are run by unobservable software that can produce erroneous results, either due to inadvertent errors or malicious attacks. Therefore, after an election it is imperative to check that the software has behaved correctly. That means that election results need to be audited independently of voting system hardware and software to make sure that the software has performed correctly, and it must be possible to recount all the votes in order to confirm the election results.

The outcomes of an election that uses optical scan machines can be verified by manually examining a randomly selected set of paper ballots (a post-election ballot audit) for which a sound chain of custody has been maintained. A properly conducted audit will either confirm that the machine results are correct or will determine the correct results by a full hand recount, if necessary. Discrepancies uncovered by post-election ballot audits should be reported and analyzed.

By contrast, although some performance information can be obtained, it is not possible to conduct a meaningful audit or recount of elections using paperless DREs, nor is it possible to determine that the electronic results are correct. DREs are not needed for voters with disabilities, since accessible ballot marking devices that produce paper ballots that can be audited and recounted are now available.

Internet voting (the return of voted ballots over the Internet including fax and e-mail) has been

proposed as a solution to long lines at the polls. But since it is vulnerable to attacks from anyone/anywhere, Internet voting must not be allowed at this time. In addition to security and accuracy risks, Internet voting threatens the secret ballot, which is key to avoiding voter coercion and vote buying and selling. The secret ballot was originally instituted not as a right that an individual can waive, but rather as an obligation of the government to protect all citizens from coercion and intimidation as they cast their votes. Because of multiple intrinsic risks, Internet voting should be forbidden unless and until proposed systems have undergone extensive, independent public review and open testing to ensure that they have solved the fundamental problems of security, privacy, authentication, and verification.

Finally, to improve future elections we need to start measuring and publicly reporting poll wait-times, the accuracy of vote counts, and all incidents that interfere with the conduct of a free and fair election. All federal contests should be audited and, if the audits uncover problems, fully recounted.

In summary, we strongly recommend Federal legislation to prohibit Internet transmission of cast (marked) ballots in Federal elections and to encourage local governments to replace aging DRE voting systems with paper ballots tabulated by precinct-based optical scan machines. These two steps will greatly enhance our national capacity to ensure both that every ballot is recorded as the voter intended and counted as cast, and that the results can be verified as accurate.

The signers of this letter include elections officials, as well as experts in cyber security, election law, post-election audits, election integrity, and accessible technologies. We would be delighted to be of assistance in any way possible.

Our great democracy deserves voting systems that facilitate the act of voting without creating long lines and that attain the highest standards of accuracy, accessibility, reliability, transparency, and security.

Respectfully,

[AFFILIATIONS ARE FOR IDENTIFICATION PURPOSES ONLY]

Contact: **Barbara Simons**, IBM Research (retired); member, EAC Board of Advisors; Chair, Board of Directors, Verified Voting; Former President, ACM; Coauthor, *Broken Ballots: Will Your Vote Count* [simons@acm.org](mailto:simons@acm.org) 650-328-8730

**Andrew W. Appel**, Eugene Higgins Professor of Computer Science, Princeton Univ.

**Matt Blaze**, Assoc. Professor, Computer & Information Science, Univ. of Pennsylvania

**Harvie Branscomb**, Colorado Voter Group

**Duncan A. Buell**, Computer Science and Engineering Professor, Univ. of South Carolina

**David Dill**, Computer Science Professor, Stanford Univ.; Board of Directors, Verified Voting

**Susan Dzieduszycka-Suinat**, Overseas Vote Foundation

**Jeremy Epstein**, Senior Computer Scientist, SRI International

**David J. Farber**, Distinguished Professor of Computer Science & Public Policy, Carnegie Mellon Univ.

**Lowell Finley**, Member, EAC Standards Board

**Irene Etkin Goldman**, Voting Rights Advocate, Board Chair, Coalition for Peace Action, Princeton, N.J.

**Mary Ann Gould**, Co-Founder, Executive Director, Coalition for Voting Integrity

**J. Alex Halderman**, Assistant Professor of Computer Science & Engineering, Univ. of Michigan

**Joseph Lorenzo Hall**, Senior Staff Technologist, Center for Democracy & Technology

**Mark Halvorson**, Founder and Former Director, Citizens for Election Integrity Minnesota

**Candice Hoke**, Director, Public Monitor of Cuyahoga Election Reform; Law professor, Cleveland State Univ.

**Representative Rush Holt**, Member of Congress

**Harri Hursti**, Security Researcher, CTO SafelyLocked

**Holly Jacobson**, Co-Founder, Voter Action

**David Jefferson**, Computer Scientist, Lawrence Livermore National Laboratory; Board of Directors, California Voter Foundation; Board of Directors, Verified Voting

**Douglas W. Jones**, Associate Professor of Computer Science, Univ. of Iowa; Coauthor, *Broken Ballots: Will Your Vote Count*

**Earl Katz**, Public Interest Pictures

**Douglas A. Kellner**, Co-Chair, New York State Board of Elections

**Marybeth Kuznik**, Executive Director, VotePA; Judge of Elections, Penn Township, Westmoreland County, PA

**Mark Lindeman**, Adjunct Assistant Professor of Political Science, Columbia Univ.

**Collin Lynch**, Intelligent Systems Program, Univ. of Pittsburgh; Past President, VoteAllegheny; Member, VotePA; Past Co-Chair, Allegheny County Citizen's Advisory Panel on Election Systems

**Margaret MacAlpine**, Advisory Comm. Member, California Post Election Risk-Limiting Audit Pilot Program

**Neal McBurnett**, ElectionAudits (the open source project)

**John McCarthy**, Lawrence Berkeley Nat'l Laboratory Computer Scientist (retired); Verified Voting volunteer

**Dan McCrea**, President and Co-Founder, Florida Voters Foundation

**Walter Mebane**, Professor of Political Science and Professor of Statistics, Univ. of Michigan

**Justin Moore**, Board of Advisors, Verified Voting Foundation

**Michelle Mulder**, Consultant, Verified Voting Foundation

**Peter G. Neumann**, Principal Scientist, SRI Internat'l Computer Science Lab; Moderator, ACM Risks Forum

**Ronald L. Rivest**, Viterbi Professor of Computer Science, MIT

**Lida Rodriguez-Taseff**, Miami-Dade Election Reform Coalition

**Aviel D. Rubin**, Professor of Computer Science and Technical Director of the Information Security Institute, Johns Hopkins Univ.

**Noel Runyan**, President of Personal Data Systems, Campbell, CA.

**Ion Sancho**, Leon County Supervisor of Elections

**Bruce Schneier**, Chief Security Technology Officer, BT; Security technologist and author

**Kevin Shelley**, Former California Secretary of State

**Stephanie Singer**, Philadelphia City [Elections] Commissioner

**Pamela Smith**, President, Verified Voting

**Howard Stanislevic**, Founder, E-Voter Education Project, NY, NY

**Philip B. Stark**, Professor and Chair, Department of Statistics, Univ. of California, Berkeley

**Paul Stokes**, United Voters of New Mexico

**Penny M. Venetis**, Clinical Prof. of Law, Judge Dickinson R. Debevoise Scholar; Co-Director, Constitutional Litigation Clinic, Rutgers School of Law-Newark

**David Wagner**, Professor of Computer Science, Univ. of California, Berkeley

**Luther Weeks**, CTVotersCount

**Rebecca Wilson**, Co-Director, SAVE our Votes: Secure, Accessible, Verifiable Elections for Maryland

cc: House Committee on Judiciary  
House Committee on House Administration  
Senate Committee on Rules and Administration  
Congressman Gerry Connolly  
Congressman George Miller  
Congressman John Lewis  
Senator Chris Coons  
Senator Mark Warner  
House Speaker John Boehner  
House Minority Leader Nancy Pelosi