

COOPERATING NONPROFIT ORGANIZATIONS & INDIVIDUALS
Dedicated to Fair & Trustworthy Elections

February 12, 2010

The Honorable Eric Holder
Attorney General
United States Department of Justice
950 Pennsylvania Ave. NW
Washington, DC 20530-0001

Christine A. Varney, Assistant Attorney General
Antitrust Division
U.S. Department of Justice
950 Pennsylvania Avenue, NW
Washington, DC 20530-0001

Thomas E. Perez, Assistant Attorney General
Civil Rights Division
U.S. Department of Justice
950 Pennsylvania Avenue, NW
Washington, DC 20530-0001

RE: ES&S Purchase of Diebold/Premier: Remedies for Unlawful Concentration of Market Power and Other Public Injuries Within DOJ Jurisdiction

Dear Attorney General Holder, Assistant Attorney General Varney, and Assistant Attorney General Perez:

The undersigned organizations and individuals possess nationally recognized expertise in voting systems technologies, local and State election administration, and in removal of barriers to voting participation. We have cooperated in the preparation of this letter that seeks to address appropriate remedies for ES&S's anticompetitive disruption of the relevant markets and the threats thereby posed to American election integrity.

We are deeply concerned about the public impact of ES&S's purchase of Diebold's Premier Election Solutions, Inc. ("PESI"), referenced here as the "merger." Fortunately, the Federal Government has expedited its research into purchaser ES&S's accelerated absorption of PESI assets into ES&S and the business goliath's concerted attempt to achieve a *de facto* dissolution of PESI before the DOJ can act.

We commend the DOJ's Antitrust Division ("AD"), the U.S. Senate Rules Committee, and the Congressional Research Service for their swift research to document and assess this merger's legal, economic, and fiscal impact on voters, election administration, taxpayers, local and State governments budgets, and other public interests.

Based on our extensive experience in the voting systems equipment, procurement and services arena, we would like to bring forward an outline of antitrust remedies that we believe would redress the major market injuries and the merger's broad-based detrimental public impact. We additionally would like to request that the Department of Justice utilize other statutory authority, pursuant to U.S. voting and civil rights laws, to rectify public injuries that have been sustained or that are threatened by this merger.

As you know, we do not have access to the evidence the Government has gathered and evaluated. Our expertise in the voting systems and services markets, however, and our review of public domain information, lead us to conclude that the Government will likely have documented substantial current and threatened antitrust injuries that warrant DOJ's intervention. For purposes of setting forth important remedies that are needed to protect the larger public interest in legitimate elections with accurate vote counts and correctly reported election winners, we set forth the following propositions as our working assumptions.

I. Anticipated Factual & Legal Conclusions

A. Discrete Markets Have Suffered Harms Cognizable as Antitrust Injuries

ES&S's business conduct, and particularly its purchase of PESI, impacts a number of separate markets that collectively constitute the election administrative goods and services marketplace. In addition to the high expenditure/capital goods voting equipment market, other discrete election products and services markets have been and continue to suffer injuries traceable to this sale/merger. These discrete markets, which previously were largely comprised of smaller local or regional companies, include:

- Ballot design
- Paper ballot printing (which may include absentee ballot mailings)
- Election Day precinct supplies & support
- Programming of e-voting machines, other technical equipment
- On-site election office support services
- Maintenance services for technical equipment (voting and registration devices and servers)
- Election readiness testing of technical equipment (voting and registration devices and servers)

Some vendors operate in only one of these markets while others are market participants in several of these areas.

B. Unlawful Anticompetitive Impact

The merger has generated anticompetitive impact on election equipment and services markets, including excessive control over the relevant markets. This market power in turn has produced or will produce:

1. High barriers to market entry for prospective new vendors, and high barriers to other vendors in their attempts to negotiate continuation of their contractual relationships;
2. Fewer governmental-customer choices in voting system products, support services, packaged combinations, and contractual-pricing terms; and,
3. Artificially inflated prices and other coerced contractual terms.

C. History of ES&S Anticompetitive Market Conduct:

Buyer ES&S's record of anticompetitive market conduct includes:

1. Legally proscribed tying arrangements to achieve vertical integration and market dominance;
2. Predatory pricing of goods and services; and
3. Threatened breaches of contracts on the eve of elections, unless the election jurisdiction agreed to ES&S's unilaterally determined price increases for essential goods (e.g. ballots) and services (e.g., technical maintenance and testing of voting equipment) that had been previously negotiated and approved for local or State fiscal planning.

D. ES&S Conduct Post-Merger Designed to Obstruct DOJ Remedial Options

ES&S engaged in conduct which appears to have been deliberately designed to vitiate the Antitrust Division's (AD) scope of available remedies, and specifically the Government's ability to unwind the sale as by a divestiture of PESI. Given the market share of the resulting corporate entity and other factors that justify DOJ review, buyer ES&S should reasonably have known that DOJ-AD would examine the merger. ES&S conduct that sought to obstruct DOJ's vindication of the antitrust laws and larger public interest includes:

1. Taking physical possession and control of all PESI intellectual property and business records within a few days of the sale/merger;
2. Rapidly renegotiating contracts with local election jurisdictions, to transfer them to ES&S products and services at steep discounts if the contracts were executed quickly, thus eviscerating the PESI business relationships;
3. Discharging PESI employees, so that virtually no qualified workforce would remain to manage and execute PESI's business if DOJ required ES&S to divest PESI; and,
4. Undertaking an arguably deceptive sales effort to excise some low-value PESI assets in order to unilaterally and superficially restructure the voting products and services markets, with the objective of superficially restoring competitive market conditions while also not actually reducing or endangering the ES&S dominant market share.

In sum, ES&S's restrictive contractual provisions intensify the dependence of local and State governments on one privately held firm for their mission-critical election operations. ES&S's vertically integrated business model and standard terms greatly reduce the opportunities for smaller vendors to offer goods and services to governmental units. The terms also augment the opportunities for ES&S vendor intimidation of governmental customers in ways that threaten the integrity of elections. ES&S's oligopolistic control over the market (an estimated 70% share) and the injuries inflicted by this degree of market power will likely escalate unless DOJ-AD redresses ES&S's problematic contractual provisions as part of the remedies ordered.

II. Recommended Remedies

The undersigned submit that the history of ES&S's market conduct, its degree of market share, and its current business practices present substantial and ongoing threats to critical markets whose goods and services are currently required to conduct American elections.

We believe DOJ-AD should structure remedies that will restore and improve competition in the relevant markets and also protect the American people's larger interests in verifiably accurate elections that a legitimate, trustworthy democracy demands. No simple divestiture of some few previously PESI-owned assets will suffice to redress existing injuries and prevent imminent, foreseeable harms. Therefore, we urge you to consider imposing the following remedies to protect the democratic system that preserves our Republic.

A. Prohibit ES&S From Conducting Business Under Contractual Provisions that Undermine Competitive Market Conditions and Unfairly Perpetuate Oligopolistic Market Share

Background and Rationale: Standard form ES&S election equipment contracts bar their governmental customers from permitting third parties - which includes smaller vendors - from (a) servicing ES&S-marketed equipment and from (b) modifying such equipment to render it interoperable with hardware and software developed by other vendors or by the governmental unit.

ES&S contracts often also require customer governments that choose ballot scanning equipment to (c) order their paper ballots exclusively from ES&S. In some cases, ES&S's initial pricing for ballots can be described as "loss leaders" that are designed to entice customers from their current vendors, whose business will experience severe losses. ES&S has also mandated exclusivity in providing other election goods and services in a prototypical tying arrangement.

The classic models obtain here, for after forcing other vendors out of business, the market predator can raise prices, even to recover its income losses from earlier loss-leader pricing. The predator's normal ability to raise prices significantly can be augmented by restrictive tying arrangements, like those of ES&S, that bar customers from access to other vendors for the needed goods and services. ES&S contractually requires customers to waive access to other vendors for substitute or alternative goods and services, thus producing a captive

customer base subject to duress and extortionist pricing after ES&S has forced the other market participants to abandon their election products and services business lines.

DOJ Actions Recommended: With DOJ-AD retaining monitoring power over the next 36 months:

1. Void all contracts ES&S has negotiated with former PESI jurisdictions in the post-merger period to the present, as they were products of oligopolistic market-share control and threats (to deprecate-- no longer support--PESI GEMS software and other products). Unless these agreements are voided, ES&S will reap the fruit of its anticompetitive conduct and perpetuate the markets' anticompetitive conditions.
2. Invalidate and prohibit the enforcement of ES&S contractual provisions that vertically integrate in exclusive tying arrangements goods and services that can be separated; apply these prohibitions to all ES&S's existing contracts with election jurisdictions and forbid these clauses in future contracts.
3. Ensure that election jurisdictions possess the legal authority to use their ES&S and PESI voting, registration, and other hardware without being required to use ES&S software.
4. Require ES&S and/or the successor owner(s) of PESI assets to withdraw the plan to deprecate GEMS and other Diebold-Premier equipment and software, and instead to service and support these PESI products for at least 5 years.
5. Require ES&S to divest itself of a specified percentage of the election equipment and services contracts in each State for a minimum of three years. Or, restrict ES&S to supplying goods within only one market - such as the voting systems equipment market -- and then bar ES&S from also providing technical services, ballot design and printing, election support, and equipment maintenance services to the same jurisdiction. In other words, prohibit ES&S from seeking and signing vertically integrated product and services contracts.
6. Require of ES&S, and of any successor entity that purchases PESI assets, to provide to other vendors and service providers who desire to become ES&S product resellers and suppliers: (a) reasonable terms and authority to sell, lease, and service ES&S voting system equipment and other election products; (b) ample supplies of voting system and ancillary products at fair wholesale prices; and (3) inclusion of these resellers and service vendors' personnel in ES&S training programs.
7. Require ES&S to post on a publicly accessible website, human-readable, search-engine usable copies of goods and/or services contracts the firm executes with any government or election jurisdiction, including all appendices, addenda and amendments; also require ES&S to post every contract it currently holds with a government or election jurisdiction to provide election services or products.

B. Require Continuation of PESI's Efforts to Achieve Increased Electoral Transparency

Background and Rationale: In response to a growing demand for more transparent voting equipment that permits greater public accountability, PESI was reportedly taking steps to release some or all of its software code into the public domain. An open system would

enable customers and the public to independently assess the reliability, accuracy, and integrity of the electronic balloting and tabulation systems used in their elections.

In a *New York Times Magazine* article on electronic voting equipment failures, a PESI representative reported his company's stance open source software in technical election equipment. He underscored PESI's desire to increase voter trust and satisfy the growing demand from customers for more accountable, transparent elections systems:

*[T]he Diebold [PESI] spokesman, Chris Riggall, admitted... that the company is considering making the software open source on its next generation of touch-screen machines, so that anyone could download, inspect or repair the code. The pressure from states is growing, he added, and "if the expectations of our customers change, we'll have to respond to that reality."*¹

PESI undoubtedly recognized that open source software not only provides public access to the election tabulation code but that impartial computer scientists can both participate in upgrading the code and scrutinize it closely to identify bugs and other flaws that impede the capacity to produce accurate vote counts.

These PESI's plans to improve electoral transparency and accountability, however, threatened the competitive status quo. If PESI had remained independent, such a move would have radically changed voting system industry practices by increasing the competitive pressure on ES&S to provide its customers publicly accountable voting systems. By purchasing PESI, ES&S eliminated the only major competitor that planned to transform and heighten the public's expectations of voting system accountability.

DOJ Actions Recommended Because ES&S benefitted in legally proscribed ways from its acquisition of PESI, DOJ should require ES&S to continue PESI's work toward increased public transparency and auditability. Steps should include:

1. Require ES&S contracts for goods and services sold for use in U.S. elections to include authorization of election observers and independent computer science consultants (whether local or State-authorized) to assess the system and data integrity, including the equipment's capacity to produce accurate vote totals. DOJ should *inter alia* require ES&S to permit access to the ballot definition files, to the underlying election database(s), and to other electronic data that can be scientifically evaluated.
2. Require ES&S to cooperate fully in any election assessment or inquiry that in any manner questions the performance or accuracy of ES&S products or services, and to permit independent election investigators to have access to all relevant or material information, including the source code, that the investigators consider necessary to the forensic inquiry.
3. Consider requiring ES&S to release into the public domain the Unity, GEMS, and Assure source code and builds, and concomitantly revise these source codes from proprietary to open source. Alternatively, DOJ could require ES&S to make its election equipment software available for frequent auditing and inspection by a select group of experts, such as

¹ Clive Thompson, *New York Times Magazine*, *Can you Count on Voting Machines* (Jan. 6, 2008), at 9.

computer professionals and election integrity advocates.

C. Require ES&S to Continue PESI's Effort to Serve Voters With Disabilities By Identifying Alternatives to the AutoMark Voting Machine

Background and Rationale: HAVA requires States and counties to supply functioning, accessible voting equipment. Compliance with HAVA is essential to ensuring every that person, no matter their disability status, is extended the right to vote privately and independently.

ES&S owns the AutoMARK™ line of voting machines, which is the dominant HAVA-compliant product for voters with disabilities. AutoMARK has become the *de facto* choice for counties and states nationwide. Both ES&S and PESI distributed AutoMARK but PESI was developing an alternative to AutoMARK. Such a move would have provided a much-needed spur to making more options available.

DOJ Action Recommended: Require ES&S to divest itself of the PESI assets related to producing an alternative to the AutoMARK, including research notes and business planning documentation, and transfer to the purchasing firms the PESI research personnel primarily assigned to design and bring to market additional accessible ballot marking devices. *See FTC Divestiture Study*, at 40-41.

D. Require Buyers of PESI Assets to be Qualified to Compete in Jurisdictions that Mandate Paper Ballots

Background and Rationale: A number of electoral jurisdictions require vendors to offer paper-ballot voting systems. As important as this condition precedent is to transparent and verifiable elections, some vendors do not include within their product lines an optical scanner-paper ballot set of balloting and tabulation options.

DOJ Action Recommended: Require all prospective buyers and contractors of ES&S/PESI election jurisdiction business opportunities (that are relinquished as a part of this DOJ challenge) to qualify for the contract by demonstrating they are or would be qualified to offer paper-ballot systems. A vendor's plan to purchase or lease the PESI optical scanning assets and thereby support paper-ballot jurisdictions systems should be considered acceptable satisfaction of the requirement.

E. Require ES&S to Modify Its Voting Systems Design Criteria and Marketing Practices to Permit Interoperability with other Vendors' Components

Background and Rationale: ES&S utilizes proprietary components and unique software data formats that undermine competitive markets and block the realization of the public's interests in transparent and verifiable elections. These design choices thwart election officials' ability to customize their voting system equipment by combining several vendors' products into a functioning voting system. For instance, we understand that Kodak manufactures several high speed, high volume scanner models with performance metrics that exceed those of voting system vendors. Kodak's pricing is considerably lower than the

voting system vendors' pricing for their inferior scanners. But owing to current ES&S system criteria (and to be fair, some jurisdictions' certification rules), election officials cannot choose to combine a Kodak scanner with other ES&S components and save substantial funds.

If DOJ were to require ES&S to adopt strategies that foster interoperability, significant benefits would accrue to the market, to potential market participants, and to taxpayers and voters. Election officials could choose from a broader array of products and services; the relevant markets would experience significantly more competition with many more vendors able to participate; and the cumulative impact would be to exert a substantial downward pressure on voting system pricing.

Local and State governments have sustained dramatic increases in their election administrative costs in large part owing to their being a captive market required to comply with federal election law governing voting technologies. ES&S's refusal to participate in standardizing data formats is one tool by which this vendor exerts excessive control over the voting system market and preempts new competitors, third party suppliers, and service providers.

The omission of standardized data formatting across vendors also imposes barriers between vendors' goods and services, both inter-vendor and intra-vendor. Unable to contract with third-party service and goods suppliers, election offices are thereby consigned to dependence on the voting system vendor, chiefly ES&S, to provide the necessary interfaces and other work that cumulatively permit the voting and tabulation system to function.

These same unique data formats impede public accountability efforts designed to determine whether the machines are accurately counting and reporting votes, and producing useful election records. This "Tower of Babel" result at best, adds expense and complexity to U.S. elections. At worst, the practice opens our elections to the possibilities that particular election results will have been manipulated by foreign interests, in undetectable and untraceable ways. The American people deserve meaningful, honest elections, with standardized data formats that allow larger windows into vote counting and reporting.

DOJ Actions Recommended:

1. Require ES&S to undertake a good faith effort, in conjunction with other election equipment vendors, governmental election policymakers, voter advocates, and independent voting systems scientists, to develop market-wide common data formats and greater standardization of voting system and related election equipment components, and to then to implement the collaborative conclusions into their own products and services.
2. Prohibit ES&S from including contract provisions that bar the copying or printing of output from any ES&S components or software.²
3. Require ES&S to work with election accountability and voter advocacy organizations to ensure that election tabulations, ballot definition files, and all other mission-critical software-produced election outputs can be fully audited.

² For an example of the problematic uses of these contractual barriers, see the "prohibited uses" clause in this contract: http://accurate-voting.org/contracts/IL/Bloomington/IL_bloomington_2003.pdf

F. To mitigate the increased threat to national security generated by this merger, require ES&S to divest sufficient assets, reduce its contractual control over election jurisdictions, and take other appropriate actions.

Background and Rationale: The consolidation of the voting system market resulting from this merger creates a near *monoculture*. That is, a single vendor controls the vast majority of election jurisdictions including those of several entire states. This monoculture creates new risks of “wholesale” election failure, both intentional and unintentional. Since election failure on a large scale has the potential to destabilize the Nation, DOJ should assess and remedy these risks on the basis of their presentation of real threats to U.S. national security. (See Exhibit A attached; Statement of Dr. David Jefferson).

DOJ Action Recommended: Require ES&S to divest sufficient assets, reduce the scope of election jurisdictions subject to its software; and take other actions to mitigate the increased threat to national security arising from this merger.

The undersigned organizations and individuals appreciate the opportunity to recommend for DOJ’s consideration the foregoing remedies for ES&S’s excessive market power and anticompetitive conduct in the elections equipment and services markets. We thank the Department of Justice for investigating this sale and for your sincere efforts to understand and redress the complex public injuries it engendered.

Should you have any questions or desire any additional information, please contact Professor Candice Hoke or Attorney John Bonifaz, who will transfer the requests. The Appendix (Statement of Dr. David Jefferson on national security implications of the merger) follows the signatory list.

Very truly yours,

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Affiliations are for identification purposes only

Exhibit A

14 December 2009

The Hon. Charles Schumer, Chairman
U.S. Senate Committee on Rules and Administration
Washington, D.C.

Dear Senator Schumer,

This letter addresses the subject of the merger between the largest and second largest voting system companies in the United States, Election Systems & Software (ES&S) and Premier Election Solutions (formerly Diebold).

I am a senior computer scientist at Lawrence Livermore National Laboratories¹, working on a daily basis with various national security issues, including cyber defense, space surveillance, and missile defense. I am also an election technology and security expert (see attached bio), having served as a technology advisor to five successive California Secretaries of State, and have been deeply involved in the study of voting system technology for over a decade now.

The merger between ES&S and Premier Election Solutions is troubling in many respects. Others are better qualified than I to comment on the economic, market, and regulatory consequences of an effective national monopoly in the voting systems business. I wish instead to focus only on the technical risks and national security consequences.

I consider election accuracy, reliability, and security to be a key aspect of U.S. national security. The legitimacy of democratic government depends on actual and perceived integrity of elections, and a successful attack on a U.S. federal election would be a national disaster. Election integrity has not traditionally been thought of as a national security issue because elections are administered at the local level and because until recently there was no technical way to subvert an election at a scale larger than a single jurisdiction (although in some cases a whole state is a single jurisdiction). But over the last decade the increased centralization and automation of election processes, while simplifying and speeding election administration in some ways, has also left them much more vulnerable to manipulation and attack.

In what follows I am assuming that the effect of this merger between ES&S and Premier will be the gradual elimination of Premier systems and their replacement by ES&S systems. This will have the effect of creating a voting system hardware and software **monoculture** spanning the vast majority of counties in the United States, including a number of whole states. The fundamental risk of such a monoculture, in which the same systems and software are used almost everywhere in the country, is that it greatly magnifies the accuracy, reliability, and security risks associated with every individual design flaw, software bug, erroneous procedural recommendation and security vulnerability. It has roughly the same effect as planting only a single strain of wheat or corn over large regions of the country, which greatly magnifies the risk of widespread epidemics or insect infestations. A new strain of mold or plant virus, or a new insect introduced that is especially adapted to attacking that single strain of grain may cause vastly greater damage on a national scale than it would if a mixture of different genetic strains of grain were cultivated instead.

¹ The opinions herein are my own, and are not endorsed by LLNL or connected with my employment.

There are several distinct consequences of a voting technology monoculture effect that I wish to highlight here: the effects of bugs, insider attacks, software virus attacks, and loss of innovation. These were already a problem before the merger because of too few vendors and too little competition, but the effect is greatly amplified now.

First, consider the problem of hardware or software **bugs**. Election systems today have nowhere near the testing, usage, or customer feedback volume that ordinary commercial software does, and they are not developed according to the high assurance methodologies that are required for high reliability and security. Voting systems are not noted for their high quality, despite the claims of the vendors and the (very weak) certification program that they undergo. We just have to accept the simple fact that all voting systems today have plenty of bugs at every level, and many are (now) well known and documented. The problem caused by the ES&S-Premier merger is that with only a single source for most of the nation's voting systems, any software or hardware bug will be replicated all over the country, affecting elections everywhere that ES&S equipment is used. The point is *not* that ES&S software is likely to be buggier than the Premier software it replaces, but rather that all bugs will now affect more jurisdictions than before the merger, greatly magnifying their effect. Most jurisdictions have no strong auditing requirements or procedures in place that are capable of detecting the effects of bugs unless they are extremely out of the expected range.

Consider next the danger of **insider attacks**. Every security expert will testify that by far the most dangerous attacks on any organization or system, the attacks that do the greatest damage and are the most difficult to prevent or detect, are those perpetrated by critically placed insiders. Because election integrity is an important national security concern with so much at stake in a general plebiscite, we absolutely must consider the possibility of insider attacks. If one ever succeeded it could be a weapon of mass electoral destruction. U.S. voting systems are not built in controlled national security environments (with citizenship requirements, high security clearances, and strong security apparatus everywhere), but even if they were, considering our terrible national experiences with insider malfeasance at even extremely high-security organizations such as the CIA, the FBI, or WW II atomic bomb program, we would still need to be concerned.

What does this have to do with the merger? Before the computerized voting era the most powerful insiders were election officials, whose control extended only to the votes in a single jurisdiction, usually a county. These days, however, the most powerful election insiders are actually ES&S employees, particularly their programmers, because tens of millions of votes from thousands of jurisdictions all over the country will be collected and counted through the invisible software that they write and that virtually no one else is permitted even to see. Again, most jurisdictions have no strong auditing requirements in place that are capable of detecting a well designed insider attack emanating from ES&S. I am not at all suggesting that an insider attack is likely in any single election, or that it is more likely from ES&S than from Premier or any other organization. The concern, rather, is that the effect of such an insider attack, *if it occurred*, would now reach much farther after the merger than before, because ES&S's systems are used in so many more jurisdictions than before.

Another vulnerability is the possibility of **virus attacks** against voting systems. It has now been known for several years that it is possible to construct special purpose computer viruses that can be easily injected into a few electronic voting machines (DREs), or just one, which can then slowly spread from machine to machine in a jurisdiction until a large fraction are contaminated. Such viruses can swing elections in any direction the virus writer wants, leaving no evidence behind. ES&S iVotronic machines are vulnerable to such attacks (as are those of several other vendors, including Premier), and neither the vendor nor the EAC has moved to correct the problem. Once again, the point is not that ES&S's systems are more vulnerable to viral attacks than other vendors', but rather that virus attacks of this kind will spread among the systems of a single vendor, but will not cross the boundary to those of another vendor. Hence, the more widespread the usage of a single vendor's systems, the more dangerous such an attack would be. The merger, by creating a software monoculture among DREs, exacerbates this already extremely serious problem.

Finally, I want to comment about the likely effect of the merger on voting system innovation. Past experience with technology monopolies (AT&T in the 1950s and '60s, IBM in the 1960s and '70s, Microsoft in the 1990s) suggests that they inevitably suppress more innovation than they create. They usually tend to protect their products and markets rather than to take risks investing in changes that undercut their current businesses. Innovation is driven more by the effects of competition than by the market leader's own actions, and the less competition there is, the easier it is for the market leader to coast, and sometimes even suppress innovation. The voting system industry is desperately in need of responsible reliability and auditability innovation, and I fear that an industry overwhelmingly dominated by a single vendor will not be motivated to lead in that direction.

Thank you for your consideration of this letter. If I can be of further assistance, please don't hesitate to contact me.

Sincerely,

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Election Bio for Dr. David Jefferson

Dr. David Jefferson is an internationally recognized expert on voting systems and election technology. He has been a pioneer in research at the intersection of computing, the Internet, and elections for 15 years, and has been an advisor to five successive Secretaries of State of California on technology-related issues.

In 1994, in the earliest years of the web, Jefferson developed the California Election Server in cooperation with Acting California Secretary of State Tony Miller, Digital Equipment Corporation, and the California Voter Foundation. This was the first web server anywhere to provide online voter information on candidates and issues, as well as live election returns, setting a world traffic record of 1 million hits in 24-hours. In 1999 Jefferson chaired the technical committee of Secretary of State Bill Jones' Task Force on Internet Voting, whose report was the first major study of that subject. In 2003, he was a member of the Secretary of State Kevin Shelley's Ad Hoc Task Force on Touchscreen Voting, whose recommendations led eventually to voter verified paper audit trails for electronic voting machines in California. He subsequently chaired the Voting Systems Technology Assessment and Advisory Board under Secretary of State Bruce McPherson. In that capacity he led and coauthored half a dozen detailed technical studies on reliability and security problems in particular voting systems. In 2007 under Secretary of State Debra Bowen he chaired the Post-Election Audit Standards Working Group that worked in parallel with the Top to Bottom Review to produce the first government-sponsored report on the subject of post-election auditing (www.sos.ca.gov/elections/elections_peas.htm).

In 2004 he was coauthor of the SERVE Security Report, which detailed major security vulnerabilities in the DoD's proposed SERVE Internet voting system in 2004 and led to the cancellation of the program (www.servesecurityreport.org).

Jefferson has been an invited speaker on election technology issues at the annual conferences of IACREOT (International Association of Clerks, Recorders, Election Officials and Treasurers), NASED (National Association of State Election Directors), and the Election Center, as well as at universities such as Stanford, M.I.T., U.C. Berkeley, U. T. Austin, Evergreen College, U.C. Irvine, University of Calgary, and University of Massachusetts. He has also consulted with numerous agencies and states on the subject of voting security, including the FEC and the Department of Defense.

In 1980 Jefferson received a Ph.D. in computer science from Carnegie-Mellon University. From 1980 to 1994 he was a computer science professor, first at USC and then at UCLA, where he conducted research in parallel computation, simulation, and genetic algorithms. In 1990 he received an R&D 100 Award for leading one of the top 100 R&D projects in the United States, and in 1996 he received a James Madison Freedom of Information Award for his work on bringing nonpartisan election information to the web.

Jefferson is a member of the boards of directors of the California Voter Foundation (www.calvoter.org) and of Verified Voting (www.verifiedvoting.org), two nonprofit, nonpartisan organizations devoted to promoting open, secure election technology. He is also a member of the Board of Advisers of ACCURATE (accurate-voting.org), an NSF-sponsored academic research project on voting technology. In 2009 served as the Co-Chair for the EVT/WOTE '09 conference – the primary academic voting technology and security conference in the U.S. (www.usenix.org/event/evtwote09).

Jefferson is well known among computer scientists for the co-invention of the Time Warp method of parallel discrete event simulation and is the author of one of the most frequently cited papers in the history of computer science, *Virtual Time*, in which the method was first described. He is currently a computer scientist at Lawrence Livermore National Laboratory, where he leads research in cyber security and simulation for national security applications.