

330 Jefferson Dr.  
Pittsburgh, PA 15228

September 26, 2006

Members, County Council  
436 Grant St.  
Pittsburgh, PA 15219

Dear Council Members

My name is David Eckhardt. I reside at 330 Jefferson Drive in Mt. Lebanon. I have taught Computer Science at Carnegie Mellon for three years, after having received my Ph.D. there. My areas of specialty are computer operating systems and computer networks. In addition, I have served as a Judge of Elections in Mt. Lebanon since 1997.

I am grateful to my Westmoreland County colleague, Marybeth Kuznik, for making me aware that the Pennsylvania Election Code, in Section 3012(c), Paragraph 1, requires each polling place to be provided with a lantern, “or proper substitute therefor,” so that voters can read ballot labels and election officers can read mechanical counters.

Clearly there are some cobwebs in our Election Code, which needs to be re-thought in light of modern technology. Some developments, such as the general availability and reliability of electric lighting in polling places, are straightforward and pose no threat to election integrity.

Other developments, such as the replacement of hundreds of metal gears visible to the naked eye by literally tens of millions of microscopic transistors, operating under the control of program code which can instantly and undetectably rewrite itself, have more grievously outdated our Election Code.

Machines made of gears can’t consult internal clocks to determine whether they’re being tested the week before the election or whether they’re collecting real votes on Election Day—but computers can. My colleagues are correct to urge parallel election-day testing as part of a sound security architecture.

My focus today is a different problem of equal urgency. The enormous increase in voting-machine complexity means that the Logic and Accuracy testing procedures in our Election Code are arguably as irrelevant as the lantern provision. It is flatly impossible to thoroughly test a large complex body of software by casting tens or hundreds or even thousands of votes. This is the reason for the federal and state examination and certification processes, but they don’t help us—at all—unless *all* election-system software exactly matches what was examined and certified.

We know that this did not happen in the May primary. Since then we have learned that the County’s procedure for checking voting-machine software involves asking the software itself to declare whether it is legitimate or fake—akin to calling home from work to see if any burglars answer your phone. Meanwhile, Ed Felten’s research group at Princeton has conclusively demonstrated what was before a theoretical likelihood—a voting-machine software virus which can spread from one machine to another while altering vote totals and audit logs.

Until we can deploy the cheapest and most transparent integrity measure, voter-verified paper ballots, we have no choice but rigorous vigilance when it comes to other measures such as parallel testing and complete, thorough software audits. I respectfully request that you act to provide Allegheny County with a strong software audit process as outlined in the draft ordinance I am providing you with today. Pittsburgh is blessed with an abundance of software professionals with expertise in system security, so world-class advice on a final ordinance should be readily available.

Sincerely,

Dr. David A. Eckhardt

encl: draft ordinance