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VoteAllegheny Report on ES&S M650 Logic & Accuracy Testing, October 31st, 2006

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Background

On Tuesday, October 31st, 2006, election integrity advocates representing VoteAllegheny and PA Verified Voting attended “Logic and Accuracy” testing of the ES&S M650 optical ballot scanner at the main office of the Elections Division of the Allegheny County Department of Administrative Services. The M650 will be used to scan and tally absentee, provisional, and emergency ballots in the November 7th general election.

Partial List of Test Personnel and Observers

- Todd Mullen, ES&S
- John O'Brien, Voting Machine Custodian
- Mark Wolosik, Director, Elections Division, Department of Administrative Services
- Richard King, PA Verified Voting
- David Eckhardt, VoteAllegheny
- Martin B. O'Malley, Council Member, Forest Hills
- Giovanni Kessler, Head of Mission, Election Assessment, Office for Democratic Institutions and Human Rights, Organization for Security and Co-operation in Europe (OSCE/ODIHR)
- Michaela Kuefner, OSCE/ODIHR

Events As Reported By David Eckhardt

1. County employees and the ES&S representative were sworn in.
2. A small number of single ballots were voted. For example, a ballot was prepared by marking the Constitution Party straight-party bubble and also marking the bubble for Titus North (Green Party candidate for U.S. House); it was run through the machine and the paper summary was checked to verify that there was indeed one vote recorded for the Constitution Party candidate for PA Senate (Joseph Murphy) and also for North. A second ballot was prepared by marking the Constitution Party bubble but also marking the bubble of the Democratic candidate in the sole race with a Constitution candidate; this was run through the machine and the result was checked. We then voted two ballots from the 2nd district of the 4th ward of Mt. Lebanon: I marked one and Mr. Kessler marked the other. When I marked mine I was careful to be sloppy, but the machine read it correctly. The machine was cleared after each run (and the audit-trail printer indicated that each time).
3. Then a 40-ballot test deck prepared by the ES&S representative was run. I asked for a copy of the test deck in order to evaluate its thoroughness. Mark Wolosik said he would check with his legal counsel and subsequently inform me of the response to my request¹. The results of scanning the deck were saved to a

¹ The next day he left a phone message indicating that upon advice of legal counsel he is unable to provide a photocopy of the deck of test ballots. VoteAllegheny thus is unable to comment on the extent to which the test deck adequately covers the large number of individual ballot styles present in Allegheny County.

Zip disk which we took down the hall to a room containing the computers running the Unity election-result software. Mr. Wolosik and the ES&S representative began hand-tallying the test deck in preparation for loading the Zip disk into Unity and verifying Unity's election report. I got bogged down in a "side issue" (described below) and asked Marty O'Malley to watch them work.

While we were discussing ballots, I was told that at least 150 paper ballots have been prepared for each polling place: 50 absentee, 50 provisional, and 50 emergency. Mark Wolosik indicated that polling places with more voters had more pre-printed ballots.

4. The "side issue" was my concern about the network in the Unity room (approximately 4 laptops, 3 tower machines, and a laser printer). They were connected by blue Ethernet cables which were tucked behind tables and other furniture, resulting in a very neat and professional appearance. As a side effect, however, I was unable to readily verify that there was no connection to the outside world. While peering behind furniture, I happened to notice that the activity lights on the network switch were blinking away cheerily... even though, as far as I could tell, only one tower PC was turned on. So I did more peering and saw what appeared to be two Ethernet cables disappearing into wall jacks.

When I inquired about this, some confusion, discussion, and dialogue ensued. In summary, the network in the room was indeed connected to (at least) two other machines in two other rooms, namely a laptop used by John O'Brien to print absentee ballots and a machine intended for use by the press on Election Night. It was explained to me that the connections consisted of Ethernet cables running through ceilings and walls, terminating at a patch panel in an access-controlled machine room (containing a variety of cameras, including one pointed directly at the patch panel).

We talked a bit about my concern that wires running through walls and ceilings aren't really secure, and that the goal should be that it is visually obvious that the Unity network is not connected to any other machines.

The official response appears to be that a local consulting company, "Vigilant Minds," will come in and certify that the network is secure before the election and subsequently that it was not tampered with from the time of security certification until after final results are certified by the Board of Elections.

As we discussed these and other issues, County employees told me that the laptops as delivered by ES&S contained wireless network cards. The ES&S representative indicated that the wireless hardware had been disabled (via a software setting), but this was disputed by the County employees, who felt that physically removing the cards was more appropriate – of course I concur!

5. While we were discussing network security the issue of exactly what software was present on the Unity computer network arose. VoteAllegheny representatives observing the June 2nd vote reconciliation process in the Elections warehouse on the North Side were surprised to observe that software installed on the Unity PCs included a commercial remote-access program called "PC Anywhere." PC Anywhere has no legitimate function on the Unity PCs, and actually poses a security threat, since it is important that unknown remote parties not access these machines. I was informed that as of the time of the 650 L&A session the machines still contained PC Anywhere (and, I was told, other inappropriate software which ships with Microsoft Windows).

I was given to understand that there is a plan for rectifying this, involving a mixture of ES&S employees, Vigilant Minds, and County IT. However, it appeared that the plan as described involved Vigilant Minds signing off on system security, then the PCs being re-imaged without the inappropriate software, followed thereafter by removing the ballot-printing laptop from the network. This is the opposite of the order of events which would result in assurance of a secure network running only authorized software.

Furthermore, keep in mind that Tuesday was exactly one week before the election, and the County's plan for securing the central tabulation hardware and software was not fully specified. My understanding is that many things were expected to change Monday – the day before the election.

Finally, this means that any validation of the behavior of Unity which we observed will become null and void if the Unity software on the PCs (or, arguably, any software thereon) is reinstalled or reconfigured.

Events As Reported By Martin B. O'Malley

My interest in voting-system integrity was sparked by an anomaly which took place during my successful 2005 candidacy for a seat on the Forest Hills Borough Council. The count of votes cast for me on one of the two lever machines in my polling place was recorded incorrectly. While the error was quickly resolved, I became sensitized to the possibility of errors in the electoral process.

During my observation of the M650 testing I was disturbed to see that only the ES&S representative loaded, operated, adjusted, and fed ballots into the scanner. I was also concerned because I did not observe any process which verified that the scanner's software was correct. All the county employees stood passively, observing the actions of the ES&S corporate representative. After all the tests were completed one county employee stated emphatically that this was only a test and that, when the real election occurs on November 7th, only county election employees will be operating the machines and not the corporate employees. However he did not discuss any software testing to be done on the machines.

Open Issues

1. We did not get a chance to discuss in detail the M650 firmware provenance and other integrity issues, though we were told that the firmware is upgradeable via Zip disk. Also, the M650 knows the date and time, so if it wanted to it could suppress malicious behavior during L&A testing and activate it for the election. Luckily the presence of paper (if securely stored!) allows recounts and hand audits.
2. It appears that insufficient attention has been given to the security of the Unity central tabulation network. While the introduction of an explicit security certification into the process is a welcome development, it is happening *very* late in the process and no details are yet available on what will be certified. It seems likely that a multi-room network will be certified, and that the software running on the machines at the time of certification will be of unknown provenance.
3. The voting system equipment we have was bought in the face of substantial, reasoned, articulate opposition from poll workers, election integrity advocates, computer professionals, and members of the general public – and bought in contravention of our right, as guaranteed by the Pennsylvania Constitution,

to have the final say. A key feature of this system, and a key feature consistently objected to by members of the public, is the utter dependence of this system on the integrity of its software. Thus it is particularly disturbing to be on the verge of a second election in which software verification is clearly inadequate and not apparently a core priority.

4. It is once again disheartening that on the one hand each face-to-face encounter between integrity activists and deployed election systems uncovers further serious issues (not just here, but nationwide), but that meanwhile these encounters are limited by government officials to being after the fact, in response to plans set in progress before any opportunity for public comment.

Moving Forward

1. Because we have a voting system so vulnerable to software issues there is an ongoing urgent need for further attention in this area, including verification and also accessibility via potentially unsecured networks. In this regard VoteAllegheny is in the unfortunate position of reiterating the recommendation we made in our June 5th report on irregularities we observed in the May 16th primary: it is critically and urgently important that the County develop a strong and convincing process for verifying all program code in use throughout our election system. We note in passing our discouragement that the other three recommendations contained in that report are still, to our knowledge, also unimplemented.

2. The County should prepare a document explaining election procedures, threats, and defenses. This document should include treatment of software verification, parallel testing, and post-election audits. Public comment should be sought and incorporated into the plan.

Conclusion

Citizen participation in a healthy democracy depends on the consent of the governed. This consent depends not only on the pomp and circumstance of an election process but also on the widespread and strong confidence that the process is accessible and accurate. When the lack of a voter-verifiable paper ballot means that voting-system integrity hangs by the thread of software correctness, voter confidence demands the most comprehensive possible software examination process coupled with utter certainty that the software deployed on voting systems exactly matches the software which was examined and certified.

VoteAllegheny once again urges Allegheny County officials, the Secretary of the Commonwealth, and voting system vendors to make rapid progress toward voter verifiability and election system integrity.

Postscript and Clarification (November 12th)

A question was raised about the use of the phrase “the scanner” in the initial version of this report. Although we observed the presence of two central-count optical scanners, only one was operated in our presence; the second remained beneath a dust cover during our observation of the operation of a single scanner.