

A 2008 e-Voting Wrapup with Dr. Barbara Simons



By [James Turner](#)

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James Turner: This is James Turner for O'Reilly Media. I'm talking today with Dr. Barbara Simons, past President of the Association for Computing Machinery. Dr. Simons was recently appointed to the Advisory Board of the Federal Election Assistance Commission which oversees and recommends voting technology in the United States. Dr. Simons previously worked at IBM, and is now taking some time to write a book on election technologies. Thank you for taking the time to join us.

Barbara Simons: Oh it's a pleasure.

JT: So the purpose of getting you here today obviously is to talk about the Election cycle we've just gone through but before we do that why don't you talk a little bit about the work of the Election Assistance Commission and for those of us who may have successfully repressed the memories of the 2000 and 2004 Election cycles remind us why it was created.

BS: The Election Assistance Commission was created by the Help America Vote Act which was passed in 2002 in response to a lot of the problems that occurred in Florida in the 2000 Election and 2002 Primary--2002 Mid-Terms. So the Help America Vote Act provided almost \$4 billion to replace punch card and other types of old technologies and the Election Assistance Commission was to oversee that; it also is mandated to create standards for voting systems and that's basically what it's been doing--that sort of thing. It's the closest thing we have to a Federal agency that oversees the Elections in the United States.

JT: So what is the role of the Advisory Committee inside of that and how did you get involved with it?

BS: The Board of Advisors, the role as I understand it is to provide advice to the Election Assistance Commission. I was just appointed to it a short while ago; I haven't attended a meeting yet, so I can tell you more specifically the kinds of things that happen once I have that experience. The Board of Advisors was also created by the Help America Vote Act and it represents many different interests. I was appointed by Senator Harry Reid to one of the four seats on the Election Assistance - on the Board of Advisors which are designated for technologists. However, I really am the only technologist on the Board of Advisors so far as I know. There are no other Computer Scientists on that Board and no Statisticians.

JT: So getting to the current Election cycle, obviously with the margin of victory this time around at least in the Presidential race it's not as critical how any particular State went but there are a couple of tight races, the notable one being the Senatorial race in Minnesota between Al Franken and the Republican incumbent which is a couple hundred votes out of a couple of million. But other than that, we've got a couple of hundred electoral vote margin here; given that there hasn't been a lot of focus I think on problems that occurred. What have you been hearing?

BS: Well it's interesting that you brought up the Michigan situation because I think that's going to be quite fascinating. Last I saw there were 357 votes separating Franken and Coleman and because of Michigan law; Minnesota law--excuse me--Minnesota law any time there is a discrepancy of 0.5-percent or less between the two top candidates there has to be--there's a required recount. So the recount that is occurring is not occurring because Franken requested it; it's occurring because of Minnesota law. And most of the voting in Minnesota was done on precinct based optical scan machines, paper ballot which is then fed into the optical scanner at the precinct. And the good thing

about that is it gives the voter immediate feedback if there is any problem, such as over-voting, voting twice for a candidate.

What's interesting--what's going to be fascinating about this is that most of the precincts in Minnesota use the ES&S-M100 scanners and so when this recount--this manual recount occurs it's going to be a check on how accurate these scanners are. Now there was a problem in Michigan with these same scanners where some early testing showed some discrepancies between what the scanners reported and what should have been, and so this is really going to be quite fascinating. It's not clear what the outcome is going to be.

JT: This is the same style of machine that is used in standardized testing in that you fill in the bubble and it records it. What is it that can go wrong? That's in fact the system we use in my town. Other than mis-programming the reader, what is there to go wrong in that system ?

BS: Well there's several problems; one is--well first of all, as you say because these things have computers in them they can be mis-programmed, there can be software bugs. You could conceivably have malicious code. You could have the machines give you a different count from the right one. There was a situation back in the 2004 race where Gephardt in one of the Primaries--Gephardt received a large number of votes after he had withdrawn from the race. And this was done--using paper ballots, using optical scan paper ballots. I don't know if it was this particular brand or not. And when they were recounted it was discovered that in fact that was the wrong result; that he had gotten fewer votes. Now I never saw an explanation for what happened but my guess is that whoever programmed these machines had mistakenly assigned the slot that was for Kerry to Gephardt and the slot that was for Gephardt to Kerry; that's my guess. Now I don't know if that's true but if that did happen I think there's very little reason to believe it was malicious because there was really nothing to be gained by doing that. So I think it was just an honest error but of course errors can occur.

So even with these machines, there's this system where you have paper ballots and you have a scanner; you have the capacity to recount the ballots which is a very good thing. That's what happened with the Gephardt case and that's what going to happen in Minnesota. And you need that capability but you then have to exercise so it's not enough to just have the paper ballots that you can audit or recount I believe, and I'm speaking for myself now. I believe that it's we really have to start auditing our Elections nationally. We have to conduct manual random audits that are statistically significant of all of our Elections so that the loser and the loser's supporters will believe the outcome of the race. In this case, in 2008 it was very clear who won and I don't think there's been any people who have been raising questions about the correctness of the outcome. But we saw in 2000 and 2004 that was not so--that people did raise questions and there was really no way to conduct an audit that could have convinced the supporters of the losing candidates that their candidates truly had lost. I don't think that's healthy for democracy.

JT: So in terms of what actually is going to go on, are they essentially going to take all of the scanned ballots and take them to some central location and run them through some known programmed good machines or is it going to be a precinct by precinct recount?

BS: That's a detail I don't know, but I do believe it's going to be manual. My guess is obviously if you're going to be doing something like that you have to divide it up because of the huge number of ballots.

JT: So the two States that were notable in the last couple of Election cycles were Florida and Ohio. Have you heard anything so far as to issues or successes? Those are also two States who have gone very heavily in--for touch screen as I believe.

BS: Well Florida now has a lot of paper in 2008; they've gotten rid of a lot of their touch screen machines. And Ohio has too. So they've changed.

JT: Was that because of the 2004 and 2006 problem?

BS: Yeah; well yeah and also Ohio conducted a major study of electronic voting machines called the Everest Study which was commissioned by the current Secretary of State Bruner, Secretary of State Bruner and this study uncovered huge problems with these--with most of these voting systems, these touch screen voting systems. They were found to be insecure, unreliable, difficult to use; basically a similar study had been studied in California not too much earlier called the Top to Bottom

Review and the Ohio study confirmed every--all of the problems that had been uncovered in California and found additional problems, so based on that there was a push to get rid of a lot of these machines.

There had been problems you know in Ohio and Florida however involving the Voter Registration Databases and I've heard of complaints from both States of--well in particular I've heard of complaints in--from Ohio of people going to the polling place to vote and finding that their names were not on the electronic devices that people have--had in the polling places which listed all of the eligible voters, even though these same people had been voting for years. And in some cases their names were on the Central Database but they weren't on the devices in the polling places. So I believe what typically happened is that they had to vote provisional ballots. In Florida of course there were a lot of concerns as you probably know about that you've got match requirements that had been required under Florida law.

One of the problems was that if the voter--the information that the voter had on the Voter Registration didn't exactly match some information that was on for example the Department of Motor Vehicle Database or the last four digits of the Social Security Number then the voter could correct that by bringing ID prior to the Election Day but there was a decision made on Election Day such voters had to be given provisional ballots if they hadn't already corrected any problems and then they had a few days afterwards to go to the various places and prove that they were allowed to vote. What I understand happened in Florida is that a lot of the registrars accepted ID on Election Day rather than forcing people to vote provisionally. And one of the reasons they did this is that otherwise they would have been stuck with large numbers of provisional ballots which is just an enormous headache to deal with. And so they basically allowed people to identify themselves on Election Day and vote

JT: What happens with provisional ballots?

BS: Well it varies from State to State but what happens with provisional ballots is there's--each one--for each provisional ballot there has to be a determination as to whether or the not voter was allowed to vote. And so this has to be done on a ballot by ballot basis and it can be very time consuming. There have been a number of studies done where these people have looked at what's happened with these provisional ballots and it seems as if the number that actually gets counted can vary considerably from State to State. So in general, a lot of people feel that the provisional ballots are better than not being allowed to vote at all but it's a lot better if you can vote a regular ballot than to vote provisionally because if you vote provisionally there's some chance your vote won't be counted even if you are a legitimate voter.

JT: Is there a conceivable situation where a Secretary of State or a local registrar might say you know nothing was very close at all; we're just not going to count them?

BS: As far as what gets counted for example I think with absentee ballots I think that--that kind of decision is--it can vary from State to State. I believe that there are States and don't--you know I'm a little bit uncomfortable saying this on air quite frankly but I believe that there are States where if the Election is not at all close and the number of absentee and possibly provisional ballots that you have is not large enough to change the outcome that then the ballots aren't counted. I believe that's the case for absentee ballots in some States; I'm not sure about the status of provisional ballots but I wouldn't be surprised if it's the same for them in some States. In other States that's not the case so I think it really varies from State to State.

JT: So what States this time around have to--you know really drunk the e-voting Kool Aid the heaviest? Who had the most touch screens in place?

BS: Maryland and Georgia are entirely touch screen States and so is New Jersey. In Maryland they're supposed to replace them with optical scan paper ballots by 2010 but there's some concern that there may not be the funding to do that. In fact Maryland and Georgia both use Diebold which is now called Premier, paperless touch screen voting machines; Georgia started using them in 2002 and in that race, that's the race in which Max Cleveland, the Democratic Senator, paraplegic from--the Vietnam War Vet was defeated and I know that there are some people who questioned the outcome of that race because the area polls had showed him winning. And because that race--those machines are paperless there was no way to check the outcome. Another thing that was of a concern in Maryland in 2002 was that--I mean in Georgia in 2002 was that there were last minute

software patches being added to the machines just before the Election and the software patches hadn't really been inspected by any kind of independent agency.

JT: Did you hear any--have you heard anything out of those State about how went this time around?

BS: This time around, well you know I believe there's going to be a runoff on the Senatorial Race in Georgia if I'm not mistaken because--a run-off that's right; a run-off that's right; excuse me I meant runoff because the top candidate got fewer than 50-percent of the votes. So they are going to be doing a re-run on these machines; it's going to be very interesting. These are old machines; they're known to have a lot of security problems. They've been examined by independent security experts and they're known to be really problematic.

JT: So it sounds like in the upcoming Election cycles we're actually going to see a little bit of a retro return to more manual balloting systems. Is this kind of a quick patch in that scanned ballots are the easiest way to make sure you have a paper trail?

BS: Well I think scanned ballots--well certainly scanned ballots give you a paper trail and they give you a good paper trail. The kind of paper trail you want and it's not really a paper trail; it's paper ballots because they are the ballots. What you want is you want it to be easy to audit and recount an election. And I think that's something that really people hadn't taken into consideration early on when a lot of these machines were first designed and purchased. You want it to be easy to conduct an audit or a recount and so the best way to do that is the way we would count money which is you sort things into piles and you count each pile. And you can sort them into--let's use for example you have piles which say--say for example you sort it into piles that say McCain and piles that say Obama and then you can do multiple counts of each of those piles; you can--you would probably count them into groups of 50 so you can let's say you know--just groups of 50 of each one. You could have multiple people look at them and read the ballots and say yes; these are indeed McCain ballots. Yes; these are indeed Obama ballots. And if each of these piles has 50 of them you can count and recount. You can have observers; you can videotape it; you can be incredibly transparent and then correctly I think you're very accurate.

JT: The one comment that people have had about the touch screen and one of the big pushes that was made for them is that they are ADA compliant. How does that play out with these older technologies?

BS: Well optical scans are not older technologies. They're like I guess for a while--some of these DRE--these touch screen machines have been around for quite a while too. One of the things that was investigated in California when they did the Top to Bottom Review was just how easy is it for people with disabilities to use these touch screen machines? Nobody had ever done that before and these test results came back very negatively. If you look at the California results they're very negative on these touch screen machines. In many cases people in wheelchairs had a very difficult time being able to operate them correctly, people who were blind sometimes had troubles understanding what was being said or things were said too loudly or too softly or they would get confused about the instructions or some of the ways that they had for manual inputting; their votes were confusing. The results were quite negative. There is a--there are these things called Ballot Generating Devices which are not what we generally refer to as touch screen machines although they can be touch screen. The most widely used one is called the Auto Mark. And the way the Auto Mark works is you take a paper ballots, one of these optical scan ballots and you insert it into the Auto Mark and then it operates much the same way that these other paperless--potentially paperless touch screen machines work. It has a headphone--headset so that a blind voter can use it; it has--it's possible for somebody in a wheelchair to vote, although in fact you don't have to use this if you're in a wheelchair; you can vote optical scan clearly. Somebody who has severe mobility impairments can vote on these machines using a sip, puff device where if you sip it's a zero or one and if you puff it's the opposite or a yes or a no. And these--the Auto Mark was designed with disability people in mind from early on. And it fared much better in the California tests. What it does is at the end when the voter with disabilities is finished he or she will say okay cast my ballot. At that point the Auto Mark simply marks the optical scan ballot; it just marks it. And then you have an optical scan ballot that can be read by an optical scanner. There should be no problems with it because it's been generated by a machine. And you have a paper ballot that can be recounted.

JT: And also conceivably it can be visually verified by the voter if it's not a visual disability before they cast it?

BS: That's right. Or you can have it verified audio--you could put it to an audio reader and have it verified that way too but that does get into some complications. But basically yes; you can do that. You can also have it tested by a voter who doesn't have any vision problems as a way to randomly check to make sure that there's no malicious code in it. That's not 100-percent guaranteed but it is a kind of check that you can do.

JT: So speaking of that--right; so speaking of code errors and similar things, there seems to be a large push all of the sudden for the concept to get the software and perhaps the voting machines themselves need to be Open Source so that there is a greater transparency. Diebold seems to be--has gotten out of the business or has renamed the business or sold the business off. Is it no longer kind of a popular business to be in? Do you think that there's more of a push to just make it like you know have the Federal voting machine factory with an Open Source set of code?

BS: I certainly don't see a Federal voting machine factory in the near future; I mean that's an interesting concept. What--in general I'd like the idea of Open Source but I don't think it's a panacea. Even with Open Source you can have problems; you can have software bugs; you could even have malicious code. Admittedly it would be harder to conceal malicious code but if you've got a very long piece of software, very long complicated software it's still possible to do. So I don't see Open Source as being the end-all and be-all for our problems. I actually don't have such a problem with having systems that are not Open Source if and this is a big if--if these systems can easily be audited and recounted and if we actually do audit them. I mean having paper ballots, having paper trails--I think is very important but it doesn't do any good if nobody is looking at them after the election. So you really need--we need to start running our elections the way we would run our businesses; we need to have accountability and we need to start auditing them and we need to audit them in a regular way. It shouldn't fall on the shoulders of a candidate to demand an audit or a recount and then have to worry about being called a poor loser. It's in the interest of everybody to know that our elections are accurate and that the correct person won. I'm actually less concerned about getting the votes exactly precisely correct than I am about making sure that the right people win. And with a statistically significant audit you can have that so long as you have something which you can audit and which is easy to audit. And I think that's what we need to focus on.

JT: So one last question I've got for you. In terms of the States that did go purely for touch screen what is the recourse there? Short of re-holding the whole election is there any quality control at all on these machines?

BS: Well I mean as you know the software's secret and efforts that have been made by independent computer scientists to look at these machines have frequently been rebuffed; the reason that they have been examined extensively is because a couple of Secretaries of States have--they have demanded it, in particular in California and Ohio and there's also been some testing done in Connecticut and a few other States, so I mean it's not just Ohio and California. But basically it seems that the State has to take up that responsibility in order to get independent computer security experts to examine these machines, but basically I don't see any recourse. I mean I don't see I mean--it would be nice to be able to examine the software after the election if you think there may have been a problem. I think that's important. I know there was an effort made to do that in 2006 in Sarasota County, Florida when there was a very large under-vote for the House of Representatives race, an exceedingly large under-vote which means people didn't vote for that race and that--there was actually a court case there. And the software was examined by the State of Florida as a result of that but the person who lost the race wanted to have her own independent computer security expert also examine the software and he wasn't allowed to do that. We still don't know exactly what caused the problem in Sarasota in 2006. Another issue with software is, as I expect you know and probably a lot of your listeners will know is that it is possible if you want to rig an election to insert software which would then erase itself. Now I'm not saying that it's an easy thing to do but in theory and in principle you can have malicious software in a voting machine or in any kind of system; it doesn't have to be a voting machine--which will do whatever it's going to do and then erase itself. That means if afterwards you have a forensic examination of the system and you go and look at the software you won't find the problem; it won't be there. So that's a concern.

You know I've heard people make claims that various elections have been stolen on these machines. It's a difficult--it's not a claim I would make because I think it's risky to make a claim

when you can't prove it nor would I say that no elections have ever been stolen on these machines as some other people claim because you can't prove that either. And I think the problem is when we find ourselves in the situation where we can neither prove nor disprove that the election was--would be tabulated--recorded and tabulated and what we need to do is move to systems where we can prove things. And I think that's what we have to do and the fact that the 2008 Presidential election has not been contested the way that for example the 2000 election was contested doesn't mean we're out of the woods. There will be other contested races as we're seeing in Minnesota although there they're going to count it and there we will find out. But if that had happened in Georgia or if it happens in Georgia with the upcoming race for Senate that's happening because neither candidate got 50-percent if that ends up being very, very close I don't know what people will do if they don't trust the outcome. There's no recourse. I don't think that's healthy.

JT: Right the recount is you look at the machine and you know it says 12. Are you sure? Yeah; it still says 12.

BS: Exactly; that's what it will do. The machine will be consistent but that doesn't mean it's right and again you don't have to have someone rigging the Election to have it wrong. It can be a mistake. It can be a mistake.

JT: Right; and in fact I know from experience with touch screens you've got to align them correctly. They get dirty. They malfunction--.

BS: Well calibration is a big issue with touch screen machines and of course you were hearing in this last Presidential election that people were complaining that they touched one candidate and their vote was recorded for the other candidate for President. And I heard it going both ways; I heard a lot of people saying they voted for Obama and McCain showed up but I think in North Carolina there were cases where people said they voted for McCain and Obama showed up. So the point is that if these systems are not properly calibrated you could have things--you can have situations like that and furthermore they can go out of calibration during the course of the election. So they're--you know it's--you shouldn't be using--we shouldn't be using a technology where we have to worry about recalibrating the damn things all the time. That's just not--it doesn't make sense.

JT: So just to wrap up; where do you see--we'll have the 2010 Congressional and then we'll have the 2012 Presidential. It sounds like the trend is going to be more back toward paper-based systems for those. Do you think that's going to hold especially given the economic situation and the cost of doing that?

BS: I certainly hope it will hold. I know that there is a lot of pressure against it--at least on some parts--on the parts of some individuals and vendors. One of the things to keep in--there's a couple things to keep in mind when thinking about replacing these systems. The first is that these direct recording electronic systems or touch screen systems as they're called they have to have--the States and localities that buy these systems have to have maintenance contracts with the vendors because they're very complicated systems to maintain and of course the software is a secret. So some of these contracts are quite costly and these are ongoing expenses with these machines. In addition, because they have software in them they have to be securely stored and they have to be securely delivered and those create enormous problems especially when you have to worry about delivering large numbers of machines to places prior to the election. Frequently these machines end up staying in people's garages or in churches for periods of time when they're relatively insecure.

And in addition there seems to be problems with some of these machines just deteriorating because of usage and age. Avi Rubin has a blog where he talks about problems with the machines that were being used in his precinct in Maryland where they say at least one of the machines seemed to be having the problems because it was deteriorating--you know there were physical problems with the machine because it's a piece of machinery--having nothing to do with the actual voting. So you know there are going to be maintenance problems with keeping these machines going that in some cases are not going to be cheap. If we move on a large scale to paper based systems while it's true you have to print out the paper each time, the paper ballot you also have to print out paper ballots for absentee voters anyway, so it's not as if you have to come up with paper ballots only for these systems. You've got to print them out; you just got to print out more of them. And you need far fewer scanners; the security issues with scanners are not as great because you can do an audit and a recount, so altogether it just seems to me that moving to paper based optical scan systems with

precinct scanners so that the voter gets feedback on the ballot if the voter votes twice for President; the ballot is kicked out and the voter can vote a new ballot. I think that's the best way to go and I really hope that that's what happens and that people just stop using these systems that are very difficult to audit and recount. And as I say there is the Auto Mark for voters with disabilities to use; there's also another system called Populex but that's not as widely used as Auto Mark. There could be new systems coming forward.

But one other final comment; when you talk about Open Source voting systems, another issue with bringing on any kind of new system is that it has to go through extensive testing and this can be quite expensive and time-consuming. So there's a big upfront cost to any new vendor getting into the voting machine--voting system business, which it can be a problem.

JT: I actually lied. I have one little follow-up to that which is one other trend we've seen in this election is I think the estimate was up to 30-percent of the Electorate may have voted early and there's even some talk about making that into a Federal law. How is that going to fit in with this changing tapestry of voting technologies?

BS: Well I have mixed feelings about early voting. On the one hand I think it served a really good function in this election because it helped to debug some of these systems so I think when people started having problems with early voting you know they would get technicians in and try to fix them or they would send out alerts and so on, so it's not like everything happened on Election Day. So I think that was actually a very positive thing that these systems were being subjected to intensive usage and by that I also mean the electronic Voter Registration Databases as well--that they were being subjected to intensive usage prior to Election Day so that some of the kinks could be worked out beforehand, so I think that was positive. I think it's also positive when people get an opportunity to vote when hopefully they don't have to wait in line so long, although I understand that a lot of the early voting had very long lines. What concerns me with the early voting and this is a general issue--is that you've got to worry about chain of custody of the ballots. So you have to be very careful that the voting is taking place and these ballots are properly secured and I think that's an issue that I haven't seen a lot of discussion of but it's something that definitely needs attention with early voting.

JT: Right; it telescopes the problem from keeping an eye on the ballots for a day to keeping an eye on them for two weeks.

BS: We didn't talk about emergency paper ballots.

JT: Sure; there were some places where they had to go to those weren't there?

BS: Right; and there was also a court case over that in Pennsylvania where the Secretary of State put out an order saying that 100-percent of the machines had to break down before the paper ballot--before the paper ballot or before emergency paper ballots automatically had to be given out. And there was a court case over that and the Judge ruled that if at least half of the systems break down then emergency paper ballots had to be given out and but apparently the local Election officials could have--could give them out at any point if they wished to. So they had the ability to give them out at any time but they had to give them out if half of the systems broke down. And there was--I've seen a lot of discussion about emergency paper ballots as being a way to help alleviate some of the long lines that people were anticipating especially with voting machines.

JT: Did they end up using them anywhere?

BS: I'd have--I'm pretty sure they did but if you wanted specifics I'll have to get back to you on that.

Editor's Note: Dr. Simons wrote me later to say: "Many Pennsylvania polling places opened on election day with half or more of their voting machines broken -- so they used emergency paper ballots until they could fix their machines."