Testimony of Verified Voting
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Georgia House of Representatives
House Science and Technology Committee
Re: Voting System Technology- A Comparison
November 30, 2017

Thank you Chairman Setlzer and members of the committee for the opportunity to testify on voting system technology.

Verified Voting is a national non-partisan, not for profit research and advocacy organization committed to safeguarding democracy in the digital age. Founded by computer scientists, Verified Voting's mission is to advocate for the responsible use of emerging technologies to ensure that Americans can be confident their votes will be cast as intended and counted as cast. We promote policies that provide for auditable, accessible and resilient voting for all eligible citizens. We commend the Committee for its attention to this critical issue.

Georgia's voting machines need an update. The lifespan of voting machines has been estimated at 10-15 years.[1] Purchased in 2002 Georgia's voting machines are at the outside of that estimate. As voting systems age they are more susceptible to error, malfunction or security threats potentially losing or miscounting votes.

Perhaps more importantly, Georgia's Diebold electronic touchscreen voting machines have been found to be extremely vulnerable to undetectable hacking or cyber attacks. There have multiple studies[2] and security reviews[3] over the years which have found significant security flaws in the Diebold touchscreen voting systems in use in Georgia. Ohio,[4] California[5] and Virginia[6] conducted independent security reviews of these same voting machines and determined they were just too insecure to be trusted, leading these states to decertified them. Other states such as Maryland, Florida and Colorado scrapped the Diebold touchscreens through legislation years ago because of the myriad security concerns.

Georgia is one of only a handful of States that is still casting votes on entirely electronic voting systems, known as Direct Record Electronics (DREs). These machines record votes only in digital form; if the digital records are corrupted, either by benign error or malicious attack, there

[1] Norden, Lawrence, Famighetti, Christopher, "America's Voting Machines at Risk," The Brennan Center for Justice, Sept. 15, 2015

[2] A. Kiayias, L. Michel, A. Russell, and A. A. Shvartsman. "Integrity Vulnerabilities in the Diebold TSX Voting Terminal," UConn Voting Technology Research (VoTeR) Center, July 16, 2007

[3] Ryan Gardner, Alec Yasinsac, Matt Bishop, Tadayoshi Kohno, Zachary Hartley, John Kerski, David Gainey, Ryan Walega, Evan Hollander, and Michael Gerke. Software Review and Security Analysis of the Diebold Voting Machine Software. Security and Assurance in Information Technology (SAIT) Laboratory, Florida State University, For the Florida Department of State, July 27, 2007

[4] "Project EVEREST," Ohio Secretary of State, December 14, 2007 https://votingmachines.procon.org/sourcefiles/Everest.pdf

[5] California Secretary of State "Top-to-Bottom Review," July 27, 2007, http://www.sos.ca.gov/elections/voting-systems/oversight/top-bottom-review/

[6] Virginia Department of Elections, "Virginia Decertifies Paperless Voting Equipment," Sept. 8, 2017

are no backup records and no way to know the votes have been corrupted. When Georgia purchased these machines in 2002, the national trend was toward paperless touchscreen voting machines. However, over the years states moved away from paperless voting systems, driven by mounting research establishing these machines' security flaws and some high profile and costly machine failures.[7] Most of the nation has adopted voting systems that rely on a voter-marked paper ballot, an election safeguard recognized as essential by election officials and computer scientists alike. A paper ballot provides a durable, physical record that is out of reach of a cyber attack and cannot be lost by a digital malfunction or programming error. The paper ballot can then be used in a recount or to perform a post-election audit or check on the election results to ensure the election outcome is correct. Today roughly 70% of voters in our nation mark a paper ballot which is counted by an electronic scanner.

Public statements by Secretary of State Brian Kemp indicate an interest in moving Georgia toward adoption of a voting system that provides a voter-verified paper ballot. In November Rockdale County piloted the ExpressVote ballot marking device (BMD) provided by ES&S. In the pilot voters feed a paper ballot into a BMD and utilize the touchscreen on the device to make and then print their selections as marks on their paper ballots. After printing, the paper is then fed by the voter into a precinct-based ballot scanner that reads and tabulates their votes. The Rockdale pilot used a voting system that was termed a "hybrid" in that it provided BMDs for all voters to use to mark their paper ballots. This was unusual in that no jurisdiction in the U.S. currently employs an all-BMD voting system. As stated above 70% of the nation votes on paper ballots that are hand-marked by able voters. BMDs are offered at jurisdictions for ADA/HAVA compliant disabled access, generally one BMD per polling location. Able voters hand mark their ballots with pens.

This is the most widely used voting system in the country, commonly referred to as voter-marked paper ballots and scanners. The system works like this – once the voter is authenticated and checked in, the voter is given a paper ballot. (The ballot is similar to the absentee ballot you would receive in the mail if you needed to vote absentee.) The ballot lists the candidates and ballot questions and beside each one is a small circle or bubble. The voter is given a ballot and a "privacy sleeve" (this is essentially a folder to protect ballot secrecy after the ballot is marked). The voter takes the ballot to a table or desk that affords a private place to mark the ballot and the voter then marks his/her choices by filling in the bubbles with a pen. The voter brings the ballot, in the privacy sleeve, to an optical scanner which is fitted on top of a secure ballot box. The voter feeds the ballot into the scanner. If the voter over-voted or there are stray marks the scanner will kick the ballot back out to the voter so a poll-worker can spoil the ballot and the voter vote on a new ballot. The scanner can also be set to alert voters if they under-vote. After the ballot is accepted by the scanner it drops into the secure ballot box. For voters with disabilities, an accessible BMD is provided at each polling location. This is a computerized device, like ExpressVote, that is compliant with the Americans' with Disabilities Act and the Help America Vote Act of 2002. It typically has a touchscreen as well as sip/puff, audio and joy stick accessories for voters with disabilities. The device records and marks the voters' choices on a paper ballot which can then be scanned at the same scanner as the hand-marked ballots.

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[7] In 2004 a voting system failure in North Carolina caused the loss of more than 4,500 votes. Because a state-wide contest had a margin less than 4,500 votes, the election had to be run again. "More than 4,500 North Carolina votes lost because of mistake in voting machine capacity," *Associated Press,* Nov. 4, 2004

With this system most jurisdications need only purchase one optical scanner and one accessible ballot marking device per polling location.

In contrast, the system piloted in Rockdate, which required voters to use a computerized device to mark their ballots, requires purchasing multiple ballot marking devices for each polling location, escalating the cost considerably. It has been estimated that BMDs for all voters in the state based on the Rockdale model would cost over $100 million. Additionally, these systems would also require programming, servicing and software licensing fees.

If Georgia were to adopt a voter-marked paper ballot and optical scan system, like those used in most of the country, it would cost considerably less. Based on a projection of 3000 polling locations in Georgia, we estimate new equipment for the state would cost roughly $30,000,000. This is based on prices quoted to the state of Michigan[8] which recently purchased new optical scan tabulators.

The cost for the scanners quoted from the three major vendors ranged from $ 4200 to $5600 per device. The cost for the accessible devices ranged from $2700 to $4500 per device. Additionally counties would need to license software to aggregate the vote totals. If Georgia continues to program all machines at the state-level the cost will be less, but we can estimate it would be approximately 13%-17% of the total.

This excludes the cost of electronic poll books or ballot printing but is still significantly less than the cost projection of over $100 million that has been estimated for the touchscreens BMDs piloted in Rockdale County.

In addition to the considerable cost savings, there are several other advantages to adopting voter-marked paper ballots and optical scanners. By requiring voters to use a touchscreen device to mark their ballots, the number of voters that can vote at any given time will be limited to the number of devices. With hand-marked paper ballots and ballot scanners, voters need only a pen and a place to mark their ballot, making it easy to scale-up during busy voting periods and decreasing lines and wait times.

Under current practice Georgia counties print absentee/emergency/provisional/challenge ballots for each election. If Georgia opts for the ExpressVote model counties will still need to pay to print absentee/emergency/provisional/challenge ballots in case the touchscreen ballot marking systems fail on Election Day, incurring printing costs for ballots that will probably not be used in additional to costs for the ballot marking device.

Opponents of hand-marked paper ballots may claim that the voters' marks vary introducing inconsistencies in vote counting by the scanners. While this may have been a problem fifteen years ago, today's sophisticated scanners are able to discern voter marks carefully and flag questionable ballots for adjudication.

With the advanced age of Georgia's voting machines we encourage the legislature to take action to replace the voting equipment with voter-marked paper ballots and precinct-based ballot scanners, the most commonly used and cost-effective voting system available. Verified Voting does not endorse any specific voting system vendor. All major vendors offer similar machines that function essentially the same. Thank you very much for your consideration. We welcome the

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[8] http://www.michigan.gov/documents/sos/CostComparison_549577_7.pdf

opportunity to provide any additional information and hope to work with the legislature moving forward.

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