Georgia 6th District Election Reporting Problems - Preliminary Root Cause Analysis

By VoterGA

This document is a preliminary Root Cause Analysis of the 6th District special election reporting problems that occurred in Fulton County on April 18. The analysis finds that voting equipment security flaws and improper election scheduling by state and local governments were the root causes of a human error. The error was corrected manually but the several hours of delay in election reporting and the change in election results generated national skepticism about the trustworthiness of the election.

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BACKGROUND

The State of Georgia held a special election on April 18, 2017 to fill the seat vacated by U.S. 6th District Congressman Tom Price. Rep. Price was appointed by President Trump as Secretary of Health and Human Services. A field of 18 candidates participated, including 11 Republicans, 5 Democrats and 2 independents. The election garnered national attention as one of the first since the closely contested Presidential election in November 2016.

The 6th district spans the counties of Cobb, Dekalb and Fulton, Georgia's largest and most populous county. Fulton experienced a rare error that caused vote count tabulation delays during Election Night although Cobb and Dekalb did not. Fulton has experienced one other vote counting problem with a write–in candidate in 2006. Georgia counties, particularly Cobb, have previously experienced a variety of vote counting problems as explained in the Appendix.

The scope of this analysis is limited to April 18 Election Night vote count tabulation problems experienced by Fulton County for 6th District results. On that same day, Fulton County also conducted a Georgia State Senate District 32 special election, a South Fulton City special election, a Johns Creek City Council special election and a Roswell City Council Runoff. The two former elections are immaterial to the to the 6th District tabulation problems that occurred while the two latter ones are directly related and are referenced in this analysis.

Throughout Election Night the interim reporting percentages for 6th District vote leader, Jon Ossoff hovered in the 50s but declined gradually to just over 50%. Once Fulton County the rare error was corrected just before midnight, the leader's vote totals dropped below 50%, thus necessitating a runoff with the second place candidate according to Georgia law. That candidate, Karen Handel was nearly 30 points behind with 19% of the vote. The results and sequence of events for the evening drew national skepticism about the validity of the election. This skepticism continued a trend of national criticism that Georgia has received since 2002 when the state implemented what national election experts call "unverifiable elections".

(See also Exhibit 1)

The county, Secretary of State and local media outlets attributed the problem to human error involving a mix up of vote count memory cards but these claims raise serious questions such as:
- Why didn't the voting software technology prevent the human error?
- Why was Fulton County conducting three redundant elections on the same day?
- Can more details be provided so that the public can trust published election results?

This analysis will provide preliminary answers for these questions from publicly available information pending receipt of forensic evidence from submitted Open Records Requests.

PRELIMINARY ANALYSIS

Georgia Election Environment:

In 2002, Georgia conducted a statewide voting system implementation of AccuVote TS voting machines. They were produced by Global Election Management Systems (GEMS) which was acquired by Diebold before the contract was signed in May of that year. County election servers using GEMS software were also purchased as part of the contract. The server software runs on the Windows 2000 Operating System with Service Pack 4 installed. The voting machine software runs on a modified version of the Windows/CE operating system. The server database is built on a version of the Microsoft *Joint Engine Technology* (JET) engine. In 2011, the voting machine software was upgraded to the Ballot Station 4.5.2 version and the GEMS software was upgraded in 2011 to GEMS Version 1.18.22 as part of a statewide voting software upgrade.

In 2012, the Georgia Secretary of State Kemp executed a contract to publish its state election results through Clarity Elections ENR that is produced by Tampa based SOE Software. SOE was a subsidiary that had just been acquired by the Spanish owned SCYTL in January of that year. Cobb County reported its votes using Clarity software in 2014 and Fulton County began reporting its votes using Clarity software in 2016.

The vendor supporting Georgia's statewide voting system implementation is Election Systems & Software (ES&S). ES&S acquired hardware and software support rights from Premier Election Solutions in 2010 while selling the intellectual property rights to Canadian based Dominion Voting Systems. Premier Election Solutions was a new name given to the Diebold Election Systems subsidiary in 2007 after the company received negative nationwide publicity for its voting equipment. Diebold acquired Global Election Systems in 2002 when it established its election subsidiary. Both Global and ES&S originally started in 1979 as Data Mark, which was renamed American Information Systems in 1980. The companies were founded by Bob and Todd Urosevich, who separated to form Global Election Systems and ES&S, respectively.

The Georgia voting system implementation is also supported by the Center for Election Systems (CES) at Kennesaw State University (KSU). KSU has been under contract with the state since the original voting machines were purchased in 2002. Former professor Britain Williams also participated in a voting equipment evaluation conducted by Secretary of State Cathy Cox in 2001.

Election Scheduling:

On April 18, 2017, Fulton County became the first county in Georgia to ever be required to administer three election databases and three completely separate elections on the same day. Separate databases were needed for the 6th Congressional District special election, the Roswell City Council Runoff and a Johns Creek special election. Normally local and federal races can be combined on a single ballot however special circumstances described below in regards to ballot readiness prevented these races from being combined.

After former 6th District Rep. Tom Price was confirmed on February 10th, Governor Deal issued a writ by Executive Order for the 6th Congressional District special election to be held on April 18th. The order was executed in conformance with Art. V. Sec II. Para. V. of the Georgia Constitution and O.C.G.A. § 21-2-543 of the Georgia Election code. April 18 was also previously scheduled as a runoff day for candidates in the March 21 Roswell City Council election. Lori Henry and Marie Willsey qualified for the April 18th Post 4 Runoff as a result of that March 21 election. On or about February 27, the City of Johns Creek called for a special election that was required to fill a vacant Post 4 seat left by Bob Gray. Councilman Gray qualified to run for the 6th District U.S. Congressional seat during the qualification period of February 15-17. Johns Creek also selected April 18th as the day for their special election to replace him.

Federal election law requires ballots to be readied, printed and distributed to overseas military personnel 45 days in advance of an election. Thus, the ballots would have to be published before March 5. The Roswell Runoff candidates could not be known until March 21, thus there was no way for the candidates to be included in a separate race on the same ballot with the 6th District candidates. The Johns Creek special election did not have qualification until March 6-8. Therefore, those candidates could not have been known in time to be included in a separate contest with the candidates on the 6th District ballot.

These three elections had to be run on three separate databases with three separate sets of procedures. Roswell and John Creek voters who wanted to vote in both elections and were qualified to do so, had to check in twice and vote twice on separate machines for the local and 6th District races. Roswell and Johns Creek precinct workers had to perform all standard precinct functions such as printing, results posting and card management twice instead of once. Fulton county election officials had to perform county functions such as consolidation, export and reporting three times instead of once. This redundancy led to delays in election reporting but it alone is not the primary root cause of the overall delay.

Fulton County Election Process and Statistics:

Fulton County, Georgia's largest and most populous county operates three collection sites using AccuVote TSX voting machines that communicate with the central elections warehouse over a phone line. These sites are used to collect voting cards and poll books from each precinct and upload individual voting machine cards for tabulation to the central server warehouse at 1365 English St. Although somewhat unique in Georgia, our research indicates that the process of uploading voted memory cards is certified for TSX machines in one or more other states.

To perform the collection and upload functions on Election Night, the Fulton elections staff established temporary services with on-site technical experts. The sites used on April 18 were the North Service Center Annex on Roswell Rd. the South Annex in College Park and the Roswell City Hall.

To try and compensate for the need to process three elections on the same night, Fulton County implemented cost effective color coded dots for the voting machine memory cards. They also used separate color coded storage baskets that contained memory cards for Roswell and Johns Creek. These precautions helped reduce the risk of elections staff confusing memory cards among different races. However, this type of manual process cannot fully eliminate such a risk.

On April 18, 2017, 192,569 ballots were cast in the 6th District Congressional special election. 87,041 of those ballots were cast in Fulton County. For all five races Fulton County operated 117 polling locations with 524 poll workers. They received 87,381 ballots for an average voter turnout of 40.54%. Of the total ballots cast 29,821 were from early voting. Two polling locations experienced operational problems that delayed their opening for about a half hour and were allowed to stay open roughly one half hour later by court order to compensate. These exceptions are immaterial to this analysis and any tabulation problems experienced.

April 18 Election Night Procedures

On April 18ᵗʰ 2017 when the polls closed after 7pm, the poll workers in Roswell and Johns Creek had to close out two elections instead of one. After completing both elections they carried the election poll books and vote count memory cards to the Roswell City Hall for uploading. The memory cards for both elections were uploaded by placing the cards into the AccuVote TSX and pressing an Upload button. The equipment indicated that all uploads were successful.

The central warehouse received the cards from the precincts, on the GEMS server there and begun to export the precinct results to an encrypted folder for publication by the Clarity ENR software. However, after the first export, the central warehouse was unable to export more precinct results. The GEMS export software displayed a rare generic error code that was not descriptive enough to be helpful in resolving the issue.

Fulton elections staff contacted KSU for assistance. The KSU staff was able to determine that an invalid memory card had been loaded into the server but GEMS had no software mechanism to determine which one was invalid during the retrieval and export. Thus, the invalid memory card had to be found manually. After trying to resolve the problem in other ways, KSU suggested a creative manual approach that eventually resolved the problem. They recommended that Fulton staff delete precincts one at a time and export again after each card was deleted. Once the export was successful, the Fulton staff would know that the last precinct deleted had the bad memory card. The Fulton staff followed this approach, successfully resolved the problem and reprocessed the deleted precincts. However, at least an hour and a half elapsed while the two teams of personnel "debugged" the problem.

The Fulton staff was able to determine that during the closing or subsequent uploading one Roswell Runoff memory card apparently from the East Roswell Library RW20 precinct was included with the memory cards for the 6ᵗʰ Congressional District of the same precinct. From that point on, processing resumed as normal beginning with the third export described below. The Clarity ENR exports that were completed along with the time, number of complete precincts and number of ballots exported unofficially are:
1. 8:22 – 29,281 ballots - after Early voting and absentee ballot uploads
2. 9:19 – 37,788 ballots - upload total: 19/116 precincts
3. 11:49 – 76,972 ballots - upload total: 83/116 precincts
4. 12:42 – 83,269 ballots - upload total: 91/116 precincts
5. 2:17 – 87,381 ballots - upload of all precincts

FINDINGS

The root causes of the human error described in the previous section are:

1. The Ballot Station 4.5.2 software on the AccuVote TSX voting machines at the collection sites cannot identify invalid election cards that may be uploaded for accumulation. **This is a critical security flaw.** The software has the ability to distinguish when a Precinct ID of a memory card being loaded is different than the previous one that was being loaded. In that case, it produces the appropriate error message. However, the software is not able to detect when an Election ID changes and this proved to be a direct root cause of the April 18 problems. **This critical software flaw allows memory cards for a foreign election to be loaded and transmitted into results of a different election.** It is likely that this flaw has always existed without detection since it was implemented.

2. The GEMS 1.18.22 server database used on the Windows 2000 servers has no data edit facility to identify invalid election data that is uploaded to it for processing. **This is another security flaw that is even more critical than the first** and it is also another direct root cause of the April 18 problems. Even if a remote upload failed to detect an invalid memory card, the database at the central sever should have adequate security provisions to edit and validate data that it receives prior to providing precinct totals. Otherwise, virtually any type of data or commands could be injected into an election database. **The GEMS database at the central site has no feature to distinguish invalid data and protect the integrity of election results.** It is likely that this flaw has existed without detection since the servers were purchased in 2002.

3. The GEMS 1.18.22 export facility on the Windows 2000 central warehouse tabulation server cannot specifically identify the problem it encountered when it malfunctions as it did on April 18. When the export could not produce a message to identify exactly what type of malfunction it experienced, Fulton and KSU election officials spent nearly two hours to manually locate the source of the malfunction. The export facility was unable to alert election officials that it had detected invalid precinct results that were for another election. **This is a serious security flaw that was another direct root cause of the April 18 delay.** It is also likely that this security flaw has been present since 2002.

The software edit and validation checks necessary to detect the security flaws cited in this section likely should have been included as requirements, defined as acceptance criteria, verified with test cases and resolved as defects in 2001-2002 when the voting systems were evaluated and implemented. Similar activities could also have been performed in 2011 when the equipment was upgraded. However, software defects are not the only root causes:

4. The state erred in selecting April 18, 2017 as the date for the 6ᵗʰ District Congressional special election because a complete ballot including Roswell Runoff candidates could not be produced 45 days in advance of the election according to federal law. The Roswell Runoff candidates could not be determined until Roswell City Council Election was held on March 21 over two weeks after the ballots were due to be complete. No known legal reason dictated the April 18 date in the Governor's writ according to his staff. [Art. V. Sec II. Para. V of the Georgia Constitution and O.C.G.A. § 21-2-543 of the Ga Election Code]

   This election scheduling error caused Fulton County to operate two redundant elections with separate databases, and procedures on the same day. A memory card from the Roswell runoff became mixed in with the 6ᵗʰ District memory cards**,** thus the **improper scheduling of the 6ᵗʰ District election was a direct root cause of the April 18 problems**. The selection of this date greatly increased the risk of election problems. However, the Governor had little or no way to be aware of voting machine technology limitations and flaws when he selected the date on February 10.

5. The city of Johns Creek erred in calling the Johns Creek Post 4 special election for April 18, 2017 because it did not conform to the newly enacted Georgia special election code for counties and municipalities. O.C.G.A. § 21-2-540 previously stipulated that special elections for counties and municipalities can only be held in March, June, September or November. The law was changed when HB42 was introduced on January 11, passed in the General Assembly and signed by Gov. Deal as Act 7 on February 23. The new law allows local special elections to be combined with federal elections *"provided all other provisions of law regarding such elections are met."* On February 27, when Johns Creek called for their special election they also set qualifying on March 6-8. The qualification period for Johns Creek candidates occurred after the 45 day advance deadline to have the ballots finalized and mailed for the 6ᵗʰ District election as required by the Military and Overseas Voter Empowerment Act (MOVE).   (See Exhibit 2)

   If the Johns Creek election had been scheduled for June in compliance with federal law, Johns Creek candidates would have been known far enough in advance for the election to be combined with the 6ᵗʰ District on the same ballot. **The Johns Creek election caused Fulton to operate a third redundant database, and set of election procedures on the same day.** The election caused some further delay due to duplicate precinct close-out and upload procedures but was not a root cause of the problems experienced. However, **Johns Creek election call appears to violate both federal and state law**. Johns Creek notified Fulton County to conduct the election and the state prepared the ballots.

OUTSTANDING ISSUES

1. During the course of producing this analysis **another serious defect was identified with the current poll book software**. This defect appears to have resulted in Fulton County voters being misdirected to the wrong precinct under certain conditions. Analysis of the impact, root cause and conditions causing this defect are **not** within the scope of this analysis that covers vote count tabulation only. A defect resolution process must be in place with the voting machine vendor so that Fulton County and Kennesaw State University will be able to resolve it.

2. Also during the course of producing this analysis another procedural problem was identified. Early voters at the East Rowell library and potentially other Roswell precincts could not vote in the Roswell Runoff or were asked to come back to vote on the runoff on a different day than when they voted in the 6th Congressional District special election. Identifying the reasons for the denial is outside the scope of this analysis. However, it is obvious though that **this problem is directly attributable to the state's improper election scheduling that required redundant elections and redundant databases to be managed simultaneously** as previously described.

3. An out of state election monitor raised an uncorroborated concern that the published results on the Clarity Election's web site on April 18 for Fulton County showed the partially completed election results increasing from about 16% to about 24% while the completed election results decreased by the same percentages. If true, this would indicate that election **results may have been backed out**. Such an event has not yet been corroborated and is not considered with the findings so far in this analysis. It would be prudent for the Secretary of State to proactively identify any scenarios when this type of event can legitimately occur.

CONCLUSIONS

All computer software should be designed to reduce and prevent human error wherever possible. The human error that occurred on the Election Night of April 18th revealed two critical security flaws that exist for all Georgia counties within the voting machine and county server software.

The sequence of events that occurred in Fulton County publicly confirm that **the GEMS databases at any county will accept invalid election data from a remote or local source and inject the invalid data into live election results for totaling and publishing.** These statewide critical security risks were uncovered by the unusual redundant processes that Fulton County was forced to use as a result of improper election scheduling by the state and Johns Creek. However, these same critical security flaws are not unique to Fulton. They clearly exist on every GEMS server and database in every county as well as any voting machine that may upload data to a county server.

Two other serious flaws were discovered in this analysis. One is in the export facility. It cannot identify the invalid data before exporting the results for publishing and public consumption. This flaw is responsible for much of the lost time on Election Night of April 18. Another was discovered in the electronic poll books which were out of scope as part of this analysis. That flaw may have prevented some people from voting.

This analysis should become as little surprise. During the past thirteen years, hundreds of critical and serious security flaws have been documented by a variety of studies that examine the same type of voting equipment that is employed in Georgia. These studies have been conducted by universities such as Stanford, MIT and Johns Hopkins, technology firms such as Compuware, SAIC and Raba Technologies and states such as Maryland, Ohio, Nevada and California.

Although justifiable suspicions were raised throughout the country from the way in which results were reported on April 18th in the 6th District election, no evidence has been found at this preliminary stage that any type of vote counting fraud occurred. However, these findings present concrete evidence that **the GEMS servers are vulnerable to fraud and critical errors that can dramatically alter the results of an election**. While this particular critical human error was manually detected, **other error and fraud scenarios could occur without detection**. Given the urgent nature of these circumstances it is incumbent upon Secretary of State Brian Kemp to act immediately.

EXHIBITS

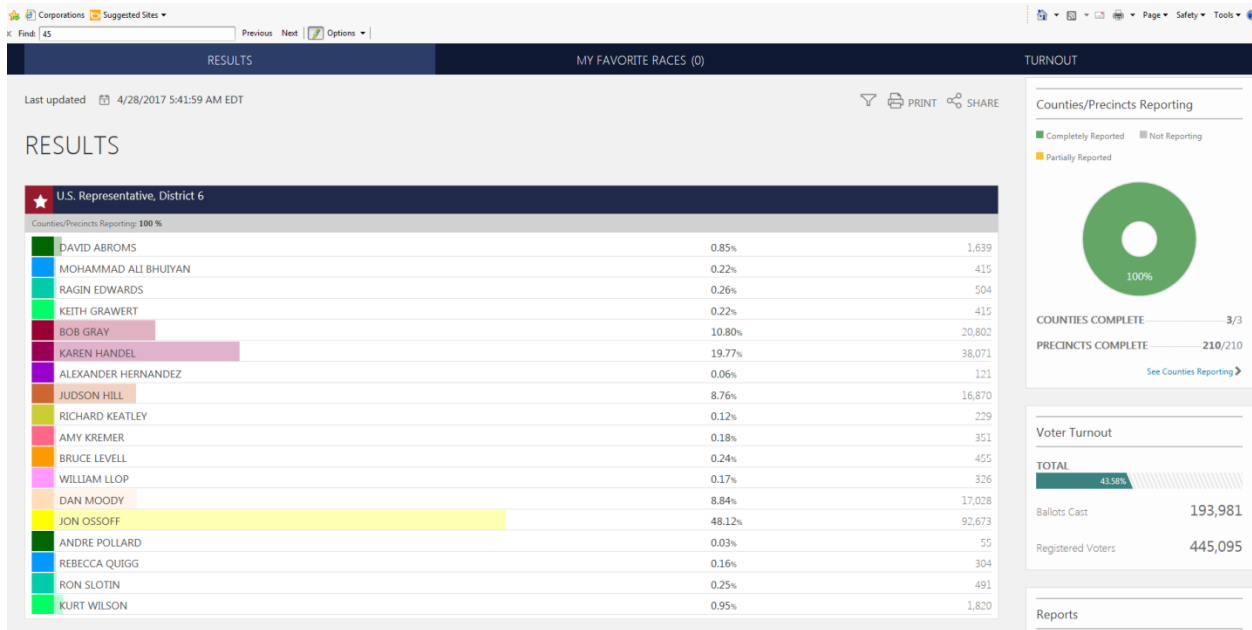**Exhibit 1 - 6th District Election Results:**

Exhibit 2 - Johns Creek Call for special election:

AFTERWORD

This VoterGA analysis has been independently produced mostly from public information available through recent Fulton election board and commission meetings (5:20.00) technical interviews and previously collected documentation about the conduct of Georgia elections. It has been reviewed by out of state technology professionals and election experts. It is intended to provide preliminary answers for critical outstanding technology questions pending receipt of forensic evidence from Open Records Requests that have been submitted.

Since production of this analysis began, the Secretary Kemp quickly concluded that Fulton officials are ultimately responsible for a training and procedure error and he then opened an investigation to support his conclusion. The scope of that investigation is limited to training and basic procedures according to Secretary Kemp's April 20 Fox Atlanta public statement:

- *"This is user error, not an equipment malfunction, and Fulton officials are ultimately responsible for the error. We have opened a formal investigation, and we will continue to gather the facts to find out exactly why this failure in training and basic procedure occurred,"*

(Exhibit 3)

The investigation hinders completion of this analysis and warrants protected sources. KSU election officials who are normally responsive declined to answer questions while the investigation is in process even though such an exception applies only to criminal investigations. [O.C.G.A. § 50-18-72 (a)(4)] Any minor technical corrections needed for the final version of this analysis will not significantly alter the preliminary conclusions already reached.

The scope of this analysis is election technology and scheduling and the SOS investigation will have little or no impact on these preliminary findings. The SOS investigation scope will not determine the true root causes of what happened on the April 18th Election Night.

Exhibit 3: Sec. Kemp Call for Investigation

APPENDIX

History of Georgia Vote Counting Discrepancies

1. In 2005, a Cobb County Special Purpose Local Option Sales Tax (SPLOST) referendum appeared to be headed for defeat, however, election problems halted the counting and when the errors had been addressed, the SPLOST was declared to have passed by 114 votes even though there were 285 blank voted ballots and the SPLOST was the only contest on the ballot.

2. In 2011, another Cobb County SPLOST was similarly declared passed by 79 votes with 95 blank voted ballots. There was a 9 point percentage difference in verifiable mail-in votes vs. unverifiable electronic early votes and Election Day votes. The SPOLST passed even though it failed to capture a majority of verifiable votes.

3. In 2002, 3,256 test votes were added in live election results in Cobb County. Election officials found the error after the results were published and corrected it.

4. In 2008, 947 test votes were included in live election results for Lowndes County. The Election Director and assistant who loaded the cards and certified the results tried to blame a voting machine technician who was not present for loading or certification

5. In 2008, the results of 25,000 Douglas Co. Election Day ballots were placed into a spreadsheet, reviewed by an Election Board member at his home and then re-entered the next day into the country servers. The outcome of several races changed. An investigation was conducted but the board member and Elections Director were never charged for this specific infraction.

6. In 2008, the State of Georgia failed to count over 100 write-in votes for Constitution Party Presidential candidate Chuck Baldwin, including 75 that were recorded by Cherokee County election officials alone. The state never explained how this occurred or verified the write in results with other counties despite formal inquiries by party officials. This evidence was used in a recent ballot access [lawsuit](#) where the U.S. District Court and 11th Circuit Court of Appeals ruled against the state and struck down its restrictive Presidential ballot access law as being unconstitutional

7. In 2006, Fulton County failed to count over 230 votes for Constitution Party Candidate Woody Holmes, who ran for State Representative of District 65, as a write-in candidate. Although Fulton County reported only two write-in votes for Mr. Holmes, the elections office later located 238 more votes after party officials visited their office to find out why his vote totals were wrong

8. In 2010, a GA Supreme Court candidate got 733,770 votes (35%) but did not campaign, advertise, have a web site, take donations, respond to surveys, accept media requests or register her complete contact data with the Secretary of State.