COVID-19, Social Distancing, and Securing the American Vote

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Executive Summary
COVID-19 has drastically and rapidly changed the world and America. Stores are closed. Schools are shut down. And Americans are quarantined. What is more, there is no definitive timetable to end these restrictions, and some scientific models predict an 18-month or longer need to shelter-in-place. Being unable to go to the mall is one thing, but what about being unable to go to the ballot box in November? Fair and honest elections are an integral part of maintaining the Republic. Project Spectrum has an app-based solution in development to keep US citizens safe, while also helping to secure their votes.

Introduction
Few aspects of daily life are immune from the pandemic, which also threatens the upcoming elections - local, state, and national. Many of the states that have not yet held primary elections or caucuses have postponed them or adopted other solutions, such as mail-in ballots. Because there is no date for the end of quarantine, some primaries and caucuses could be postponed until after the Democrat and Republican conventions. Because Joe Biden and Donald Trump are the presumptive presidential candidates, such a development would have minimal impact. However, another critical impact is pending: the 2020 federal presidential election.

Mail-in balloting is not a perfect solution because COVID-19 can survive for days on surfaces such as the envelopes in which ballots would be mailed. This could put mail carriers and election workers at risk of infection. Also, large scale mail-in balloting can lead to lost or unrecorded votes. The federal government sets rules for the election of federal officials, but the states are responsible for regulating many other aspects of the nation’s elections. Furthermore, states delegate many responsibilities to counties and their equivalents, including voter registration and eligibility. Those responsibilities are further delegated to selected election board members. There are 3,142 counties and county-equivalents in the United States. Changes to the current system(s) would involve lots of moving parts and lots of bureaucrats. America’s greatest electoral challenge is that it has no national or federal voting system.

The lack of consistent standards and uniform security, make the country more vulnerable to infiltration and election meddling, especially in the aftermath of the 2016 election and alleged Russian collusion.\(^1\) America needs a viable solution to avoid an electoral and political nightmare. Because COVID-19 limits social interactions, the time for a Plan B and C for American voters is now. Project Spectrum.io – a Department of Defense-supported initiative – proposes an app-based model that would fortify and protect American democracy.

A History Lesson
No system or computer is un-hackable, and there has never been an impenetrable company or piece of software. If that were the case, this discussion would be moot. Best practice standards exist to mitigate attacks against vulnerabilities. Many companies, however, ignore cybersecurity best practices and leave the American public open to exposure because they want to be first to the marketplace. It is painfully apparent that security must not be a secondary concern.

The general public often regards voting machines as simply tally boxes. Voting machines are computers, and a sizeable majority of them are obsolete because they not supported by the Operating System vendor), unpatched, or both. Many run on outdated operating systems. Such computers are vulnerable to many kinds of attacks, which are routinely demonstrated at hacking conferences, such as DefCon and BlackHat.

DefCon is one of the largest and most important hacker conventions in the world. Founded by Jeff Moss, it has been held annually in Las Vegas for nearly 30 years. Defcon hosts sessions on hacking and holds contests and hosts “villages” or rooms with topics ranging from lock-picking to social engineering. The most recent conference included a “Voting Village,” which focused on hacking America’s voting machines. Moss invited all the major voting machine vendors to participate. He expected that they would be very interested and quite likely to attend to take advantage of the presence of more than 10,000 of the world’s hackers - free resources who would demonstrate the vulnerabilities of their machines. Not one of the vendors accepted the Defcon invitation to test or be available for the free and open-source testing.

Faulty voting machines and all, the 2016 election is estimated to have cost $6.25 billion - a hefty price tag for voting on faulty machines subject to manipulation. While the 2016 presidential election revealed several vulnerabilities, the 2020 balloting could be the occasion of the greatest cyberattack in US history.

Although remote voting via a Smartphone app was introduced in the 2018 mid-terms in some regions of the country, it has not been widely adopted. Consider the alternative. In localities that use only paper ballots, the vast majority still tally votes by electronic machines. The machines are monitored during the primaries, as well during early-voting and election days. But what about the days between primaries and elections? Although the US Election Commission (EAC) has set standards for the physical security and storage of voting systems, many machines are simply left unpatched and unsecured in the facilities of local church/school/community centers. It is, therefore, an understatement to say that physical security is a major cybersecurity concern.

The US election system is not only vulnerable to Foreign Nation State-sponsored, Advanced Persistent Threats (APTs) attacks, but it is also susceptible to lone-wolf attacks. Many devices have by-passable locks, which easily grant access to an attacker.

<table>
<thead>
<tr>
<th>Voting System</th>
<th>Percent of US Counties Using System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand Counted Paper Ballot</td>
<td>1.54%</td>
</tr>
<tr>
<td>Optical Scan</td>
<td>62.78%</td>
</tr>
<tr>
<td>Electronic (DRE or BMD)</td>
<td>32.85%</td>
</tr>
<tr>
<td>Mixed</td>
<td>2.69%</td>
</tr>
</tbody>
</table>

Table 1: Types of Voting Systems Used in the United States in 2016

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2 https://media.defcon.org/DEF%20CON%2027/voting-village-report-defcon27.pdf
4 Brace, Kimball, President, Election Data Services, Inc., “The Election Process from a Data Perspective,” presentation to the Presidential Advisory Commission on Election Integrity, September 12, 2017, Manchester, NH,
Supply chain and ownership concerns are not new to the Defense Industrial Base (DIB), but they are to most Americans. Questions about who owns the major voting machine manufacturers have followed the industry for years. The issue, however, became more pressing when the FBI disclosed in July 2018 that a Russian oligarch had invested in a Maryland election services firm. Officials in Maryland and North Carolina have started questioning voting machine makers about potential foreign ownership.

Eddie Perez is the Global Director of Technology Development for the Open Source Election Technology Institute. He is concerned about the lack of oversight of the voting process, “The way people vote is managed by a couple of entities that people don’t know a lot about, and that creates risks for the country.” Perez adds that when it comes to the essentials, voting machine makers should be more diligent: “They have to check the boxes, but once they’ve done that, they focus on selling their product.”

And Then COVID-19
America has laws and regulations that help disabled citizens vote. Yet, according to Clyde Terry, Chair of National Council on Disability’s (NCD) Policy Development Program Evaluation Committee, “People with disabilities make up approximately 1 in 5 of our nation’s population and yet 70% of polling places are still not accessible.” Below are the key findings from the organization’s study on issues that affect voting by the disabled community:

![Figure 1. Voter turnout among the voting-eligible population in 2016](https://www.electiondataservices.com/wp-content/uploads/2017/09/BracePresentation2PenseCommAmended.pdf)

The research shows that people with disabilities were least likely to vote even before a global pandemic. With limited mobility and a higher risk of infection, the 2020 presidential election will be even more problematic for this demographic.

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6 Ibid.

7 Ibid.

8 Ibid.
This brief overview of voting machine problems, foreign meddling, and low turnout for in-person voting forces all Americans to ask whether the election should be postponed or canceled? This dichotomy forces our democracy to choose between two dangerous, unprecedented dilemmas. So, what if there were a third option?

Enter Project Spectrum
An essential goal of ProjectSpectrum.io is to eliminate barriers that prevent Americans from participating in the electoral process. The following proposed solution complies with FedRAMP, NIST-800-171 standards. Project Spectrum is focused on working to comply with all the draft CMMC guidelines as well.9

The analogy below demonstrates how Project Spectrum’s proposed solution might work:

1. Bob, the customer (voter), enters a restaurant (voting place) and proves to Gary, Maître D (authentication and voting app), that he is allowed to be there and hasn’t already been there today (voter registration number/password/pin/fingerprint/etc.).
2. Once validated on the guest list (registration list), Gary marks Bob as having entered the restaurant and removes him from a list of patrons who can access the restaurant. He then gives Bob an entry token (proof of eligibility) and points Bob to a table (virtual voting instance).
3. Alice, the waitress (election volunteer), then takes Bob’s token and information from the menu (ballot) without knowing who it came from and provides it to Liam the Chef (tally server) who tallies it to the daily sales (vote totals) and provides an auditable but non-attributed “receipt” for the manager (election official) to return to Bob.

This analogy of the customer, restaurant, maître D, guest list, entre, table, and menu captures the process flow of voting. Gary is the one who validates, but he has no idea what Bob did once inside the voting booth. Alice has no idea what information was used to validate the entrance, she simply accepts the token in exchange for the ballot. The ballot is then edited by Bob passed, via Waitress Alice, to the Chef, who has no idea from which booth it came, much less what information was used to validate. Bob has a receipt confirming his selection that can be used later to validate the tally. This replicates transactional e-commerce, with safeguards at every step.

9MoveAmerica “Removing Barriers and Enabling Disabled Americans Access to the Electoral Process with Innovative Solutions”
App-based e-Voting Only
Project Spectrum can authenticate and validate a voter via an app-based solution. The app provides a token (entry) to the voter (Bob) to prove authentication for him to interact with a separate “vote recorder” (Liam). The vote recorder verifies the token (e.g., Liam, tallies the voter’s result, and delivers a receipt to the waitress (Alice). The vote tally server (Alice) verifies the token and then records the vote.
The vote tally server then provides a digital record of the vote to the voter and election official (manager), which is auditable but not to the voter. A physical copy of the vote is printed, an electronic one is stored on backup devices, and the official one is cast.

App-based e-Voting with Paper Mail-in Ballots
Project Spectrum also has a solution to make mail-in voting accessible and secure. It addresses concerns with an e-Voting-only solution for those who do not trust e-Voting or for those who prefer a physical copy of their vote. This solution offers all the robust features of the voting-only solution to include a vote by mail solution. It features all of the alternatives above and the ability to either stop the “waitress” involvement after delivering the menu and simply mailing in the ballot or implement dual-factor accountability by registering the vote via the secure connections and also via mail. The voter has not only both an electronically verifiable receipt and a physical copy, as mentioned in the previous solution, but also an extra layer of accountability through the mail-in portion.

Project Spectrum Solutions are compliant with the following:

- Built with security and integrity as the top priority
- Americans with Disabilities Act (ADA)
- Military and Overseas Voter Empowerment (MOVE) Act

Conclusion
Over the past two decades, several initiatives have been launched to improve US election systems, with activity especially intense after the 2000 presidential election. Progress has been slow, and old problems persist, and new problems emerge. US elections are vulnerable to aging equipment and susceptible to external actors. COVID-19 and the threat environment provide an extraordinary opportunity to create more resilient and adaptive election systems that are accessible, reliable, verifiable, and secure. The US Government must improve election security or risk damage to the very foundation of democracy, i.e., free citizens exercising their right to vote.

Ahead of the 2020 election amid the COVID-19 crisis, Project Spectrum proposes a developmental solution and urgently recommends the following:

1. A nationwide standardized system to conduct elections and primaries in the coming years
2. Risk-limiting audits, which include a paper trail across this standard
3. Strict eligibility requirements and a non-attributable but auditable paper ballot trail to ensure the integrity of the ballots.
4. Prioritized funding of a nationwide election system and training of election officials and the American public

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10 Non-attribution to the voter is important to stifle coercion, voting buying, and punishment by corrupt governments/employers/etc.
COVID-19 must not threaten the American way of life. The country needs a uniform and secure solution. One that is not just hardware and systems, but a solution that fortifies and protects the American way of life.

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