

U.S. House Appropriations Subcommittee on Financial Service and General Government
“Election Security: Ensuring the Integrity of U.S. Election Systems”
February 27, 2019

Opening Statement of Dr. J. Alex Halderman
Professor of Computer Science and Engineering, University of Michigan
Director, Michigan Center for Computer Security and Society

Chairman Quigley, Ranking Member Graves, and distinguished members, thank you for the opportunity to address this urgent matter of national security.

Three years ago, America’s election infrastructure was attacked. Hackers targeted voter registration systems, and in some states had the ability to destroy registration data, which would have caused chaos at the polls. We were spared, only because the attackers chose not to pull the trigger.

Next time things could be much worse, because America’s *voting machines* remain stunningly vulnerable. I and other computer scientists have found numerous ways that hackers could sabotage machines and alter election results, and sophisticated hackers can penetrate them even though they aren’t directly connected to the Internet.

Last fall, Chairman Quigley and Representative Katko invited me to demonstrate a hack here on Capitol Hill, in a mock election with a voting machine used in eighteen states. I remotely hacked in, stole both Congressmen’s votes, and changed who won. These capabilities are *certainly* within reach for America’s enemies.

Fortunately, we know how to better defend elections: Paper ballots, manual risk-limiting audits, and security best practices are a prescription endorsed by the overwhelming majority of security experts and by the National Academies, and widely favored by election officials.

Most states have started implementing these defenses using the \$380 million that Congress appropriated last spring, but many are still struggling to afford replacing vulnerable machines. For example, Georgia voted in November using the same machine that I hacked in front of Chairman Quigley, but received only a tiny fraction of the cost to replace them. Forty-three states use machines that are no longer manufactured, and twelve states use paperless machines, which are impossible to secure. This puts the entire nation at risk.

States and local governments need further federal assistance before attackers strike again. The highest priority should be to eliminate paperless voting and deploy hand-marked paper ballots, optical scanners, and assistive devices for the disabled. If provided under the Help America Vote Act, about \$900 million is needed to ensure all states receive at least half the necessary funding. States need this money now, even before stronger equipment standards are in place, but Congress should at least prohibit purchasing new machines that lack a robustly auditable paper ballot.

With your leadership, elections in 2020 and beyond can be well secured, and voters will have good reason for confidence. But if we delay, it is only a matter of time until an election is disrupted or stolen in a cyberattack.

Thank you. I look forward to your questions.