Chapter 6

Other Challenges to Internet Voting

The current system of American voting faces many challenges including inaccurate registration data, lost ballots, inaccurate counting of votes, and broken voting machines. Use of the Internet to improve the voting systems does present cybersecurity challenges, but I believe they are surmountable. The following sections describe some additional challenges to creating an improved system of voting.

Voter Registration

A significant challenge for Internet voting occurs before voting begins. The challenge lies with problems in voter registration, in both the existing system of voting and in Internet voting trials. It was estimated up to two million voters were not able to vote in the Presidential elections of 2000 because of registration errors.[322]As demonstrated in the March 2016, Utah Republican Internet voting trial, there were thousands of citizens who wanted to vote online but could not due to registration errors.

Although registration procedures vary among the more than 10,000 voting jurisdictions countrywide[323], the role of the voter registration process is mainly the same. In order to vote, you need to be registered. Most states require pre-registration prior to election day. The vast majority of voter registrations occur by mail or via online voter registration. There is no confirmation process, as it is an honor system. When submitting and signing a voter registration form, the voter is asked to attest to the following, "Above information is true and correct". It is a felony to falsify registration information.

If you show an ID at the polling place with an incorrect address, you cannot vote. In some states, you can fill out a provisional ballot and if the registration issue is resolved in a few days, your vote will count, although it may be after the election is over. In the situation in Utah, there was no online process to file a provisional ballot. Voters were told to call a help line if there were any problems in the online voting process. However, if the problem was a discrepancy in the registration information, there was nothing the helpline could do.

There are several reasons for the problems with voter registration. The voter could have filled out a registration request incorrectly or entered incorrect information online. If a registration request was mailed to an election office, a member of the election staff could have entered the data into the database incorrectly. The required time to be registered prior to Election Day varies from state to state but, if the registration does not

meet the required timeframe, the citizen cannot vote. In many states, registration must take place a month or more prior to the election. People who move from state to state often are not aware of the different state requirements. Elderly people who no longer drive often do not have a photo ID. In a *Scientific American* article "Fixing the Vote: Electronic Voting Machines Promise to Make Fixing Elections More Accurate Than Ever before, but Only If Certain Problems—with the Machines and the Wider Electoral Process—Are Rectified", Ted Selker, Visiting Scientist at the Center for Information Technology in Interest of Society at UC Berkeley said, "Registration problems prevent millions of citizens from voting."[324] On the positive side, online registration via the Internet is growing rapidly. As of May 4, 2016, 31 states plus the District of Columbia offered online voter registration.[325] Five additional states have passed legislation to create online voter registration systems, but have not implemented them yet.

Validation of voter registration information is performed by comparing it to the voter's driver's license or other state-issued identification cards. If a person entered his or her name with a middle name when obtaining a driver license or for other state transaction, the same name must be used for voter registration. When the information does not match, such as when the registration application shows a middle initial instead of a middle name, the application is sent to officials for further review or action. Online registration can be a boost for voter participation by reducing the number of voters who are rejected. Data can be entered by the voter and verified in real time.

Offsetting Registration Benefits

Online registration also has the potential for significant cost savings. A case study in Arizona showed a reduction in registration costs from 83 cents per paper registration to 3 cents per online registration.[326] The cost to implement online registration systems in some states was absorbed easily within existing budgets. The funds from the Help America Vote Act have been used in some states to implement online voter registration. Although the savings potential has been shown to be real, moving to online registration requires vision, leadership, and funding.

Online registration is one component of e-government. The U.S. ranks number seven in the world as an e-government leader, based on The United Nations 2014 E-Government Survey. [327] The survey presents a systematic assessment of how well the 193 Member States of the United Nations use information and communication technologies to transform the public sector by enhancing efficiency, effectiveness, transparency, accountability, access to public services, and citizen participation. The six countries which rank higher than the U.S. include: 1) The Republic of Korea, 2) Australia, 3) Singapore, 4) France, 5) Netherlands, and 6) Japan.

Adoption of e-government among the U.S. states varies widely. In its comprehensive 2014 Digital States Survey, the Center for Digital Government evaluated the digital technology practices in all 50 states. Grades from A to D were assigned based on quantifiable results in better serving citizens and streamlining operations. Compared to the results of the 2012 survey, grades improved in 21 states, declined in 12 and stayed

even in 17.[328] Eight states earned top grades: Connecticut, Georgia, Michigan, Missouri, Ohio, Pennsylvania, Utah, and Virginia. The states receiving a C or lower grade included Alabama, Alaska, Florida, Nevada, New Hampshire, Oklahoma, Rhode Island, and Wyoming. The rankings do not specifically highlight performance at voter registration.

Current and accurate registration data about voters sets the stage for the actual voting. However, even if all eligible citizens were properly registered, other challenges need to be solved prior to implementing Internet voting.

Election Officials Training

Internet voting represents a major shift in the process of how elections are conducted. Election officials will need to be trained in the new processes. If they are not trained prior to implementation of Internet voting, problems could arise. A similar training challenge existed when healthcare providers began to implement electronic health records. The clipboard, manila folders, and fax machines had been the lingua franca in healthcare for decades. E-prescribing was another change in process which required major staff re-training. It was adopted at a very slow pace until the federal, state, and local provided billions of dollars of incentives. The incentives worked. More than half of prescriptions now are created electronically resulting in lower medication errors and improved patient safety.[329] Like physicians facing the change to electronic prescribing, election officials at the state and county levels will need training to implement Internet voting. It will be essential for vendors to develop Internet voting systems which are easy to use and to provide training programs to election officials.

Privacy at Home

A frequent objection by Internet voting critics is the lack of privacy and the possibility of coercion. I think Internet voting would provide more privacy, not less. When I curl up in a chair or on a park bench and review communications, financial, or healthcare data, I feel completely private. In many current voting places during a closed primary, you are asked which party you belong to so you will get the correct ballot. This can take place where anyone can hear you say which party you belong to, which certainly isn't private.

While I believe there are advantages to being able to vote from the privacy of one's home, some are concerned there could be a danger. A friend, family member, or visitor may coerce or bribe a voter to cast an unintended ballot. In an extreme and highly unlikely case, one or more persons could surround the voter and threaten harm unless a certain vote is cast. Fortunately, there is a simple solution to these problems. After the person or persons making the threat have departed, the voter could cast his or her vote a second time. The voter could actually vote multiple times up until the time the voting period is over. The last vote cast would be the one which counts. Estonia and Arizona have used this method successfully. A voter under duress or perceiving a threat could go to the local library and cast the ballot there. Some critics believe voting outside the

polling place is not secure against coercion by those who buy last minute votes. I believe this is a minimal risk compared to the many flaws in our current system.

The Status Quo

When Internet voting is introduced, it will represent a major change from the way voting works today. Most changes of this magnitude face resistance by those interested in preserving the status quo. "Follow the money" is a catchphrase said to have originated in William Goldman's screenplay for the 1976 film *All the President's Men*.[330] Current use of the Internet has disrupted multiple industries, and in each case I believe the flow of money has been a major factor.

For example, Apple's iPod and iTunes were the beginning of the demise of music tapes and CDs, which in their turn had caused the demise of vinyl records. Since Apple has become more aggressive in the movie business they are beginning to disrupt the movie theatre status quo. Money has moved from traditional publishers and broadcasters to a new business model Apple calls services. Apple reported revenue of $8.9 billion from music, apps, and movies during the last quarter of 2015.[331] The company does not break out the details of its services revenue, but they have reported 13 million Apple Music subscribers.[332] At $10 per month, the annualized revenue would be $1.6 billion. In 1997, Apple's revenue from music was zero.

There are other examples of major changes disrupting the status quo. Amazon disrupted the book industry with the Kindle which changed how many people feel about reading a physical book. Consumers began to purchase books from Amazon on-line or on Kindle rather than buying hard copy books from a traditional book store.

More recently, Uber, the American multinational online transportation network company headquartered in San Francisco, California, has faced strong resistance from local taxi commissions. Millions of consumers consider Uber the smartest way to get around. One tap on your smartphone and a car comes directly to you. You enter where you want to go and the driver sees it on his or her smartphone. Payment is completely cashless using the credit card you have on file with Uber. Taxi operators in New York pay large fees to get a medallion from the taxi commission authorizing them to operate.

Airbnb, a San Francisco, California based private company, provides an online community marketplace for people to list, discover, and book lodging accommodations around the world. A consumer may be looking for an apartment for a night, a castle for a week, or a villa for a month. Airbnb operates in more than 34,000 cities and 191 countries. Consumers like the service, but the company has raised concerns from hotel operators and municipal tax collectors.

Bitcoin, the digital currency described in chapter 4, has raised concern from banks and money transfer companies which collect large transaction fees which may not be justified in a world of digital currencies. Bitcoin is now accepted by 100,000 merchants worldwide.[333]

In all of these examples, the issue revolves around money. Disrupting the status quo disrupts the allocation of money, and usually means money moves from old to new companies. In all of the cases, those benefiting from the status quo have resisted change.

The Voting Machine Industry

The industry serving governmental voting jurisdictions consists mostly of traditional voting machine companies. The voting machine industry has had a checkered past. The authors of *Broken Ballots* cited numerous cases of monopolization, corruption, and conflicts of interest.[334]

At one point, there were 19 voting machine companies listed in the Federal Election Commission Buyers Guide, but the guide is no longer available. Through a series of mergers, acquisitions, and business failures, the voting machine industry currently is dominated by the three companies. All three companies are privately held and do not disclose their revenue or profits.

Dominion Voting Systems Corporation is based in Toronto, Canada. It sells electronic voting and tabulating hardware around the world. In May 2010, Dominion acquired Premier Election Solutions, formerly Diebold Election Systems, from Election Systems & Software. They just had acquired Premier Election Solutions from Diebold, but were required by the United States Department of Justice to sell Premier Election Solutions for anti-trust concerns.

Election Systems & Software, based in Omaha, Nebraska, is the giant of the voting machine industry. In addition to a line of hardware products, the company provides equipment rental, print services, maintenance services, ballot management services, election support, professional services, and voter registration mailing services. The company's equipment, software, and services are used by municipalities and counties throughout the U.S.

Hart InterCivic, based in Austin, Texas, has been working with election professionals for more than 100 years. The company makes a wide range of voting machine hardware and services. Its election services include consultation, training, professional services, preventative maintenance, and ballot production services. The company claims its mission is to help advance democracy one election at a time.[335]

A review of the websites of these three companies reveals they all claim to be innovative. However, in my opinion, when you look at their products and services, they are basically refinements of decades old technology. Although it may take a decade, I believe Internet voting revenue will replace most of the existing revenue of these companies. In the future, voting industry revenue will come from software and services.

The question is whether these companies will reinvent themselves and become leaders in the future or whether they will not change and cling to the status quo. If they choose to lead, they will have significant advantages. They have long standing

relationships with government election professionals and have employees who understand the voting process. The music and publishing industries waited too long to embrace the Internet and newcomers such as Apple and Amazon took the lead, and the revenue. It is possible new companies will do the same thing to the election industry.

Incumbent Politicians

There are different views concerning who benefits the most from high voter turnouts. Thomas Hansford, Associate Professor of Political Science, University of California and Brad T. Gomez, Associate Professor of Political Science, Florida State University studied this question. In their 2010 paper, "Estimating the Electoral Effects of Voter Turnout", the researchers concluded, "High turnout elections portend partisan change, anti-incumbency tendencies, and generally less predictable consequences."[336]

I believe Internet voting will bring more voters to the polls, and higher voting turnout will not benefit incumbents. Washington Post's Amber Phillips investigated the relationship between politics and the adoption of Internet voting. She said, "Politicians want to keep their jobs, and one of the best ways to do that is to avoid massive turnout that could get them in trouble -- especially should any negative headlines come their way before Election Day."[337]

The Center for Public Integrity, a nonprofit, nonpartisan organization which does investigations and analyses of public service, government accountability, and ethics related issues said,

> Being a member of Congress remains a surprisingly sweet gig. In addition to the power to shape policy and public discourse, legislators get great health care and retirement benefits, hefty salaries with annual cost of living increases and the incumbency-boosting ability to blanket constituents with mail touting their achievements. [338]

Joe Mohen agrees. He is an entrepreneur best known as co-founder and CEO of election.com, the company which ran a successful trial of Internet voting for the Arizona Democratic Primary in March 2000. He believes incumbents are very focused on staying in office to preserve the perks they receive.

Mohen said, " Politicians get reelected more than 80% of the time."[339] According to The Center for Responsive Politics, a non-profit, nonpartisan research group based in Washington, D.C., his estimate is low. Between 1964 and 2014, the reelection rate averaged 93%.[340] Mohen believes the reelection rate would drop to 50% if Internet voting was implemented nationwide. The 50% number is hard to prove, but I believe Mohen's rationale is logical. He said, "With Internet voting, it will be much easier to vote and participation will rise significantly. If more people vote, those who are dissatisfied with the incumbents will have a stronger voice."

In August 2015, a Gallup poll showed Congress approval fell to 14% from 17%.[341] As of May 23, 2016, a RealClearPolitics average of six surveys put the approval rating at 13.3% with a disapproval rating of 78.2%.[342] In my research, I found no current congressional politicians from the Democrat or Republican party pushing for the adoption of Internet voting. Despite the many benefits to citizens of an easier, more convenient voting system, there appears to be no political will to change the American system of voting.

The 'It Just Can't Be Done' Attitude

The strongest challenge to Internet voting comes from a small, highly influential, and knowledgeable group of anti-Internet voting activists. During the early to mid 1990s, the attitude of many technologists and business people concerning potential uses for the Internet was very different from what it is today. I attended a conference in Paris, France in 1995 where Bill Gates was the keynote speaker. He said that the Internet had no place in business because it was too slow, insecure, and unreliable. At the same time, I also met with banking and insurance executives who told me they would never connect their firms to the Internet. Even IBM computer scientists were skeptical of the Internet. One IBM Fellow, with a PhD in computer science, told me it was not possible to perform transactions on the Internet. He said, "It just can't be done."

IBMs proprietary networking software at the time, Systems Network Architecture, used very sophisticated software, developed in the mid 1970s, called Virtual Telecommunications Access Method, known as VTAM. Most large enterprises in the world at the time the Internet was emerging used IBM's VTAM. VTAM provided the basis for a deterministic network. This meant the sender and receiver of a digital packet of information could determine with certainty exactly the state of the information packet. In other words, the sender and receiver knew exactly where the packet of information was. When the packet of information arrived at the destination, the sender and receiver got a confirmation.

During the early 1990s, as the Internet was beginning to emerge into the business world, computer engineers realized the Internet was not a deterministic network like VTAM. Senders and receivers had no way to confirm if an information packet had arrived at its destination. This is why the IBM Fellow believed it would be impossible to perform transactions using the Internet. There was no state built into how the Internet worked. This meant if you visited a website, the website would not know you visited, so if you came back again it would not recognize you. Remembering you had visited and what you were doing on the site when you visited is called the "state" of your visit. Mainframe systems, with VTAM, had this capability. The Internet, prior to cookies, did not.

Netscape Communications, founded in Mountain View, California and best known for its web browser, Netscape Navigator, set out in the early 1990s to enable companies to use Internet webservers to perform transactions many believed only IBM mainframes with VTAM could perform. Netscape had a vision for the Internet which

went beyond the limitations the computer scientists at IBM accepted. The Internet's lack of state would be solved by the invention in 1994 of the cookie by Netscape Internet pioneer Lou Montulli.[343] A cookie is a small file containing a piece of text. The cookie file could contain a user ID. When a user visited a website, the webserver would write the small cookie file on the user's computer. When a user visited the website a few seconds later or months later, the webserver would look on the user's computer and if it found the cookie, it would know the identity of the returning visitor. In other words, the cookie gave the Internet the ability to do things previously only possible with mainframe software.

The cookie is a simple concept, but it enabled Internet pioneers to eventually build websites which could do anything IBM's mainframes and VTAM could do. The implementation of the cookie was not a remake of the Internet. The 24 year old Netscape software engineer did not have blinders on. He knew what he was trying to accomplish and he invented a solution. It was a small tweak inspired by a vision. The Internet approach to handling transactions was not nearly as robust as IBM's approach at the beginning, but the Internet evolved rapidly. IBM adopted Internet technology in 1995, and within a few years, incorporated it into all of its hardware and software solutions.

There have been countless ideas where one or more pundits said, "It just can't be done." In 1972, a study about world dynamics was sponsored by The Club of Rome, a global think tank that deals with a variety of international political issues. The study resulted in a book, *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind*.[344] This book was my introduction to brilliant people's pessimism. The book presented a simulation model based on five variables: world population, industrialization, pollution, food production, and resource depletion. The model was developed by Jay Wright Forrester, an American pioneering computer engineer and systems scientist. He was a professor at the MIT Sloan School of Management and is known as the founder of system dynamics.[345]

The five variables in the study were considered to grow exponentially, while the ability of technology to increase resources availability was believed to be linear. The initial simulation showed the world would collapse by the beginning of the 21st century because there would be too many people, insufficient production, overwhelming pollution, a shortage of food, and a depletion of critical resources. The authors explored the possibility of breakthroughs to avoid the collapse. After considering the most optimistic scenarios imaginable, the conclusion was essentially the same. The world could collapse. Needless to say, the world did not collapse. Brilliant as they were, the researchers could not see the future breakthroughs which would occur. In other words, they thought, "It just can't be done."

Some computer scientists have become anti-Internet voting activists and share a similar attitude toward Internet voting. "It just can't be done." Following are a few examples of this anti-Internet voting activist attitude:

It's going to be decades, if ever, before the technology used for security is at the point where online voting can be done with confidence.

There's just so much that can go wrong, and the need for it is not nearly so pressing as the risk (2016).[346]

> J. Alex Halderman, Ph.D., Assistant Professor of Computer Science and Engineering, University of Michigan and member Board of Advisors at Verified Voting.

Our goal is to convince you that secure Internet voting is unachievable for the foreseeable future and therefore, we sincerely hope, not inevitable.

> "Internet Voting in the U.S." (2012) by Barbara Simons, Ph.D. and Douglas W. Jones, Ph.D.[347] Simons, Chair of the Board of Directors of Verified Voting and member of the Board of Advisers of the U.S. Election Assistance Commission. Douglas W. Jones, Professor of Computer Science, University of Iowa and member Board of Advisors at Verified Voting.

Internet voting is a nonstarter. You can't control the security of the platform. The app you're using, the operating system on your phone, the servers your data will cross en route to their destination, there are just too many openings for hacker interference (2016).[348]

> Aviel D. Rubin, Ph.D., Professor of Computer Science, Johns Hopkins University and member Board of Advisors at Verified Voting.

I have not yet seen anyone come up with any way to address the security problems we identified with Internet voting and I believe it would require either some new breakthrough or a wholesale change to our computing infrastructure (2011).[349]

> David Wagner, Professor, Computer Science Division, University of California, Berkeley.

The dissenting anti-Internet voting activists, who effectively torpedoed the military and overseas citizens Internet voting expansion pilot, hold Ph.D. degrees and have very impressive backgrounds. Two of them, Barbara Simons and David Jefferson are board members at Verified Voting.[350] Aviel D. Rubin is a member of the Verified Voting Board of Advisors. The fourth, David Wagner, is Professor at Berkeley Electrical Engineering & Computer Sciences.

Verified Voting

Carlsbad, California based Verified Voting is comprised of two separate organizations. Verified Voting Foundation is a 501(c)(3) nonprofit educational organization founded in 2003 by Dr. Dill. VerifiedVoting.org is a 501(c)(4) nonprofit lobbying organization formed at about the same time. The two organizations engage in many of the same activities, but the IRS requires the lobbying activities be funded separately. The two organizations have nearly identical mission statements.

> We believe the integrity and strength of our democracy relies on citizens' trust that each vote be counted as cast. Our primary concern lies in ensuring that the means for verifying election outcomes are in place and used for that purpose. We also focus on the reliability and security of voting systems. We connect those who are making and implementing policy that shapes how we vote to those who understand the particular risks associated with the emerging digital landscape, particularly online and electronic voting.[351]

Verified Voting has significant breadth and depth of experience on voting and voting rights. The staff and board members provide education and advice to election officials, voter advocates, lawmakers, technologists, researchers, and the media. A major focus of Verified Voting is to ensure auditable systems are in place and ensuring audits are conducted. They actively seek to eliminate or greatly reduce the use of systems which cannot be audited. They include the use of the Internet in voting to be among the systems which cannot be audited.

In an interview in 2016 with Pamela Smith, President of Verified Voting, she explained that Verified Voting provides information and public testimony on voting issues at federal and state levels throughout the U.S. [352] Ms. Smith is co-editor of the "Principles and Best Practices in Post Election Audits," co-author of "Counting Votes 2012: A State by State Look at Election Preparedness", and is a contributing author for "Confirming Elections: Creating Confidence and Integrity through Election Auditing".

I asked Ms. Smith if Verified Voting was biased against Internet voting. She would not use the term biased but agreed the organization considers Internet voting to be risky, not verifiable, and not ready for widespread use.[353] She acknowledged the current system has many flaws, but believes the focus should be to fix the current system rather than introduce what Verified Voting considers to be unproven technology. Verified Voting endorses what Los Angeles County and Travis County are doing to specify improved voting systems, but not the use of the Internet.

The publicly available tax returns for the two Verified Voting organizations reveal they had income of approximately $4.6 million during 2004-2013 and expenditures on program activities of approximately $2.5 million. Almost 90% of the income is collected by the educational organization. The source of the funding is mostly grants from non-profit foundations which have an interest in American democracy and the election process. There are no members of Verified Voting but they do use mailing

lists to solicit donations from individuals. Ms. Smith assured me that the voting machine industry is not among the donors to Verified Voting or its Foundation.

I take Verified Voting's stated goals and mission at face value. I believe they are strongly committed to helping assure American democracy is protected with auditable voting processes. When it comes to Internet voting proposals or even discussions about the topic, the voice of at least one of the board members or board advisory members is present. With 9 board members and 31 advisory board members, it is a formidable group. Their papers and sound bites concerning the dangers of Internet voting are widely circulated. Their messages about the dangers of Internet voting are consistently negative. Based on discussions with people directly associated with Verified Voting, election officials who have talked to them, and quotations attributed to them, I conclude Verified Voting's unstated goal is to stop Internet voting in its tracks. The elite anti-Internet voting activists actively lobby and speak out in a manner which often frightens politicians and election officials from even considering Internet voting pilots.

I believe Verified Voting's message is a response to their concern voting officials or politicians might perceive that citizens want Internet voting. They further believe claims by boastful vendors that Internet voting is ready are not valid. I understand the concern raised by some voting systems administrative staff who may not have the background or skills to implement secure Internet voting today. They may not have the funds to hire the necessary skills. Despite my understanding of the Verified Voting exploits to criticize Internet voting pilots, I have some concerns about how they are displaying their critiques.

There is little acknowledgement in Verified Voting's publications or quotes about how Internet voting would compare to the dire situation of the current system of antiquated, insecure voting machines. Comparisons are made between Internet voting of today and a perfect Internet voting system in the future. The concerns raised about Internet voting are legitimate concerns, but are theoretical and not supported with statistical analysis showing the probability of their concerns actually occurring. Other than the End to End Verifiable Internet Voting paper in which Verified Voting board and advisory members actively participated, I could not find papers with specific constructive suggestions for how to make Internet voting pilots more successful. Neither could I discover any suggested strategies for mitigating the concerns they raise. Although solutions are not their primary responsibility, it would be helpful if they used their incredible talent pool to collaborate on developing creative solutions.

I would like to see more discussion from Verified Voting on their research about Internet voting. I have concerns about the approach some of the board and advisory board members of Verified Voting have used to undermine Internet voting trials. While finding weaknesses can be helpful, I found the communications following the Estonia and the District of Columbia pilot projects on Internet voting to be more destructive than constructive.

When I started to research this book, I did not expect to find one of the major challenges to introducing the use of the Internet into the voting process would come from computer scientists. Although I share some of the concerns raised by Verified Voting and others, I feel the challenges can be overcome. I agree with Ms. Smith when she said, "Let the research continue".[354]

Think Big, Act Bold, Start Simple, Iterate Fast

I believe there are two ways to consider the feasibility of Internet voting. One is the doom and gloom approach advocated by the anti-Internet voting activists. "Never is too soon," some say. Another view is to follow the kind of thinking the young Netscape programmer applied to make the Internet able to replace traditional networking. In the late 1990s, I developed a mantra which matches his approach. I believe it can enhance an election attitude. I called it Think Big, Act Bold, Start Simple, Iterate Fast.[355]

Think Big is about the potential to greatly increase voter participation and strengthen our democracy. I believe Internet voting has the potential to make these improvements.

Act Bold is what the Utah Republicans did in 2016. They took a calculated risk by trying Internet voting. They found they were able to enfranchise thousands of voters of all ages who were able to vote from home or remotely. Many voters were serving with the military or living and working abroad. Mormon missionaries voted from 45 countries.[356] Voters were able to reliably vote using the Internet.

Start Simple is the third element of the mantra, and perhaps most important. Healthcare.gov thought big, acted bold, but started big and initially failed big. A smaller start or a pilot project has a higher chance of success.

Iterate Fast is the path to ultimate success. Most multi-billion dollar Internet companies have followed this part of the mantra and continue to do so. The Internet voting proposal for military and overseas citizens was an excellent idea with broad support. The supporters started simple and had a successful pilot with just 84 voters. Unfortunately, the follow-on pilot designed for 100,000 was not permitted to proceed because of the strong voice of just four dissenters.

America is a big place with states bigger than many countries. A national election voting server would not be a good idea. However, a national blueprint for how Internet voting could work would be a great idea. Each state and its election jurisdictions could implement on their own schedule based on their unique needs and skills. The key is then to iterate fast based on what is learned. Estonia is not resting on its laurels. It is continually improving and strengthening its Internet voting system by refining processes, adopting new technology, and continuously reviewing how the system works.

A good starting point for how to think about Internet voting is a 2016 report from the Atlantic Council entitled, "Democracy Rebooted: The Future of Technology in

Elections", written by Conny McCormack.[357] The Atlantic Council is a 501(c)(3) non-profit organization which promotes constructive leadership and engagement in international affairs based on the Atlantic Community's central role in meeting global challenges. The origins of the organization dates to the signing of the North Atlantic Treaty in 1949. The Council publishes authoritative papers and reports intended to shape policy choices and strategies to create a more secure and prosperous world.

Toomas Hendrik Ilves, President of Estonia, summed up Internet voting at an Atlantic Council conference as follows,

> In an era where citizens engage in everything from communication to education to leisure through technology, it is time to access how elections can become reflective of modern realities. Estonia has been the leader in implementing technology to strengthen our democracy. The Atlantic Council offers excellent advice for implementing modern elections and provides the international community recommendations for how countries can best use the latest technology in their elections.[358]

Another Atlantic Council report, written in 2014, is titled, "Online Voting: Rewards and Risks". The author, Peter Haynes, is a Nonresident Senior Fellow for the Atlantic Council's Strategic Foresight Initiative and Vice President of Product Strategy at Polyverse Corporation, a cybersecurity company. A summary of the report states,

> With the right, carefully chosen security considerations, online and e-voting could become more widespread. The report found that many of the technologies that handle online financial transactions could be applied to make e-voting and online voting a reality.[359]

The Report provides specific guidelines for how to create a secure Internet voting system. The Internet voting seeds are planted. Discussions are underway across the country among voting election officials. Innovative startup companies are working on developing new technologies to modernize the way we register and vote. Although the Internet is not perfect, and there are challenges which need to be addressed prior to adopting Internet voting, the path to an election attitude offers many advantages.