2019 Awards

Professional Practice Papers
In Election Administration and Voter Registration

We thank all our colleagues who took the time to share their best practices this year. These papers show a commitment to our profession and the desire to always improve. To work in a profession like ours, filled with people that perform their duties with dedication, vision and willingness to share their success is truly an honor.

Please take some time to review these great ideas and consider how they may benefit your jurisdiction.

Jill LaVine, CERA, Chair Professional Practices Committee
Grace Wachlarowicz, CERA, Professional Practices Committee
Vicki Davis, CERA, Professional Practices Committee
Dawn Williams, CERA, Professional Practices Committee

Democracy Award Winner - Outstanding Practice of 2019

Enhanced Security and Access for UOCAVA Voters

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Shelby Miller, Election Division Assistant, Denver Election Division, Colorado
2019 Professional Practices Program
Enhanced Security and Access for UOCAVA Voters
Denver Elections Division, CO

Submitted by:

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Executive Summary

The Denver Elections Division partnered with Voatz, Inc., Tusk Philanthropies, and the National Cyber Security Center to pilot a blockchain-based mobile voting application for the Denver municipal election cycle in 2019. The application was available only to voters who qualify under the Uniformed and Overseas Citizen Absentee Voting Act (UOCAVA). The goals of the pilot were to provide a more convenient method by which military and overseas citizens could vote, and to provide a more secure method of returning cast ballots than other electronic delivery methods available. Survey responses showed voters overwhelmingly preferred to vote using the app than by any other means.

We also helped to develop a third-party audit tool hosted by Voatz through which election observers could conduct an independent audit of the ballots cast through the blockchain app and verify the votes were recorded and tabulated correctly. The audit offered observers full access to independently verify the election outcome, and suggests the potential benefits of end-to-end verifiable elections.

Easier Access and Enhanced Security for Remote Voters

In preparing for our 2019 municipal election cycle, the Denver Elections Division sought a solution to the unique obstacles facing overseas and active-duty military personnel and their eligible dependents. While UOCAVA voters can access their ballot electronically through a web-based platform, this “one size fits all” approach does not address voters’ lack of access to certain technology. Traditional electronic voting methods require access to a printer or scanner; even if a voter is able access their ballot they face a secondary obstacle of properly signing and returning the affidavit.

Another challenge for UOCAVA voters is ensuring their cast ballot is securely returned. Traditionally, UOCAVA voters who opt to return their voted ballots electronically must send them as PDF attachments to email. This is perhaps the most unsecure return method available and offers no assurance that their ballot is counted correctly. In statewide elections, the Colorado Secretary of State hosts a secure file transfer site for UOCAVA voters to upload their voted ballots, but this method does not resolve all potential security risks and is not available for Denver voters in home-rule elections.

Blockchain offers enhanced security over email and other electronic methods of return. Because blockchain is a distributed digital ledger of data transactions, mobile votes become immutable and tamper-proof once recorded. In the unlikely chance a hacker has the money and expertise to compromise a blockchain, its distributed nature would create so much digital noise as they move through it that a security team would be alerted well before they reach their intended target. When combined with the latest advances in smartphone security technology (e.g. biometrics and hardware-based encryption for data transmission over the internet), mobile voting via blockchain is more secure than other methods of electronic return currently available to UOCAVA voters.

Conducting the Pilot

To test the convenience to UOCAVA voters, we solicited volunteers to participate in the pilot. Voters who signed up were added to the Voatz database and received instructions on the 45th day before the May 7th election on how to download the mobile app and verify their identity. The identity verification step involved inputting basic voter identifying information and taking a photo of a government-issued photo ID, such as a driver’s license or passport. Next, they took a 10-second selfie video. The photo and video were then used by facial recognition software hosted by Voatz that matched the voter’s photo ID to the video. This process usually took only a few minutes, and none of the photos or videos are stored by Voatz for longer than 24 hours.
When the facial recognition portion is finished, the voter is then able to access their ballot, mark their selections and proceed to sign the affidavit directly on the phone’s touchscreen, effectively eliminating the need for any secondary technology. The voter then uses their biometric fingerprint as registered in the phone’s internal security to cast the ballot. Once a voter submits their ballot, the voter receives a digital receipt showing his/her ballot selections. If a voter noticed something amiss, he or she could immediately cancel the vote and receive a new ballot through traditional methods.

Our office simultaneously receives an anonymized copy of the digital receipt as well as an email containing the signed affidavit. The UOCAVA processing team is then able to print the affidavit and proceed with signature verification. The cast ballots are housed in a separate Voatz dashboard, only to be accessed in bulk at the time of audit. The dashboard requires two designated users to sign-in simultaneously to download and print the ballots directly onto ballot stock for scanning and tabulation with all other ballots cast.

**Transparency and Auditability**

Following the election, the Denver Elections Division also piloted a third-party audit tool to make the votes cast through the blockchain fully transparent and auditable. This digital bulletin board was made available to any interested party who wanted to participate, including election observers and experts in election administration and blockchain technology. The tool enabled auditors to verify each of the following steps:

- Votes recorded in the blockchain from the voter’s device;
- Votes recorded on ballot images extracted from the blockchain; and
- Votes recorded in the tabulation system from the cast vote record.

The data was verified against the anonymized voter-verifed digital receipt. To ensure voter anonymity during the public audit, all variable races were redacted on the digital receipts, ballot images, cast vote record, and block explorer. Eighteen independent auditors participated in the initial audit following the Municipal General Election. All auditors confirmed the accuracy of the cast vote record against the voter-verifed digital receipts. Recommendations were made to clarify eligible write-in votes and to enable users to track the ballots verified as they proceed through the audit. Those changes were made ahead of the audit for the June 4th Run-Off Election.

**Results and Findings**

Overall, the pilots in the Municipal General and Run-Off Elections were successful. A total of 120 voters cast ballots using the app in the May 7th Municipal Election, and 112 voters cast ballots in the June 4th Run-Off. This turnout was more than double the UOCAVA turnout in the 2015 Municipal Election, suggesting that the more convenient voting method may have encouraged more voters to participate. In surveys of voters who participated in the pilot, they unanimously stated they preferred to vote through the mobile app over any other method of voting in the future. And the third-party audit demonstrated successfully that the votes cast over the blockchain were recorded and tabulated accurately.

In the future, this technology holds the promise of making voting easier not only for UOCAVA voters, but also voters with disabilities. Voatz also plans to enhance its digital bulletin board to enable voters to verify their votes were recorded properly on the blockchain and tabulated in the elections office accurately – offering an end-to-end verifiable election system.
Attachment 1: Screenshots from the Mobile App

Your choices were recorded as follows:

**NATIONAL TICKET**
FOR U.S. SENATOR
(Note for ONE)
JOSEPH MANCHIN III
Charleston, Kanawha County

**NATIONAL TICKET**
FOR U.S. HOUSE OF REPRESENTATIVES
(Note for ONE)
RALPH AXBREY
Wheeling, Ohio County

**STATE TICKET**
FOR STATE SENATOR
(Note for ONE)
BBQ BEACH
Huntingtown, Harford County

**COUNTY TICKET**
FOR CONGRESSIONAL DISTRICT EXECUTIVE COMMITTEE
For Tennessean of America

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**Elections in Your Area**

**Ballot**

**NATIONAL TICKET**
FOR U.S. SENATOR
(Vote For ONE)
JOSEPH MANCHIN III
Charleston, Kanawha Co.

PAULA JEAN SWEARENGIN
Coal City, Raleigh Co.

**NATIONAL TICKET**
FOR U.S. HOUSE OF REPRESENTATIVES
1st Congressional District
(Vote For ONE)
TOM PAYNE
Waynesboro, Mineral Co.

RALPH AXBREY
Wheeling, Ohio Co.

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Read the following self-affirmation and sign or mark below:

I swear or affirm, under penalty of perjury, that:

1. I am a member of the Uniformed Services or Merchant Marine on active duty, or an eligible spouse or dependent of such a member, or a U.S. citizen temporarily residing outside the U.S., or Other U.S. citizen residing outside the U.S.; and
2. I am a U.S. citizen, at least 18 years of age (or will be by the date of the election), and I am eligible to vote in the requested jurisdiction; and
3. I am not incarcerated or on parole due to a felony conviction; and
4. I am not registering, requesting a ballot, or voting in any other jurisdiction in the U.S. except the jurisdiction cited in this voting form.

To vote, I have marked and sealed my ballot in private and have not allowed any person to observe the marking of the ballot, except for those authorized to assist voters under state or federal law. I have not been influenced. The information on this form is true, accurate, and complete to the best of my knowledge. I understand that a material misstatement of fact in completion of this document may constitute grounds for conviction of perjury. My signature and date below indicate when I

---

Touch ID for “Voatz”
Use your Touch ID to continue.

Cancel
Attachment 2: UOCAVA Voter Turnout in 2011, 2015 and 2019

2019 Municipal General Election
Total Eligible Voters: 3858
Total Accepted: 288
Total Electronic Ballot Delivery: 2967
% Electronic Ballot Delivery of Total Eligible: 76%
% Accepted of Total Eligible Electronic Ballot Delivery: 9.7%

*Does not include returned Mail ballots, but includes ballots voted electronically and returned via mail

Breakdown of Electronic Ballot Return
Democracy Live Mail Return: 136
Votz Mobile Voting Pilot Project: 120
Mail/Fax: 17
Accessible Voters through Democracy Live: 12
Emergency Replacement Ballots: 3

UOCAVA Voter Report

2011 Municipal General Election
Total Eligible Voters*: 428
Total Accepted: 91
Total Electronic Ballot Delivery: 49
% Accepted of Total Eligible: 23%
% Electronic Ballot Delivery of Total Eligible: 11%

2015 Municipal General Election
Total Eligible Voters: 7,418
Total Accepted: 273
Total Electronic Ballot Delivery: 116
% Accepted of Total Eligible: 11%
% Electronic Ballot Delivery of Total Eligible: 5%

*Legislation was passed in 2011 after the Municipal General Election that allowed all Overseas Permanent Residents to participate in Municipal Elections. This is reflected in the difference of total eligible voters from 2011 to 2015.
## Attachment 3: Survey Results

### Q5 Was it easy to cast/submit your ballot?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>42</td>
</tr>
<tr>
<td>No</td>
<td>0%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>42</td>
</tr>
</tbody>
</table>

### Q7 How secure did you feel submitting your ballot through this mobile voting pilot?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Average Number</th>
<th>Total Number</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td></td>
<td>42</td>
</tr>
</tbody>
</table>

### Q6 What would you change about casting/submitting your ballot, if anything?

<table>
<thead>
<tr>
<th>#</th>
<th>Responses</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nothing</td>
<td>2/7/2019 11:07 PM</td>
</tr>
<tr>
<td>2</td>
<td>Nothing</td>
<td>6/7/2019 6:05 AM</td>
</tr>
<tr>
<td>3</td>
<td>None</td>
<td>5/5/2019 9:05 AM</td>
</tr>
<tr>
<td>4</td>
<td>Nothing, it was very simple.</td>
<td>5/5/2019 5:50 PM</td>
</tr>
<tr>
<td>5</td>
<td>Nothing</td>
<td>5/5/2019 3:56 PM</td>
</tr>
<tr>
<td>6</td>
<td>Nothing</td>
<td>5/5/2019 2:23 PM</td>
</tr>
<tr>
<td>7</td>
<td>Nothing</td>
<td>5/5/2019 1:20 PM</td>
</tr>
<tr>
<td>8</td>
<td>Nothing</td>
<td>5/5/2019 1:55 AM</td>
</tr>
<tr>
<td>9</td>
<td>My phone wasn't new enough to use the app so I had to use my computer. Not sure if you can do this.</td>
<td>5/2/2019 3:20 PM</td>
</tr>
<tr>
<td>10</td>
<td>Nothing, this was a bit easier than filling out the online ballot, signing it, scanning it, and then creating a ballot voting office.</td>
<td>4/28/2019 4:13 PM</td>
</tr>
<tr>
<td>11</td>
<td>Nothing</td>
<td>4/28/2019 4:13 PM</td>
</tr>
<tr>
<td>12</td>
<td>Nothing, it was so much easier than the past process for overseas absentee.</td>
<td>4/28/2019 4:09 PM</td>
</tr>
<tr>
<td>13</td>
<td>Nothing</td>
<td>4/28/2019 4:01 PM</td>
</tr>
<tr>
<td>14</td>
<td>Nothing, it was very simple with this process.</td>
<td>4/28/2019 3:01 AM</td>
</tr>
<tr>
<td>15</td>
<td>Nothing</td>
<td>4/28/2019 3:01 AM</td>
</tr>
<tr>
<td>16</td>
<td>Nothing</td>
<td>4/28/2019 3:01 AM</td>
</tr>
<tr>
<td>17</td>
<td>Nothing</td>
<td>4/28/2019 12:26 AM</td>
</tr>
<tr>
<td>18</td>
<td>Nothing</td>
<td>4/28/2019 1:43 AM</td>
</tr>
<tr>
<td>19</td>
<td>Nothing</td>
<td>4/28/2019 1:09 PM</td>
</tr>
<tr>
<td>20</td>
<td>nothing</td>
<td>4/28/2019 1:09 PM</td>
</tr>
<tr>
<td>21</td>
<td>Nothing, it was a bit easier than filling out the online ballot, signing it, scanning it, and then creating a ballot voting office.</td>
<td>4/28/2019 6:18 PM</td>
</tr>
<tr>
<td>22</td>
<td>nothing, it is a great advancement.</td>
<td>4/28/2019 5:07 PM</td>
</tr>
<tr>
<td>23</td>
<td>nothing</td>
<td>4/28/2019 3:21 AM</td>
</tr>
<tr>
<td>24</td>
<td>nothing</td>
<td>4/28/2019 2:21 PM</td>
</tr>
<tr>
<td>25</td>
<td>Nothing</td>
<td>4/28/2019 1:00 PM</td>
</tr>
<tr>
<td>26</td>
<td>Nothing</td>
<td>4/28/2019 12:26 PM</td>
</tr>
<tr>
<td>27</td>
<td>nothing</td>
<td>4/28/2019 12:01 PM</td>
</tr>
<tr>
<td>28</td>
<td>nothing</td>
<td>4/28/2019 11:00 AM</td>
</tr>
</tbody>
</table>

### Q9 What method do you prefer to submit your ballot?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vote at the polls for the pilot project</td>
<td>100.00%</td>
</tr>
<tr>
<td>Via e-mail</td>
<td>0.00%</td>
</tr>
<tr>
<td>Via fax</td>
<td>0.00%</td>
</tr>
<tr>
<td>Via postal mail</td>
<td>0.00%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100.00%</td>
</tr>
</tbody>
</table>
Attachment 4:

Below you’ll find a screen shot of the Audit Tool used by third party auditors to audit the voter-verified digital receipt against the scannable ballot extracted from the blockchain.

Here also is a link to the Facebook Live Video from the May 9, 2019, Public Demonstration of the Audit Tool:

Smartphone voting is underway – inside the most radical voting system in America: Pioneering election in Denver showcases the promise and unresolved challenges facing digital revolution in election

By STEVEN ROSENFELD | steven@ind.media | Salon PUBLISHED: May 27, 2019 at 12:29 pm

Two days after May's city elections, Denver's Elections Division held a low-profile audit of key parts of America's most radical new voting system.

Over several weeks, 119 residents who were overseas had been using their smartphones...