Possible UOCAVA Pilot Projects for the 2012 and 2014 Federal Elections

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1 Introduction

The Uniformed and Overseas Citizens Absentee Voting Act requires that states and territories allow military personnel and family members, as well as US citizens living abroad, to register and vote in Federal elections. Historically this has been accomplished with mail-in absentee voting. Due in part to long transit times between overseas voters and election offices, UOCAVA voters face many challenges obtaining and returning ballots in time to be counted.

In 2002, Congress directed the Department of Defense to conduct a demonstration project to allow uniformed service members to cast ballots through an electronic voting system. Congress delayed implementation of this project in 2004 until the Election Assistance Commission establishes guidelines for electronic absentee voting systems. Furthermore, in 2009 Congress passed the Military and Overseas Voter Empowerment Act (MOVE Act), which allows the Federal Voting Assistance Program to conduct pilot programs that use new and emerging technology to improve the UOCAVA voting process. It further instructs the EAC and NIST to support these efforts by providing standards or best practices, and directed the EAC to create a detailed timeline for the development of guidelines for electronic absentee voting systems.

In response to the MOVE Act, the EAC issued a report to Congress in April of 2010 detailing a roadmap for the development of these guidelines. This roadmap was created in collaboration with FVAP and NIST. It consisted of a deliberative and iterative approach for the guidelines' creation and implementation, with multiple phases of remote electronic absentee voting pilots to determine approaches that best meet the needs of UOCAVA voters and provide adequate reliability, usability, accessibility and security.

According to the EAC's roadmap, the first phase of the remote electronic absentee voting system pilots is to be implemented in the 2012 Federal election. The roadmap calls upon the Technical Guidelines Development Committee, with technical support from NIST, to provide supporting materials for the pilot project, which could involve the development of testable requirements, guidelines or best practices.

The first step in the implementation of the initial phase of the pilot projects is to identify one or more possible pilots to support for the 2012 or 2014 elections. While the roadmap gives the EAC the authority to select the pilot project, all stakeholders will be involved in the identification, selection and implementation of the project.

This whitepaper of the TGDC's UOCAVA Working Group explores some of the possible pilot projects that could be conducted in the 2012 and 2014 Federal elections.

2 Pilot Project Goals

The EAC has charged the TGDC with developing guidelines for remote electronic absentee voting, while the responsibility of improving the current process resides in the EAC, FVAP, and state and local jurisdictions. While all stakeholders in the process, including the FVAP, EAC, NIST and the TGDC, hope for an end product that will dramatically improve the UOCAVA voting process for military personnel and overseas citizens, the near-term goals of interim pilot projects in the roadmap may have a different focus. In the near term, the goal of improving the UOCAVA voting process may not necessarily coincide with the Congressional mandate to develop guidelines for remote electronic absentee voting.

As such, we must carefully consider the goals of pilot projects and how they fit into the context of the overall UOCAVA voting efforts of the EAC, FVAP and states. This section identifies a possible set of goals for pilot efforts. Pilot projects may not necessarily meet every goal; there is an understanding that many pilots may need to be conducted before final guidelines can be developed, and different pilots may focus on different goals.

When evaluating possible pilot projects in this whitepaper we will consider the following basic goals:

- It should be possible to deploy a pilot system in the 2012 or 2014 Federal election.

- The pilot project should be a learning opportunity to test key technologies or processes that are necessary to conduct secure, usable, and accessible remote electronic absentee voting, or improve election management.

- The performance of pilot project systems regarding usability, accessibility for disabled voters, security, and ease of election management should be monitored and documented

- The resulting pilot system should make improvements to the UOCAVA voting process for UOCAVA voters and/or local election officials charged with collecting and tabulating ballots from UOCAVA voters. The pilot system should help improve access, usability, accessibility for

disabled voters, security, and ease of election management.

- The pilot system should use existing technologies with a proven track record in voting or e-commerce applications.

- The pilot system should be an incremental step beyond previous efforts. Past pilot efforts by FVAP, and/or state and local jurisdictions should not be duplicated unless it is to address problems identified in previous efforts or obtain additional information.

3 Project Descriptions

The TGDC's UOCAVA Working Group has identified the following five projects as possible pilot projects for the 2012 and 2014 Federal elections.

3.1 Electronic Ballot Delivery System Pilot

3.1.1 Description of Project

This pilot project would involve the development of electronic ballot delivery systems. While several different architectures could be considered, the most likely architectures involve delivery of ballots over web sites. However, there are many different ways to implement web-based delivery of electronic ballots. One issue to consider is the data format of blank ballots. Ballots could be transmitted as static documents, such as PDFs, or race and candidate information could be sent electronically, perhaps using a voting-specific data format, and rendered on-screen. Another issue to consider is how voters interact with the blank ballots. Voters could be expected to print out and mark ballots by hand, or the system may provide an on-screen wizard for marking the ballot. A third issue to consider is the identification of voters and ballot styles, and voter authentication. These choices have different implications for the usability, accessibility and security of the system.

3.1.2 Purpose of Pilot Project

The purpose of this pilot is to build on the successes of blank ballot delivery systems deployed by FVAP and states and improve them in several key areas.

While the primary reason for running additional electronic ballot delivery pilots would be to immediately improve the UOCAVA voting process, a pilot could investigate several key aspects in working toward final guidelines for UOCAVA voting systems

- **Usability**: If the voting system includes an on-screen wizard for marking ballots, this pilot would help us identify issues with applying existing usability requirements for polling place voting machines to UOCAVA systems. Issues could be identified through expert review of pilot voting systems, or by conducting usability studies remotely with volunteer participants.
- **Accessibility**: A voting system with on-screen ballot marking wizard could either include accessibility features for disabled voters as part of the wizard, or the wizard could be designed to interoperate with commonly-used personal assistive technologies. Pilot systems could explore how to design the software with tags and other necessary structures for assistive technology to work on systems with this technology preinstalled and to have built-in access features delivered by the software interface itself. As with usability, systems could be studied with expert reviews or by conducting accessibility studies remotely with volunteer participants.
- **Security**: This pilot would include operating a high-availability server for distributing blank ballots in a potentially hostile threat environment. If the pilot system includes a voter authentication component, as opposed to authenticating voters with hand-written signatures on marked ballots, the pilot would provide an opportunity to learn challenges and solutions for remotely authenticating voters.
- **Election Management**: Past electronic ballot delivery efforts have been hampered by problems exporting ballot style information from jurisdictions' existing election management systems. This pilot could explore methods for exporting this data and importing it into UOCAVA blank ballot delivery systems.

3.1.3 Past Efforts and Related Work

While email and fax delivery of blank ballots has been conducted in several states, the move to web-based delivery of blank ballots is more recent. A large number of states moved to web-based delivery of blank ballots for the 2010 election, many of which provided an online ballot marker to mark and print ballots.

In 2010, FVAP operated a portal that links voters to information on how to fill out an absentee ballot. Through this portal, FVAP allowed voters to fill out a Federal Write-In Ballot (FWAB) using an on-screen wizard that presents voters with the candidate names for Federal races. A marked PDF document was constructed on the FVAP server, and voters were told to download, print and mail the marked FWAB. In some cases, the FVAP portal also linked voters to web sites running states' own MOVE Act systems for electronic ballot delivery.

The Overseas Vote Foundation, a nonprofit organization, operates a similar website that also links voters to state-specific information, and provides a wizard for marking FWABs with on-screen candidate lists.

3.1.4 Role of NIST/TGDC

At this time there are no detailed standards or guidelines for electronic ballot delivery systems. The TGDC could develop a standard for these systems if there is agreement that states and manufacturers need more guidance in implementing, configuring and/or using these systems.

Alternatively, the role of the TGDC may be more narrowly focused, with a goal to make it easier for vendors, jurisdictions, and organizations to implement and deploy electronic ballot delivery systems. Pilot projects directed at this goal could include development of an electronic blank ballot specification, or a common data format for integrating UOCAVA voting systems with existing Election Management systems. Those pilot projects are described in later sections of this document.

3.1.5 Necessary Partners

The success of this pilot relies on interest from manufacturers to design, implement and market new or updated electronic ballot delivery systems based on the TGDC's recommended standard. It also depends on the interest of states, local jurisdictions, Federal agencies and/or private organizations to buy and deploy these systems. As many state and local governments have already invested in electronic ballot delivery systems for MOVE Act compliance, it is not clear how many jurisdictions would be willing or able to obtain new systems.

3.2 Attended Kiosk-based Remote Voting System Pilot

3.2.1 Description of Project

A kiosk-based remote voting system is a type of Internet voting system where voters cast votes on specially configured machines, rather than personally-owned devices. One model for a kiosk-based voting system involves staffed locations for kiosks, using pre-built kiosk voting machines designed for use with elections. Election workers would set up these machines at kiosk locations, check-in voters, and monitor kiosks during the voting period.

A small-scale kiosk-based remote voting system was deployed in the 2008 election for overseas and military voters. However, this system only allowed

voters from a single county to vote, with a limited number of ballot styles. An important element of this proposed pilot is using a single kiosk platform to support voting from multiple jurisdictions, which has not been attempted in the United States.

3.2.2 Purpose of Pilot Project

The architecture of kiosk-based remote voting systems is very similar to that of today's PC-based Internet voting systems. The front-end of the system, the terminals used by voters to cast ballots, differs greatly between a kiosk-based voting system and an Internet voting system where votes are cast on personal computers. However, the back-end of the system, which stores voter lists, ballot definitions, and cast ballots, is largely the same. A kiosk-based remote voting system would be a safer environment to investigate many of the challenges facing deployment of an Internet voting system.

- **Usability**: Pilot systems would be expected to meet voting system usability requirements. The usability of voting systems could be evaluated by a usability expert for conformance to the requirements and for overall usability.
- **Accessibility**: Kiosk voting systems would be expected to meet accessibility requirements for disabled voters. These systems could investigate the feasibility of designing remote voting systems with accessibility features built-in to the voting application that would not require additional personal assistive technologies.
- **Security**: This pilot would include operating a high-availability server for allowing voters to cast ballots. Pilots could investigate challenges facing the auditability of the records produced by these systems, or cryptographic key management in a large system spread across geographically-diverse regions. While an attended kiosk could have voter authentication performed by election workers at the kiosk location, pilot systems that include an electronic voter authentication component would provide an opportunity to learn challenges and solutions for remotely authenticating voters.
- **Election Management**: Past kiosk-based remote voting pilot projects have been limited to single jurisdictions. A larger-scale kiosk voting pilot project could investigate the ability of kiosk systems to scale to support many jurisdictions, including logistical challenges of managing many ballots styles from several jurisdictions, and routing cast ballots to the appropriate jurisdiction for tabulation and reporting.

3.2.3 Past Efforts and Related Work

Okaloosa County, Florida, in partnership with Operation BRAVO and Scytl, deployed a kiosk-based remote electronic voting system for the 2008 Federal election. Okaloosa County set up three remote voting kiosks in England, Germany and Japan, each of which was staffed by two election workers. The voting system underwent testing by the State of Florida, and received a provisional certification.

In 2009 the EAC established a working group to draft testable requirements for kiosk-based remote electronic voting systems for use in a pilot certification testing program. The final version of these requirements was posted in August of 2010. The intent of the pilot certification program was to encourage deployment of kiosk-based voting systems servicing multiple jurisdictions in an effort to learn more about the technical, administrative and procedural challenges involved with deploying Internet voting systems, as well as to create a starting point for future work on the development of guidelines for remote electronic voting systems. However, no state or local jurisdictions chose to deploy kiosk-based remote voting systems in the 2010 election.

3.2.4 Role of NIST/TGDC

Little additional work would be needed by the TGDC and NIST to support a pilot using an attended kiosk architecture. The EAC's existing pilot certification requirements for kiosks provide a good starting point for an attended kiosk-based remote voting system pilot.

3.2.5 Necessary Partners

A kiosk-based voting system pilot would require the cooperation and support of voting system manufacturers and state/local election jurisdictions. State and local jurisdictions, as well as the Department of Defense, have had reservations about deploying kiosk-based systems due to cost and logistical concerns, as well as questions about their effectiveness at reducing the challenges faced by overseas voters.

3.3 Unattended Kiosk Remote Voting System Pilot

3.3.1 Description of Project

Attended kiosk-based remote voting systems have been criticized as being logistically difficult and expensive to deploy. Alternative architectures for kiosk voting systems could mitigate some of these concerns. A possible second type of kiosk-based voting system uses an unattended kiosk built

using off-the-shelf hardware and software components. Election workers would be required to set up the kiosk voting system voting system at remote locations, but would not monitor the kiosks continuously throughout the voting period.

There are two different models for deploying an unattended kiosk that could be explored:

1. The unattended kiosk system could be entirely software-based. Prior to the election, software could be distributed to remote locations via CDs or using a secured network connection. Election workers could install that software on computers already available at the remote location, such as a shared computer at a military base.

2. Unattended kiosks could be built from off-the-shelf, low-cost, highly mobile computer platforms, such as a netbook or Internet tablet. While there may be added expense to distributing this hardware to remote locations, they could be delivered preconfigured.

In either case, an unattended kiosk architecture requires a secure and reliable method for remotely authenticating voters. It also requires that the kiosks be sufficiently secured to prevent users from tampering with the kiosk machines.

3.3.2 Purpose of Pilot Project

Pilots based on an unattended kiosk voting system architecture could test many of the same technologies and election administration processes as a system with an attended kiosk. However, the unattended nature of these kiosks could allow systems to be fielded at reduced cost and fewer logistical challenges. In addition, this pilot could explore usability, accessibility, and security issues that are likely to come up in systems which allow voters to cast ballots from personally-owned devices at home, or shared devices (e.g., public library computers).

- **Usability**: Pilot systems would be expected to meet voting system usability requirements. The usability of voting systems could be evaluated by a usability expert for conformance to the requirements and for overall usability.
- **Accessibility**: Kiosk voting systems would be expected to meet accessibility requirements for disabled voters. Prior to the implementation of pilot project systems, information regarding known accessibility issues with off-the-shelf devices such as netbooks and Internet tablets should be collected, and plans developed to mitigate or solve identified problems. Pilot systems could investigate how the

accessibility features included in off-the-shelf components, such as netbooks or Internet tablets, could be leveraged to create accessible remote voting systems.

- **Security**: This pilot would include operating a high-availability server for allowing voters to cast ballots, as well as some type of electronic authentication mechanism to authenticate voters. Compared to an attended kiosk, unattended kiosks would require deployed systems to include greater physical security protections to protect kiosks from tampering. Experienced gained from designing such systems may be useful if unattended kiosks are used for future UOCAVA voting systems or early voting stations. However, results may not be relevant for developing UOCAVA voting systems in which voters obtain or cast ballots using personally owned devices.
- **Election Management**: An unattended kiosk architecture may be able to scale better than an attended kiosk architecture, potentially resulting in more kiosk locations, and a larger number of participating jurisdictions. A large-scale unattended kiosk voting pilot project could investigate the ability of kiosk systems to scale to support many jurisdictions, including logistical challenges of managing many ballots styles from several jurisdictions, and routing cast ballots to the appropriate jurisdiction for tabulation and reporting.

3.3.3 Past Efforts and Related Work

Unattended kiosks were identified in the California Internet Voting Task Force as a possible step beyond supervised voting from attended kiosks. However, there are no known cases of unattended kiosk-based voting systems being deployed or developed.

3.3.4 Role of NIST/TGDC

While the EAC's existing requirements for attended kiosks could serve as a useful starting point for guidelines for unattended kiosks, the differences between the attended kiosk architectures described in the previous section and the unattended kiosk architecture described in this section will likely require development of additional guidelines or best practices. Notably, the EAC's requirements for attended kiosks does not include requirements for remote voter authentication, which is an important element to this pilot project.

3.3.5 Necessary Partners

An unattended kiosk-based voting system pilot would require the cooperation and support of voting system manufacturers and state/local election jurisdictions. Overseas military bases are good candidates for kiosk locations, requiring cooperation with the Department of Defense.

3.4 Standardized Ballot Delivery Format

3.4.1 Description of Project

While the previous pilot projects described in this whitepaper involve development of voting systems that could be directly used for one or more aspects of UOCAVA voting, the next two pilot projects involve the development of specifications that would make it easier for UOCAVA voting system vendors to create products capable of interoperating with other election equipment.

The first option is to develop a specification for querying a ballot style from a host system, and returning the proper ballot style in an electronic format which can be parsed to support different user interfaces for displaying and marking the ballot.

Such a specification may make it easier for jurisdictions and vendors to design, implement and deploy a variety of UOCAVA voting systems, including electronic ballot delivery systems and kiosk-based voting systems. For example, jurisdictions could deploy servers adhering to this specification that host ballot styles for their voters. Kiosk systems then would not necessarily need to hold ballot styles for all jurisdictions locally. Instead, using a single, common protocol, kiosk systems could query jurisdictions' servers for the proper ballot style, and present it to the voter.

3.4.2 Purpose of Pilot Project

Nearly any type of proposed voting system for UOCAVA voters would benefit from the use of a standard electronic format for blank ballots. The development of a specification for a standard format for ballot definitions would be an important first step in supporting near-term pilot projects involving electronic ballot distribution or kiosks, as well as longer-term efforts on remote voting. This pilot project would provide fewer opportunities to learn about usability, accessibility, and security issues related to UOCAVA voting, but the effort could investigate data fields which could support those goals.

3.4.3 Past Efforts and Related Work

The Organization for the Advancement of Structured Information Standards (OASIS) has established a technical committee on Election and Voter Services that has produced the Election Markup Language (EML) based on the Extensible Markup Language (XML) with the goal of allowing hardware,

software, and service providers of election system and service providers to exchange information. More recently, the Institute of Electrical and Electronics Engineers (IEEE) has begun investigating data formats to allow voting systems to exchange information electronically.

3.4.4 Role of NIST/TGDC

There is no single, widely accepted common data format used to describe ballot styles in the United States. While there are several candidates for a common data format, there's general agreement that any existing format would need to be tailored to meet the needs of election officials in the United States.

Furthermore, the scope and purpose of this pilot project is different than past work on a common data format for voting systems. First, this project is focused on election data for overseas and military voting. Second, the scope of this work is potentially larger than just a common data format for ballots. In addition to a common format for exchanging voter and candidate information, the TGDC may need to identify a common communications interface for allowing different systems to interact with each other.

3.4.5 Necessary Partners

Implementation of this pilot project would require coordination with software vendors that would provide UOCAVA voting solutions with state and local election officials.

3.5 Common Data Format for EMS Integration

3.5.1 Description of Project

The specification would identify a common data format for integrating UOCAVA voting systems with jurisdictions' existing Election Management Systems (EMS). The first phase of this project could include development of a specification for a common data format that would allow Election Management Systems to export ballot styles so that they can be imported into a UOCAVA voting system used for electronic blank ballot delivery, kiosk voting, or other forms of remote voting. The second phase of this project could include development of a common data format for reporting, so that cast ballots from the UOCAVA voting system can be imported into Election Management Systems for tabulation and reporting with jurisdictions' other voting methods.

3.5.2 Purpose of Pilot Project

The development of a common data format linking UOCAVA voting systems with jurisdictions' Election Management Systems would facilitate the development of UOCAVA voting systems that are easier to manage, particularly in systems which collect and tally ballots from UOCAVA voters. For instance, cast ballots or tabulation reports from a kiosk voting system could be imported into a jurisdiction's election management system for reporting purposes. Like the development of a standard electronic ballot definition format, this pilot project would provide few opportunities to learn about usability, accessibility, and security issues related to UOCAVA voting, but the effort could investigate data fields which could support those goals.

3.5.3 Past Efforts and Related Work

Past efforts include work on a common data format for exchanging election information by OASIS and the IEEE, as described in the Past Efforts and Related Work section of Standardized Ballot Delivery Format project.

3.5.4 Role of NIST/TGDC

There is no single, widely accepted common data format used to describe ballot styles in the United States. While there are several candidates for a common data format, there's general agreement that any existing format would need to be tailored to meet the needs of election officials in the United States.

3.5.5 Necessary Partners

Implementation of this pilot project would require the support of manufacturers of polling place voting systems that are currently used by the states, and of software vendors that will provide UOCAVA voting solutions. We would also need help from state and local election officials to identify and describe the necessary data fields in the common data format, as well as desirable functions for inputting and outputting data.

4 Summary Table

Evaluation Criteria	Pilot Project				
	E-Ballot Delivery	***Attended Kiosk***	***Unattended Kiosk***	***Ballot Delivery Specification***	***EMS Integration***
Deployable for 2012/2014 election	High probability of being ready to deploy a system in 2012.	Moderate probability of being ready to deploy a system in 2012.	Moderate-to-low probability of being ready to deploy a system in 2012.	Moderate-to-low probability of being ready to deploy a system in 2012.	Low probability of being ready to deploy a system in 2012.
Improvement to UOCAVA voting process	Significant benefit to UOCAVA voters over mail-based absentee voting.	Little benefit to most UOCAVA voters due to the difficulty of setting up a large number of kiosk locations overseas.	Moderate benefit to UOCAVA voters, as kiosks locations would still be limited.	Significant benefit to UOCAVA voters if software vendors are able to build innovative election systems.	Significant benefit to UOCAVA voters if software vendors are able to build innovative election systems.
Use of existing, widely deployed technology.	Possible to implement using only widely deployed technologies.	Kiosks would have to be deployed to a large number of locations.	Kiosks could use already deployed computers, or COTS machines.	Possible to implement using only widely deployed technologies.	Possible to implement using only widely deployed technologies.
Learning opportunity	Moderate learning opportunity for future pilots.	Significant learning opportunity for future pilots.	Significant learning opportunity for future pilots.	Moderate learning opportunity for future pilots.	Moderate learning opportunity for future pilots.
Incremental step beyond previous work	Very similar to systems already used in past elections.	Small step beyond past work on single-jurisdiction kiosks.	Small step beyond past work on single-jurisdiction kiosks.	Small, but important step, beyond previous work.	Significant step beyond previous work.