

Unisyn Voting Solutions, Inc.

Common Industry Format for Usability Test Report v1.1

Comments and questions about this format: iusr@nist.gov

OpenElect Voting System Release 1.0

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Executive Summary

The OpenElect Voting System (OVS) is a paper ballot precinct voting system that uses touch screen and scan technology to scan and validate ballots, provides voter assisted ballots for special needs voters, and tabulates precinct results. The complete system adheres to the Voting Systems Standards 2005 published by the Election Assistance Commission (EAC) in the areas of capability, functionality, and security.

The test focuses on the two components of the OVS that the voter would use to print ballots and cast votes – the OpenElect Optical (OVO) and the OpenElect (OVI). Participants in the test take on the role of voters who will be casting ballots at the polls. Participants will also take on the tasks of testing the system used by special needs voters who require auditory, visual or physical assistance to cast their vote.

Combined Performance Results

5 people with partially impaired vision were used to conduct the tests 4 being female and 1 male. The age ranged from 55 to 75 years. The participant comments are in quotes and overall comments are as follows:

Participant #1

Female

Start Time: 9:57am End Time: 10:35am

Election Password Screen was too small

Audio Instructions – Was able to navigate through the Instructions using the keypad easily. Continued listening to instructions.

Audio – “Sounds like a robot” She did not like it. It sounded very monotone.

Problem – There were 2 sounds being heard during certain contests –“Like an echo”

The words “you, you, you” continued to be repeated when navigating through the list of candidates. I observed when “you” was being repeated the OVI was beeping at the same time. The participant was not continuously pressing the keypad.

“Keypad is easy to use”

Zoom –in – “Would not help. Would still need a magnifying glass”

After testing session with Participant #1, the OVI was rebooted to see if that would help the duplicate sound issues. It did not.

Participant #2

Start Time: 10:40am End Time: 11:03am

Female - This person was the computer instructor at the center. She did say, however that she had 20/400 vision.

Navigated immediately into Ballot Selection screen

Indicated the keypad was usable and easy to use.

Could see the color on the screen but was unable to read the names.

Write-in candidate did not highlight

While in write-in screen “If a person had no vision and continues pressing the keypad to navigate through the letters, the person would not know what letters they passed”

Gray down arrow takes you to the keyboard. “So if you have a name with 13 characters, you have to navigate through the keyboard 13 times?”

“The keypad is easy for me to use but it may be difficult for someone with Arthritis to press the buttons”. She suggested using a touch screen as the keypad.

She commented overall it would be helpful to voters who are blind.

Participant #3

Start Time: 11:05am End Time: 11:15am

Female - This person had to use a walker and had hearing aids

Audio – “Talks too fast”. Had to restart and slow the tempo down.

Could not understand the audio. Had hearing aids. Ray understands the problem.

Tried using the touch screen display, however could not see the ballot. Participant #3 appeared frustrated and was unable to continue.

Participant #4

Start Time: 11:15am End Time: 11:35am

Male

“Very Monotone” was able to understand

“If the person cannot see the screen, why have it refer to the sound file?”

Asked about the keypad button feel. He said, “It’s alright”

He indicated he was able to navigate through the keypad with ease.

Participant #5

Start Time: 11:45am End Time: 12:15pm

Female – This person paid close attention to the instructions, contests, candidates and overall usage of the OVI.

Used the keypad for entering write-ins

Used the keypad for making selection while using the touch screen to verify her selection.

Indicated the OVI was “Very Easy” to use.

The “Voice was not bad”

Introduction

Full Product Description

The OVS is a paper ballot precinct voting system that uses touch screen and scan technology to scan and validate ballots, provides voter assisted ballots for special needs voters, and tabulates precinct results. The complete system adheres to the 2005 Voluntary Voting System Guidelines published by the Election Assistance Commission (EAC) in the areas of capability, functionality, and security. The OVS system being submitted for the usability test is Release 1.0.

The OpenElect Voting System (OVS) is composed of a central suite of software, and two voting devices, described below:

OpenElect Central Suite (OCS): A System with Ballot Layout Manager, Election Manager, Election Server, Tabulator Client, Tabulator Server and Tabulator Reports software. In addition, the OCS includes the Software Server (SS) system for updating and validating OVO and OVI (voting devices) software.

OpenElect Voting Optical (OVO) scan: A full-page dual-sided optical scan system that reads and validates voter ballots and provides a summary of all ballots cast. The election is loaded from the OVS Election Server over a secure local network. On Election Day, an OVO at each poll location scans and validates voters' ballots, and provides precinct tabulation and reporting. The OVO runs Logic Tests and Training Elections in addition to General and Primary Elections. A Software Server utility is provided to update the OVO and OVI with the current level of certificated software.

The OVO unit is also paired with the OVI for early voting to scan and tabulate early voting ballots.

OpenElect Voting Interface (OVI): The OVI supports both ADA and Early Voting requirements. The OVI enables voters during early voting to cast regional ballots using Super Centers, and voters with special needs to prepare their ballots independently and privately on Election Day. The voter Interface unit features a 7-inch full-color touch screen display that is easy to read making voting simple and error free. The OVI presents each contest on the correct ballot to the voter in visual and (optionally) audio formats. The voter with limited vision navigates through the ballot using the audio ballot and the ADA keypad or touchscreen input to make their selections. The voter validates his/her selections by listening to the audio summary, printing the ballot and inserting it into the OVO.

The OVI facilitates special needs voters through a variety of methods including wheelchair access, sip-n-puff, zoom-in ballot function and audio assistance for the visually impaired. The OVI provides for write-in candidates when authorized. Voters input candidates' names via the ADA keypad. Each OVI can support multiple languages for both visual and audio ballots, allowing the voter to choose their preferred language.

The components of the OVS system that are to be evaluated for usability are the OVO and OVI. The OVI will be the primary focus of the test due to the fact that the voter has the most interaction with the OVI.

The OVS system was designed for the voting user population.. The OVS system has been designed specifically to support a broad range of voter needs, which include physical abilities, language skills, and technology experience.

The OVS system accommodates voters who are physically challenged in terms of sight, auditory capabilities, and speech.

The OVS system is used at the voting precinct, the Election headquarters and the warehouse used to set up the election.

The user work supported by the OVS system for the purposes of the usability test is the user work performed by the voter: entering voting selections and printing paper ballots using a touchscreen, keypad or sip n puff device.

Test Objectives

The purpose of the evaluation was to validate the usability of voting using both voting devices (OVO and OVI). Representative users were asked to complete typical tasks, and measures were taken of effectiveness, efficiency and satisfaction.

It was expected that the following tasks could be performed in the two-week timeframe as defined.

Method

Participants

- The total number of participants is 5.
- Users were divided into groups that represented voters with special needs.
- Voters participate in the voting process regardless of technical expertise, language, and physical ability. Therefore, there were no particular characteristics or special skills required for the users participating in this test.
- Participants were selected according to criteria defined by the Vista Center for the Blind. The participants represented a sampling of all voters from 55 years of age through 75 years of age.
- The participants had no prior knowledge of the OVI voting device

Context of Product Use in the Test

The test will be performed in an office environment as opposed to the polling place where the actual votes will be cast

Tasks

The participants will be simulating the voting procedures using the OVO and OVI. Tasks were selected by reviewing the functionality and processes of the equipment, and also reviewing test cases designed to test system functionality and usability.

Participants will be given sample election ballot data and a brief instruction guide that describes how to use the equipment.

They will be asked to perform the following tasks:

OVO - Scanning a Ballot

Tasks using OVI Touchscreen:

OVI – Entering selections on the Ballot Entry screen using the touchscreen.

OVI – Using the zoom feature on the Ballot Entry screen to enlarge and reduce text.

OVI – Moving to the next page or previous page of the Ballot Entry screen.

OVI – Cancelling the Ballot Entry Screen.

OVI – Using the Help button on the Ballot Entry screen.

OVI – Using Done on the Ballot Entry screen.

OVI – Printing the Ballot using the Summary Review Screen.

OVI – Entering selections using the keypad (using the navigating buttons (right key, left key, up arrow, down arrow)).

OVI – Using the zoom feature on the keypad to enlarge and reduce text.

OVI – Moving to the next page or previous page using the keypad.

OVI – Entering selections using the sip-and-puff. *

OVI – Using the zoom feature on the sip-and-puff to enlarge and reduce text. *

OVI – Moving to the next page or previous page using the sip-and-puff. *

OVI – Printing the Ballot using the sip-and-puff. *

OVI – Write In Selection

OVI - Write In Navigation and Process (using the space, backspace, clear, ABC or QWERTY, and Finished button)

OVI – Instructions Screen Navigation (Start, Cancel, Cancel Yes/No, Continue, Done, Previous Page, Next page, Page Count)

OVI – Summary Instructions Screen Navigation (Start, Cancel, Cancel Yes/No, Continue, Done, Previous Page, Next page, Page Count)

Tasks using OVI Headphones:

OVI – Entering selections on the Ballot Entry screen using the headphones and keypad.

OVI – Using the zoom feature on the Ballot Entry screen to enlarge and reduce text.

OVI – Moving to the next page or previous page of the Ballot Entry screen.

OVI – Cancelling the Ballot Entry Screen.

OVI – Using the Help button on the Ballot Entry screen.

OVI – Using Done on the Ballot Entry screen.

OVI – Printing the Ballot using the Summary Review Screen.

OVI – Entering selections using the keypad (using the navigating buttons (right key, left key, up arrow, down arrow)).

OVI – Using the zoom feature on the keypad to enlarge and reduce text.

OVI – Moving to the next page or previous page using the keypad.

OVI – Entering selections using the sip-and-puff. *

OVI – Using the zoom feature on the sip n puff to enlarge and reduce text. *

OVI – Moving to the next page or previous page using the sip-and-puff. *

OVI – Printing the Ballot using the sip-and-puff. *

OVI – Write In Selection

OVI - Write In Navigation and Process (using the space, backspace, clear, ABC or QWERTY, and Finished button)

OVI – Instructions Screen Navigation (Start, Cancel, Cancel Yes/No, Continue, Done, Previous Page, Next page, Page Count)

OVI – Summary Instructions Screen Navigation (Start, Cancel, Cancel Yes/No, Continue, Done, Previous Page, Next page, Page Count)

** - Not tested at the Vista School for the Blind due to no participants.*

Test Facility

The test will be performed in an office environment or interior that simulates a voter's experience at the polling location.

Participant's Computing Environment

The computing environment consists of a Unisyn Voting Solutions Inc. OVO and OVI voting devices. The OVI will also have a keypad, sip-and-puff, and headphones.

All required software and election information would be pre-loaded on the machine. Ballot cards will be provided.

Display Devices

The OVO and OVI provide a touch screen that displays all text in a sans serif font at a default size of 3.0 mm or higher

8 ½ x 14" Ballots will be provided for use in the OVO usability test.

Audio Devices

Sony Headphones (MDR-210LP)

Provided audio headphones are sterilized and wrapped for individual voters. The initial (default) volume for each voter is set between 40 and 50 dB SPL for each device.

Manual Input Devices

Origin Instrument AirVoter™ Sip n Puff *

** - Not tested at the Vista School for the Blind due to no participants.*

Test Administrator Tools

Members of the Vista Center observed tasks for the Blind as well staff members of Unisyn Voting Solutions. Both parties observed sessions and all directives towards the voters were overseen by staff. At the end of each session, participants completed a subjective rating scale from 1 – 3 on the usability of the equipment. 1 being difficult, 2 being normal and 3 being easy. This is attached as Appendix A.

Experimental Design

Five Impaired and partially Impaired voters were tested.

The subjective ratings were based on all aspects of the voting process, to include;

- Pre-Voting
- Voting Process
- Vote Casting Process

Election Definition:

- General Election
- 15 Offices
- 3 Referendums
- Vote Limits: 1, 2 and 3
- Write-Ins
- English

Device Under Test Details:

- Machine Name: UNI150008 (UNI150012 used on 5th participant)
- OVI OS Ver. 0.0.9
- OVI Application Ver. 0.1.1
- Election used: Unisyn County CA USA, 10/10/2010
- Election ID – 106
- Election Ver. – 33.5.2

- Precinct 0001 (Oceanside)

Procedure

On arrival, participants were informed that the usability of the OVS was being tested, to find out whether it met the needs of users such as themselves. They were told that it was not a test of their abilities. Participants were shown the evaluation suite, including the control room, and informed that their interaction would be recorded.

Participants were given introductory instructions. The evaluator reset the state of the system before each task, and provided instructions for the next task. Participants were told the time allocated for each task, and asked to inform the evaluator when they had completed each task. Participants were told that limited external assistance could be provided.

After the last task, participants were asked to complete a subjective ratings scale on the Usability of the system.

The evaluator then asked them about any difficulties they had encountered.

The purpose of this exercise is to find out how easily people like yourself can use the OVS Voting System to cast your votes on a simulated Election Day.

To achieve this, we will ask you to perform some tasks, and your performance will be recorded for later analysis. Then, to help us understand the results, we will ask you to complete a standard questionnaire.

The aim of this evaluation is to help assess the product, and the results may be used to help in the design of new versions.

Please remember that we are testing the software, not you.

When you have finished each task, or got as far as you can, please notify us.

Suggestions made to Unisyn Voting Solutions

1. Entering selections on the Ballot Entry Screen using the touchscreen

In 3 of 5 occasions, near-blind students were trying to see the screen by moving very close and failed because of lack of sight. They instead started using the keypad and were successful.

2. Using the Zoom feature on the Ballot Entry screen to enlarge and reduce text
3 of 5 students attempted to use the Zoom feature and failed and stated that they saw no difference in size of type. Extreme near-blindness caused them to see only shadow. The screen goes from 3 columns to 2 or 1 column.
3. Moving to next page or previous page of the Ballot Entry screen
3 of 4 students had difficulty moving to next page on the first try – Upon further instruction, all students were able to maneuver without difficulty
4. Cancelling the Ballot Entry screen
2 of 3 students attempted cancelling a ballot entry and had difficulty, but with further instruction were able to complete the action without problems.
5. Using the Help button on the Ballot Entry screen
*1 of 3 students could not find a way to move to Help button without assistance.
With additional assistance and instruction all students found use of Help.*
6. Using Done on the Ballot Entry screen
2 of 3 students had a little difficulty finding Done without more instruction. One did very well without assistance because of her computer training -- The other 2 required additional instruction to continue to Done.
7. Printing the ballot using the Summary Review screen
All three of the students that went all the way through the ballot had no problem in using the Summary Review screen
8. Entering selections using the Keypad (Using the navigation Buttons, i.e. right arrow, left arrow, up arrow and down arrow)
All 4 students found the keypad easy to use and informative. None students had any problems. A short verbal instruction was provided before the start
9. Using the Zoom feature on the keypad to enlarge and reduce text
All 5 students attempted to use the zoom feature and had success -- Near-blind, all students moved very close to screen and all stated the font did not change –

The ballot went from three columns to 2, or 1 columns.

10. Moving to the next page or previous page using the keypad

3 of 5 students used the feature successfully. Next page was said to be easier to use than Previous page. 2 students had difficulty and required additional personal assistance

11. Write-in Navigation and process (using the space, backspace, clear, ABC or QWERTY, and the Finished button)

2 of the 5 students were willing to attempt the write-in feature and were successful -- 1 student stated she preferred QWERTY.

12. Instruction screen navigation (Start, Cancel, Cancel Yes/No, Continue, Done, Previous Page, Next Page, Page Count)

3 of 5 students used all features without trouble – 2 students had trouble with Cancel, Cancel Yes/No, and Previous Page until additional instruction was Provided.

13. Summary Instruction Screen Navigation (Start, Cancel, Cancel Yes/No, Continue, Done, Previous Page, Next Page, Page Count)

3 of 5 students attempted to use Summary Screen and were successful – 2 students either did not want to go to that feature or had trouble without it

Appendix A

| Task | OVI Usability Testing | | | | | |
|--|-----------------------|---------------|---------------|---------------|---------------|---------------|
| | Participant 1 | Participant 2 | Participant 3 | Participant 4 | Participant 5 | Participant 6 |
| Entering selections on the Ballot Entry screen using the touchscreen | <i>1</i> 2 3 | <i>1</i> 2 3 | <i>1</i> 2 3 | 1 2 <i>3</i> | 1 <i>2</i> 3 | 1 2 3 |
| Using the zoom feature on the Ballot Entry screen to enlarge and reduce text | <i>1</i> 2 3 | <i>1</i> 2 3 | <i>1</i> 2 3 | 1 <i>2</i> 3 | 1 <i>2</i> 3 | 1 2 3 |
| Moving to the next page or previous page of the Ballot Entry screen | 1 2 3 | <i>1</i> 2 3 | <i>1</i> 2 3 | <i>1</i> 2 3 | 1 <i>2</i> 3 | 1 2 3 |

| | | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|--------------|
| Cancelling the Ballot Entry Screen. | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 |
| Using the Help button on the Ballot Entry screen. | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 |
| Using Done on the Ballot Entry screen. | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 |
| Printing the Ballot using the Summary Review Screen | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 |
| Entering selections using the keypad (using the navigating buttons (right key, left key, up arrow, down arrow). | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 |
| Using the zoom feature on the keypad to enlarge and reduce text | 1 2 3 | 1 2 3 |
| Moving to the next page or previous page using the keypad | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 |
| Write In Navigation and Process (using the space, backspace, clear, ABC or QWERTY, and Finished button) | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 |
| Instructions Screen Navigation (Start, Cancel, Cancel Yes/No, Continue, Done, Previous Page, Next page, Page Count) | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 |
| Summary Instructions Screen Navigation (Start, Cancel, Cancel Yes/No, Continue, Done, Previous Page, Next page, Page Count) | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 | 1 2 3 |