Poster & Demo

Madness

Abstracts for all presenters can be downloaded here.

NIST
**National Institute of
Standards and Technology**
U.S. Department of Commerce

Ground Rules

- 2 minute time limit! Therefore,

  - **Highlight** the main theme of your posters and demos

  - No Q&A

- Fun & lighthearted!

1. Sarah Farmer

2. UMD

3. Lynne Tamor (x2)

4. John Schmitt

5. Jill Piner

6. Sarah Swierenga (x2)

7. Dominion

8. Dan Gillette

9. Jessica Jones

10. Anywhere Ballot

11. Everyone Counts

12. Pascal Lola

13. Chris Crawford

14. Jon Allen Sanford

Sarah Farmer

"Voting accessibility survey of older adults in metro Atlanta"

Georgia Tech Research Institute

Up Next: Genny Mayhew & Mike Hanmer

Genny Mayhew & Mike Hanmer

"Maryland's Electronic Absentee Ballot Delivery System"

University of Maryland

Up Next: Lynne Tamor

Lynne Tamor

"Cognitive Access & AccessibleVoting.org"

Center for Accessible Information

Up Next: John Schmitt

Visit AccessibleVoting.org

Intellectual Disabilities and Information Processing Difficulties

Possible Areas of Difficulty

- ☑ Pre-election information (candidates and issues)
- ☑ Voter registration (rights and processes)
- ☑ Navigating the polling place
- ☑ Using an accessible voting machine
- ☑ Navigating the ballot
- ☑ Write-ins
- ☑ Understanding the ballot
- ☑ Voting the ballot

Solutions

- ☑ Clear and simple language for all information
- ☑ Special publications/posters on rights and accommodations
- ☑ Large and clear signage throughout the polling place, including outside (from the curb or street)
- ☑ Easy-to-use audio that synchronizes with the screen or paper ballot
- ☑ Simple and consistent ballot navigation
- ☑ Photographs of candidates on the ballot
- ☑ Accessible and available sample ballots
- ☑ Place to keep sample ballot visible while voting
- ☑ Hospitable, well-trained poll workers
- ☑ Opportunities to practice ahead of time

*i*NFO

Center for Accessible Information

AccessibleInfo.org

iNFO — **Center for Accessible Information**
Accessible documents, accessible websites, accessible training

Home | About Us | Our Services | Resources

You are here: Home

ℹ **Welcome to the Center for Accessible Information**

We live in the "information age"...

But finding and using the information we need or want can be challenging.

> Getting information off the Internet is like taking a drink from a fire hydrant.
> *Mitchell Kapor*

Mitchell Kapor | Photo by Will Lion, via Flickr

The Center for Accessible Information is here to help:

ℹ We provide training and resources for people wanting to use the Internet, starting at the very beginning.

ℹ We provide assistance with web design and web hosting, and with "clear and simple" content, people who want to share information with others.

ℹ We create fully accessible digital documents.

ℹ We provide comprehensive web assistance for non-profits serving people with information processing difficulties.

ℹ We engage in research and service projects to enhance inclusion in community life.

ℹ We maintain an extensive resource library to assist in accessibility of documents in print and on the Web.

John Schmitt

" The Technical Evolution of Oregon's Alternate Format Ballot"

Five Cedars Group

Up Next: Jill Piner

Oregon's Alternate Format Ballot

Poster Madness: Applying Technology

Five Cedars Group, Inc.

WWII - Document Delivery Problem

World Wide Mail Delivery
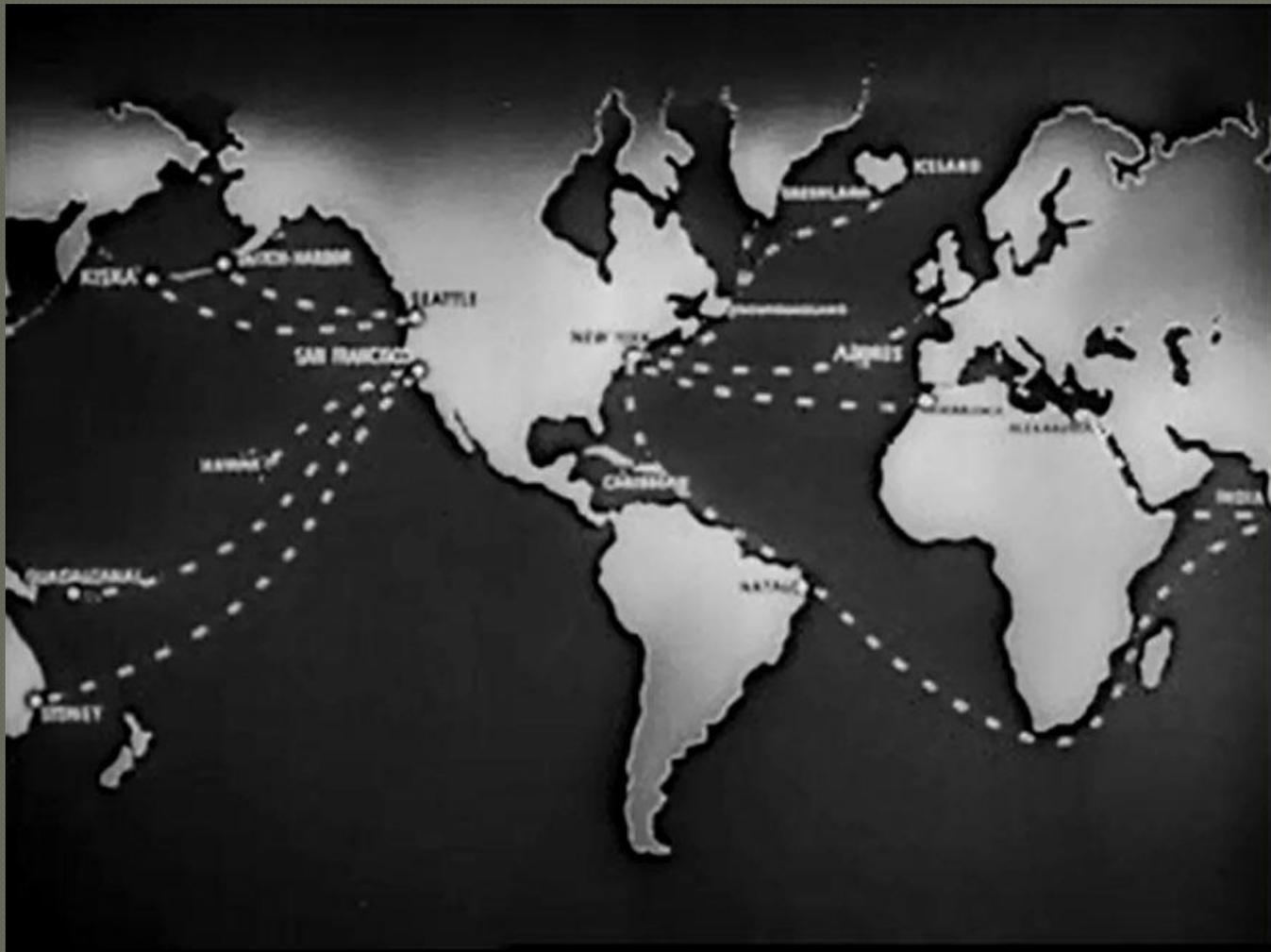
Millions of Letters = Tons of Weight

Write on a Single Page

Scanned to 35mm Film

Used Photo Technology

Develop in Smaller Format

Deliver as Normal Mail

What did they call this amazing, fuel saving, war winning mail delivery process?

V-Mail Used Photo Technology

AFB Uses Today's Technology

- HTML or Large Print Ballots

- Works with accessible peripherals

- Uses USPS so no trip to a poll required

- Used in Oregon since 2008 Primary

- Come see the AFB Poster

AFB = Voting in Your Bath Robe!

Thank You!

John Schmitt
Five Cedars Group, Inc.
john.schmitt@fivecedarsgroup.com
503-329-4700

Jill Piner

"CHILVote: Audio-only Accessible Voting Interface"

Rice University

Up Next: Sarah Swierenga

Sarah Swierenga

"Overview of NIST testing protocol"

Michigan State University

Up Next: Sarah Swierenga #2

TESTING USABILITY PERFORMANCE OF ACCESSIBLE VOTING SYSTEMS

MICHIGAN STATE UNIVERSITY | University Outreach and Engagement
Usability/Accessibility Research and Consulting

Sarah J. Swierenga & Graham L. Pierce

Usability/Accessibility Research and Consulting, Michigan State University

PREPARING SYSTEMS FOR TESTING

Pre-Test Accessibility Inspection

- Identify user interface issues
- Identify ballot interaction issues
- Categorize issues

Manufacturer's Usability Testing

- Formative testing to locate issues and improve systems
- Follows same protocol as formal evaluation
  - Modified demographic questionnaire
  - Interview and post-study questions

EVALUATION STEPS

Planning a Study

- Guide to set up evaluation and recruit participants
  - Timeline
  - Facilities and staffing
  - Recruiting participants
  - Recruiting sources
  - Screener script for blind, low vision, & dexterity limitations

Conducting Sessions

- Everything necessary to prepare for a session
  - Session timing
  - Room setup and preparation
  - Participant arrival and paperwork
  - Sample consent form
  - Demographic questionnaire form

Figure 1. Students voting.

Documents Developed

1. Screener Script
2. Consent Form
3. Demographic Questionnaire
4. Session Protocol
5. Moderator Script
6. Voting Instructions
7. Post-Study Questionnaire
8. Receipt for Payment

Session Protocol

- How to run a session and interact with participants
  - Preparing to vote
  - Recording observations
  - NIST ballot with modified voting instructions
  - Post-study questionnaire

Voting Booth

We'll now move over to the voting system.

{Direct/guide the participant to the front of the machine, offer seat if appropriate}

[Blind] The voting machine is right here.

Please take a moment to familiarize yourself with the machine, but don't press any buttons yet.

[After finished or several seconds have passed] OK? Let's get started.

[Blind and low vision (audio output)]

Do you have your own headphones with you?

[No] {Provide a sanitized headset}

Please plug in the headphones using this connector and put them on. You may adjust the audio options at any time during the session.

{Once they are plugged in}

[Blind and low vision (oral instructions)] I'll read you the names to vote for in each contest, but can only do so after you ask me. For example, when you need to know how to vote for County Commissioner, say "Who should I vote for for County Commissioner?" and I will

Figure 2. Excerpt from Moderator Script.

Moderator Script

- Detailed script and instructions to run a session
  - Greeting and pre-test paperwork
  - Introduction to study and voting booth orientation
  - Voting session facilitator instructions
  - Post-study logistics

ANALYSIS

Measures

- Revised Draft VVSG 2.0 measures
  - Total Completion Score (Revised)
  - Voter Inclusion Index (Revised)
  - Perfect Ballot Index (Revised)
- Additional measures
  - Voting Time
  - Number of "Interactions"
- Post-study questionnaire analysis
- Reporting

DRY RUN DATA COLLECTION

		Silent	Audio
System 1	Touchscreen	10:00	
	Button Panel	11:00	17:00
	Jelly Switch	23:00	
System 2	Touchscreen	7:00	
	Button Box	18:00	37:00
	Jelly Switch	24:00	52:00
System 3	Buttons	6:00	32:00

FUTURE DIRECTIONS

- Model accessible voting system and interaction specification
  - Project funded by NIST
- Model accessible voting input controls
  - Project funded by ITIF
- Usability testing with model system and new voting systems
- Extension of protocol to include additional user groups
  - Reading disorders, mobility impairments, etc.

ACKNOWLEDGEMENTS

Sarah Swierenga

" Smart Voting Joystick"

Michigan State University

Up Next: Dominion

Voting with Joy
Student Project to Create a Smart Joystick for Accessible Voting

ECE 480 Team: Yangyi Chen, Tyler Dennis, Graham Pence, Behdad Rashidian, & Joy Yang

Research Team: Sarah J. Swierenga, Stephen R. Blosser, & Graham L. Pierce

Design Challenge

- Individuals with limited use of their hands have difficulties with current voting system input devices
- 6.7 million United States citizens have difficulty grasping objects (United States Census)
- Design a joystick to enable independent and private voting for individuals with dexterity limitations
- Use to vote a shortened NIST Test Ballot on computer

Design Goals

- Accommodate a wide variety of different motor needs
- Intuitive, universally-designed functionality
- Haptic force feedback, enabling users to "feel" ballot
- Local stability to prevent accidental movement
- Convenient to use

User Feedback

- Branden, a student with disabilities, tests the joystick and provides valuable guidance to the student team
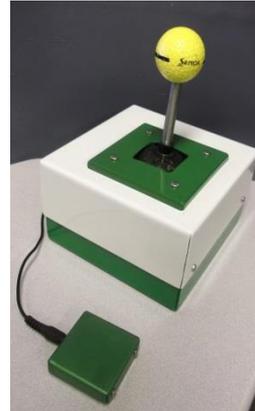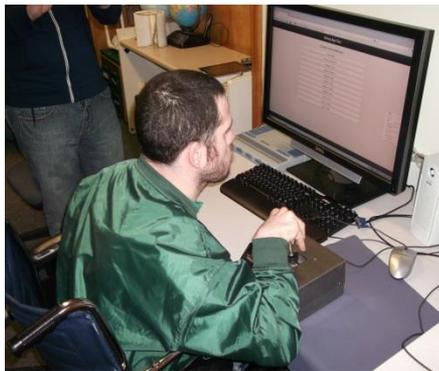
Design Concept
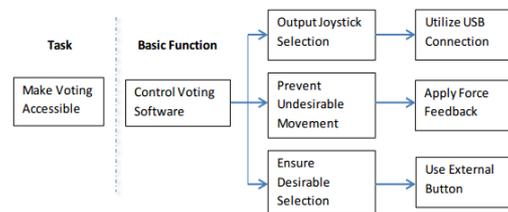
Technical Design Details

- Smart dual-axis joystick with force feedback control
- Programmable feedback schemes
    - Auditory, haptic, visual, adjustable tension
- Sturdy mechanical housing
- Easy to change ball handle
- External select button
- Universal mounting device (EGR 100 student teams)

Motivation

- Jim is an Intramural Sports Coordinator at Michigan State University with cerebral palsy
- Jim uses joysticks to navigate in his wheelchair and at his computer
- Jim pioneered many innovative joystick functions that he is delighted to share with the world to make voting easier for others like him

More Information

For more information about this project, please visit the grant website:
http://elections.itif.org/projects/grants/round-2-funded-projects/michigan-state-university/

MICHIGAN STATE UNIVERSITY | Resource Center for Persons with Disabilities

MICHIGAN STATE UNIVERSITY | University Outreach and Engagement | Usability/Accessibility Research and Consulting

Dominion

" All-in-one Scanner/BMD"

Yvonne Cai

Up Next: Dan Gillette

Dan Gillette

" Audio-only Candidate List Browsing and Write-In User Interface"

Carnegie Mellon University – Silicon Valley Campus

Up Next: Jessica Jones

Research in Accessible Voting Project at CMU

Ted Selker, Dan Gillette, Shama Hoque, Ashwin Arun & Rahul Rajan
{ted.selker, daniel.gillette, shama.hoque, ashwin.poothatta, rahul.rajan}@sv.cmu.edu

Carnegie Mellon® University Silicon Valley

Problem: Audio voting is difficult and time consuming.

Solution: Develop new candidate browsing, dialog, help, contextual awareness and write-in systems to improve audio voting.

Write-in System for Audio-only DRE Systems without Alphabetic Keypads

A B C D E **F** **G** H I J K L **M** N O P Q R **S** **T** U V W X Y **Z** *Space Hyphen End* 🔔

Above is a representation of what is read to the user in fast scrolling mode. The larger letters are read at a slower rate than the others, acting as waypoints.

Introduction

A prototype was created with HTML and JavaScript that utilizes the Chrome browser's text-to-speech capabilities.

Two scrolling modes are available: one sped up for finding a letter region and one optimized for zeroing in on letters.

An iterative pilot usability study was conducted in the winter of 2013.

Preferred Reading Rate

A reading rate equivalent to 400 words per minute proved best for rapidly finding a letter region.

Users had difficulty stopping where they intended at higher speeds.

The audio remained intelligible up to a rate equivalent to 600 words per minute.

Instructions

Without instruction on strategy, users would often go through a period of experimentation and many never took full advantage of the system's features.

With a simple set of instructions explaining the purpose for each scrolling mode, most users quickly settled into an efficient usage pattern.

Zombie Scrolling

Some users were lulled into inattention by the looping found in fast scrolling mode that linked the end of the alphabet back to the beginning.

An end-of-alphabet earcon (a bell ding) was added, and looping was removed, to prevent turning users into zombies.

Tracking Progress

Users often selected a letter twice because they had lost their place while spelling.

We are developing systems to provide helpful but unobtrusive progress tracking.
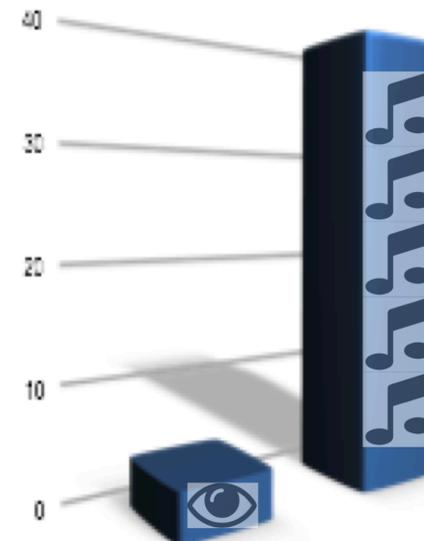
Voters report that it can take up to eight times longer to vote an audio ballot vs a graphical one.

Single-tap = Single letter movement
Press-hold = Fast letter scrolling

Controls Matter

The first iteration had a set of keys for single letter browsing and a separate set for fast scrolling. While easy to comprehend, users had a tendency to only use one set for all tasks.

The current prototype uses one set of direction keys for stepwise and fast scrolling (see diagram at left). Users find this system more fluid and easier to manage, leading to more efficient usage patterns.

The next iteration will allow for the use of a game controller's directional pad. Tests will be conducted against the current system to gauge the usability of each type of controls.
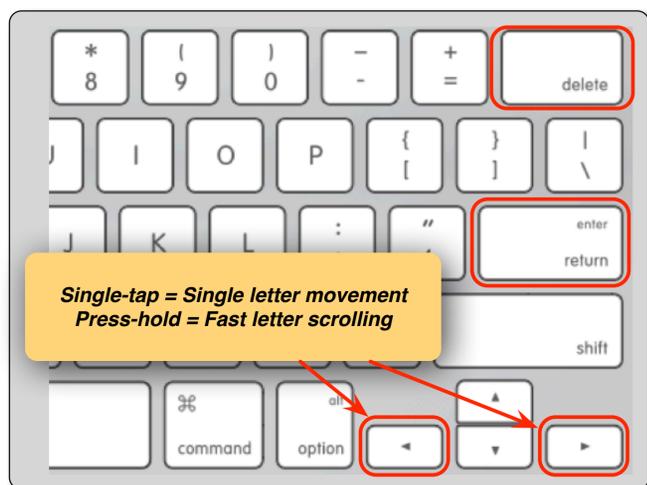
Jessica Jones

"Prime III: Printing Optical Scan Ballots"

Clemson University

Up Next: Drew Davies & Dana Chisnell

Drew Davies & Dana Chisnell

"Anywhere Ballot"

Oxide Design, UsabilityWorks, University of Baltimore

Up Next: Everyone Counts

Anywhere Ballot
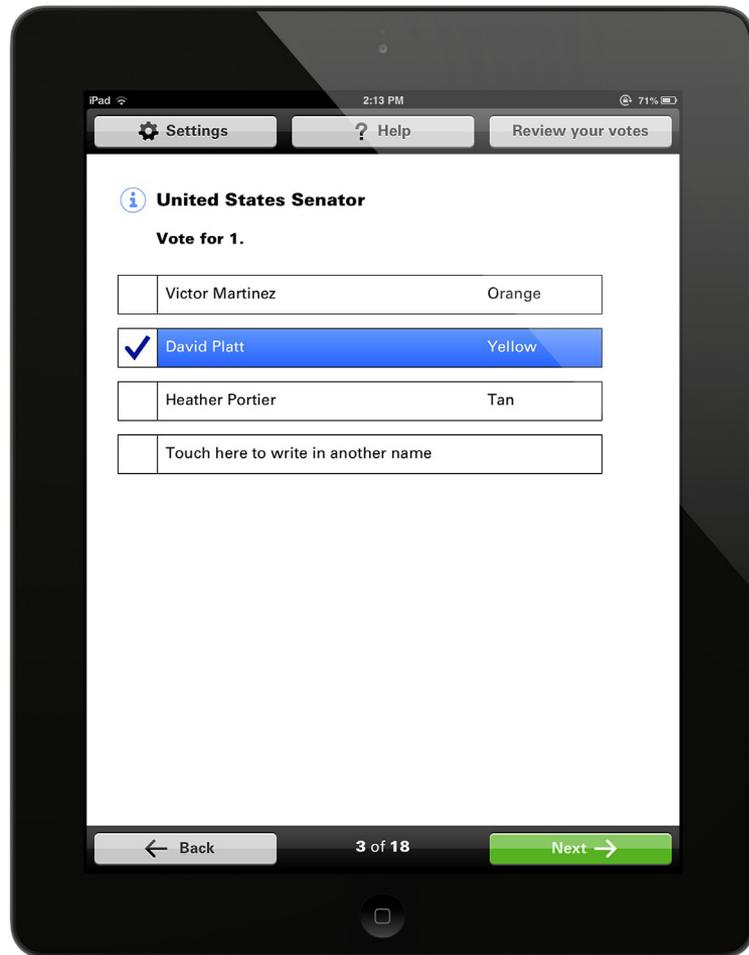
What if anyone, anywhere, could vote on any device?

Everyone Counts

" Delivering Accessible Voting with SAAS and COTS Devices"

Nick Coudsy

Up Next: Pascal Lola

Pascal Lola

"Balloting: speeding up the voting process"

Clemson University

Up Next: Chris Crawford

BALLOTING
speeding up the voting process

Pascal Lola, Ph.D. Student

Human-Centered Computing

Clemson University

plola@clemson.edu

The problem

This image shows a line at an early voting site in Florida during the 2012 National Elections. [4]

The solution

"draft" ballot – QR

Cast ballot – Prime III
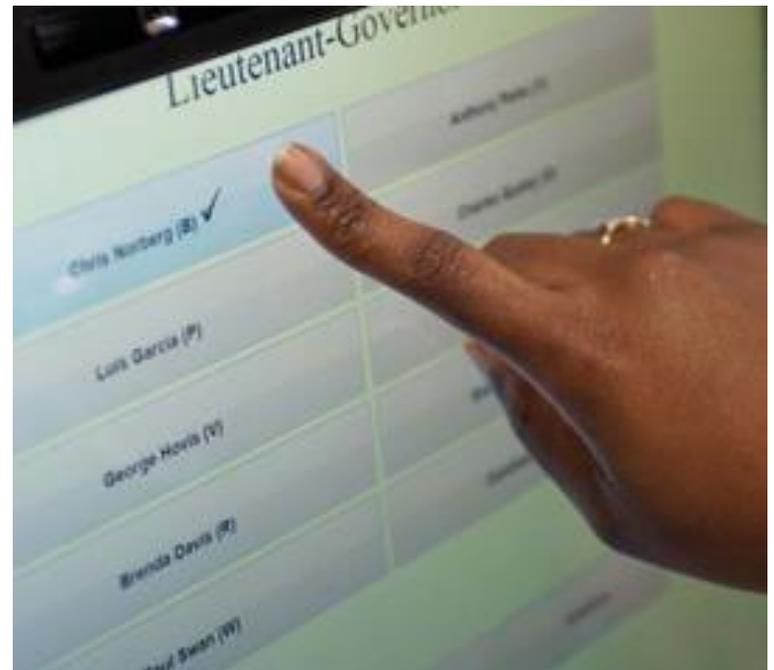
The result
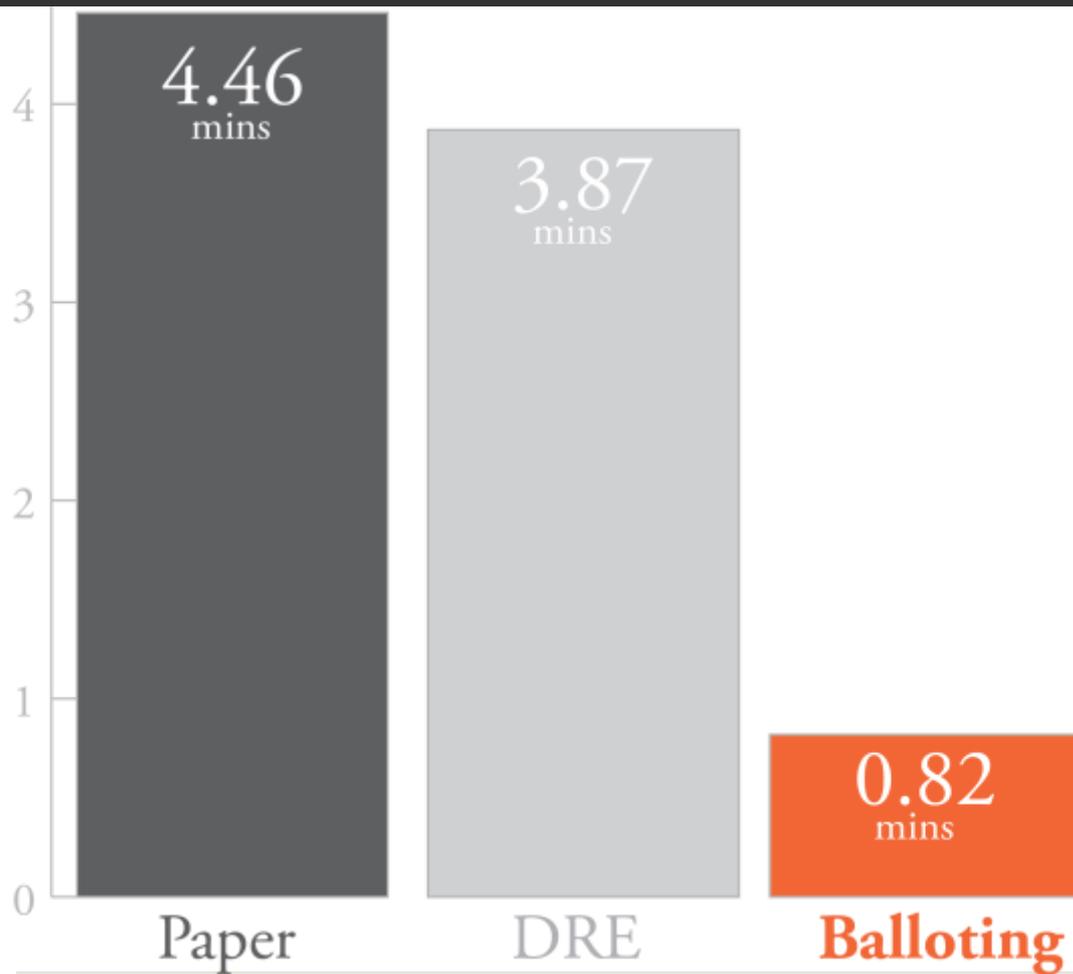
Chris Crawford

"Televoting: An Alternative Approach to Internet Voting"

Clemson University

Last but not least: Jon Allen Sanford

Jon Allen Sanford

"EZ Ballot"

Georgia Institute of Technology

Poster & Demo Session

Lecture Rooms A & B
Hall of Flags

(End of Day 1 Webcast)

Abstracts for all presenters can be downloaded here.