The event will begin momentarily.

- This event is being recorded
- Captions are available by clicking the CC icon in the Zoom toolbar below
- ASL is provided
- Presentation materials are available at:

  www.access-board.gov

Inclusive Interfaces:

Accessibility of Self-Service Transaction Machines

Agenda

- Panel 1: Accessibility Challenges Presented by Self-Service Transaction Machines
- Overview of Existing ADA and Section 508 Standards Relevant to Self-Service Transaction Machines
- Panel 2: Current Efforts to Improve Accessibility of Self-Service Transaction Machines

Welcome!

- The purpose of this event is to hear from individuals on the current accessibility (or inaccessibility) of self-service transaction machines.

- Our speakers have been invited to share information this topic; however, their inclusion in this event does not constitute an endorsement by the Access Board of any organization, product, service, or technical solution.

Panel 1:

Accessibility Challenges Presented by Self-Service Transaction Machines

Mark Hill
Deaf and Hard of Hearing Consumer Advocacy Network

Donald D. Overton, Jr.
Blinded Veterans Association

Clayton Lewis
Coleman Institute for Cognitive Disabilities

Dave Pierson
United Spinal Association


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Donald D. Overton, Jr.

Blinded Veterans Association


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SSTM Barriers for People with Cognitive Disabilities

Clayton Lewis
Co-Director for Technology
Coleman Institute for Cognitive Disabilities
University of Colorado

Many thanks for input from: Stefan Carmien, Emily Shea Tanis, Nancy Ward

Difficulty Reading

- Small letters and symbols, low contrast, and glare all cause problems.

  Note that these problems are more serious for people with cognitive challenges, because reading under difficult visual conditions creates more cognitive demands.

- Spoken prompts can help.

Small Keys and Buttons

These cause trouble in themselves, but also increase difficulty of use by making ***error correction*** more often necessary.

Touch screen interaction can support larger buttons with clearer cues.

Difficulty with Payment

It can be hard to see where to insert a chip card.

- the old swipe slots were easier to see
- tap can be good, too, if it’s clear where to tap

When the payment device is not integrated with the main interaction, confusion can result.

Managing Error

- ***Simple logic*** is important for users generally, and must be verified by testing.
    - The impact of this is especially large for people with cognitive disabilities
- Support ***corrections*** without restarting whole transaction
- ***Avoid timing out*** users who need more time to get things right

Personalization?

- People with disabilities don't like ***special*** "accessible" machines… all machines should be equally usable.
- Personalization could be a way to support diverse requirements, but ***universal design*** is simpler.
- Pass systems (***smart cards*** or ***phones***) may dominate explicit personalization in many applications (parking, transit).
    - Regular customers need not interact with SSTM at all, so SSTM can be biased toward novice customers.

Thank you!

Some examples: www.userfocus.co.uk/articles/car-park-payment-machines.html (Dr David Travis)


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United Spinal Association
TECHACCESSINITIATIVE

Accessibility to Self-Service Transaction Machines

Physically Disabled Perspective – Spinal Cord Injury (Partial Paralysis)

Spinal Cord Injury Primer

United Spinal Association
TECHACCESSINITIATIVE

- Quadriplegic/Tetraplegic – All four limbs & core affected by some form of paralysis
- Paraplegic – Legs & to a lesser extent the core is affected by some form of paralysis
- No two injuries are the same

<u>My Specific Physical Afflictions</u>

- Unable to pinch with fingers
- Unable to grab with hands
- Very limited core control – rely on arms/armrests/tilt to balance my upper body
- Grab items by sandwiching between two hands – severely limits reach

SSTMs Issues – Physical Space

United Spinal Association
TECHACCESSINITIATIVE

Background

- Power Wheelchair occupies ~6ft radius
- In sitting position my feet prohibit interaction in front of me
- All interactions are done to my left or right sides

Issues

- Multiple SSTMs in a row pose issues entering/exiting….feels like parallel parking
- Some SSTMs simply do not have enough physical space

SSTMs Issues – Height

United Spinal Association
TECHACCESSINITIATIVE

Background

- Wheelchair sits lower than most ambulatory people
- Wheelchairs require everything to be a little lower

Issues

- Distance to CC Reader is too far to enable reaching with two hands to pull card
- Some SSTMs print receipts too high to reach

What Works

- NFC (Near Field Communication) Readers (Apple Pay, Tap To Pay)
- Scan to pay (3D Code)
- Scan while you shop

SSTMs Issues – Screens

United Spinal Association
TECHACCESSINITIATIVE

Background

- Wheelchair sits lower than most ambulatory people
- Wheelchairs require everything to be a little lower

Issues

- Screens are often too high to read
- Glare on screen

What Works

- Ability to significantly tilt screen
- Matte anti-glare screens opposed to glossy screens

SSTMs Issues – Bagging

United Spinal Association
TECHACCESSINITIATIVE

Background

- Wheelchair sits lower than most ambulatory people
- Wheelchairs require everything to be a little lower
- Grab items by sandwiching between two hands
  – severely limits reach

Issue

- Bags are often not reachable

What Works

- Place bagging station at end opposed to back


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Overview of Kiosk Accessibility Regulation

Bruce Bailey, IT Specialist
U.S. Access Board
May 19, 2021

Kiosks, AKA…

- Interactive Transaction Machines
- Information Transaction Machines
- Self-Service Kiosks
- Self-Service Transaction Machines

Regulatory Statutes

- Access Board Purview
  - Architectural Barriers Act (ABA)
  - American with Disabilities (ADA)
  - Section 508 of the Rehabilitation Act
- Other Agencies
  - Air Carrier Access Act (ACAA) — DOT
  - Help America Vote Act (HAVA) — EAC

Chronology

- 2000 Section 508 EIT Accessibility Standards
- 2002 Help America Vote Act (HAVA)
- 2004 Updated ABA and ADA Accessibility Guidelines
- 2010 DOJ adopts updated ADA Standards
- 2013 ACAA Amendments
- 2017 Revised Section 508 ICT Accessibility Standards

Key Questions

- What term is used?
- What is the application/scoping?
- Is it required to talk?

Original Section 508 Standards

- 1194.25 Self contained, closed products.
  - Applicable to hardware other than kiosks.

- Does not explicitly require speech output:
  - Self contained products shall be usable by people with disabilities without requiring an end-user to attach assistive technology to the product.

Help America Vote Act

- (3) Accessibility for Individuals with Disabilities. —
- The voting system shall —
  A. be accessible for individuals with disabilities, including nonvisual accessibility for the blind and visually impaired, in a manner that provides the same opportunity for access and participation (including privacy and independence) as for other voters;
  B. satisfy the requirement of subparagraph (A) through the use of at least one direct recording electronic voting system or other voting system equipped for individuals with disabilities at each polling place;

ABA & ADA Standards

- F220/220 Automatic Teller Machines and Fare Machines
  - “automatic teller machines or self-service fare vending, collection, or adjustment machines”

- 707 Automatic Teller Machines and Fare Machines
  - 707.5 Speech Output
    - Machines shall be speech enabled.

ACAA and “Automated Airport Kiosks”

- 14 CFR § 382.57
  - What accessibility requirements apply to automated airport kiosks?

- (5)(i) Speech output enabled.

Revised Section 508 Standards

- Chapter 4: Hardware
- 402 Closed Functionality
- 402.2 Speech-Output Enabled
  - ICT with a display screen shall be speech-output enabled for full and independent use by individuals with vision impairments.


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Panel 2:

Current Efforts to Improve Accessibility of Self-Service Transaction Machines

Craig Keefner
Kiosk Manufacturer Association

Gregg Vanderheiden and Bern Jordan
Trace Research and Development Center

Phil Day
NCR

Laura Boniello Miller
Vispero

The Kiosk Association which is the Kiosk Manufacturer Association aka KMA

Our mission

- Inform
- Educate
- Improve Unattended Self Service & Kiosks
- Regulatory Focus
  - ADA - US, Europe, UK, Korea, Asia
  - PCI (Cardholder Activated Terminals)
  - UL Standards
  - HIPAA
  - FDA (temperature scanning)
  - Medical 60601
  - Gaming GLI
  - VPAT
  - WCAG

The Need for Access Standards

Days of old

The Need for Access Standards

Companies with internal IT geeks tell us all the time that, “Not to worry. We got usability figured out.”

Then they save some money and do this.

There are far too many “Not the best idea” examples and we have a whole photo gallery dedicated to them.

Internal IT department personnel are very skilled in internal network operations. Not so experienced in public facing

The Need for Accessibility – Misconceptions & Barriers

Common misconceptions about kiosks and ADA compliance:

- A simple paragraph declaring “must be ADA compliant” is sufficient
- ADA only applies to wheelchair access
- If there are store personnel available to help the disabled person then no need to comply
- An audio jack by itself satisfies ADA access for people with vision impairments
- Installation and site considerations are overlooked

Barriers to ADA compliance:

- Developing or Revising the user interface (software) to incorporate text to speech is cost prohibitive
- ADA compliance is too complicated, and the standards are too vague
- Confusion about which department’s accessibility standard for kiosks should apply
- State laws vary — California versus Alabama e.g.
- Companies may do cost analysis vs liability and decide against (Casinos e.g.)
- Accommodating multiple devices within a small accessible “strike zone” is a challenge at times

How KMA Promotes Access To Kiosks and Self-Service

- Tradeshows
  - Retail (NRF)
  - Restaurants (NRN)
  - Hospitality
- Relations
  - RNIB
  - IAAP
  - NFB
  - Patent Reform
- Legal Case Monitor
- Monthly Newsletters (9,000)
- LinkedIn (2M)
- PRNewswire monthly
- ADA 14-Point Checklist
- ADA Code of Practice
- WCAG 2.1 Checklist

Promote Access

How KMA Promotes Access To Kiosks and Self-Service

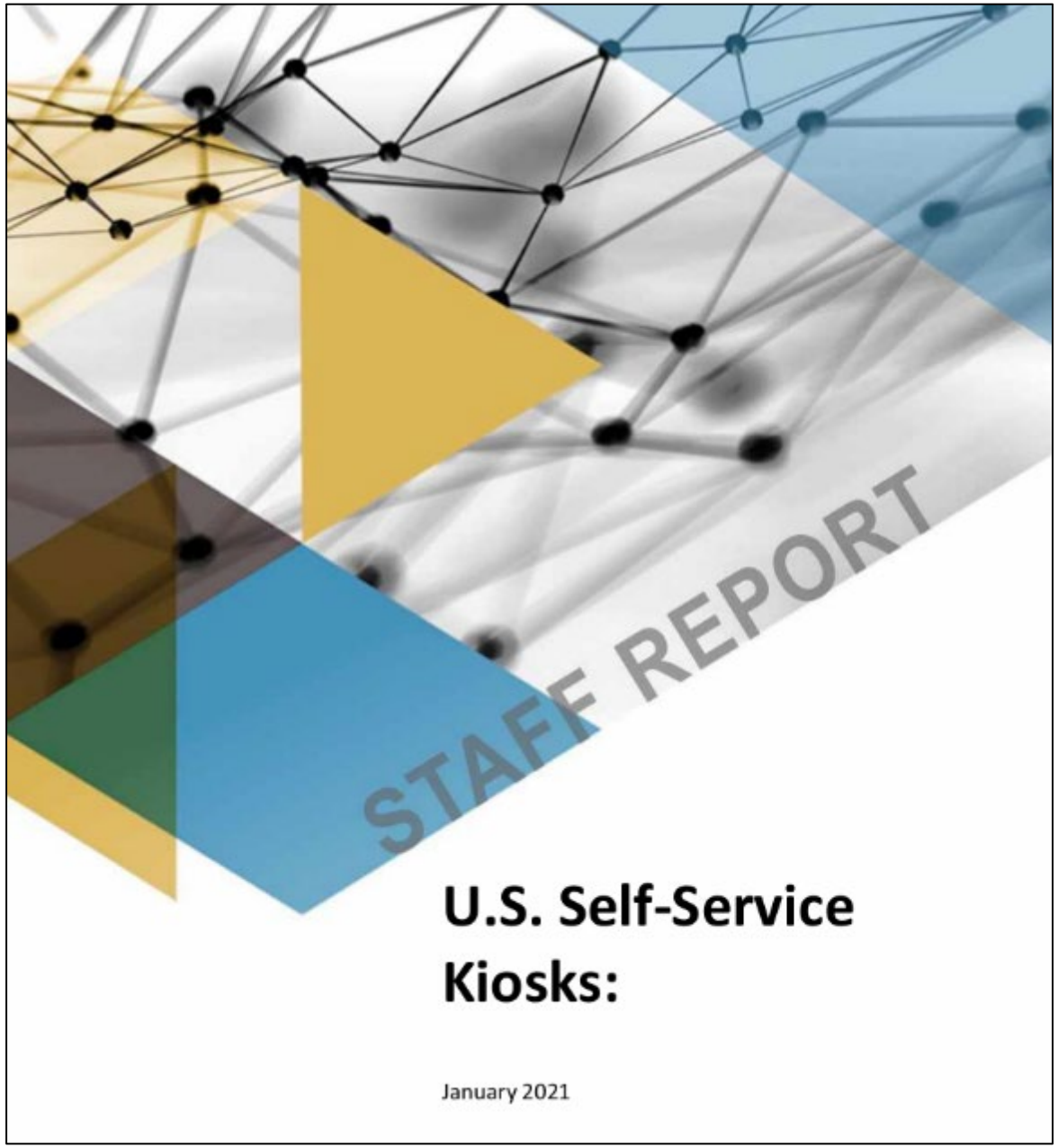
Speaking engagements

Proposed and proposing new working group for PCI-SSC named “Integrated Cardholder Activated Terminals” or ICAT (cousin of ICT)

Audio and integrated QR readers are next generation in v5.

No commissioning required.

See our PCI Update



Market Research

Community directed and peer reviewed research. Not your typical internet scrape.

We are happy to provide a free copy of up to any three reports to registered viewers today. Sorry, but kiosk companies are not included… Contact craig@kma.global or call

- 2021 Kiosk Market
- US Retail Ecommerce
- NRA State of 2021
- 2021 Payments EcoSystem
- IAAP Whitepaper
- 50 other verticals and reports

U.S. Self Service Applications

- Check-in
- Check-out
- Ticketing
- Self-Order (McDonalds e.g.)
- Banking
- Bill Pay
- Digital Menu
- Bitcoin
- Temperature
- Touch Screen Form Factors from 5" to 85"
- Payment: Mag Stripe Card, EMV Card, NFC Card, Cash, Check, Text, QR, Facial, other Biometrics and BNPL)

Market Applications

These are “functional” applications that extend from one market segment to another.

Checking in at a hospital patient kiosk is not much different from a hotel check-in or a ticketing check-in.

First Name, Last Name, Address, Phone + some sort of token credential.

A virtual fixed interface

U.S. Self Service Markets

- Hospitality
- Entertainment (Ticketing e.g. Disney or AMC)
- Healthcare
- Financial
- Food Service
- Travel (CLEAR e.g.)
- Transportation
- Government (Federal, State, City)
- Education
- Gaming (Loyalty & Sports Betting)

Market Research

Market segments have differences.

HIPAA privacy concerns are paramount in healthcare.

PCI is paramount in transactional payment.

Accommodating the required devices in shrinking zone is one of the challenges for kiosk manufacturers.

Market Numbers for 2019 thru 2025

User	2019	2020	2021	2022	2023	2024	2025	CAGR% 2020-2025
Retail	453	340	411	465	540	626	724	16
Healthcare	312	299	379	450	527	615	715	19
Financial	329	285	347	407	480	566	669	19
Travel	380	312	373	424	482	545	614	14
Hospitality	406	283	329	373	422	474	530	13
Gov	241	177	205	232	262	293	324	13
Restaurant	177	140	173	203	237	276	320	18
Education	87	62	71	$82	94	107	121	14
Others	227	177	200	233	271	313	360	15
Total	$2,611	$2,074	$2,488	$2,867	$3,314	$3,816	$4,379	16

Thanks -- For more information

- Craig@kma.global | 720-324-1837
- Websites
  - Kiosk Industry
  - KMA Association
  - Automated Retail
  - Self Service Industry
  - Patient Healthcare
  - Thin Client Computing
  - Point-of-Sale RFPs
  - Smart City Design
  - Digital Signage Solutions
  - Touch Screen Technology
  - Digital Menu Board
  - Check-In
  - Self-Service Kiosk Consulting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Accessible Kiosk Strategies

Part of the SSTM/Kiosk Accessibility Panel

Hosted by the U.S. Access Board - May 19, 2021

J. Bern Jordan, Ph.D.: jbjordan@umd.edu

Accessibility requires both **hardware** and **software** to work together

Cannot make a kiosk accessible though
– design of the physical kiosk only
– or through software only

However, I will focus mostly on the software side today

Two Major Accessibility Strategies:

1) Direct selection

(with "Cue and Respond" for non-visual access)

- View (or listen to) a menu
- Make a choice by pressing a button (or entering a code)
  - System does not rely on timing of button press

2nd Major Accessibility Strategy

2) Navigation
(with speech feedback via headphone for non-visual access)

- Use arrow buttons to move cursor through elements on screen
  (spoken through headphones)
- Use “Activate” button on the desired one
- Linear navigation ensures non-visual discovery of everything on the screen

Demonstration

of both approaches

https://youtu.be/5G61H2hhdeo

Comparison of 2 approaches

Direct-Selection (cued)

(+) Familiar to most (phone menus)

(+) Simplest to understand and use. (instructions are integral part of cuing)

(–) Practically limited to menus of up to 8 or 9 choices (or cues are more complex)

(–) Inefficient when there are many choices

(–) Limited to simple, choice-based interfaces

Navigation

(+) More efficient because a person can move at own pace

(+) Can navigate & activate relatively complicated interfaces

(+) Only real option with large number of selections

(–) Although obvious for those who can see and those who use screen readers and self-voicing products – it is not as easy as Cue & Respond for new users without instruction

WINNER for Public Kiosks?

- **Cue and respond **** when appropriate
  - small number of simple choices
  - keypad is present
- **Navigation** – otherwise

** Never use Cue and Respond without keypad
(e.g., “For X, press now”). That requires timing.

Other Complimentary strategies

(can be used along with – not as primary method)

- **"Talking Fingertip"**
  - Touch / slide across onscreen elements
  - Items are spoken as they are touched
  - Activate with a button or gesture
- **"Swipe to Step-Scan"**
  - Each finger swipe advances to next item which is read – in linear order
  - Activate with a button or gesture
- **Speech Input**
  - Can be very simple if/where it works – User just says what they want to do

PROs and CONs

(+) All of these strategies can be very efficient

(+) Some people will already be familiar

Talking Fingertip

(–) Not reliable for people with no or very limited vision. Might miss things on the screen

Swipe to Step-Scan

(–) Harder to discover/ learn /describe without training

(–) Easier to accidentally activate things.

(–) Not all people have dexterity to make clean swiping gestures – errors cause jumps (& confusion)

Speech Input

(–) Some people cannot speak or speak clearly

(–) Interaction can be frustrating when it isn't going perfectly

Thank You

This work was supported in part, by grant number 90REGE0008 (Inclusive ICT Rehabilitation Engineering Research Center) National Institute on Disability, Independent Living, and Rehabilitation Research, U.S. Administration for Community Living, Department of Health and Human Services

Grantees undertaking projects with government sponsorship are encouraged to express freely their findings and conclusions. Points of view or opinions do not, therefore, necessarily represent official policy of the Federal Government

Image Credits

- Numeric keypad & Navigation controls from Storm Interface
- ATM screen with button on the side in the public domain from Rfc1394 on Wikipedia Commons


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NCR Kiosk Accessibility

Phil Day, User Centered Design

May 2021

Introductions

- NCR
  - NCR powers the technology that helps our customers to run their restaurant, bank or store.
- User Centered Design
  - Multidisciplinary – industrial design, interaction design, usability & accessibility
  - US & UK
  - Design the hardware products for Banking, Retail & Hospitality

Research that led to Universal Navigator

- Trend to touchscreens, and larger displays
- Wanted a complementary input device to make products accessible to those with low visual acuity, poor upper body mobility or poor manual dexterity
- Multiple concepts were created, tested & either discarded or refined
- Several user tests & refinement led to the current design
- Detailed results have been published in peer-reviewed conference proceedings

User tests - uNav

- Initial testing – 25 NCR staff
- Results identified a preferred concept & input method which was then refined before another round of user tests

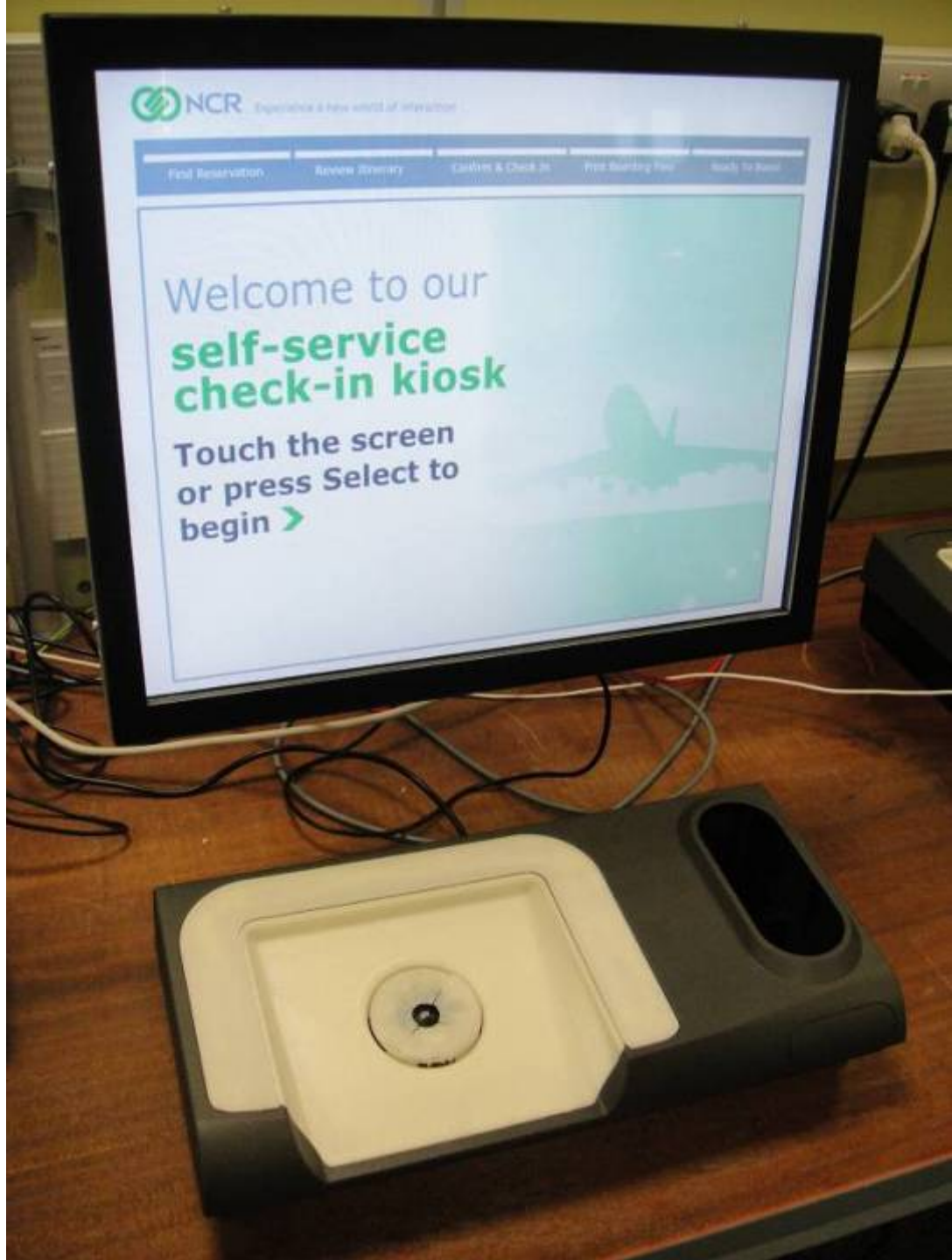


Photo of a display above a prototype input device with up, down, left, right buttons arranged in a circle around a central OK button

User tests – uNav - London

- Partnered with RNIB
- Tested with refined, higher fidelity prototype
- 48 participants (27 M, 21F)
- 47% blind without any useful residual vision
- 32% blind with some useful residual vision
- 21% partially sighted

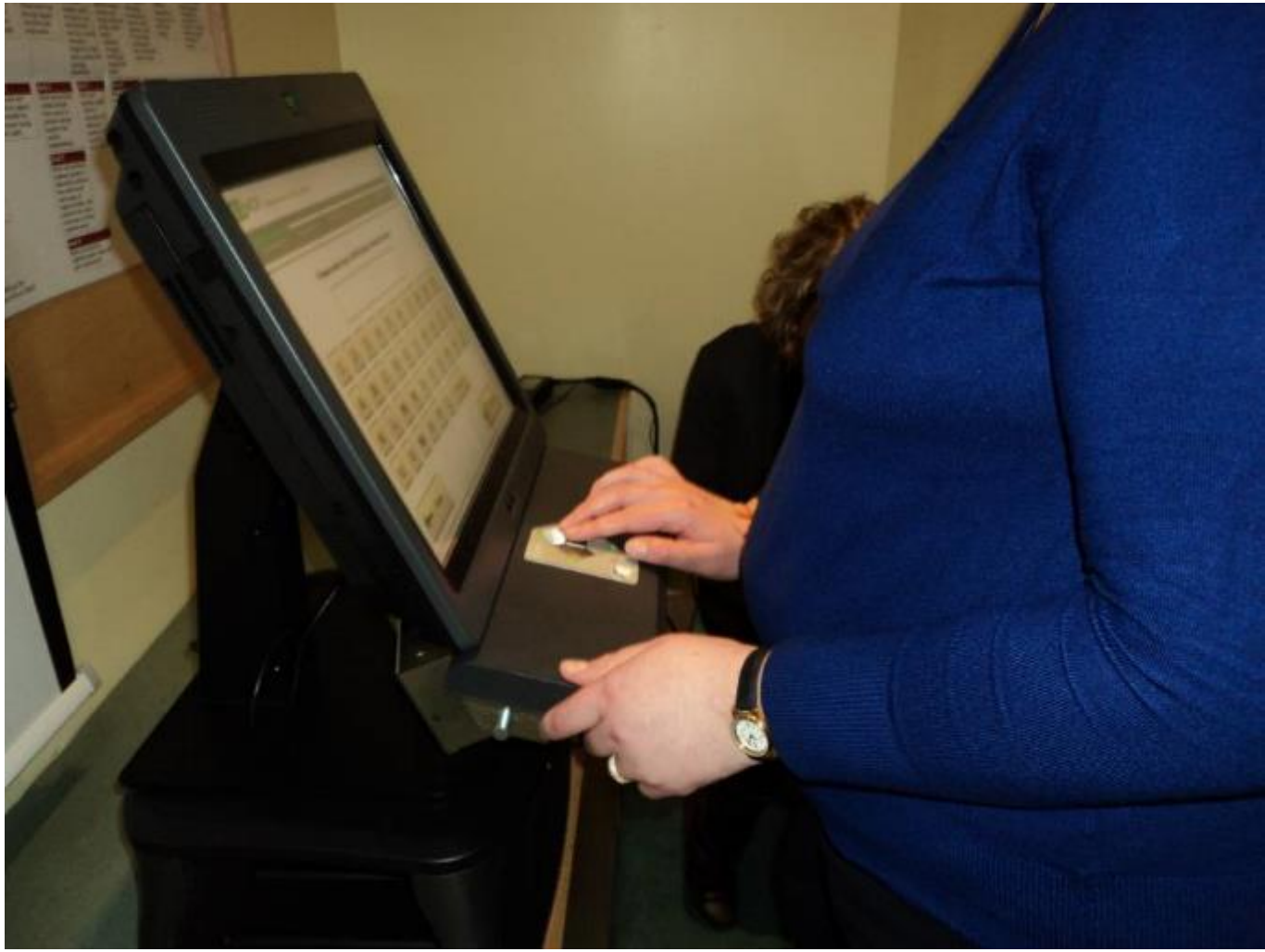


Photo of a person using a prototype uNav on a shelf below a 15” touchscreen displaying an onscreen keyboard

User tests – London

- All said uNav was acceptable
- Common question at the end; *“how soon will this be available”?*

Photo of a person using the same setup with a bag selection screen

User tests – uNav - Atlanta

- Slight improvements to software as a result of London testing
- Test at Disability Link (range of physical impairments) & Center for Visually Impaired
- 20 Participants with
  - Mobility impairments
  - Reduced manual dexterity
  - Blind
  - Partially sighted
  - Or combinations of the above
- Similar findings to London
- All managed to successfully complete the task using the uNav
- All felt that it was acceptable

Photo of a person in a wheelchair using the same setup with a menu screen

Production - uNav / Audio

- Partnership
  - Design concept by NCR
  - Developed and engineered by Storm Interface
- RNIB “Tried & Tested” accreditation
- Also available to other vendors

Photo of the production uNav, with 4 buttons (up, down, left, right) arranged in a diamond shape around a central select button. An audio jack and volume button are located to the left of the uNav. The keytips, audio socket and volume button also illuminate, and tactile features are used to differentiate each button.

Integration - SCO

- uNav has been integrated into our self-checkout (SCO R6)

Picture of a self-checkout unit. The main device consists of a scanner/scale at waist height, with a touchscreen above this, and an illuminated signage pole at the top. Below the scanner/scale are devices to accept cash, with coins on the left and notes on the right. The uNav is placed in between the 2 cash modules, with a receipt slot beneath it. There is a bagging area located to the right of the main unit.

Integration - kiosk

- uNav also available with kiosks like the XK22 – a kiosk that can be used for food ordering

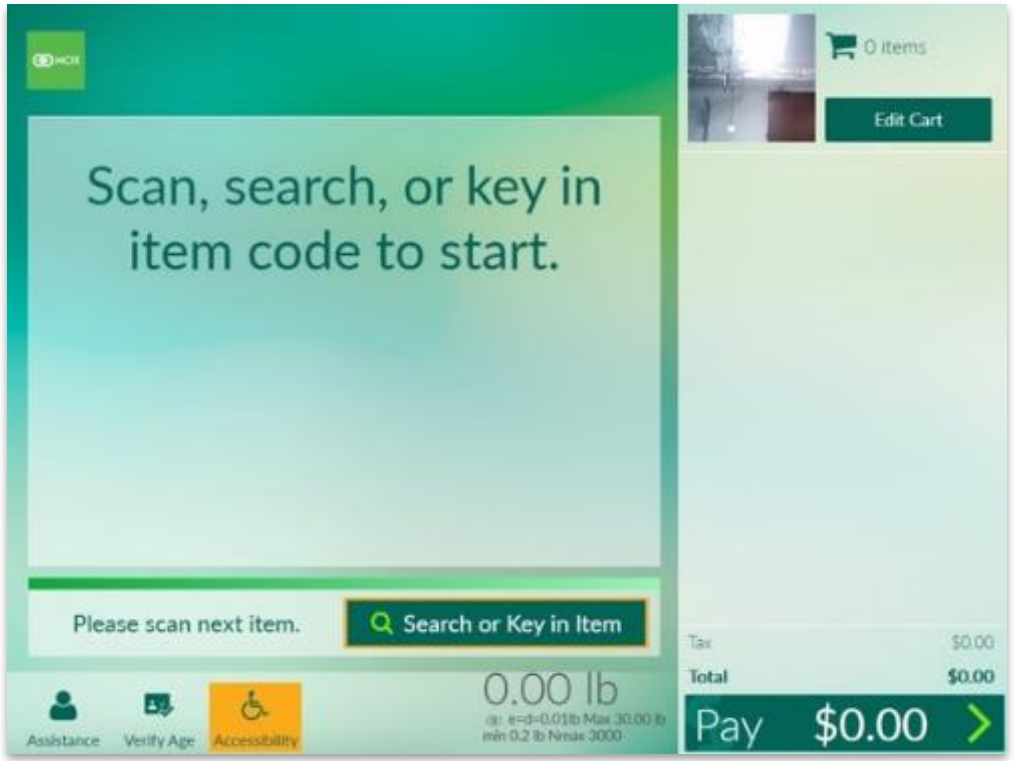
Picture of a wall-mounted, 22” portrait touchscreen kiosk. The screen is at the top, with an angled surface with the uNav on the left, a contactless card reader in the middle, and a combined card and keypad payment device on the right. Below these there is a receipt slot and a barcode scanner on a vertical surface.

uNav in use

- Activate accessibility mode – press central button
- uNav lights up, speech begins (through headphones)
- Left & right take you through each option in turn
- Up/down take you to the previous or next block of instructions
- The currently selected option is shown visually onscreen, and vocalized via the headphone jack

Photo of a person pressing the central uNav button. uNav illuminates with green light around the direction buttons, and white light around the audio jack and volume

Picture of self-checkout screen. Currently selected option (Search) has a coloured border, accessibility button is also highlighted



Conclusions

- Thanks for the work on creating & refining accessibility standards
- Importance of harmonization – we now track 55 accessibility standards (for self-service) in 48 countries – which unfortunately differ & sometimes conflict in their technical detail
- ADA section 707 seems to offer a well-defined set of requirements that could be applied more broadly
- If additional software requirements are needed WCAG has been widely adopted
- These requirements also harmonize with EN 301 549, which has been adopted not only in Europe, but also in Australia (and potentially Canada)
- Future standards (kiosks, and ATM updates) should allow for newer technologies (such as touchscreens, voice, gestures, interaction with smartphones/wearables) so everyone has the opportunity to use innovative and usable new solutions

THANK YOU

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Screen readers and Kiosk Accessibility

Laura Boniello Miller

Corporate Business Development Manager

What is a Screen reader?

- Providing dynamic voice output that changes as the content on the kiosk changes
- Voice input and voice output available
  - Examples of both shown via videos
    - Video 1: Slot Machine

The Power of JAWS

- Most popular screen reader worldwide
- Product has been selected by SSA, Wells Fargo, Carnival Cru Line and others for implementation in Kiosks
- JAWS supports over 30 languages with more each year
- User can customize but the settings reset between users
- Same interface for all customers (no separate accessibility mode)
- Configured to work with the Storm Audio Nav Keypad, & other input devices
- Installed locally – No servers or internet connection required

Features of JAWS

- Supports headphone jack detection
- User specific configuration; default user experience
  - Speed
  - Volume
  - Verbosity Level
- Languages and Voices
- Customizable, context specific help interaction
- Ability to use headings to move between sections
- Dictionary file to ensure correct pronunciation
- Reset to standard mode when headphones are removed
- Ability to customize introduction when accessibility mode activated

User Customizations

- Events that start or stop JAWS
  - Inserting or removing headphones
  - Pressing a key or key combination on a keyboard or keypad
  - Application reset or timeout
- Speech volume
- Voice rate or pitch
- Voice person selection (includes dozens of choices)
- Verbosity level
- Language selection

Thoughts

- Broadening definition of “kiosk”
- Responsibility is on deployers to know what is “accessible” for kiosks
- Measurable/Testing required
- Curb cuts = Accessibility helps everyone

Questions?

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Meeting of the U.S. Access Board will resume with regular business at 3:30 p.m.