

Minutes ABE60 (2) 2014

**Subcommittee Meeting ABE60 (2)
Accessible Transportation Technology Subcommittee
93rd Annual Meeting of Transportation Research Board
Tuesday January 14, 2014
Hilton Washington, Morgan Room
3:45 pm – 5:30 pm**

In Attendance:

Co-Chairs:

Daniel Blais, Co-Chair
Aaron Steinfeld, Co-chair

Transport Canada
Carnegie Mellon University

Members:

Billie Louise (Beezy) Bentzen
Betsy Buxer
Lilian Salazar Diaz
Mary-Jane Gravelle
Rex Luk
Claude Marin-Lamallet
Jim Marston
Kit Mitchell
Uwe Rutenberg
John Schoon
Lalita Sen
Anabella Simoes
Ling Suen

Accessible Design for the Blind
MV Transportation, USA
Monterrey University
Canadian Transportation Agency
Hong Kong Society for Rehabilitation
IFSTTAR
Atlanta VA
Retired
Rutenberg Design Inc.
University of Southampton
Texas Southern University
ISG/CIGEST
International Centre for Accessible
Transportation
TranSystems Corporation
Easter Seals Project Action, USA
Federal Highway Administration

Russell Thatcher
Karen Wolf-Branigin
Mohammed Yousuf

Friends:

Melissa Anderson
Naomi Armenta
Kaveh Bakhah Kelavestaghi
JoAnne Chalom
Kevin Chambers
David Chia
Caitlin Cottril
Andres Dalcazor

US Access Board
Nelson/Nygaard
Morgan State University
In Focus Mobility Inc.
Ride Connection Inc
The Collaborative Inc.
University of Aberdeen
Global Alliance on Accessible Technologies and
Environments

Janet Geissler
Rosemary B Gerty
Cynthia W. Lister
Eileen Lu
C. Marie Maus

Michigan Department of Transportation
Regional Transportation Authority
Milligan CPA
Eden Social Welfare Foundation
Easter Seals / Project Action

AGENDA

1. Call to Order 03:45
2. Introduction of new Co-Chair **Aaron Steinfeld**, new members, current members and friends 03:50
3. Review of previous meeting minutes for 2013 04:00
4. **Jennifer Weeks**: TRB Staff Announcements 04:05
5. **Dan Blais**: TCRP, ACRP, NCHRP, Research Programs Overview 04:10
6. **Carol L. Schweiger**: Use of Electronic Passenger Information Signage in Transit 04:20
7. **Aaron Steinfeld**: Deep Dive on CMU Smartphone Apps 04:30
8. **Uwe Rutenberg**: Defining the Scooter: Report on TDC motorized mobility device workshop 04:40
9. **Jim Marston**: New Research Directions from the Smith Kettlewell Eye Research Institute 04:50
10. **Mohammed Yousuf**: Accessible Transportation Technologies Research Initiative (ATTRI) and other FHWA research projects
11. Other subcommittee business and questions for presenters

MINUTES

1. Call to Order

Daniel Blais called the meeting to order at 3:45 pm and extended a warm welcome to all participants.

2. Introduction of new Co-Chair Aaron Steinfeld, new members, current members and friends

Aaron Steinfeld, Associate Research Professor of Carnegie Mellon's Institute of Robotics was introduced as the new Co-Chair of the Technology Sub-Committee. Thanks and gratitude was extended to outgoing Co-Chair Uwe Rutenberg for his dedication to the Sub-Committee. Meeting participants introduced themselves and provided their affiliations. Eighteen members participated, along with 13 friends of the committee for a total of 31 participants. Regional representation included the USA, Canada, Mexico, France, Hong Kong, Portugal, Taiwan, and the UK.

3. Review of previous meeting minutes for 2013

A motion to accept the minutes as prepared was put forward. The minutes of the 2013 meeting were accepted as written.

4. TRB Staff Announcements

TRB representative Jennifer Weeks was unable to attend the meeting.

5. TCRP, ACRP, NCHRP, Research Programs Overview by **Daniel Blais** (slide on page 7 of this document)

Daniel Blais presented 3 research-funding programs. These programs are the Transit Cooperative Research Program (TCRP), the Airport Cooperative Research Program (ACRP) and the National Highway Cooperative Research Program (NHCRP). There are two types of submissions that can be made for each program, these are 1) submissions for Cooperative research (i.e.: Problem Statement) and, 2) submissions for Synthesis research. The Cooperative research program is an applied research program that develops near-term, practical solutions to problems. Typically the durations of projects is 18 to 24 months with a funding range of \$ 250 000 to \$ 400 000. Synthesis research reports on current knowledge and practice, in a compact format. Typically the durations of projects is 12 months with a funding range of \$ 30 000 to \$ 35 000. Information on both types of programs can be found at the following website:

Cooperative research:

<http://www.trb.org/AboutTRB/Public/AboutCooperativeResearchPrograms.aspx>

Synthesis research:

<http://www.trb.org/SynthesisPrograms/Public/SynthesisProgram.aspx>

Having multiple TRB committee support on research proposals is beneficial for the selection process as is being a member of a TRB committee; however, proposal

submissions are open to everyone. State support is not a necessary requirement, but it is helpful.

Full proposals are due in the late spring / early summer. Bids are put out in the late summer with project usually starting in September / October.

Persons who submit problem statements are able to bid on projects.

Contact information for program submission questions is the following:

Mr. Crawford F. Jencks
Deputy Director, Cooperative Research Programs
Transportation Research Board
Cooperative Research Programs
202-334-2379 (PHONE)
202-334-2006 (FAX)
cjencks@nas.edu

6. Use of Electronic Passenger Information Signage in Transit by **Carol L. Schweiger** (slides on page 8 of this document)
Carol L. Schweiger gave a presentation on a TCRP synthesis project which explored the use of electronic passenger information signage in transit. Her presentation focused on the accessibility of these information technologies. She noted that there is limited legal guidance on how to make signage accessible. The TCRP study surveyed transit agencies to explore the level of accessibility and awareness of accessibility design guidelines. She concluded that more guidance is need for transit agencies to provide information and signage that is fully accessible.
7. Deep Dive on CMU Smartphone Apps by **Aaron Steinfeld** (slides not available)
Aaron Steinfeld provided an overview of accessible Smartphone apps being developed by Carnegie Mellon University. He presented apps to help people with visual impairments and apps that provide information for travelers using paratransit and mainline services as well as exploring the possibility of providing GPS data in areas where GPS is not available.
8. Defining the Scooter: Report on TDC motorized mobility device workshop by **Uwe Rutenberg** (slides on page 21 of this document)
Uwe Rutenberg reported on a workshop on motorized mobility devices (or scooters) organized by Transport Canada's Transportation Development Centre. The workshop took place in November 2013 as part of the Canadian Urban Transit Association's fall conference. The workshop was organized based on recommendations of a 2009 Transport Canada study to analyze and assess the environment for mobility scooters. The objective of the workshop was to validate a proposed definition of scooters, determine how it could be implemented and identify research needs. The workshop included participation from transit agencies, users of transportation services, occupational therapists and researchers. The results of the workshop indicated that two definitions should be

developed, one for non-transportable motorized mobility devices and one for transportable mobility devices.

9. New Research Directions from the Smith Kettlewell Eye Research Institute by **Jim Marston** (slides on page 37 of this document)

Jim Marston presented work being done at Smith Kettlewell Eye Research Institute on Smartphone based Virtual Audible Signage. The research work is a continuation of the Talking Sign concept which uses Remote Infrared Audible Signage. The presentation highlighted how using location aware Smartphone technology could provide the benefits of a talking sign system integrated into a current device.

10. Accessible Transportation Technologies Research Initiative (ATTRI) and other FHWA research projects by **Mohammed Yousuf** (slides on page 53 of this document)

Mohammed Yousuf provided an updated on the 5 year research and development effort by the Federal Highway Administration on improving mobility of travelers with disabilities using Intelligent Transportation Systems (ITS) and technology. The presentation provided some figures on persons with disabilities in the USA and described the research initiative. The vision of the research initiative is to enhance the mobility of travelers with disabilities by providing the capability to safely, reliably, and independently plan and execute their travel. Timelines of the initiative were also presented.

11. Other subcommittee business and questions for presenters.

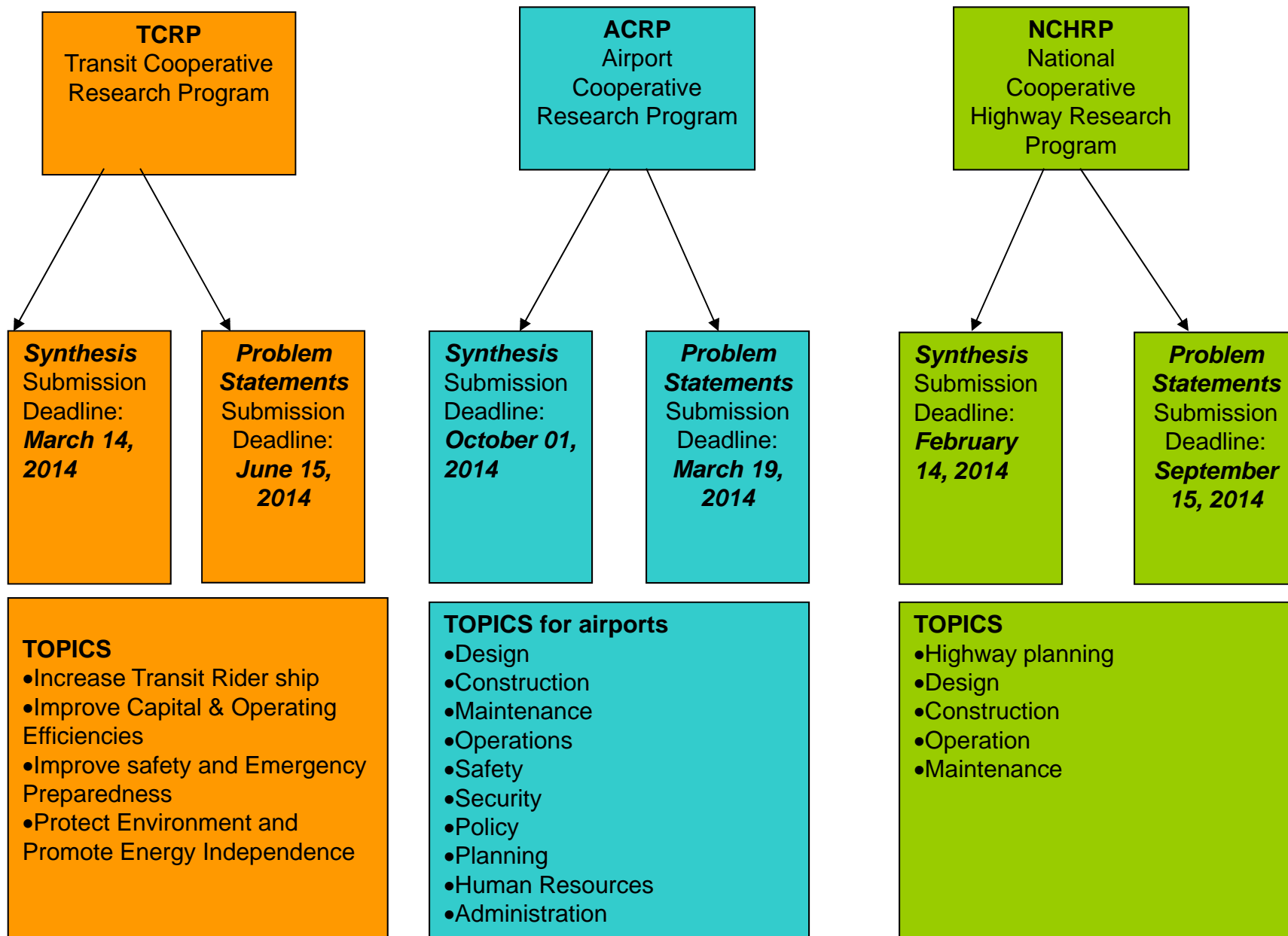
There was no other business.

The meeting adjourned at 5:30 pm.

RESEARCH Programs Submissions for FY 2015

Contact for all programs: Christopher W. Jenks: cjenks@nas.edu

Submissions online: <http://www.trb.org/Studies/Synthesis/SynthesesSubmittal.asp>



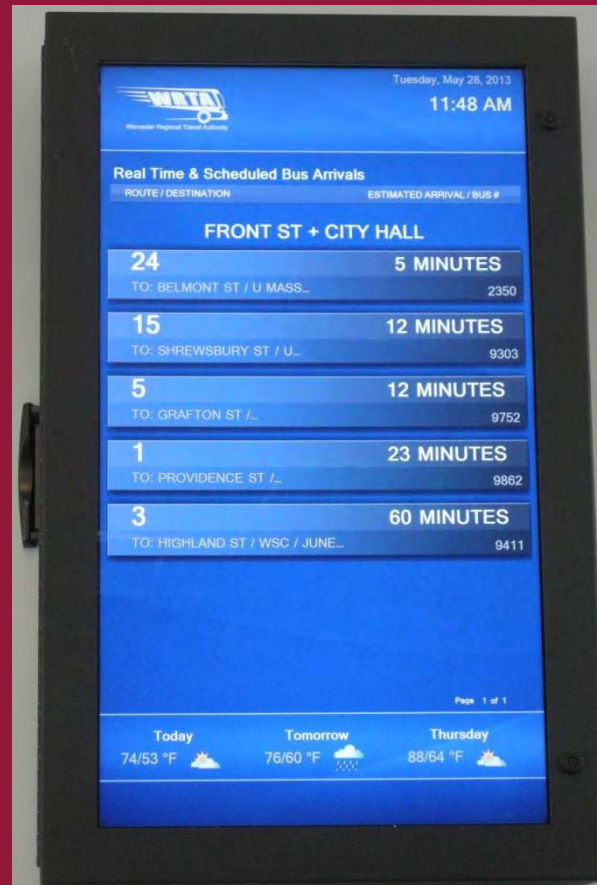
Electronic Signage for Public Transport: Is It Accessible?

Carol L. Schweiger,
Vice President



ABE60(2) Subcommittee
Meeting

January 14, 2014



EXPERIENCE | Transportation

Presentation Outline

- Introduction
- Results of Literature Review
- Survey Results
- Synthesis Results and Conclusions

LINE	CAR	DESTINATION	MIN
Green	6	Greenbelt	BRD
Yellow	6	Mt Vernon Sq	ARR
Green	8	Greenbelt	4
Green	4	Branch Ave	3
Green	6	Branch Ave	8
Green	6	Branch Ave	13

Green Line - Disruption at Southern Ave towards Bra

Elevator Outages: LEVELAND PARK DUPONT CIRCLE, Q S

Introduction

- Elements of use of electronic passenger information signage in public transport:
 1. **Underlying technology** required to generate information disseminated on signage
 2. **Sign technology** including type of display and other characteristics
 3. **Characteristics of the information** displayed on signs
 4. **Resources** required to successfully deploy and manage signage
 5. **Decision process** used to determine 1) if signage deployed; 2) where signage located; and 3) what displayed on signage
- Survey received from 37 transit agencies, including 5 Canadian and 5 European agencies
- Interviews with key personnel at agencies who have significant experience with implementing electronic signage

Results of Literature Review: Information Accessibility

Making information displayed on signs accessible accomplished in US and abroad, even though **limited legal guidance regarding making signage accessible**

- No U.S. laws addressing accessibility
- No U.S. law, but some guidelines and state regulations govern providing information in alternate formats
- Multiple approaches to providing audio:
 - Announcements at acceptable intervals
 - Push-button
 - Via telephone
 - Infrared device



January 14, 2014

Real-time Information Group (UK): Electronic Signage Guidance

- Font and format
- Refreshed text
- Scrolling text
- Sign finish, contrast and borders
- Sign positioning, lighting and environment on buses
- Sign positioning and environment at stops and shelters



Real-time Information Group (UK): Audible Assistance Guidance

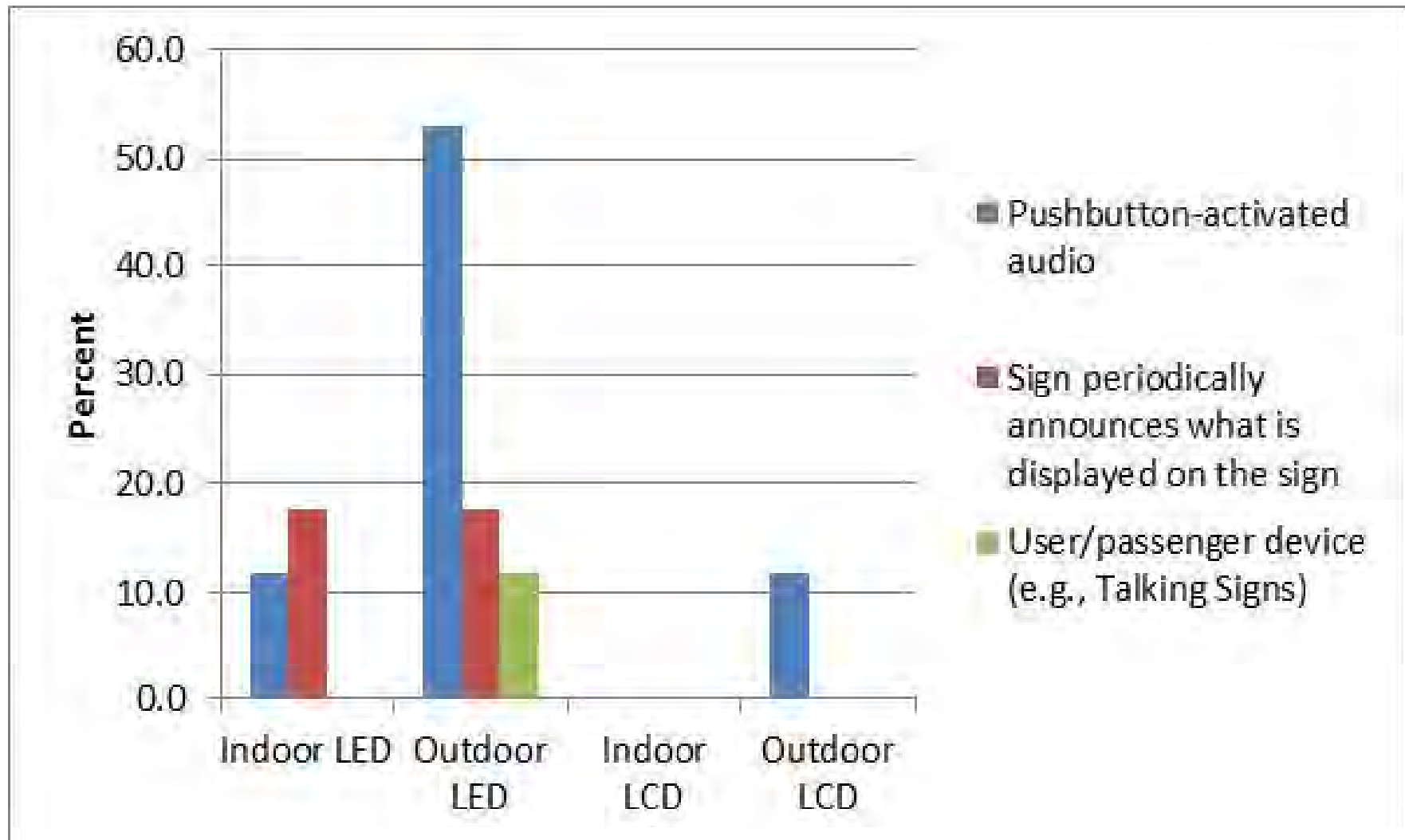
- Provision of audible information, messages and announcements
- Audio systems
- Hearing enhancement
- Triggering audio assistance with keyfobs
- Triggering audio assistance with smartcards
- Synthesized speech



Percentage Providing Information Displayed on Signage in Audio Format

Sign Type	Percent of Respondents
Indoor LED	25.8
Outdoor LED	48.4
Indoor LCD	3.2
Outdoor LCD	6.5

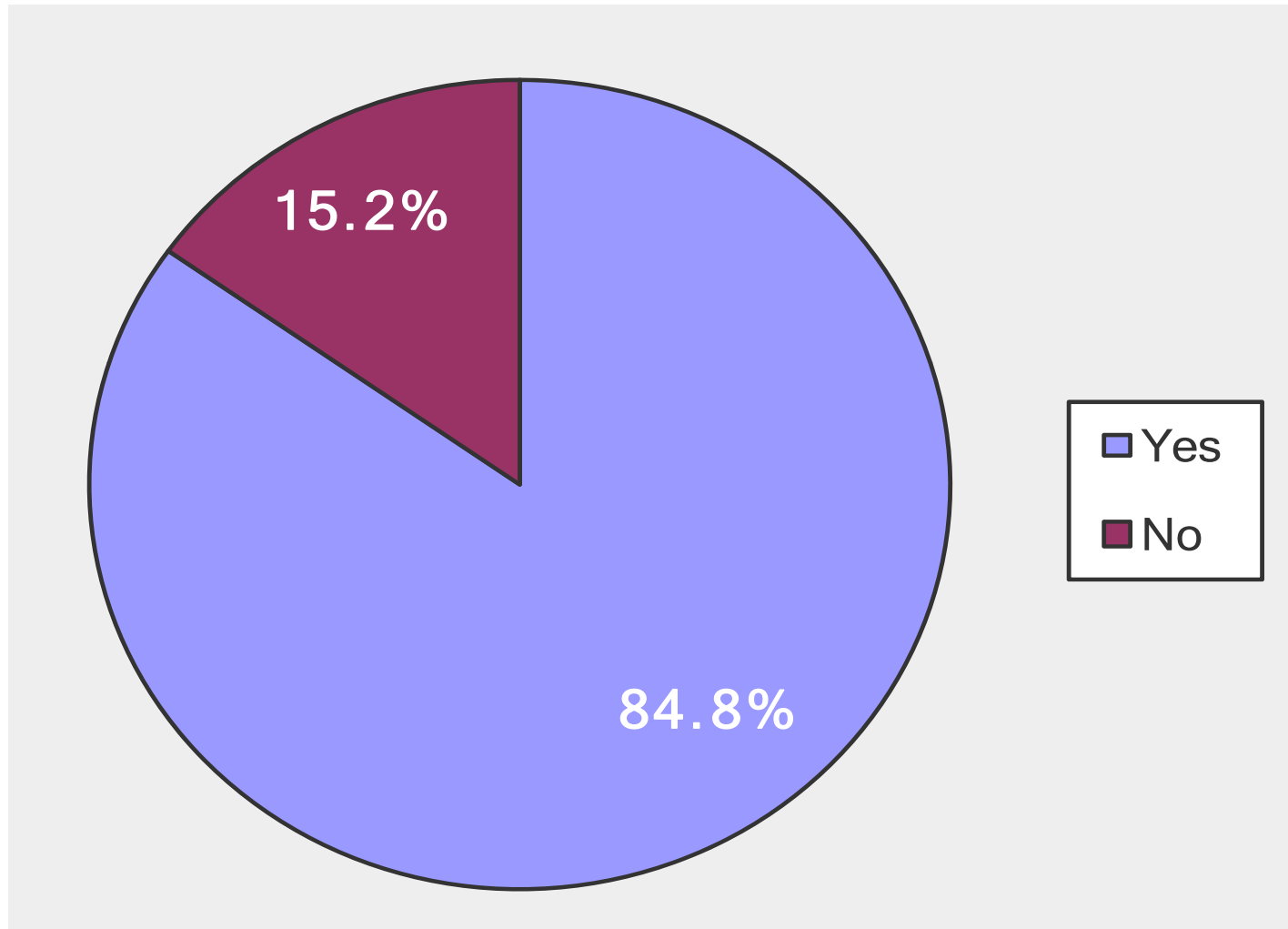
Percentage Using Specific Methods to Provide Audio Information



EXPERIENCE | Transportation

January 14, 2014

Awareness of Americans with Disabilities Act Accessibility Guidelines (AADAG)



January 14, 2014

Percentage Using AADAG to Determine Mounting and Display Characteristics*

Answer Options	Response Percent	Response Count**
Mounting Location and Height	95.5%	21
Character Height	90.9%	20
Character Proportion	63.6%	14
Finish and Contrast	63.6%	14
Illumination Levels	59.1%	13

* Canadian and UK respondents do not use the ADAAG

** 22 agencies responded to this survey question

Synthesis Findings Related to Accessibility

- Over 95% used ADAAG's mounting location and height
- Just over 90% used character height guidance to determine mounting and display characteristics
- 89% provide information displayed on sign in audio format
- Just over 65% consider information equity

Synthesis Conclusions with Accessibility Implications

- One of several methods to disseminate passenger information rather than the only method
- Opportunities to capitalize on agencies' open data and low-cost, customizable displays
- Potential to expand typical information provided on passenger information displays by utilizing full-screen or large touchscreen displays
- While information displayed cannot be personalized, content of messages extremely important to convey specific types of events
- More guidance needed to address accessibility issues such as best practices in providing information displayed on signage in audio format

Thank You!

For additional information:

Carol Schweiger, Vice President

TranSystems Corporation

Phone: +1 857-453-5511

E-mail: clschweiger@transystems.com



Transit Cooperative Research Program (TCRP) Synthesis 104: Use of Electronic Passenger Information Signage in Transit, Transportation Research Board (TRB), http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_syn_104.pdf

January 14, 2014

Analysis and Assessment of the Environment for Three- and Four-Wheel Mobility Scooters and Identification of Future Needs - Results of a Workshop

Rutenberg Design Inc.
in association with ISCA Inc.
for Transport Canada
TRB 2014, ABE60(2)

Overview

Original study was carried out in 2011

1. Identification of issues
2. Consultation with stakeholders
3. Conclusions and Recommendations
4. Workshop follow-up
5. Results of workshop

Identification of issues

- The Users
- The scooters
- The environment

The Users



Ambulatory person for recreational use



Mobility impaired couple



Mobility impaired



Ambulatory young commuting



Mobility impaired



High speed racer

The Scooters



4 wheel scooter



Vespa scooter



3 wheel scooter



Large 3 wheel scooter



Segway



E-bike scooter



T 3 Mobile

The Environment



Access to vehicles



Parking



Inclement weather



Conflict on bike path



Conflict on sidewalks



Conflict with road vehicles

Consultation with stakeholders

- Municipal and federal governments
- Standards Associations
- Transportation providers/operators
- User Associations
- Vehicle and equipment manufacturers
- Mobility device manufacturers/dealers
- Law enforcement representatives
- Occupational Therapist

Conclusions

- Lack of definition for mobility scooters
- New developments of mobility scooters
- Increased use by demographics
- Lack of standards for use in environment
- Lack of training for users at point of sale
- Transportability onboard vehicles
- Lack of standard battery connections
- Safety features, licensing, insurance

Recommendations

- Verify proposed definition for mobility scooters via workshop with stakeholders
- Classify use of scooters in environment
- Define transportability, safety features
- Licensing and insurance
- Battery connections
- Define implementation players

Proposed Definition

A mobility scooter is a powered device intended to facilitate the transport of ambulatory or semi-ambulatory persons, the elderly or persons with disabilities in a seated posture. A mobility scooter is equipped with a seat and armrest, a means to manoeuvre safely on various surfaces and has appropriate safety features. A mobility scooter has a maximum speed of 10 kilometer per hour. It is designed with dimensions that facilitate travel in public transportation modes such as intercity buses and urban public transportation. The first generation of scooters typically has three (3) or four (4) wheels and is steered by a tiller or handlebar.

Jurisdiction

- Federal Jurisdiction: regulation of vehicles and devices
- Provincial Jurisdiction: licensing, insurance, funding, highway safety code
- Municipal Jurisdiction: Access to rights of way, by laws prohibiting use

Workshop Objective

1. To validate the proposed definition
2. To strategize implementation of the definition
3. To identify the way foreward and future research

Workshop follow-up

- Interactive Workshop took place November 27th 2013 at CUTA conference, organized by Transport Canada
- 5 plenary speakers,
- 45 participants (Transit operators, manufacturers, OTs, users, municipalities)
- Roundtable
- Role playing

Results of workshop

Two Definitions of Mobility Scooters:

1. Class A: Transportable mobility scooter with limited dimensions, speed and safety features
2. Class B Non-transportable mobility scooter regulated as a vehicle
3. Federals to regulate vehicle
4. Municipalities to establish by-laws for use on infrastructure

Results cont'd

- Mandatory securement points for mobility devices for forward facing securement
- Develop universal battery connectors for powered mobility devices
- Involve Occupational Therapist for selection of mobility scooters
- Avoid user competition on shared infrastructure spaces
- Provide user training at point of sale

Information

A report summarizing the results of the workshop will be published with more details.

For further information please contact:

Daniel Blais, Transport Canada

daniel.blais@tc.gc.ca

Uwe Rutenberg, Rutenberg Design Inc.

uwe.rutenberg@sympatico.ca

S-K Smartphone Based Virtual Audible Signage (VAS)

Joshua A. Miele, PhD

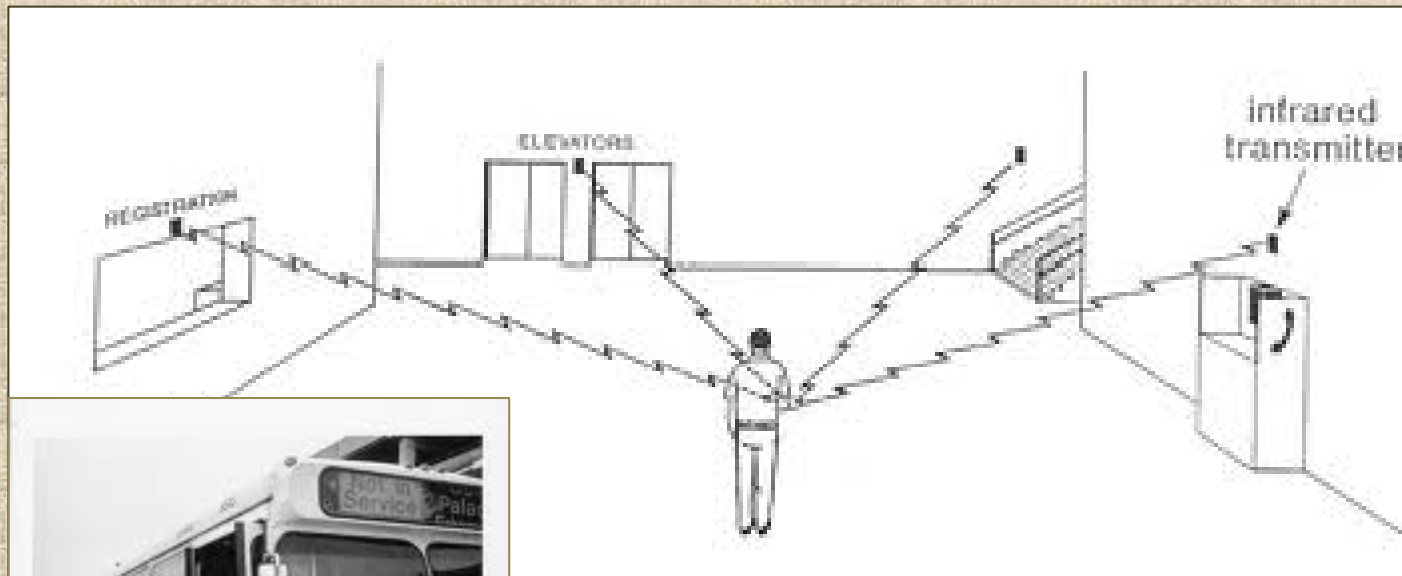
Megan M. Lawrence, PhD

James R. Marston, PhD

Smith-Kettlewell Eye Research Institute
San Francisco, CA

CSUN '13 SKERI

Talking Signs (RIAS)



- Gestural interface
- Spatially accurate haptic cues
- Research driven & proven

Talking Signs Research

Remote Infrared Audible Signage (RIAS)

Significantly improves ability to find locations in both indoor and outdoor locations (*Brabyn & Brabyn, 1982*)

Reduces barriers to efficient public transit use
(*Marston & Church, 2005*)

Reduces stress and anxiety associated with navigation
(*Golledge and Marston, 1999*)

Difficulty of 26 Transit Tasks



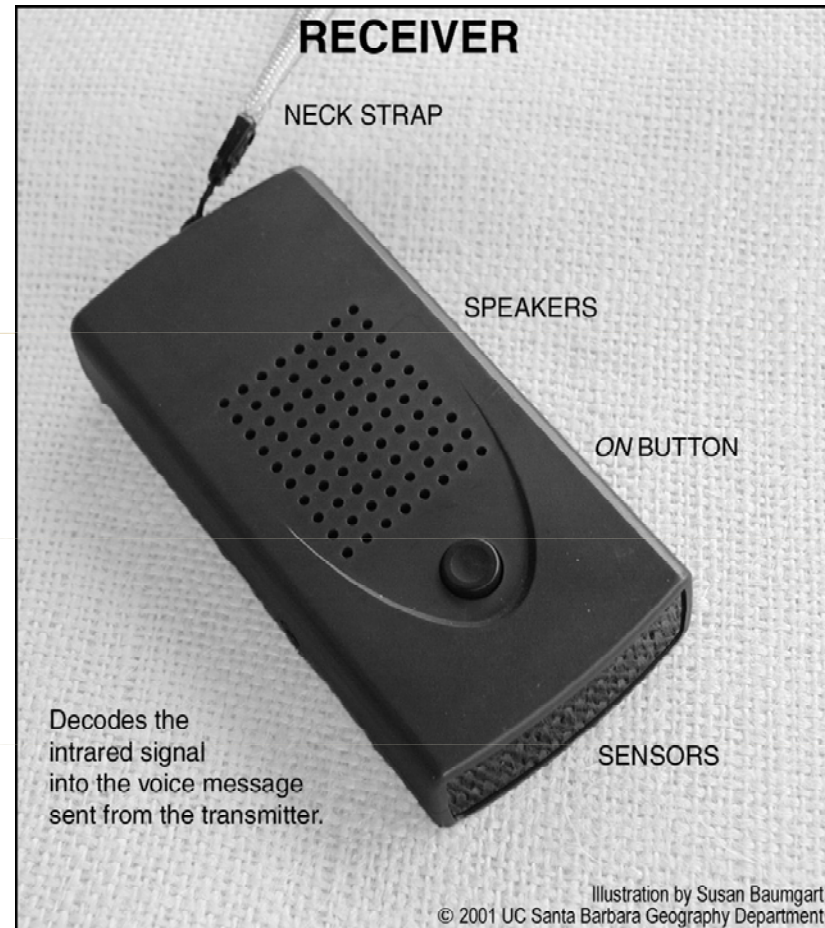
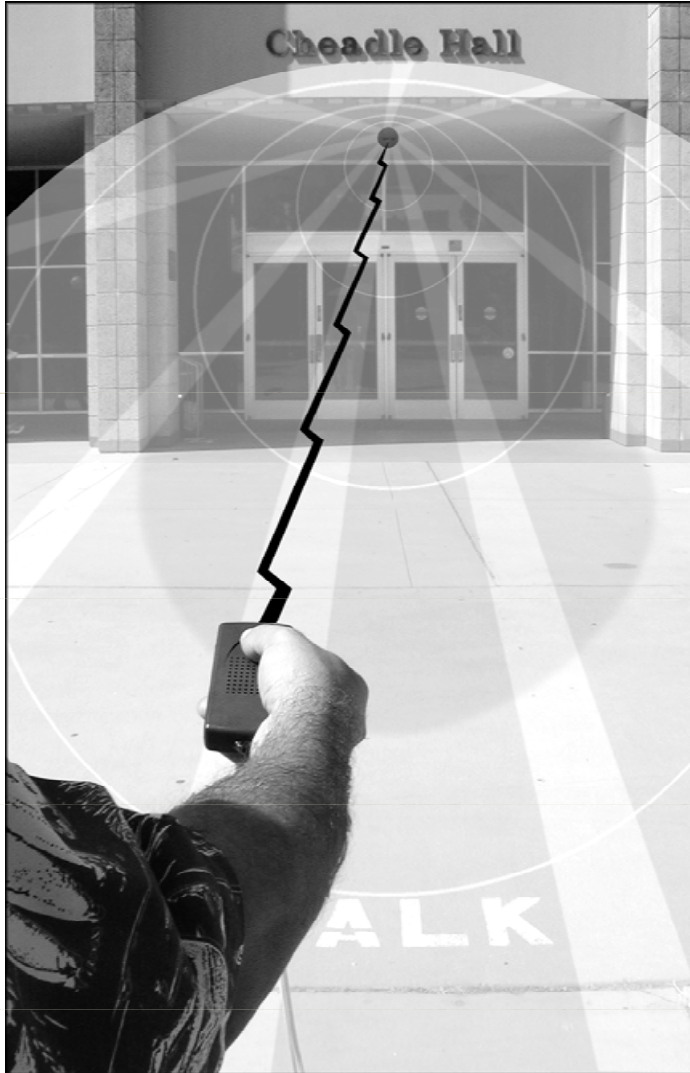
Not at all
difficult)
(5)

Somewhat
difficult
(4)

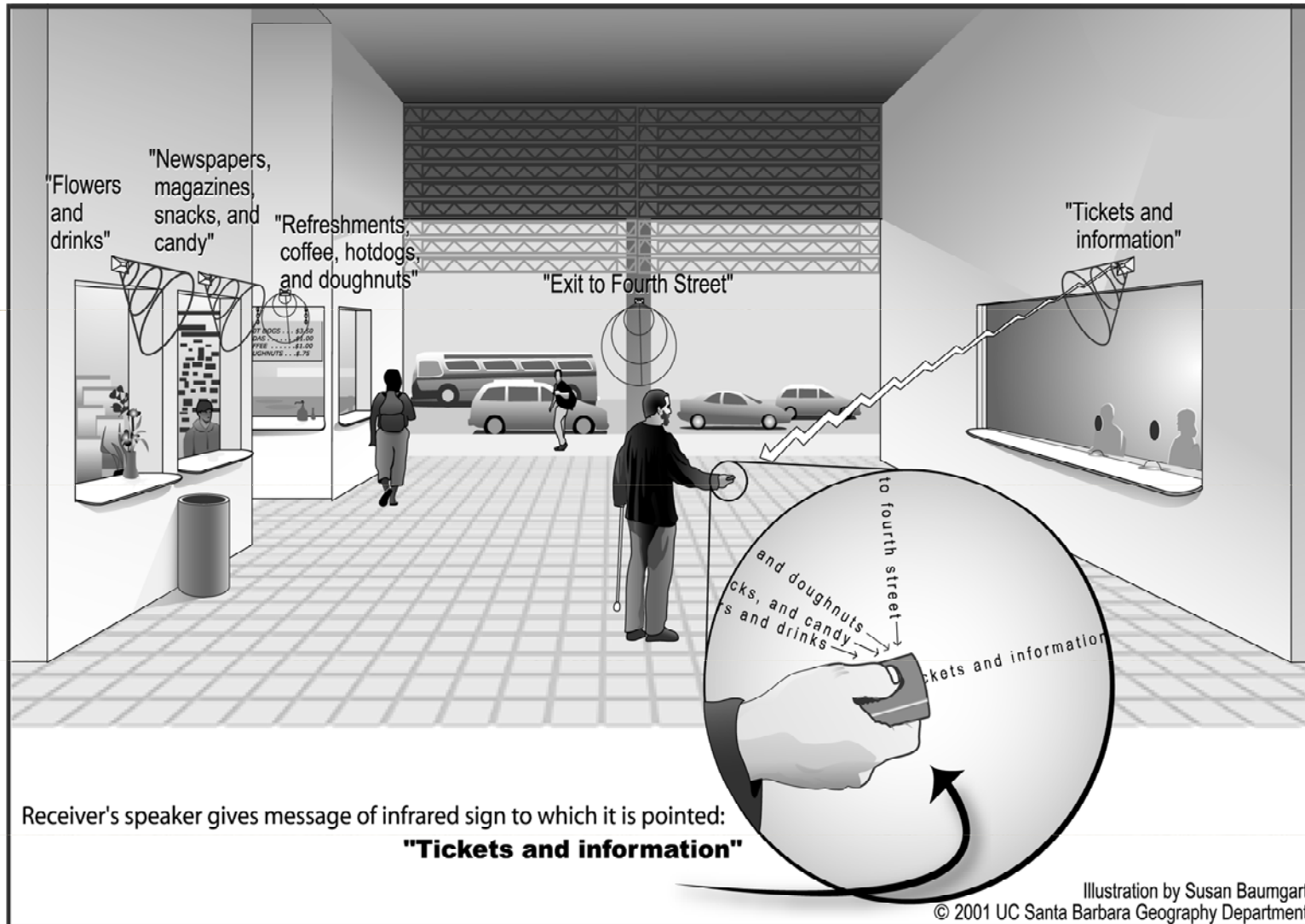
Difficult
(3)

Very
difficult
(2)

Talking Signs



Spatial Information from a Distance



Talking Signs: room for improvement

#1: Transmitter instillation & maintenance

#2: Receiver - availability



Virtual Auditory Signage

How it works.....

Sensor fusion:

- Location: GPS plus
- Orientation : compass plus gyro

location + orientation = virtual sign

Database for signs

- Cloud based
- Lat / Long Location
- Auditory message
- Orientation of signs
- Width of beam
- Power / distance of beam

Impacts of VAS

VAS includes the proven benefits of RIAS *BUT*

- Use the phone you already own & use
- Place signs anywhere, anytime
- For free!

Pointing Accuracy?

User is warned when confidence level is low



Use your iPhone as the receiver!

CSUN '13 SKERI

Pilot Data

Experimental Location:

Alta Plaza Park in San Francisco



3 Virtual Signs

bus stop
(260°)

● playground
(180°)

● bench
(116°)

■
Vantage Point
(*bench*)

CSUN '13 SKERI

Current Application

Good for outdoor environments

(Places where sensor error is minimal)

- College campus
- Parks
- Transit Boarding Areas

Moving Forward

- Personalization – build and save your own virtual signs
- Share your virtual signs with selected communities
- Use existing POI data as virtual signs

Future Applications

- Outdoor signage – improved accuracy
- synching compass and gyros with GPS
- Indoor signage?



CSUN '13 SKERI

Thank you!

Questions?



Accessible Transportation Technologies Research Initiative (ATTRI)

Mohammed Yousuf

Federal Highway Administration
Turner-Fairbank Highway Research Center

The Challenge



Persons with Disabilities

- 54.4 million; 20% US population
- Unemployment 63%; Income: \$38,400 (\$61,000)
- Poverty: 24.7% (9.0%)
- Fed expenditures: \$226 B (2002); \$357 B (2008)



Veterans with Disabilities

- Disability claims: 104, 819 (2006) vs. 634,743 (2012)
- 1.4 million deployed; one third report a disability
- Spending: \$0.93 billion (2006) vs. \$5.95 billion (2012)



Seniors/Aging

- Disability rates rise as people get older
- 35 million age 65 + in 2004
- Expected to reach 72 million by 2025






White House Initiatives



- Executive Order 13548 - increasing Federal Employment of individuals with disabilities
 - Establish the Federal Government as a model employer of individuals with disabilities
 - Measures to increase training, hiring and retention
- Lack of adequate transportation
 - Twice as many people with disabilities say it is important to their Daily Living Needs
 - 76% say it is important to their job search
 - 29% consider it a significant problem in accessing jobs
- White House Geo-Access Challenge
 - Explore use of technology and data to increase travel by people with disabilities
 - Recommend Federal research and policy interventions

Transportation Needs for Disability User Groups

Types	Jobs	Education/ Training	Healthcare	Recreational	Housing Aging in Place
 People with Disabilities	●	●	◐	◑	●
 Veterans with Disabilities	●	●	◐	◑	●
 Aging Seniors	◑	◑	●	◐	●

Transportation Need - Level of Significance: Some Significance ◐ Very High Significance ●

- Lack of adequate transportation for people with disabilities is a major barrier for mobility and independent living, access to jobs and education in particular.

Accessible Transportation Technologies Research Initiative (ATTRI)

- A new 5 year joint USDOT R&D effort
 - Co-led by FHWA and FTA with support from ITS JPO and other Federal agencies
- Enhanced mobility quality and choice for travelers with disabilities using Intelligent Transportation Systems (ITS) and other assistive technologies
 - Apply research and innovation to accessible transportation
 - Leverage technologies and innovations from Federal research and development activities
- Accessibility benefits that would extend to all travelers



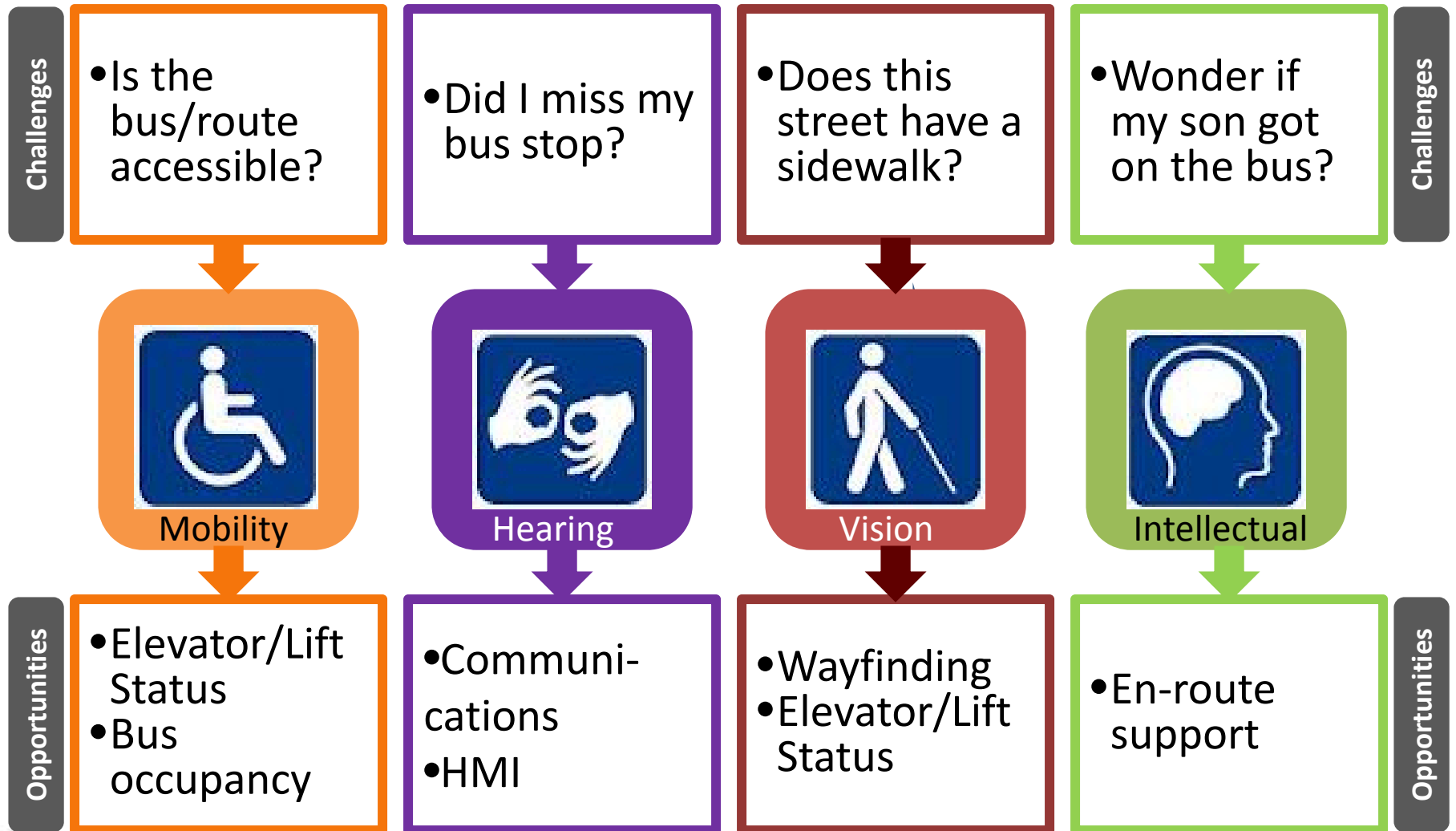
Image Source: Thinkstock/USDOT

ATTRI Vision

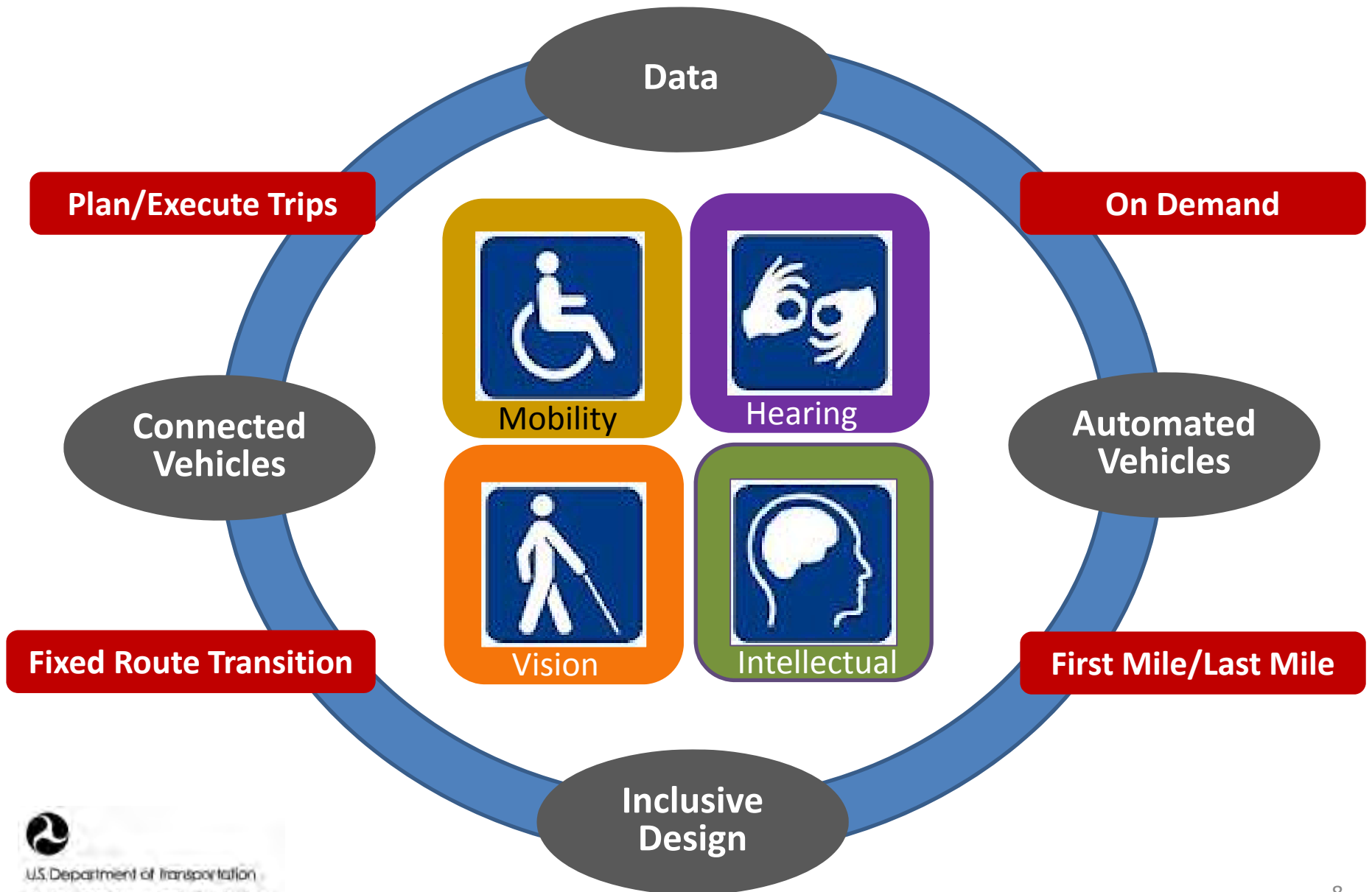
To enhance the mobility of travelers with disabilities by providing the capability to reliably, safely and independently plan and execute their travel. ATTRI identifies, coordinates, develops, and implements new integrated solutions in advancing such capabilities.



Understanding User Needs - Examples



ATTRI Concept



Accessible Transportation Environment Concept



ATTRI Phases

Phase 1
Exploratory Research
Sept. 2013 – Sept. 2014



Phase 2
**Development,
Testing, and
Evaluation**
Sept. 2014 – Sept. 2016



Phase 3
Demonstration
Sept. 2016 – Sept. 2018



Phase 1 ATTRI Activities

- Stakeholder Engagement and User Needs Assessment
- State of the Practice/Innovation Scan
- Collaboration with other Federal Initiatives
- Strategic Research Plan

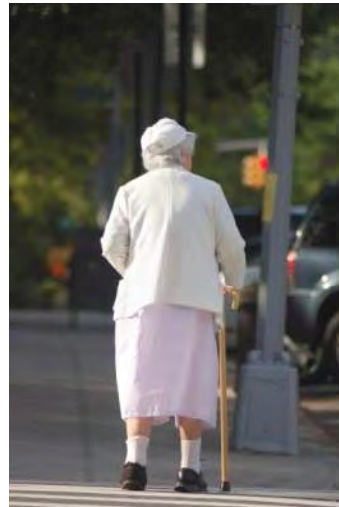


Image Source: Thinkstock

Stakeholder Engagement and User Needs Assessment

- Identification and assessment of user needs for:
 - Travelers with disabilities, wounded warriors and older Americans
 - All modalities, fare types and payment systems
 - Trips to school and work, shopping, entertainment venues, medical facilities, and leisure locations
- Identification of specific mobility challenges with near, mid, and long term priorities

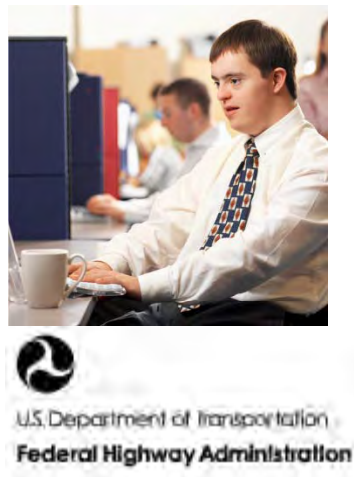
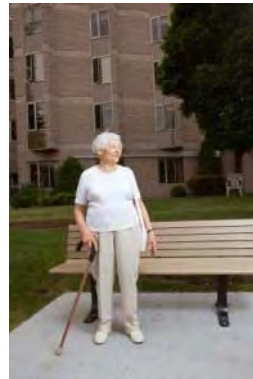


Image Source: Thinkstock

State of Practice/Innovation Scan; and Assessment of Relevant Research

- State of the practice in accessible transportation and other fields addressing:



- Accessible applications and systems for travelers with disabilities, wounded warriors and older Americans
- Innovative concepts assessment
- Virtual caregivers and coaches
- Personal mobility vehicle (automation needs)
- Accessible travel information and data needs
- Scan on new technology solutions in other domains and industries

Next Steps...

- Stakeholder Engagement and User Needs Identification
 - Workshops
 - Surveys
 - Interviews/listening sessions

- Contact:

Mohammed Yousuf

mohammed.yousuf@dot.gov

202 493 3199



Image Source: Thinkstock/USDOT