## Navigating Adobe Connect

### Shortcuts for navigating pods, menus, and windows

<table>
<thead>
<tr>
<th>Result</th>
<th>Windows</th>
<th>Mac OS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toggle between notification window and meeting room</td>
<td>F8</td>
<td>F8</td>
</tr>
<tr>
<td>Display application menu bar for keyboard navigation</td>
<td>Ctrl+Space</td>
<td>Command+F2</td>
</tr>
<tr>
<td>Move focus to next / previous pod</td>
<td>Ctrl+F6 / Ctrl+Shift+F6</td>
<td>Command+F6 / Command+Shift+F6</td>
</tr>
<tr>
<td>Display pod menu for keyboard navigation</td>
<td>Ctrl+F8</td>
<td>Command+F8</td>
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Introductions

Kunik Lee, PhD
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Ken Wood
NIDILRR
Program Specialist and Manager, Switzer Research Fellowship Program

Aaron Steinfeld, PhD
Associate Research Professor
Robotics Institute, Carnegie Mellon University
Agenda

• Welcome and Introductions
  □ Kunik Lee (FHWA)

• ATTRI Program Overview and Status
  □ Mohammed Yousuf (FHWA)

• Introduction to the ATTRI Technology Scan Task
  □ Ken Wood, ATTRI Team (NIDILRR)

• ATTRI Technology Scan Findings
  □ Aaron Steinfeld (Carnegie Mellon University)

• Q&A
  □ Kunik Lee (FHWA)
Webinar Purpose:

- Inform stakeholders on the progress of the ATTRI program
- Share the results of the ATTRI’s program:
  - State of Practice Scan,
  - Innovation Scan, and
  - Assessment of Relevant Research Reports
- Present specific examples from accessible transportation or related fields of how the relevant methods, practices and technologies can meet the needs of transportation users of all abilities
- Provide recommendations regarding key opportunities on emerging technologies relative to accessible transportation
- Engage stakeholders
Mohammed Yousuf
ATTRI Program Manager
Office of Operations and Research Development, Federal Highway Administration (FHWA)
Accessible Transportation Technologies Research Initiative (ATTRI)

- A U.S. DOT Multi-Year, Multimodal, Multi-Agency Research and Development Effort
- Identifying user needs of travelers with disabilities to develop new transformative applications to increase personal mobility
- Building collaborative research and deployment partnerships with other US and International research communities, both public and private
- Unique opportunity to develop and deploy novel applications for accessible transportation and extend those benefits to all travelers
The Challenge

- 56.7 million; 19% US population
- Unemployment Rate – 13.2%; Income: $38,400 ($61,000)
- Poverty: 24.7% (9.0%)

- 21.4 million Americas are Veterans
- 2.6 million deployed in 2012, 45% of eligible Veterans file claims for disability
- Spending: $0.93 billion (2006) vs. $5.95 billion (2012)

- Disability rates rise as people get older
- 43.1 million age 65 + in 2012 or 1 in 7 people
- 28% live alone
- Expected to reach 72.1 million by 2030

• WHO estimates that more than One Billion people in the world live with some form of disability
• The global GDP lost annually due to disability is estimated to be $1.37 trillion to $1.94 trillion
• Australian study: reducing the gap in workforce participation by 1/3 would result in a $43 billion increase in GDP over 10 years
Challenges & Opportunities

- 76% people with disabilities say adequate transportation is important to their job search
- 29% consider it a significant problem in accessing jobs

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<th>Veterans with Disabilities</th>
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<td>Types of Disabilities</td>
<td>Vision</td>
<td>Mobility</td>
<td>Hearing</td>
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<tr>
<td>Enabling Technologies</td>
<td>ITS, Wireless &amp; Sensors</td>
<td>Connected Vehicles</td>
<td>Automated Vehicles/ Personal Mobility</td>
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ATTRI Technology Research Areas

Wayfinding & Navigation Solutions
- Indoor/Outdoor navigation & orientation Apps
- Situational awareness and text recognition devices

ITS & Assistive Technologies
- Travel and emergency announcements with captioning and haptic/flashing alerts
- V2V, V2I and V2P apps for pedestrians

Automation & Robotics
- Personal mobility vehicles for first/last mile connections
- Virtual caregivers/concierge services with machine vision/AI, V2X

Data Integration
- Accessibility data and information systems
- Interoperability and data needs

Enhanced Human Services Transportation
- Real-time multimodal trip planning & services
- Inclusive one-fare payment application for all travelers
Strong Partnerships

Federal Partners
- NIDILRR
- US ARMY-TARDEC
- ICDR
- White House
- Access Board
- DOL-ODEP
- DHHS-ACL
- VA
- NASA
- NRI

U.S. DOT Research
- FHWA
- FTA
- ITS JPO
- OST

Research Institutions
- CMU – Robotics
- GA Tech – Apps for Older Adults
- CCNY, Auburn, TRX – EAR Program

International Collaboration
- Accessible Transportation Trilat SG
- E.U. City Mobil2
- Japan MLIT/SIP Tokyo 2020 Olympics

Private Industry
- General Motors
- Toyota
- IBM
- Qualcomm
- Intel
- Singapore GreenMan Plus
Standard Accessible Data Platform
• Data standardization and interoperability is critical in developing applications which aspire to enhance the personal mobility of those with the greatest needs.

Universal Design Standards
• Universal design standards incorporate a philosophy that promotes the applicability of a technical solution to the needs of all user groups.

Integrated Payment
• Interoperable electronic fare payment that can be utilized across various modes of transportation by all travelers including those with disability, at all times, and for multiple consumer purposes.

Leverage Existing Technologies
• Leverage existing technologies, including ITS, on-demand technologies, data standards, innovative smartphone and mobile technology, and transportation and other assistive and enabling technologies.
Developing Accessible Transportation Solutions

Foundational Considerations

- **Standard Accessible Data Platform**
  - Smartphone-based navigation systems for indoor & outdoor use
  - Wearable technologies
  - Community navigators

- **Universal Design Standards**
  - Pre-trip and in-route traveler information
  - Crowd-sourcing
  - Virtual caregiver help for pre-trip planning and on-route support

- **Integrated Payment**
  - Automated Robotic Characterization of Pedestrian Zones
  - Machine and robotic crosswalk assistant
  - Slow-speed automatic vehicles

- **Leverage Existing Technologies**
  - Automated intersection crossing assistance
  - Pedestrians interface with traffic signal and vehicles receive alerts
  - Multiple communication formats (visual, audible, haptic)

- **Smart Wayfinding & Navigation Systems**

- **Pre-Trip Concierge & Virtualization**

- **Shared Use, Automation & Robotics**

- **Safe Intersection Crossing**
Next Steps

- Continue Stakeholder Outreach:
  - ATTRI Session at SxSW 2016
  - ATTRI Session at 2016 Annual International Technology and Persons with Disabilities Conference
  - ATTRI USDOT/Department of Labor Online Dialogues
- Publish User Needs Report and Technology Scan Reports – Early Spring 2016
- Application ConOps and System Requirements Procurements – To be released in Spring 2016
ATTRI is addressing a significant transportation problem in a comprehensive way. The ATTRI Program is positioned to capitalize on potential large-scale opportunities.
Ken Wood
*NIDILRR*
Program Specialist and Manager, Switzer Research Fellowship Program
NIDILRR Partnership

• Joint project in coordination with National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR) within US Department of Heath and Human Services (HHS) and Federal Highway Administration (FHWA)

• NIDILRR Mission:
  □ Generating new knowledge and promoting its effective use in improving the ability of persons with disabilities to perform activities of their choice in the community, and
  □ Expanding society's capacity to provide full opportunities and accommodations for its citizens with disabilities.

• Technology Scan research being conducted by Carnie Mellon and Rehabilitation Engineering Research Center on Accessible Public Transportation (RERC-APT)
The Technology Scans have two purposes:

- Determine the state of the practice and innovations in accessible transportation or related fields.
- Gain a clear understanding of relevant research in the area of accessible transportation and travelers with disabilities to determine how these might impact the development and eventual deployment of ATTRI.

The project was divided into three reports:

- State of the Practice Scan
- Innovation Scan
- Assessment of Relevant Research
State of the Practice Scan

- Identify current practices in accessible transportation, assistive technologies, applications and systems for travelers with disabilities

Innovation Scan

- Identify other research or demonstrations currently being conducted which offer innovation in the field of transportation

Assessment of Relevant Research

- Gain a clear understanding of current relevant research and development activities in the area of accessible transportation and travelers with disabilities to determine how these might impact the development and eventual deployment of ATTRI
The Technology Scans are targeting technologies assisting:

- Persons with disabilities, veterans with disabilities and older adults.
- Vision, Mobility, Hearing, and Cognitive disabilities.
- Across the 5 ATTRI technology areas.

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Aaron Steinfeld
*Carnegie Mellon University*
Robotics Institute

Funded by FWHA via NIDILRR
Rehabilitation Engineering Research Center on Accessible Public Transportation (RERC-APT)
Grant No. HHS 90RE5011-01-00 (formerly ED H133E130004-14)
Technology Inclusion Criteria

• State of the Practice
  - Used commonly around the United States
  - Well established elsewhere

• Innovation Scan
  - Novel and limited public use in United States
  - Novel technologies from elsewhere

• Assessment of Relevant Research
  - Technology research projects
  - Early pilot testing
ATTRI Technology Research Areas

- Wayfinding and Navigation
- Assistive Technologies
- Automation and Robotics
- Data Integration
- Enhanced Human Service Transportation

- All transportation modes
  - Emphasis on travel within community
  - Daily life

- Each document has numerous examples of technologies
  - Three examples in this talk
State of the Practice: Coordinated Fare Systems

- **Enhanced Human Service Transportation**

- Regional smartcards
  - Multi-modal fare payment (e.g., San Francisco Bay Clipper Card)
  - Support for other purchases through partnerships (e.g., some university ID cards, Korea T-Money)

- Reduces confusion and effort from multiple cards
  - Multiple balances (Cognition)
  - Selecting (Fine motor control)
  - Determining which card (Vision)
Innovation: Tiramisu Transit

- **Data Integration**
- Crowdsourced real-time accessibility information
- Merges agency-supplied data with transit rider observations
- Current and future travel
- Universal design
  - Supports multiple disabilities
  - People without disabilities contribute most of the data
Assessment of Relevant Research: Driver Interfaces for the Blind

• **Wayfinding & Navigation**

• Vehicle interfaces for blind drivers
  - Converts visual information into other modes
  - Tactile gloves and seat back vibrations

Image source: Virginia Tech
Recommendations for Future ATTRI Work

• *Disclaimers*
  - Based on our technology assessment effort
  - Integrate with needs identified by ATTRI stakeholders
  - Example images are for illustration purposes only and not necessarily the recommended approach
  - Not an endorsement or the official opinion of DOT and other ATTRI government partners
Recommendation: Wayfinding & Navigation (1)

- Integration of Map Data from Various Sources
  - Regular digital map data
  - Methods for easily merging data from other sources
  - Available for third party developers via open data and open service models
  - Improve existing map data, rather than rebuild digital maps
Recommendation: Wayfinding & Navigation (2)

- Infrastructure Descriptions
  - Common encoding methods
  - Sharing gathered details
  - E.g., stairs, sidewalk quality, etc.
  - Data collected in one system is usable by others
  - Design for worldwide scale

Tags

- information=tactile_map
- information=tactile_model
- ramp=yes/no
- tactile_paving=yes/no/...
- traffic_signals:arrow=yes/no
- traffic_signals:minimap=yes/no
- traffic_signals:sound=yes/no/...
- traffic_signals:vibration=yes/no
- traffic_signals:floor_vibration=yes/no
- wheelchair=yes/no/...
- wheelchair:description:en=*  
- blind:description:en=*  
- deaf:description:en=*  

Image source: OpenStreetMap.org
• ATTRE Specific Data
  □ Accessibility details beyond just basic points of interest
  □ E.g., entry door locations, accessible entry, presence of accessible bathroom, etc.
  □ Contact information for venue so users can call ahead if needed

Lighthouse for the Blind and Visually Impaired
Recommendation: ITS & Assistive Technologies (1)

- Modernized Maintenance and Asset Management
  - Apply ITS approaches to AT maintenance and asset management
  - Have the right equipment and assistance at the right time
  - E.g., lift and elevator maintenance, pre-positioning the correct AT equipment during air travel, etc.

Image source: U.S. Department of State
Remote assistance
- Remote control of local AT and infrastructure
- Beyond just voice help calls
- E.g., unlocking gates

Recommendation: ITS & Assistive Technologies (2)

Seoul Metropolitan Subway
• Barrier Traversal
  □ Better AT for crossing curb and sidewalk barriers
  □ Opportunities for collaboration
  □ Veterans Affairs prototype wheelchair that can drive over curbs and single steps
  □ Off road military robots

Image source: Human Engineering Research Laboratories, VA
Recommendation: Automation & Robotics (1)

- Shared Neighborhood Autonomous Vehicles
  - ARIBO and CityMobil2 are good starts
  - More in this space is needed
  - Solutions that do not require a driver’s license are necessary
Recommendation: Automation & Robotics (2)

- Accessible Vehicles
  - Modification is costly and rare
  - New and better vehicle designs
  - Entering and existing shared and autonomous vehicles
  - Transportation network company (TNC) and taxi vehicles
Recommendation: Automation & Robotics (3)

- Look Ahead Functions
  - Predict how path ahead of user will change
  - Navigate by looking more than 5 feet ahead
  - Any travel mode
Recommendation: Data Integration (1)

- Open Data and Open Services
  - Important for accelerating development of novel systems

- Community Generated Data
  - New methods for gathering and distributing data
  - Crowdsourced or from local community
  - Generalizable approaches
Recommendation: Data Integration (2)

- Machine Readable Personal Information
  - User preferences on how service and technology used
  - Support flexible preferences
  - Preserve privacy

- Service Matchmaking
  - Methods for finding the right options for specific users
  - E.g., senior discounts, military transportation, etc.
• TNCs and Ridesharing
  □ Improvements on providing travel independence
  □ Ensure equal access for stakeholders
  □ Prevent service-related barriers
  □ Likely a mix of technology and service design
• Mode Shifting
  □ Seniors will increasingly be transitioning out of driving
  □ Coach users in unfamiliar transportation settings
  □ Inform users of options in easy to understand ways
  □ Guardian angel to detect and warn before a mistake
  □ Caregiver tools for remote support
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Thank You!

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