ACCESSIBLE TRANSPORTATION TECHNOLOGIES RESEARCH INITIATIVE

SxSW 2016

Mohammed Yousuf, FHWA
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U.S. Department of Transportation
Federal Transit Administration

U.S. Department of Transportation
Federal Highway Administration

U.S. Department of Transportation
Office of the Assistant Secretary for Research and Technology

Predicting the Future

"It's tough to make predictions, especially about the future."

~Yogi Berra

Accessible Transportation Technologies Research Initiative (ATTRI)

Persons with Disabilities

Veterans with Disabilities

Older Adults

- 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

Persons with Disabilities

- 56.7 million; 19% US population
- Unemployment Rate – 13.2 %; Income: $38,400 ($61,000)
- Poverty: 24.7% (9.0%)
- Rise in Autism: 1 in 150 (2000) to 1 in 68 (2010)
- Fed expenditures: $226 B (2002); $357 B (2008)

Veterans with Disabilities

- 21.4 million Americas are Veterans
- Disability claims: 104,819 (2006) vs. 634,743 (2012)
- 2.6 million deployed in 2012, 45% of eligible Veterans file claims for disability
- Spending: $0.93 billion (2006) vs. $5.95 billion (2012)

Older Adults

- 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 and Opportunities

- 76% people with disabilities say adequate transportation is important to their job search
- 29% consider it a significant problem in accessing jobs [1]

Targeted Populations

- Persons with Disabilities
- Veterans with Disabilities
- Older Adults

Types of Disabilities

- Vision
- Mobility
- Hearing
- Cognitive

Enabling Technologies

- ITS, Wireless & Sensors
- Connected Vehicles
- Automated Vehicles/ Personal Mobility
- Robotics, Artificial Intelligence
- Accessible Data

ATTRI Technology Research Areas

Wayfinding & Navigation Solutions

- Indoor/Outdoor navigation and 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

Documenting User Needs

Top Identified Barriers	**75** Lack of / or inaccessible signage/ maps/ landmark identifiers/ announcements	**71** Navigation difficulties (do not know when arrive, transfer time, distance)	**67** Inconsistent accessible pathway infrastructure
Top Identified User Needs	**102** Amenity information (e.g. restroom, shelter)	**88** Real-time transportation information	**76** Safety, security and emergency information
Top Identified Issues with Technology	**46%** Training to use and awareness of new technology	**21%** Affordability	**16%** Performance quality (especially long-distance travel, rural areas)

User Needs Final Report Due: Spring 2016

Technology Recommendations

Wayfinding & Navigation Solutions

- Focus on integration of map data and standardized infrastructure descriptions from various sources
- New data unique and specific to ATTRI users should be developed

ITS & Assistive Technologies

- Focus on remote assistance for stakeholders and opportunities to inform and aid barrier traversal
- Modernizing assistive technology maintenance and asset management (area for advanced research)

Automation & Robotics

- Shared neighborhood autonomous vehicles which are cost effective and aid at traversing distances between transit stops, homes, and places of employment.
- Assist service models, electric vehicles, and autonomous vehicles create opportunities for novel accessible designs

Data Integration

- Reduce complexity and identify coordination in service matchmaking through open data and services
- Develop environment for community generated data

Enhanced Human Services Transportation

- Support initiatives by ridersharing services to involve ATTRI stakeholders and develop accessible versions of these services.
- Support mode shift through private on-demand ride services

Technology Scan Final Reports: Due Spring 2016

Request for Information (RFI)

- To gain insight on technology applications and obtain informed views to document opportunities and challenges to technology development was published on Feb 19, 2015.
- USDOT received 20 responses.

- **Key Takeaways**
  - Technology areas rely on one another
  - Proposed technology solutions can benefit multiple user groups
  - Technology solutions vary greatly in size, scope, and complexity
  - More foundational research is necessary to advance proposed solutions
  - Integrated technology solutions are necessary to match the diverse needs of all travelers to be affective

Wayfinding & Navigation

Data Integration

Automation & Robotics

ITS & Assistive Technologies

Enhanced Human Service Transportation

Foundational Considerations

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.

Application Development

Foundational Considerations

- Standard Accessible Data Platform
- Universal Design Standards
- Integrated Payment
- Leverage Existing Technologies

•Smart Wayfinding & Navigation Systems

- Wayfinding and navigation systems for indoor and outdoor use
- Wearable technologies
- Community navigators

•Pre-Trip Concierge & Virtualization

- Pre-trip and in-route traveler information
- Connected travelers
- Virtual caregiver help for pre-trip planning an on route support

•Shared Use, Automation & Robotics

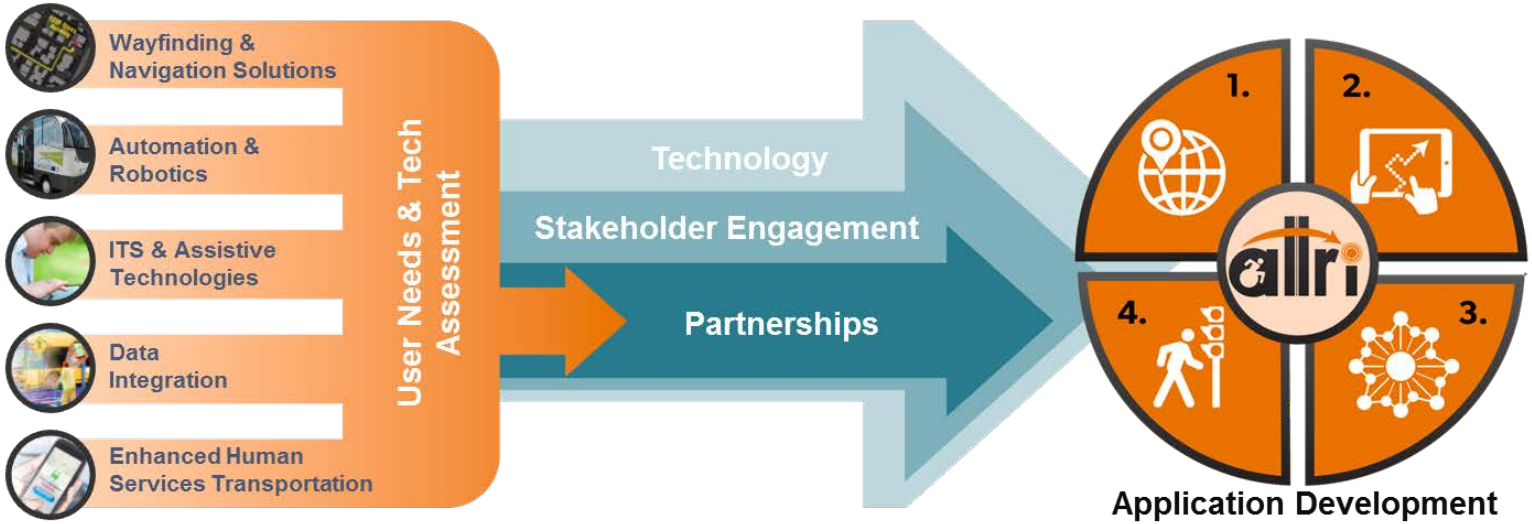
- Assistive and collaborative robotics to enhance mobility
- Ability to plan and execute trips, associated services
- Transformative transportation alternatives

•Safe Intersection Crossing

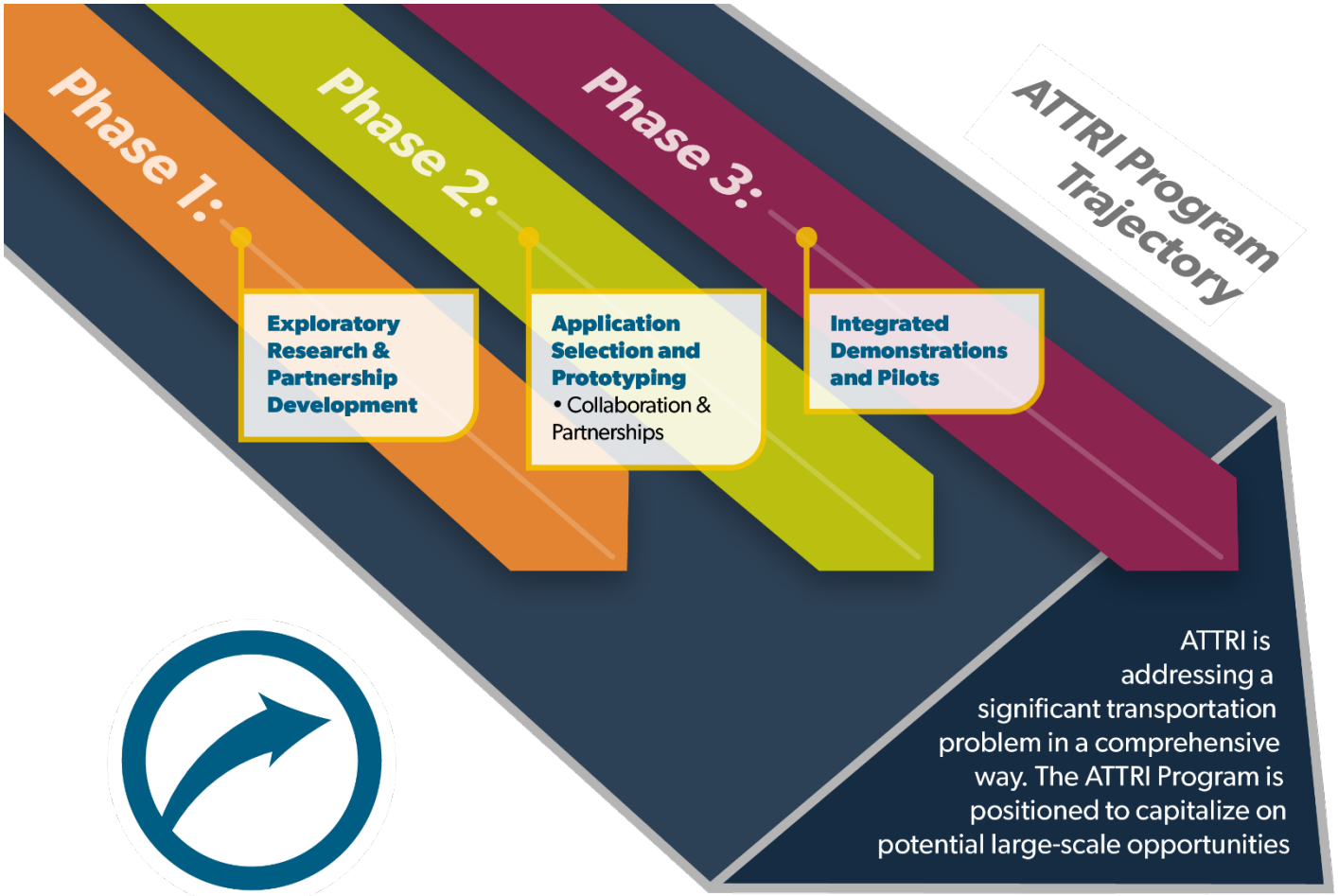
- Intersection crossing assistance for all travelers
- Pedestrians interface with traffic signals, vehicles and nomadic devices
- Guidance, notifications and alerts for optimization

Next Steps

- Continue Stakeholder Outreach:
  - ATTRI Session at SxSW 2016
  - ATTRI Session at 2016 Annual International Technology and Persons with Disabilities Conference (CSUN)
- Publish User Needs Report and Technology Scan Reports – Spring 2016
- Application ConOps and System Requirements Procurements – Spring 2016



ATTRI Program Trajectory

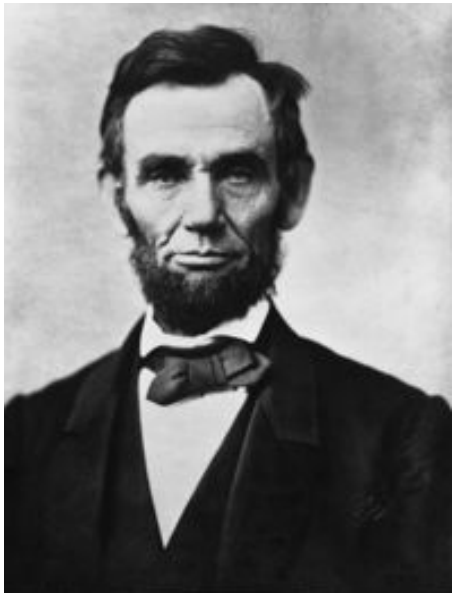


Be on the lookout!

- Spring 2016 Procurements
  - Application Development in 4 focus areas:
    - Smart Wayfinding & Navigation Systems
    - Pre-Trip Concierge & Virtualization Technologies
    - Shared Use, Automation & Robotics
    - Safe Intersection Crossings

- Sign up for the newsletter!
  - ATTRI Newsletter distribution for stakeholders
  - ATTRI updates and latest news
  - Please hand us your business card to be added to the ATTRI mailing list

Impact your Future



"The best way to predict your future is to create it."

~Abraham Lincoln

Thank You!

Mohammed Yousuf
ATTRI Program Manager
Federal Highway Administration
Mohammed.Yousuf@dot.gov

Bob Sheehan
Transit Program Manger
ITS Joint Program Office
Robert.Sheehan@dot.gov

Jeff Spencer
ITS Program Manager
Federal Transit Administration
Jeffrey.Spencer@dot.gov