First/Last Mile Research at USDOT

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U.S. Department of Transportation

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Overview

- Automation Program Tracks
- Accessible Transportation Technologies Research Initiative (ATTRI)
- Research Highlights

USDOT Automation Program

Enabling Technologies

- Digital Infrastructure
- Communications
- Technology Research

Safety Assurance

- Electronic Control Systems
- Software Assurance & Reliability
- Cybersecurity
- Human Factors

Application Development

- CACC, Speed Harmonization, and Platooning
- Lateral Control
- First/Last Mile and Transit Operations

Testing and Evaluation

- Interoperability
- Testing Methods
- Benefits Assessment

Policy and Planning

- Standards
- Analysis & Federal Role
- Program Mgmt & Outreach
- Transportation Planning

SAFETY, MOBILITY, & ENVIRONMENTAL BENEFITS AHEAD

Accessible Transportation Technologies Research Initiative (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.

ATTRI Goals

Goal 1: Identify Stakeholders and Address User Needs

Goal 2: Harness technological innovation for accessible transportation

Goal 3: Improve transportation systems integration

Goal 4 : Coordinate with Key Partners

Image Source: Thinkstock/USDOT

ATTRI Concept: Integrated System

Image Source: Thinkstock/USDOT

ATTRI Phases

PHASE 1

Exploratory & User Needs Research

FY2012-14

- Collaboration Building
- Stakeholder Engagement and User Needs Assessment
- State of the Practice/ Innovation Scan
- Strategic Plan and Roadmap

PHASE 2

Innovation & Prototyping

FY2015-17

- Institutional and Policy Issues Assessment
- International Research Coordination
- ATTRI Social-economic Impact
- Standard Development & Harmonization
- ATTRI Effects on Non-User
- Accessible Transportation Applications ConOps & SyRS
- Prototyping

PHASE 3

Demonstration

FY2018-19

- ATTRI Joint Demonstrations
- Joint Demonstration Evaluations
- Deployment Guidance

Image Source: Thinkstock/USDOT

ATTRI Phase 1

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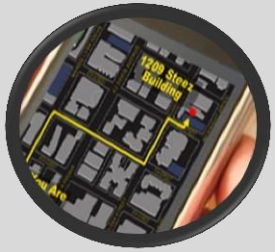
Image Source: Thinkstock/USDOT

Potential Technology Solutions

Wayfinding & Navigation Solutions



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

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
- 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

Image Source: Thinkstock/USDOT

ATTRI Phase 2

PHASE 1

Exploratory & User Needs Research

FY2012-14

- Collaboration Building
- Stakeholder Engagement and User Needs Assessment
- State of the Practice/ Innovation Scan
- Strategic Plan and Roadmap

PHASE 2

Innovation & Prototyping

FY2015-17

- **Accessible Transportation Applications Selection**
- **Institutional and Policy Issues Assessment**
- **International Research Coordination**
- **ATTRI Social-economic Impact**
- **Standard Development & Harmonization**
- **ATTRI Effects on Non-User**
- **ConOps & SyRS**
- **Prototyping**

PHASE 3

Demonstration

FY2018-19

- ATTRI Joint Demonstrations
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Image Source: Thinkstock/USDOT

Current Research Highlight

Extended Event Horizon Navigation and Wayfinding for Blind and Visually Impaired Pedestrians in Unstructured Environments	
Lead Agency	Federal Highway Administration
Summary	Three exploratory research and development projects for indoor and outdoor navigation by visually impaired users • Auburn University • City College of New York • TRX Systems, Inc
Objectives	Explore and develop situation awareness and assistive navigation technologies to provide blind or visually impaired persons with obstacle avoidance and intelligent wayfinding capabilities in indoor and outdoor environments.
Deliverables	• Concept of Operations (ConOps), data needs, and market analysis. • Prototype

Upcoming Research Highlight

First Mile/Last Mile Mobility – Concept Development	
Lead Agency	Federal Highway Administration
Summary	This Phase I project will develop the foundational research and concept development for first/mile last mile mobility. The vision for these applications includes travelers with and without disabilities including those with mobility, hearing, vision and cognitive disabilities, and the ability to accommodate their needs (wheelchairs, strollers, ICT, etc.).
Objectives	Advance applications to enable small personal mobility vehicles to transport one or more travelers in the neighborhood to the main public transportation or other hubs.
Deliverables	• Literature review • Evaluation of existing systems, algorithms and other foundational knowledge • Concept development

Thank you!

The Challenge

Persons with Disabilities

- 56.7 million; 19% US population [1]
- Unemployment Rate – 13.2 %; [5] Income: $38,400 ($61,000) [7]
- Poverty: 24.7% (9.0%) [7]
- Rise in Autism: 1 in 150 (2000) to 1 in 68 (2010) [9]
- Fed expenditures: $226 B (2002); $357 B (2008) [8]

Veterans with Disabilities

- 21.4 million Americas are Veterans [2]
- Disability claims: 104,819 (2006) vs. 634,743 (2012)
- 2.6 million deployed; one third report a disability [3]
- 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 [4]
- 28% live alone [4]
- Expected to reach 72 million by 2030 [6]

- WHO estimates that more than One Billion people in the world live with some form of disability [10]
- The global GDP lost annually due to disability is estimated to be **$1.37 trillion** to **$1.94 trillion** [11]
- Australian study: reducing the gap in workforce participation by **1/3** would result in a **$43 billion** increase in GDP over **10 years**[12]

Accessible Transportation Technologies Research Initiative (ATTRI)

- A U.S. DOT Multimodal Research and Development Effort
  - ATTRI is identifying user needs of travelers with disabilities to develop new transformative applications to increase their mobility
  - ATTRI is building strong partnerships with US and International research communities
  - ATTRI has a unique opportunity to develop and deploy novel applications for accessible transportation
  - ATTRI continues to seek new opportunities to leverage technology deployment and resources
- Accessibility Benefits that Would Extend to All Travelers

The Role of Transportation

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