



Accessible Transportation Technologies Research Initiative (ATTRI)

TECHNOLOGY AREAS

**NASA COLLABORATION
BRIEFING MATERIALS
JUNE 2015**



Accessible Transportation
Technologies Research Initiative (ATTRI)
Spring 2015



Technology Area: ITS & Assistive Technology

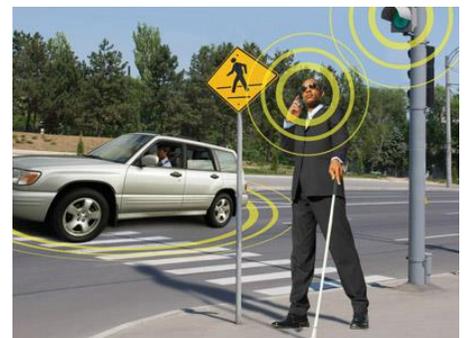
Description. The Intelligent Transportation Systems (ITS) and assistive technology area uses a broad range of wireless and sensor-based communications and information technology. Assistive technology combines:

- Smart, accessible, assistive, and adaptive devices that help with transportation and daily living activities, and
- Wearable, portable or carry-on devices

Together, these technologies can track the user's movements to map routes in accessible formats based on the travel environment and user profile. The wearable or carry-on technology can "sense" the environment such as sidewalk obstacles and traffic conditions at street crossings using ITS infrastructure and sensors.

Examples. ITS and assistive technology examples include:

- Wearable technology that would allow smartphones, watches, wrist bands, glasses, clothing to interface with vehicles, infrastructure, and pedestrians using Dedicated Short Range Communication (DSRC) or other communication technologies to provide connectivity of:
 - Vehicle to vehicle (V2V),
 - Vehicle to infrastructure (V2I), and
 - Vehicle to pedestrian (V2P)
 - Internet of Things (IoT)





Technology Area: Automation and Robotics

Description. Automation and robotic technologies are expected to improve mobility for those unable to drive or who choose not to drive. Automation and robotic technologies may use machine vision, Artificial Intelligence (AI), assistive robots and facial recognition software.

Assistive and collaborative robots are expected to be used in a variety of ways to assist travelers with disabilities. When used in tandem, they would not only assist with activities in daily life such as walking, but also work with individual travelers and human transportation services to provide related services at different stages of the travel and locations such as transit facilities, airports and railway stations.

Examples. Automation and robotic examples include:

- Vehicle automation technology to solve first mile/last mile mobility issues and to provide connections for all travelers to existing public transportation or other transportation hubs.
- Virtual caregivers/ concierge services to provide connectivity throughout travel and assist in travel decision making such as getting off at a desired bus stop.





Technology Area: Data Integration

Description. Data integration technology works by integrating user profile information with service/infrastructure information. The technology area has two main aspects:

- Information that travelers with disabilities *need*, and
- Information that travelers with disabilities can *provide*.

Travelers with disabilities need in-depth accessibility information about points of interest, infrastructure, facility amenities, and potential obstacles (both dynamic and static), integrated with maps and other information for their intended route and travel plans.

Examples. Data integration technology examples include:

- Pre-trip planning/ booking services that can integrate the user mobility profile with accessibility needs for intended travel and planning
- En-route schedule, dispatch and routing services that can integrate the needs of the traveler with the operation of the transit system(s). The integration technology would allow travelers to know when there are elevator outages at a metro stop or that an exit door is malfunctioning. Travelers can then make other arrangements or know what side of the train to exit while en-route.





Technology Area: Wayfinding and Navigation

Description. The wayfinding and navigation technology area consists of exploration and development of situational awareness and assistive navigation solutions. The technology can provide obstacle avoidance and intelligent wayfinding capabilities in indoor and outdoor environments. These solutions assist with waypoint navigation, path planning, and advanced warning of events by using Global Positioning System (GPS), geographic information system, and ITS and Simultaneous Localization and Mapping (SLAM) technologies.



Examples. Wayfinding and navigation examples include:

- Ability to recognize and detect stationary objects (e.g., doors, elevators, stairs, crosswalks, and traffic lights) and communicate just-in time information to the user. Ability to read and construct important text and signage based on a user's query or environment.
- Wearable, such as haptic belt, three-dimensional orientation devices, or pedometers, may be used in conjunction with a wearable device to provide auditory and tactile guidance for wayfinding and navigation.





Technology Area: Enhanced Human Service Transportation

Description. The enhanced human service transportation technology area focuses on real-time, multimodal trip and services planning and traveler decision support applications. The technologies assist travelers with disabilities in finding and choosing accessible transportation solutions that best meet their traveler needs. These solutions create multimodal trip options based on origin and destination types.

Examples. Enhanced human service transportation examples include:

- Integrated payment system where travelers can use the same smart card or mobile app to pay for various types of transportation, mobility options, and parking.
- Applications that link paratransit, demand-response transportation, and fixed-route transit in order to increase flexibility and options of travelers with disabilities







Notes



