



ACCESSIBLE TRANSPORTATION TECHNOLOGIES
RESEARCH INITIATIVE



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



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



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

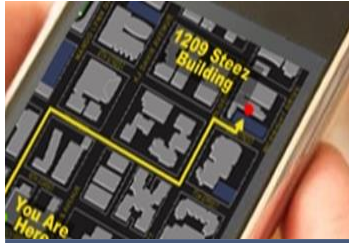
Connected
Vehicles

Automated
Vehicles/ Personal
Mobility

Robotics,
Artificial
Intelligence

Accessible
Data

ATTRI Technology Research Areas



Wayfinding & Navigation Solutions

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



Enhanced Human Services Transportation

- Real-time multimodal trip planning & services
- Inclusive one-fare payment application for all travelers
- Paratransit to Fixed-route



Data Integration

- Accessibility data and information systems
- Interoperability and data needs



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

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
- MIT-Singapore (SMART)

International Collaboration

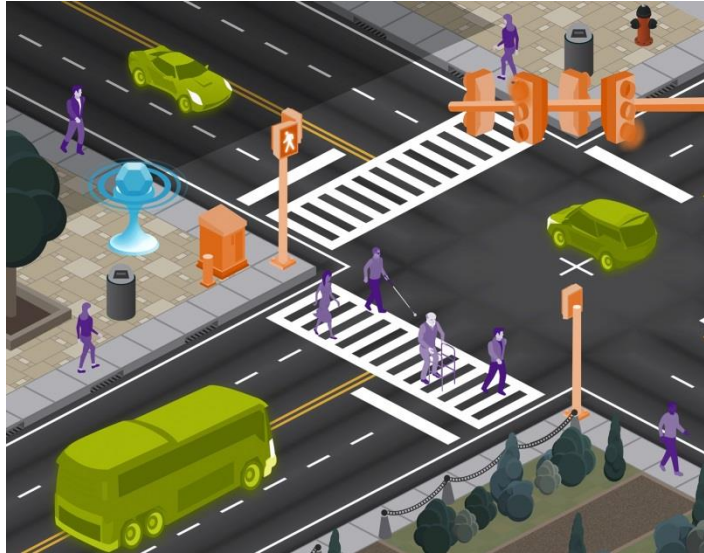
- Accessible Transportation Trilat SG
- E.U. City Mobil2
- Japan MLIT/SIP Tokyo 2020 Olympics

Private Industry

- General Motors
- Toyota
- IBM
- Qualcomm
- Intel
- Singapore GreenMan Plus



ATTRI Foundational Considerations



Standard Accessible Data Platform

- *Examples:* machine to machine, crowdsourced, archived and real time data, open data, user profiles, sensors, data standards, etc...

Universal Design Standards

- Multiple accessible communication formats and user interfaces

Integrated Payment

Leverage Existing Technologies

- Wearables, mobiles devices, in-vehicle displays, infrastructure, etc...



Application Workshop Polling Results

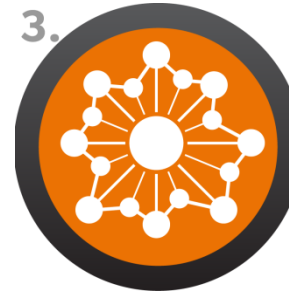
We asked: *Which application do you rank with the highest priority?*



**Smart
Wayfinding
& Navigation
Systems**



**Pre-Trip
Concierge and
Virtualization**



**Shared Use,
Automated
Vehicle**



**Safe
Intersection
Crossing**



Smart Wayfinding & Navigation



- **Navigation Systems**
 - Smartphone-based navigation systems for indoor and outdoor use
 - Beacons or electronic tags to interact with the built environment
 - Multiple communication formats (visual, audible, haptic) including multiple languages
- **Wearable Technologies**
 - Wearable, discreet assistive navigation tools
 - Connect with assistive devices already in use (e.g. white cane)
- **Community Navigators**
 - Use community volunteers to provide data on their neighborhoods.



Pre-Trip Concierge & Virtualization

2.



- **Pre-Trip Concierge**
 - Provide pre-trip and in-route traveler information (crowd sourced)
 - Design for people with blindness, low vision, cognitive and mobility issues
- **Virtualization**
 - Passengers “see” their entire routes on an app with landmarks (to remove fear and facilitate independent mobility)
 - Virtual caregiver helps plan routes and track travelers movement

3.



- **Robo-Ped** - Automated Robotic Characterization of Pedestrian Zones
 - Crowdsourced/Fleet, networked, real-time
 - Provides Market Intelligence
 - Smartphone / Mobile App
- **RoboScout** – Machine and robotic cross-walk assistant
 - Leverages existing ITS and V2I technologies
 - Safe and Connected
 - Link to fare media
- **RoboSAV** - Slow-speed Automated Vehicle Connectivity
 - Provides autonomous assistance to destination in constrained environment
 - Demand Responsive, Real-time, Ridesharing

4.



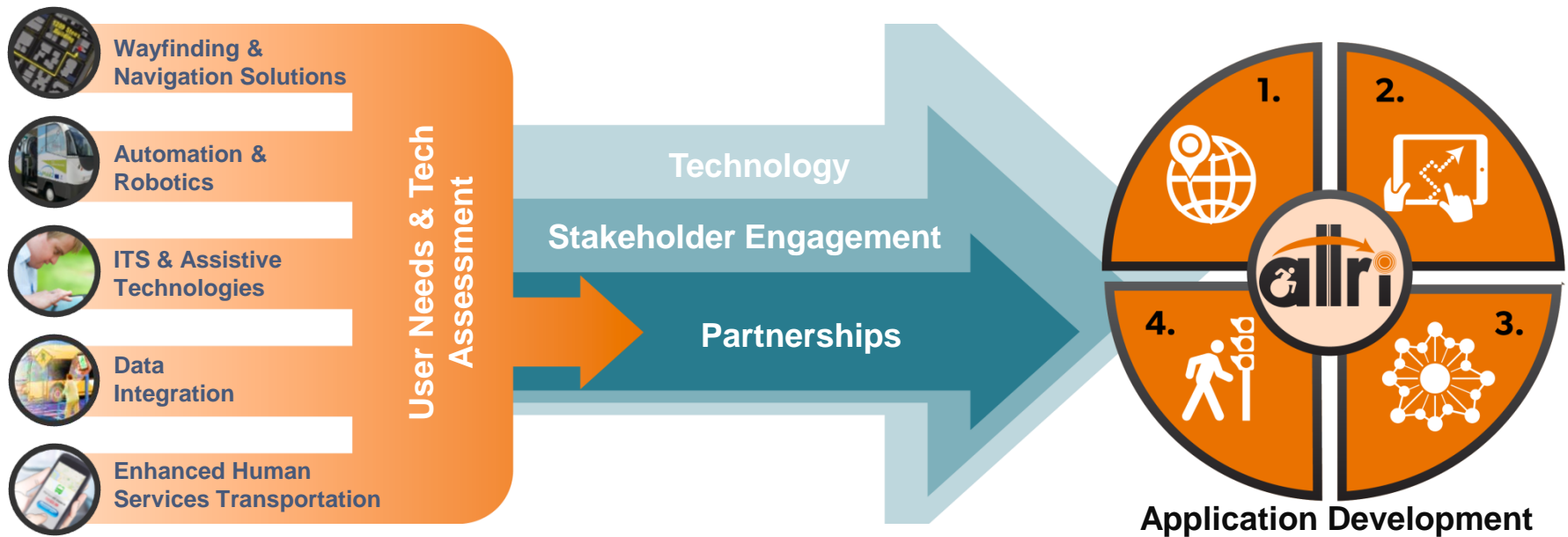
- **Safe Intersection**

- Pedestrians interface with traffic signal and vehicles receive alerts
- Automated intersection crossing assistance
- Design for people with blindness, low vision, cognitive and mobility issues
- Beacons or electronic tags to interact with the built environment
- Multiple communication formats (visual, audible, haptic) including multiple languages

Application Development Needs Partnership

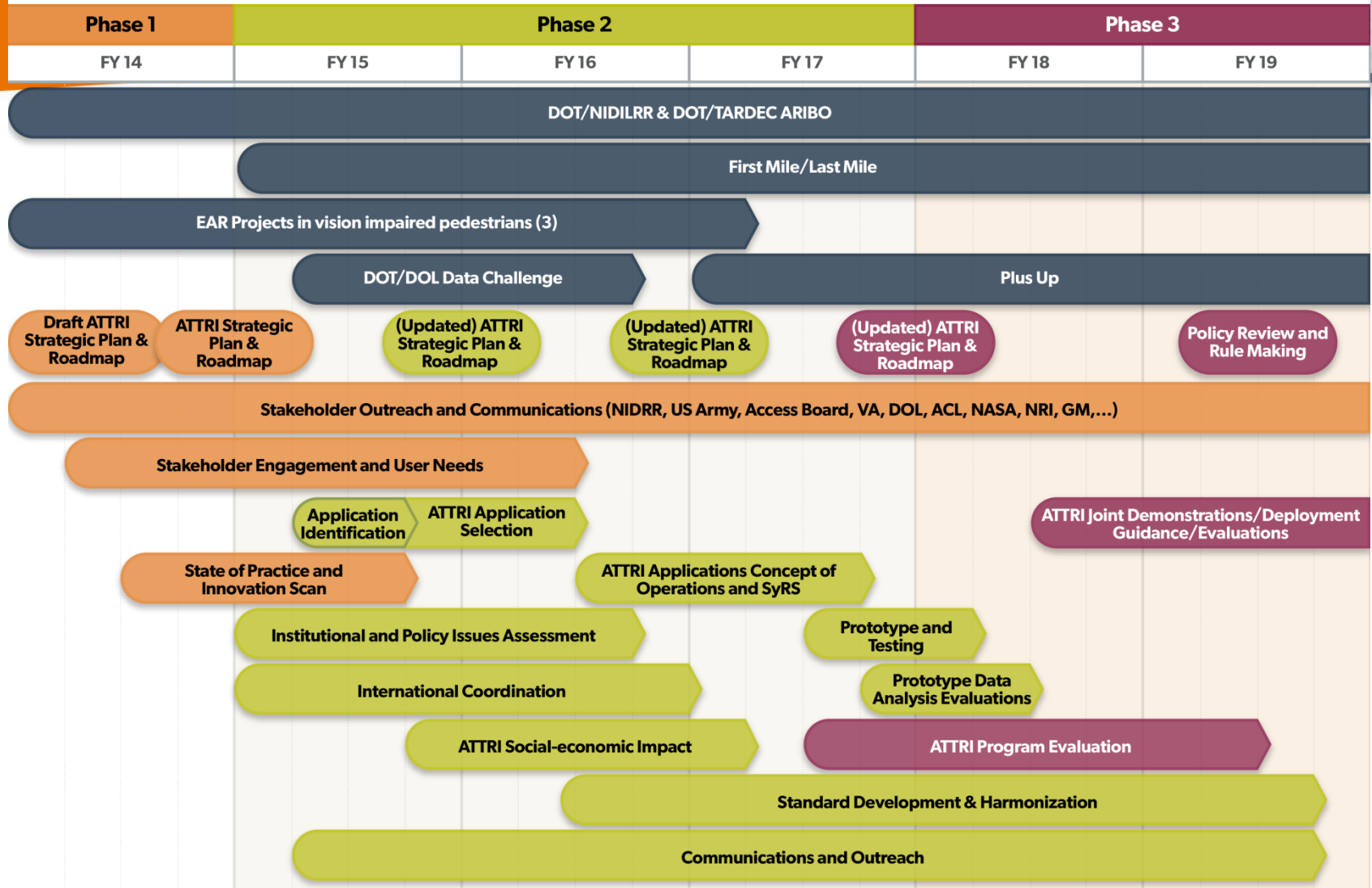


- Transportation is a complex challenge that affects all aspects of life, including health, education, recreation, and social and economic activities
- A need for multi-agency cooperation and coordination leveraging resources to address challenges in a comprehensive way
- ATTRI is expanding beyond a single-agency approach to help solve mobility challenges, partnerships are necessary!

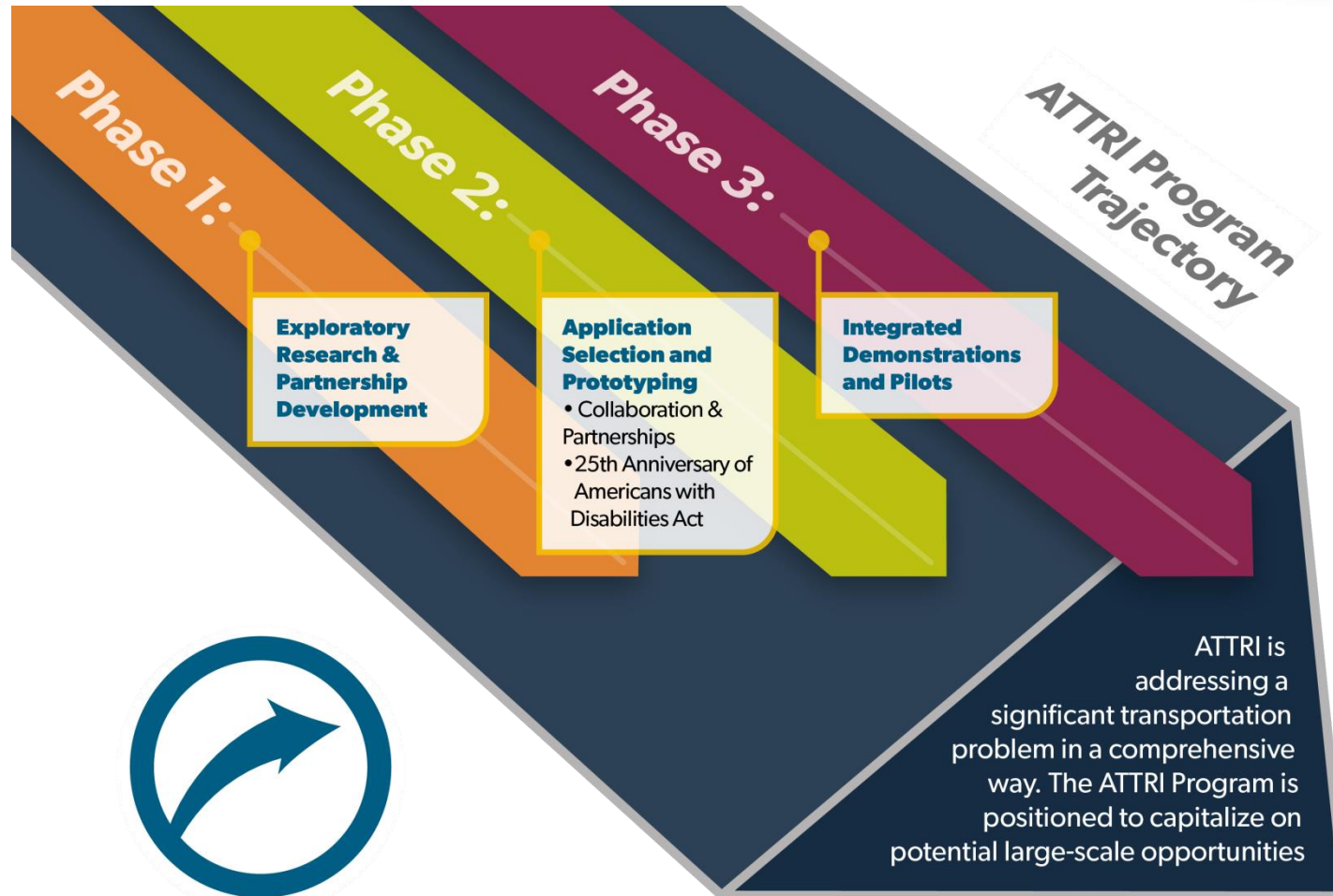


Technical Support Services

Legend: ■ Phase 1 ■ Phase 2 ■ Phase 3 ■ Collaborative Efforts



ATTRI Program Trajectory



Thank You!



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