“Mobility is the great equalizer of the 21st century.”

– Mayor Andrew J. Ginther
To empower our residents to live their best lives through responsive, innovative and safe mobility solutions.
MISSION

To demonstrate how an intelligent transportation system and equitable access to transportation can have positive impacts on every day challenges faced by cities.
What is SMART COLUMBUS?

Where we ARE NOW

What IS NEXT

How to GET INVOLVED
What is SMART COLUMBUS?
SMART CITY CHALLENGE PROJECTS
ENABLING TECHNOLOGIES
- CONNECTED VEHICLE ENVIRONMENT

ENHANCED HUMAN SERVICES
- MULTIMODAL TRIP PLANNING/COMMON PAYMENT SYSTEM
- SMART MOBILITY HUBS
- MOBILITY ASSISTANCE
- PRENATAL TRIP ASSISTANCE
- EVENT PARKING MANAGEMENT

EMERGING TECHNOLOGIES
- CONNECTED ELECTRIC AUTONOMOUS VEHICLES
- TRUCK PLATOONING
**OPERATING SYSTEM BIG PICTURE**

**Data Inputs**
- Workers
- Citizens
- Public & Private Systems
- Devices & Things

**Data Capture & Analysis**
- Data Scientist & Researchers

**Data Consumption**
- Public
- Entrepreneur
- Universities
- Commercial Partners
- City
- USDOT
- Independent Evaluators

Application hosting and connectors to other systems
A SYSTEM OF SYSTEMS

CONSUMERS/PROVIDERS
- Government Entities
- COTA
- Financial Gateway
- Mobility Providers
- Insurance/Medicaid

OPERATING SYSTEM
- Electric Vehicle Charging
- Smart Mobility Hubs
- Roadside Units

SMART INFRASTRUCTURE

SMART VEHICLES

SMART APPS

People with Cognitive Disabilities
Multimodal Travelers
Prenatal Travelers
Travelers

System of interest
Connected Vehicle Environment

- Wireless Connectivity between Vehicles and Vehicle to Infrastructure
  - High-Speed
  - Low-Latency
  - Secure
  - Interoperable
- Integration with the Operating System for Performance Monitoring
Connected Vehicle Environment

• Objectives
  • Improve vehicle operator safety
  • Improve intersection safety
  • Reduce speeds in school zones
  • Improve reliability of transit vehicle schedule adherence
  • Improve emergency response times
  • Reduce truck wait (delay) time at signalized intersections
  • Increase number of truck turns per day
  • Improve traffic management capability
  • Improve transit management capability
Connected Vehicle Data

- Number of vehicle participants installing the technology
- Number of interactions between equipped vehicles and infrastructure
- On-time performance (Transit)
- Running time (Transit)
- Headway reliability (Transit)
- Emergency response times (Police/Fire)
- Travel time through intersection (Freight)
- Number of daily truck turns (Freight)
- Driver behavior change in the corridor (All)
- Customer Satisfaction
MULTIMODAL TRIP PLANNING APPLICATION/COMMON PAYMENT SYSTEM
GEOGRAPHIC SCOPE

• Central Ohio Transit Authority (COTA) service area

• Outlying communities serviced by Mobility Providers
WHAT ‘MAAS’ MEANS FOR COLUMBUS
Gaps in existing system

• Disintegrated mobile apps require travelers to download and install multiple apps and register multiple payment media to plan and pay for multimodal trips
• Lack of a comprehensive platform to plan, book, and pay for multimodal transportation
• City agencies don’t control the trip data, and face obstacles when requesting trip data from Mobility Providers
• Trips are not being optimized for ridesharing
• Unbanked users must rely on cash for transportation options
• Lack of incentives for Mobility Providers and Travelers
CHALLENGES OF IMPLEMENTATION

- Adoption of the application
- Car centric community
- Mode Shift
Smart Mobility Hubs

- Central location to access multiple forms of transportation
- Located in areas where jobs, shopping and public services are concentrated
- Decreased dependence on the private automobile
- Reduced traffic congestion
- Ability to connect more customers with the first and last leg of their trip, providing
- “first-last mile” solutions
Smart Mobility Hubs

- Locations
  - Columbus State Community College
  - Linden Transit Center
  - St. Stephen’s Community House
  - Columbus Public Library – Linden Branch
  - Northern Lights Transit Center
  - Easton Transit Center
Smart Mobility Hubs

- Transit
- Car share
- EV charging
- Bike share/Bike Racks
- Kiosks
- Wi-Fi

SANDAG Concept, San Diego, CA
MOBILITY ASSISTANCE FOR PEOPLE WITH COGNITIVE DISABILITIES
Mobility Assistance

• The Americans with Disabilities Act defines a person with a disability as a person who has a physical or cognitive impairment that substantially limits one or more major life activities

• Cognitive Disabilities include:
  • Autism
  • Down Syndrome
  • Traumatic Brain Injury
  • Dementia
  • Attention Deficit Disorder (ADD)
  • Dyslexia
  • Dyscalculia (difficulty with math)
  • Learning disabilities
Mobility Assistance

• Current Problem
  • People with cognitive disabilities who wish to independently use public transportation must either qualify for paratransit services in accordance with the ADA, or be sufficiently independent to safely use fixed-route bus service.

  • The cost of providing paratransit service continues to grow.
    • COTA has average fixed-route trip cost of $6.18. An average paratransit trip is $35.86.
    • COTA offers free bus fares to paratransit customers as an incentive to use the fixed-route service.
    • Paratransit ridership has remained relatively unchanged despite the free bus fare incentive, at approximately 278,000 trips per year.
Mobility Assistance

• Objectives
  • Move certain paratransit riders to fixed route bus service
  • Improve independence of travelers moving from paratransit to fixed route service
  • Reduce COTA expenditures

• Solution
  • Accessible, smartphone-based application for both Android and IOS environments
  • Voice and/or precise turn-by-turn instructions
  • Ability to monitor users throughout the trip and signal when they are off course
  • Ability to speak with caregiver, if needed
PRENATAL TRIP ASSISTANCE
Prenatal Trip Assistance

- From 2012-2017 the infant mortality rate for Franklin County was 8.3 deaths per 1,000 live births

- From 2012-2017 the infant mortality rate for CelebrateOne neighborhoods was 12 deaths per 1,000 live births
Pilot Goal

Increase prenatal trips to the doctor for women living in these CelebrateOne target zip codes, where Franklin County infant mortality rates are highest.
Gaps in the existing system

• Trip scheduling available only through call center
• Limited availability of on-demand transportation
• Real-time trip optimization is not available today
• Lack of communication between parties
• Language barriers
• “B-trip” (return) timeliness
• Driver information is unavailable to the pregnant woman
  – Vehicle
  – Real-time location
• More reliable, immediate feedback options for all parties
• Lack of reliable, consistent data (e.g. driver performance, missed/late trips)
THE VISION

- Pregnant woman sets doctor appointment
- She schedules a trip via call center, smartphone app or website
- Services are available on-demand
- She receives multiple notifications via her preferred communication method
- Notifications via text and email have easy trip confirmation, cancellation or change options
- Driver location is available in real-time before pick-up
- Doctor’s office is notified if the trip is missed or running late
- On-demand return trips can also be set via call, smartphone app or website
- Pregnant woman and driver have feedback options available immediately via app, website or by calling a designated number provided by MCOs
- Driver performance and member usage data is immediately available to MCOs
EVENT PARKING MANAGEMENT
Event Parking Management

- 40,000+ spaces in parking garages
- 4,300 parking meters
- 30,000+ spaces in surface lots (estimated)
- 130 loading zones
Event Parking Management

Objectives

• Safely provide parking availability information to drivers through a mobile and website application

• Increase mobility by reducing parking-related congestion in the area around parking facilities

• Reduce emissions by allowing for more efficient, direct routing to a reserved parking spot

• Integrate with the SCOS as well as MMTPA/CPS
Event Parking Management

Proposed System

- Access to real-time parking availability in garages and lots
- Reservation ability for participating garages and lots
- Access to projected availability for City Meters
- Locational information and restrictions for Loading Zones
TRUCK PLATOONING

• Background
  • Columbus serves as a hub for long-haul trucks
  • Rickenbacker International Airport is 10th most active logistics hub in US
  • Columbus is served by major railroad lines
  • Freight-induced congestion creates significant challenges for the region

• Platooning Technology
  • Uses wireless technology to couple the brake and throttle controls of trucks traveling in convoy on limited access highways
  • Enables trucks to maintain very close following distances, thereby reducing aerodynamic drag and improving fuel economy and emissions
TRUCK PLATOONING

• Objectives
  • Reduce fuel consumption for logistics companies
  • Reduce emissions for logistics companies
  • Enable operational efficiencies for logistics companies
  • Improve freight mobility and operational efficiency along freight intensive corridors
SELF DRIVING VEHICLES

• Address, investigate and develop solutions to the social and technical challenges associated with autonomous vehicles

• Social challenges
  • How to gradually introduce and expand for best results
  • How to develop and improve user acceptance and user benefits
  • How to integrate with the rest of the transportation network for improving mobility
  • How to increase the user perception of safety and reliability

• Technical challenges
  • Determination of penetration rates for improved mobility
  • Mixed traffic problems at higher speed urban roads
  • Autonomous shuttles right of way problems at intersections
  • Pedestrian and bicyclist safety
  • All weather operation of autonomous shuttles
  • Handling uncertainty due to unpredictable operation of non-autonomous vehicles, other road users and environmental conditions
SELF DRIVING VEHICLES

- Release multiple RFPs with varying use cases
- Objectives
  - Establish guidelines for data exchange interface that is interoperable across various deployment locations and vehicle vendors
  - Establish guidelines for procurement, including demonstrated vehicle performance and data sharing requirements
  - Develop a set of automated vehicle operational testing and evaluation guidelines to benchmark AVs
  - Develop a methodology for evaluating the operational safety of the system in various deployment settings
SELF DRIVING VEHICLES

• Use Case #1 - Scioto Mile
  • COSI
  • Bicentennial Park
  • Veterans Memorial
  • Smart Columbus Experience Center

• Data Collected
  • Ridership data
  • Rider satisfaction surveys
  • Vehicle miles/hours traveled
  • Route-trips served
  • Any disengagements or interventions by an operator
  • Any and all data collected by the Selected Proposer must be shared with Smart Columbus
Where we ARE NOW

2
Working toward one innovative, integrated and holistic solution for our city
WHERE WE HAVE BEEN
How to GET INVOLVED
SIGN UP FOR OUR E-NEWSLETTER
Contact: SmartColumbus@columbus.gov

LEARN MORE Columbus.gov/smartcolumbus @SmartCbus
Smart is just the START.