



U.S. Department of Transportation

## COMPLETE TRIP

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ITS4US

The logo for ITS4US, where the number '4' is stylized as a blue and white grid with a yellow dashed line path and red location pins at the top and bottom.

Buffalo, NY

Phase 1 Concept of Operations Webinar

August 4, 2021

# Agenda

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## ■ Purpose of this Webinar

- To share the Concept Development Activities from Buffalo, NY with the stakeholders of the project.

## ■ Webinar Content

- Complete Trip – ITS4US Deployment Program Overview (Elina Zlotchenko).
- Site Orientation & Key Challenges (Jamie Hamann-Burney, Nadine Chalmers).
- Deployment Concept Overview (Deepak Gopalakrishna/Adel Sadek/Polly Okunieff).
- Stakeholder Engagement Efforts (Jamie Hamann-Burney).
- Stakeholder Q&A.
- How to Stay Connected (Elina Zlotchenko).

## ■ Webinar Protocol

- Please mute your phone during the entire webinar.
- You are welcome to ask questions via chatbox at the Q&A Section.
- The webinar recording and the presentation material will be posted on the ITS4US website

# Brief Program Overview

Elina Zlotchenko, ITS JPO/FHWA

# Complete Trip - ITS4US Deployment Program

- A USDOT Multimodal Deployment effort, led by ITSJPO and supported by OST, FHWA and FTA.
- Supports multiple large-scale replicable deployments to address the challenges of planning and executing all segments of a complete trip.



*Vision*

*Innovative and integrated  
**complete trip**  
deployments to support  
seamless travel for all users  
across **all modes**,  
regardless of **location**,  
**income**, or **disability**.*

# Program Goals

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Spur high-impact integrated Complete Trip deployments nationwide



Identify needs and challenges by populations



Develop and deploy mobility solutions that meet user needs

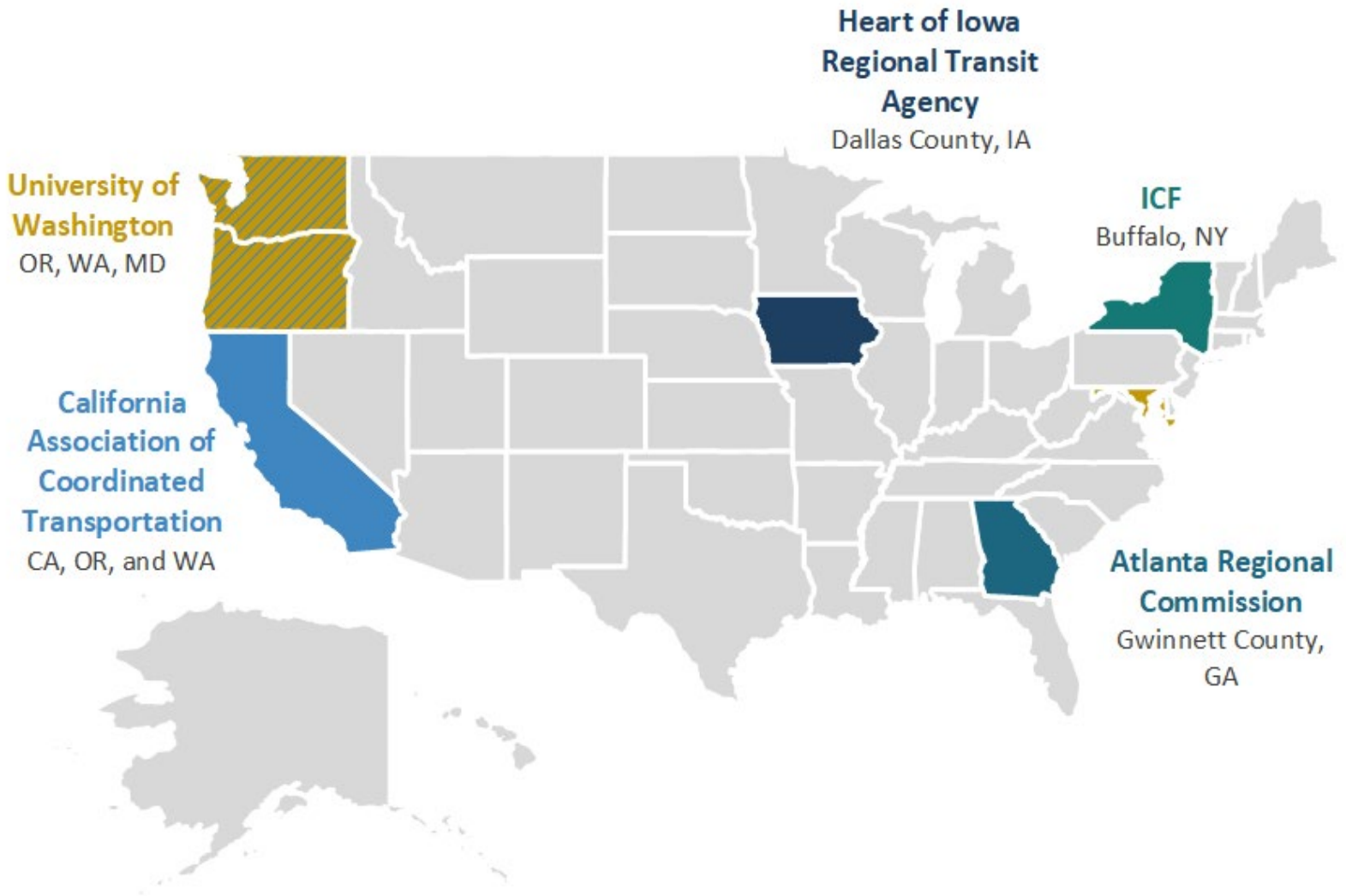


Measure impact of integrated deployments

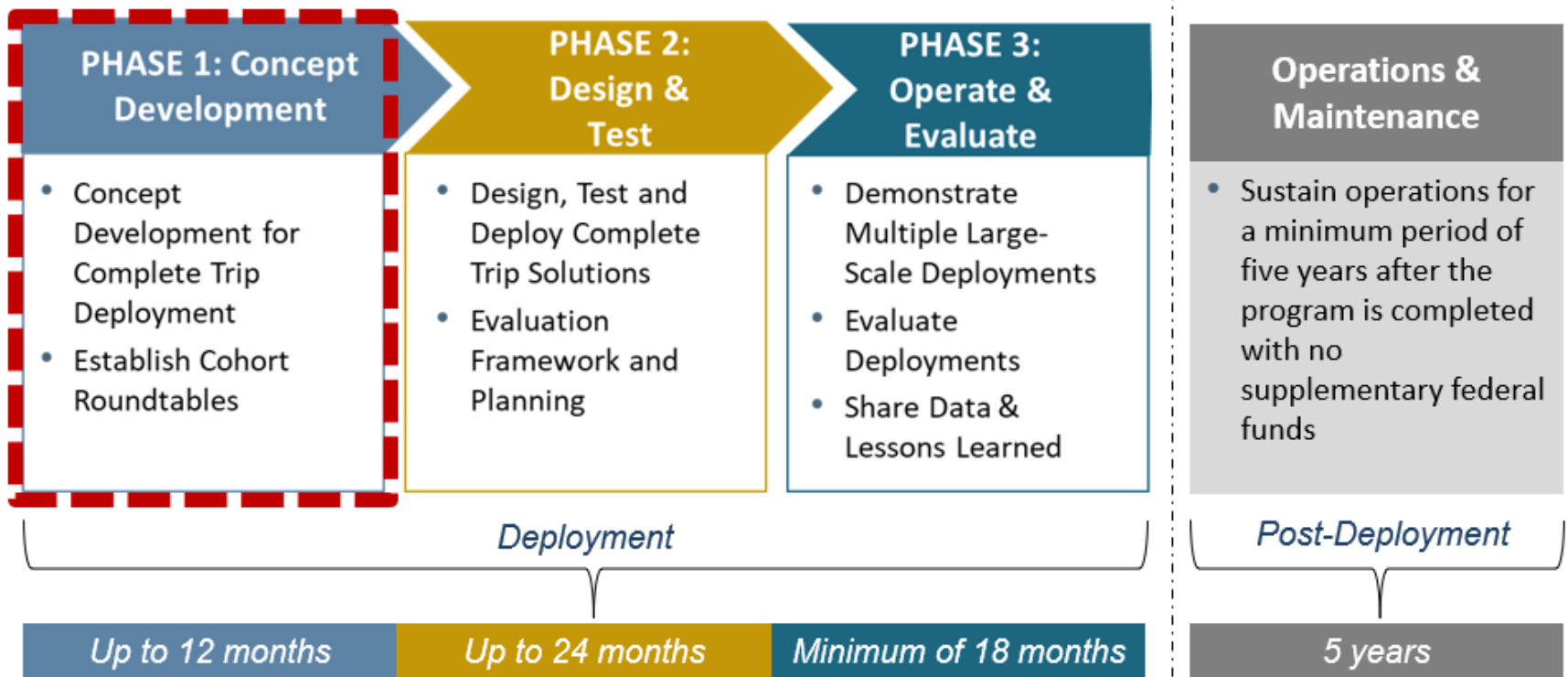


Identify replicable solutions and disseminate lessons learned

# Complete Trip Phase 1 Awardees



# Deployment Phases



# Site Orientation & Key Challenges

Jamie Hamann-Burney, BNMC Inc.  
Nadine Chalmers, NFTA



# The Location

- Buffalo Niagara Medical Campus
- 120-acre campus
- Adjacent to downtown and Main St.
- 9 Million Sq.Ft.
- 8 member institutions
- 150+ private companies
- Social, technology incubator
- Transportation innovation lab



**More than 16,000 people work or study at the BNMC and more than 1.5 million visit each year for health care and other services, generating significant transportation demand for the area, its visitors, and its employees.**

**Enabling access to jobs, health care services at partner agencies that directly address populations of interest's desire of complete trip capabilities made BNMC a compelling location.**

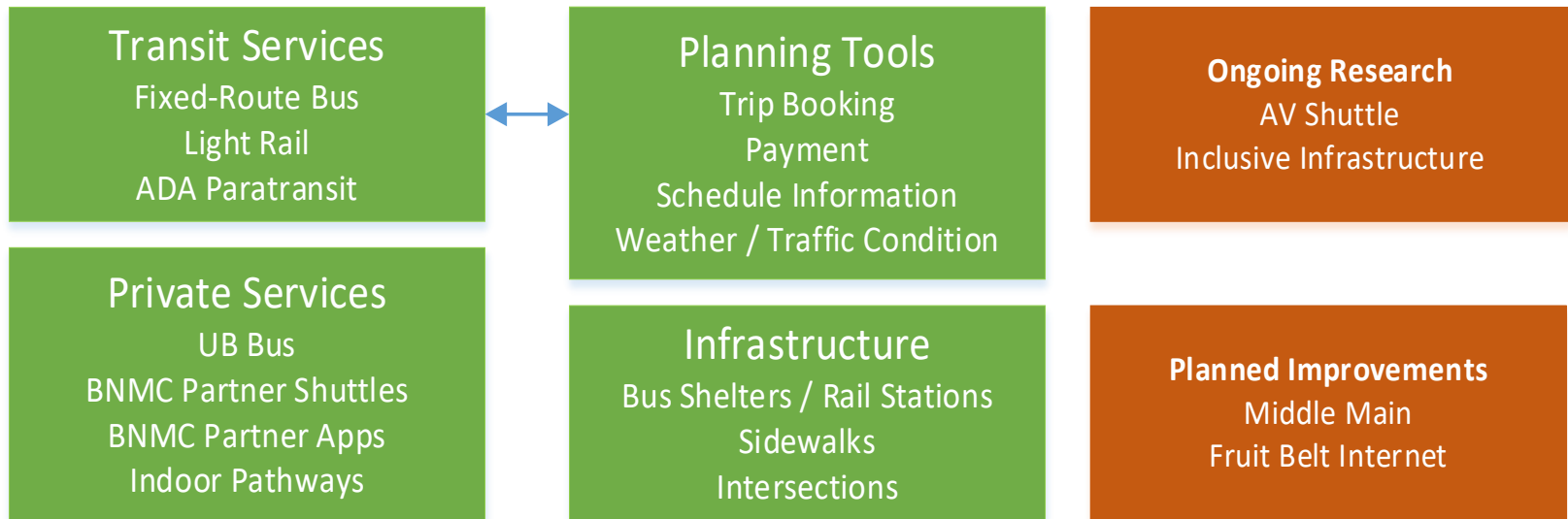
# The Neighborhood

- The deployment includes the **120-acre** Medical Campus and surrounding neighborhoods: Fruit Belt and Masten Park.
- Fruit Belt neighborhood:
  - Poverty rate of 25%, and 47% zero-car households.
  - Percentage of zero vehicle households and population that over the age of 65, with a disability, a veteran, and incomes of less than \$25,000 is above the average for the MSA.



**BNMC seeks to be a national model for how an urban campus and economic development engine can effectively develop and grow in conjunction with surrounding neighborhoods for the benefit of the greater community.**

# Existing Systems












## Legend

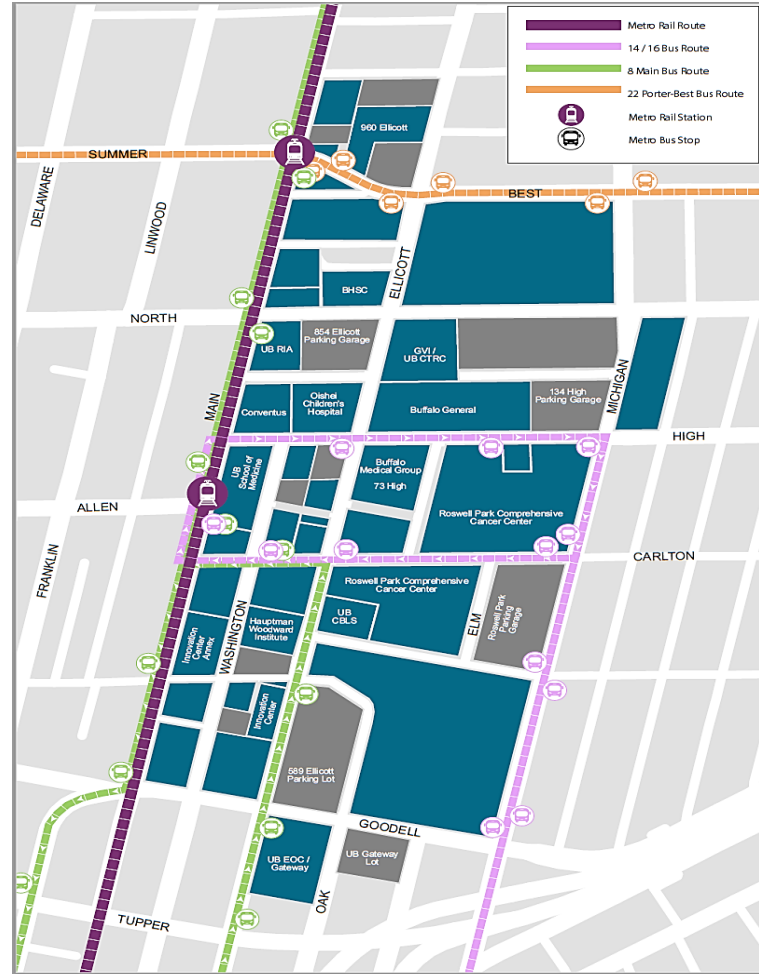
Current System

Parallel Work

Transportation options within the **BNMC** study area include driving, public transit, walking and biking to campus. There are complementing research and planned improvements within the area of interest that could be leveraged.

# Robust Transit Infrastructure

 <p><b>24 Million Riders per Year</b></p>	 <p><b>90% Customer Satisfaction</b></p>	 <p><b>626 Operators</b></p>
 <p><b>6.4 Mile Light Rail System</b></p>	 <p><b>59 Bus Routes</b></p>	 <p><b>4,500 Bus Stops</b></p>
 <p><b>321 Buses</b></p>	 <p><b>27 Rail Cars</b></p>	 <p><b>800+ Weekday Paratransit Riders</b></p>



# Variety of Travel Planning and Support Tools



Interactive Touch Model in Buildings

Source: Photo courtesy of Steve Landau, Touch Graphics Inc.

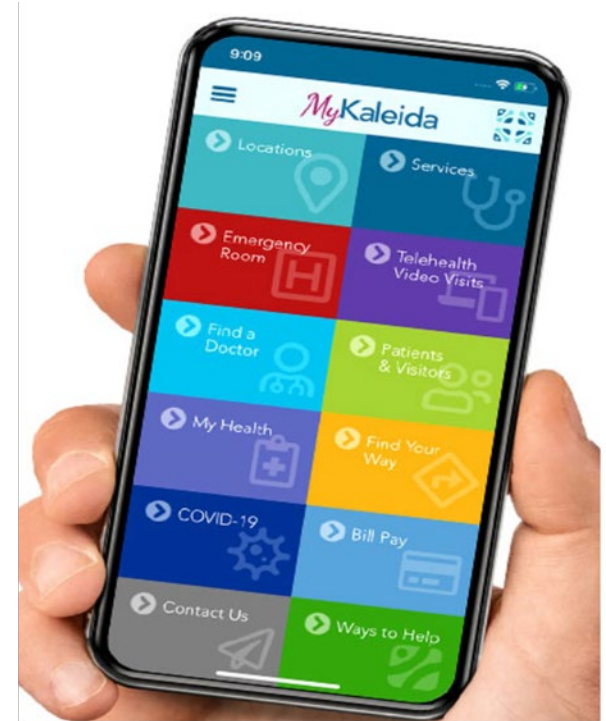
Travel Planning Tools

Functions

- Transit Trip Planning (static, reservations, real-time)
- Trip Planning and Execution (third party)
- Mobile Fare Payment
- Trip Planning (road conditions)
- Orientation support

# Partner Services and Infrastructure

- **MyKaleida Mobile App** – mobile application providing indoor directions within and between Kaleida buildings.
- **Public Safety Escort Shuttles** – major institutions (e.g., Roswell Park) provide public safety escorts within 0.5 mi radius via a shuttle on an on-demand basis. The University at Buffalo (UB) has a “safety shuttle” which operates on-demand between the hours of 8pm to 4am.
- **Circulators Shuttles** – UB has a Blue Line Shuttle, which connects South Campus and BNMC and counts with six stations in BNMC.



Screenshot of MyKaleida mobile app.

Source: Kaleida Health (2021)

# Mobility Issues and Challenges

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## Issues

- **Low transit use.** Need to support and grow efficient and accessible transit trips, especially for employees and visitors to BNMC
- **Continuous, consistent inclusive infrastructure.** Increase ability of employees and travelers with disabilities to make multimodal connections, navigate the area, and get from their home to the destination
- **Safety and intersection crossings.** Improve safety around key intersections with significant use by travelers with disabilities

## Challenges

- Aging infrastructure (sidewalks, bus shelters, intersections)
- Incomplete, disjointed or missing information to support travelers with disabilities
- Winter weather
- Lack of accessible pedestrian signals
- Lack of flexible transit options for neighborhood connectivity
- Overall low levels of transit use to access campus

# Leading to...For travelers with disabilities

- Traffic safety issues at street crossings.
- Lack of accessible infrastructure in street rights of way.
- Inconsistent information on alternatives and travel options.
- Reduced or eliminated ability to access the service.
- Constraints on when and where they can travel.

 Especially  
during winter

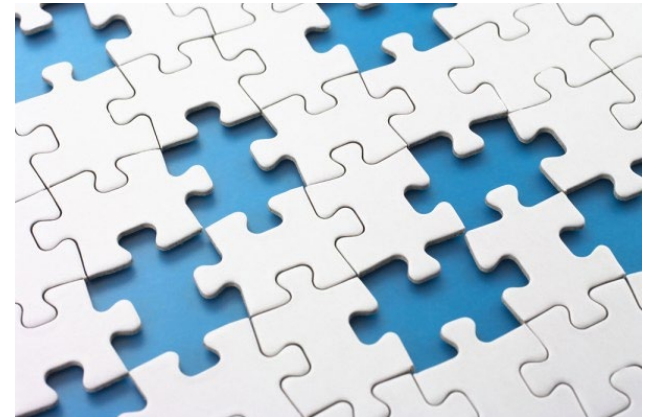
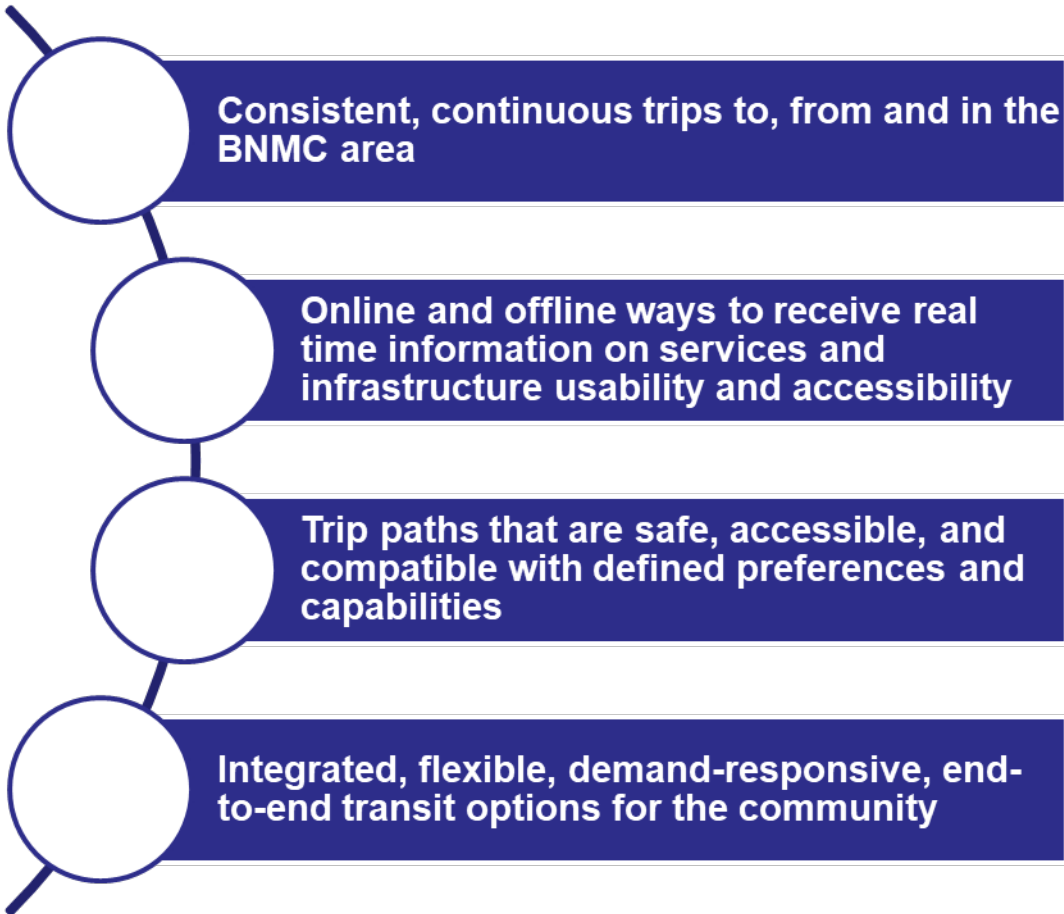


Bus Shelter in Buffalo.

Source: University at Buffalo via Easter Seals Project ACTION (2014)



# Desired Changes



# Deployment Concept Overview

Deepak Gopalakrishna, ICF

Adel Sadek, UB

Polly Okunieff, ICF

# Buffalo ITS4US Deployment Goals

Improve door to door trip making to populations with disabilities seeking to access jobs and health care services

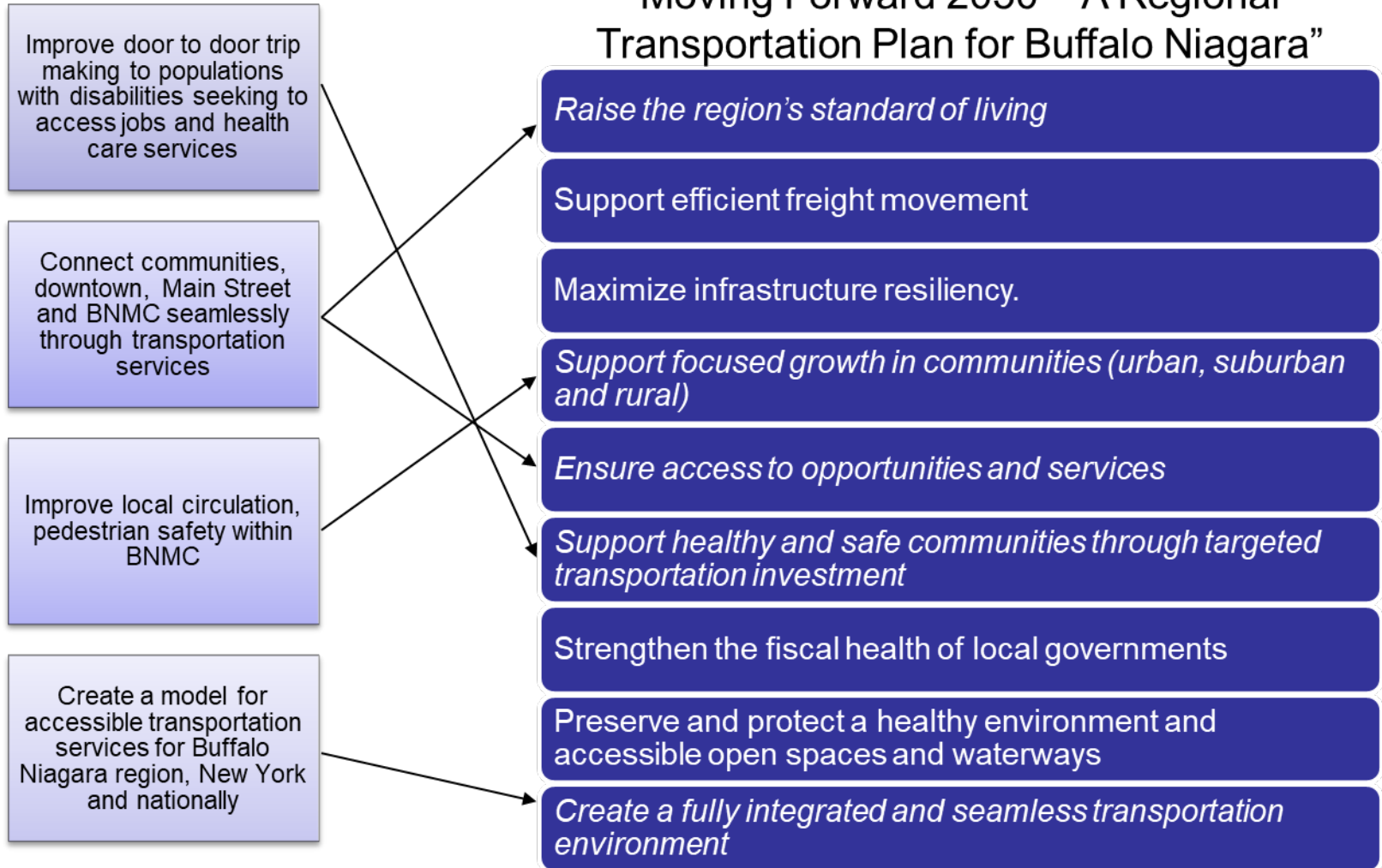
Connect neighboring communities, Main Street and BNMC seamlessly through transportation services

Improve local circulation, pedestrian safety within BNMC

Create a model for accessible transportation services for Buffalo Niagara region, New York and nationally

# Regional Alignment of ITS4US Goals

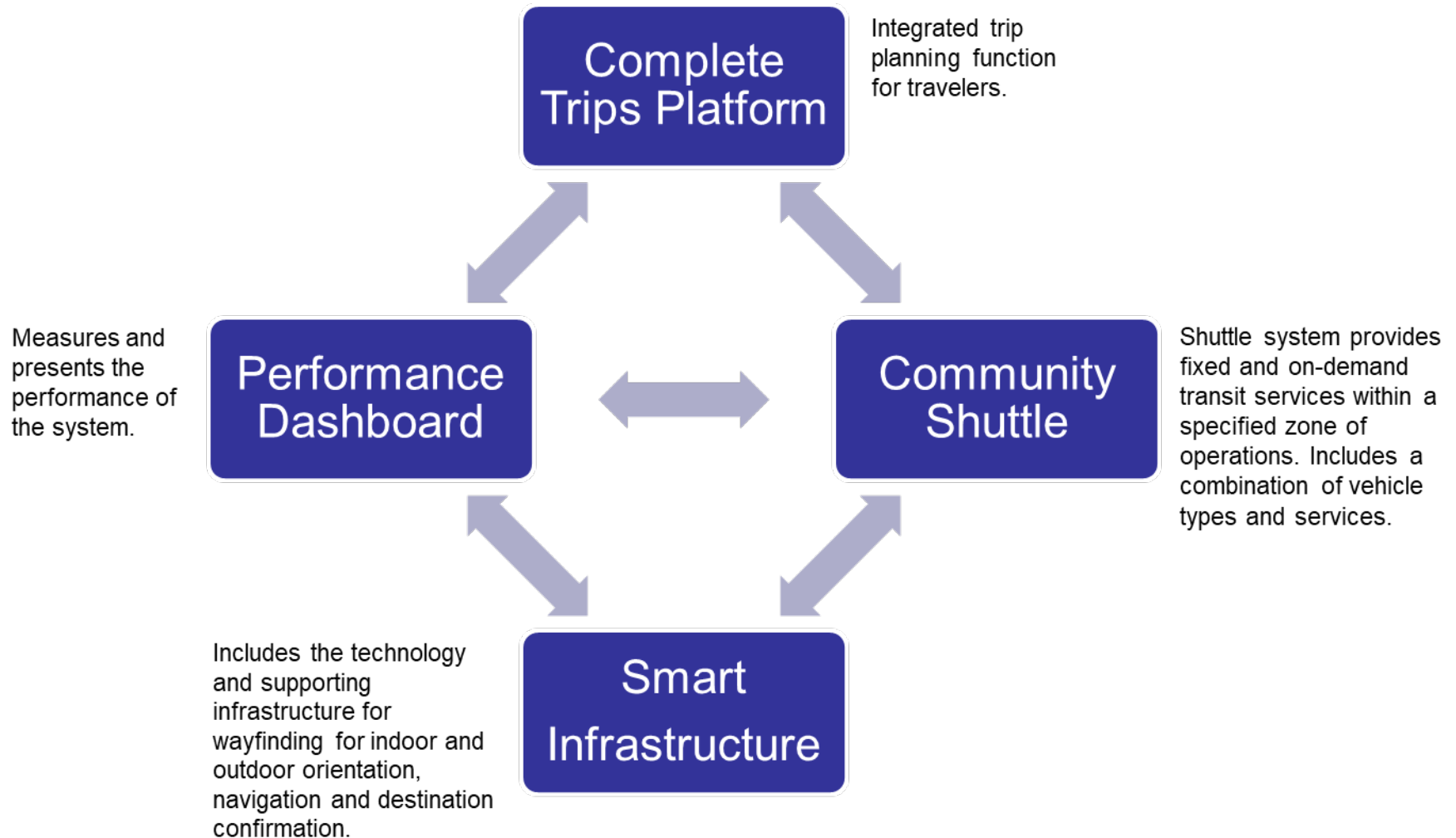
## Moving Forward 2050 – A Regional Transportation Plan for Buffalo Niagara”



# Target Users

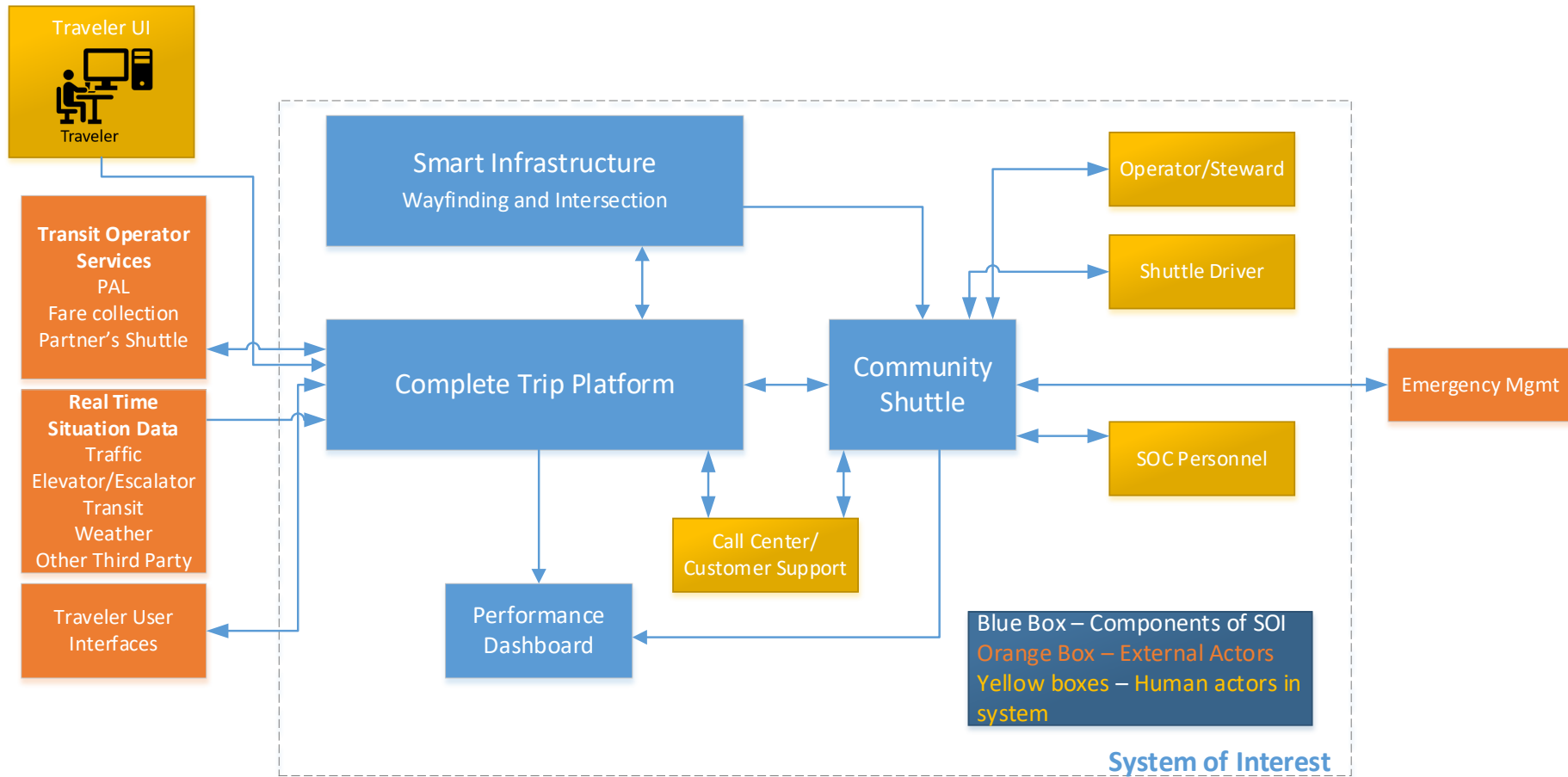
Target Users	Populations of interest
Persons with Disability (PWD) <ul style="list-style-type: none"><li>• Mobility</li><li>• Vision</li><li>• Cognitive Hearing</li></ul>	Patients, Visitors and Workers at BNMC Partner agencies
Low Income	Residents of Fruit Belt, Masten Park and across Buffalo using BNMC services, transit facilities and healthcare
Older Adults	
Low English Proficiency (LEP)	

# Proposed Concept



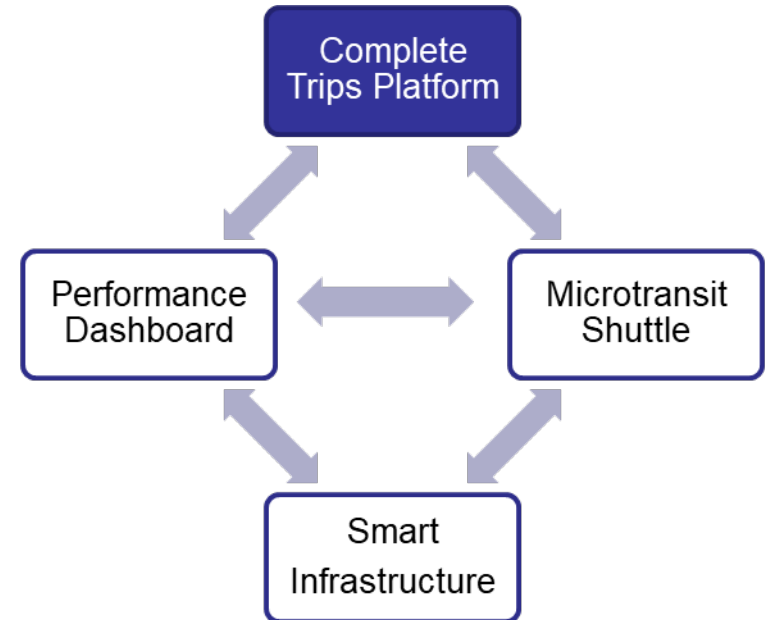
# Context Diagram

7/05/2021



# Complete Trip Platform

- A travel planning platform built to meet the needs of travelers with disabilities.
- Allow users to personalize their trip planning, execution and navigation experience.
- Customized hands-off turn by turn notifications
- Access to wayfinding assets in the inclusive infrastructure.
- Opt in to share information among other systems such as NFTA PAL, NFTA fare collection systems (including Token Transit), micro transit shuttle system, or other facility systems.



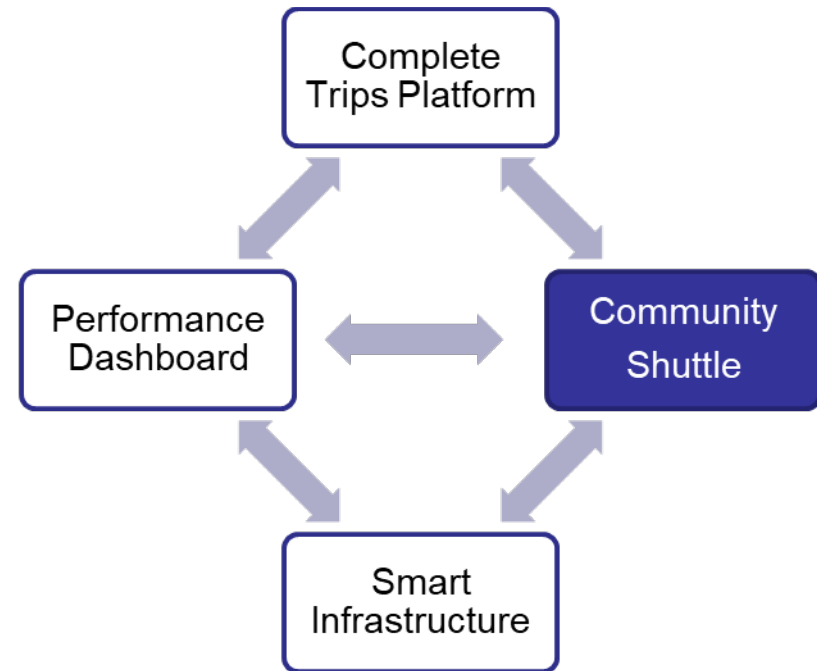


# Complete Trips Platform

- The Complete Trip Platform (CTP) provides trip planning and travel functions for travelers.
- The platform is available for registered and non-registered account users.
- Functions of the Subsystem
  - User Profiles
  - Trip Planning
  - Trip Booking
  - Geolocation And Mapping
  - Trip Monitoring And Notifications
  - Real Time Situation Monitoring
  - Trip History / Ledger
  - Performance Metrics
  - User Interfaces: Web And IVR
  - User Interface: Mobile Application

# Community Shuttle

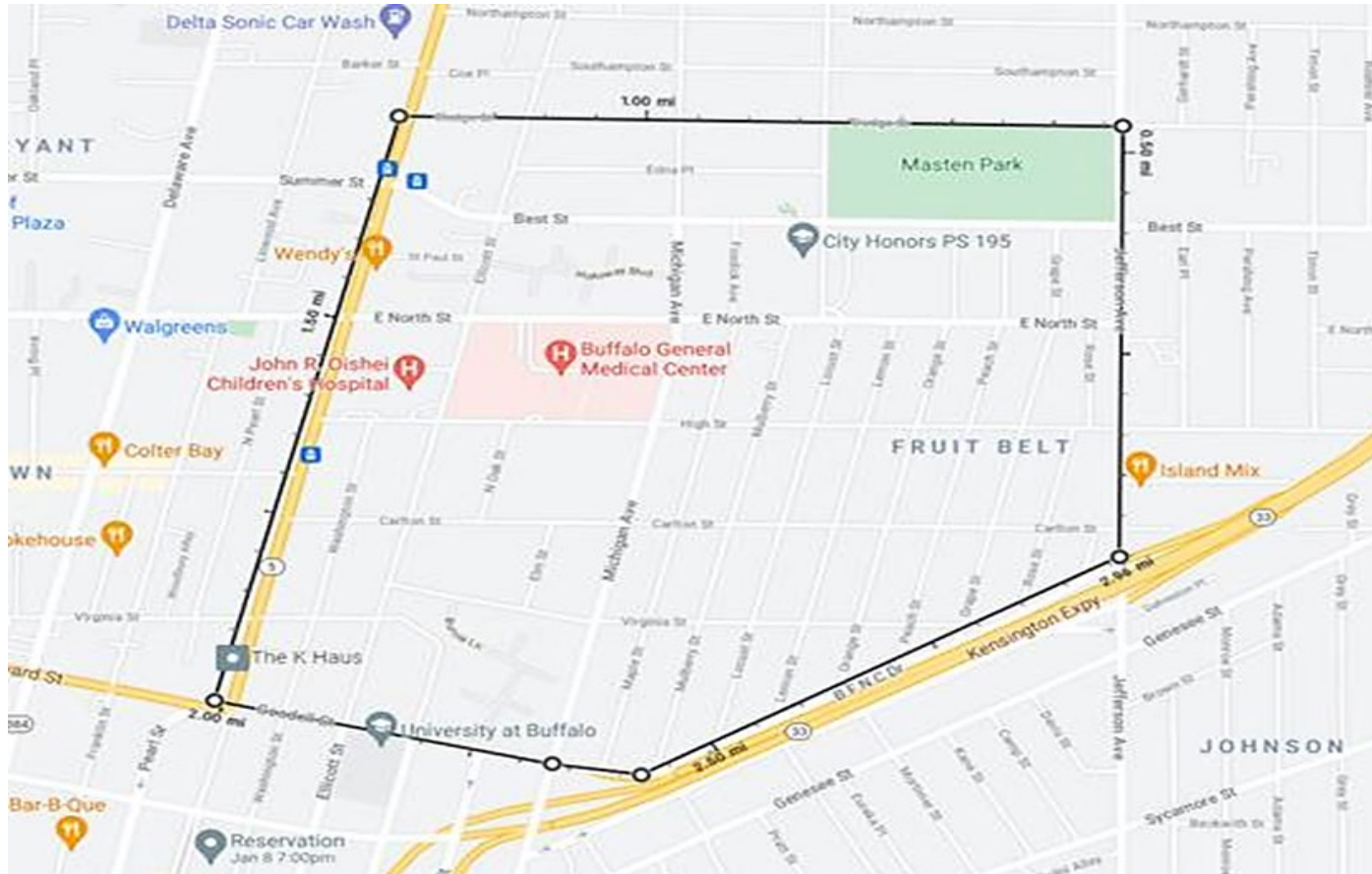
- Community shuttle system will provide **on-demand service within a neighborhood zone.**
- Connect services, metro and fixed-route transit services as a feeder.
- A fleet consisting of a mix of *human-driven* shuttles/vans and *Self-Driving Shuttles (SDS)* or AVs will be used to provide the service.
- SDS will always include an operator/steward.
- SDS will operate on a pre-determined route.



**The Self Driving Shuttle Olli being tested on UB Campus.**



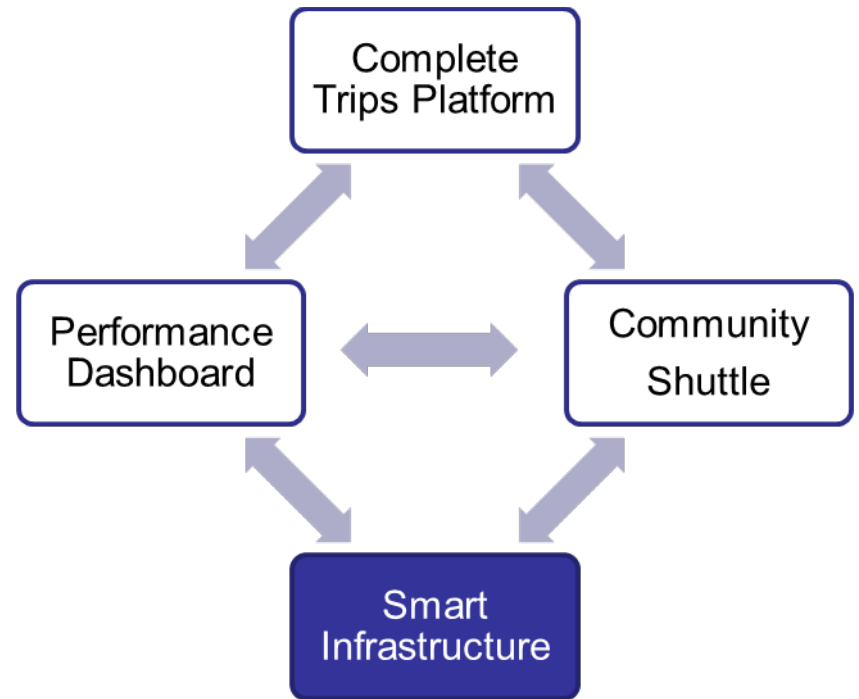
# Community Shuttle Proposed Service Area



**Proposed Service Area**  
Source: Buffalo, NY ITS4US

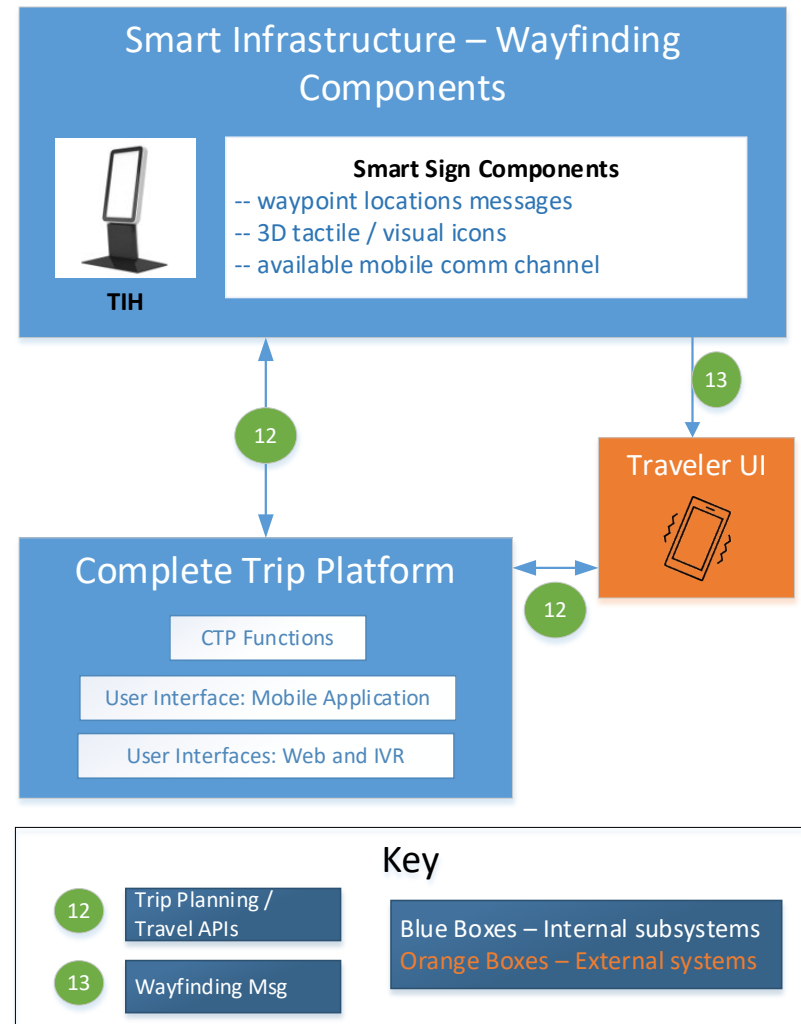
# Smart Infrastructure

- Intersection crossing requests at two key intersections on campus.
  - Main and Best
  - Ellicott and High
- Smart wayfinding components used for indoor and outdoor navigation at public right of ways, parking lots, building/facilities, bus shelters and stations.



# Smart Infrastructure - Wayfinding

- Installation of smart signs.
  - Broadcast beacons that interface with the CTP navigation functions to locate a traveler's waypoint in indoor and outdoor environments.
  
- Transportation information hubs.
  - Located at key locations on campus and bus stops that provide information through multiple accessibility channels.



# Smart Infrastructure - Intersection Crossing

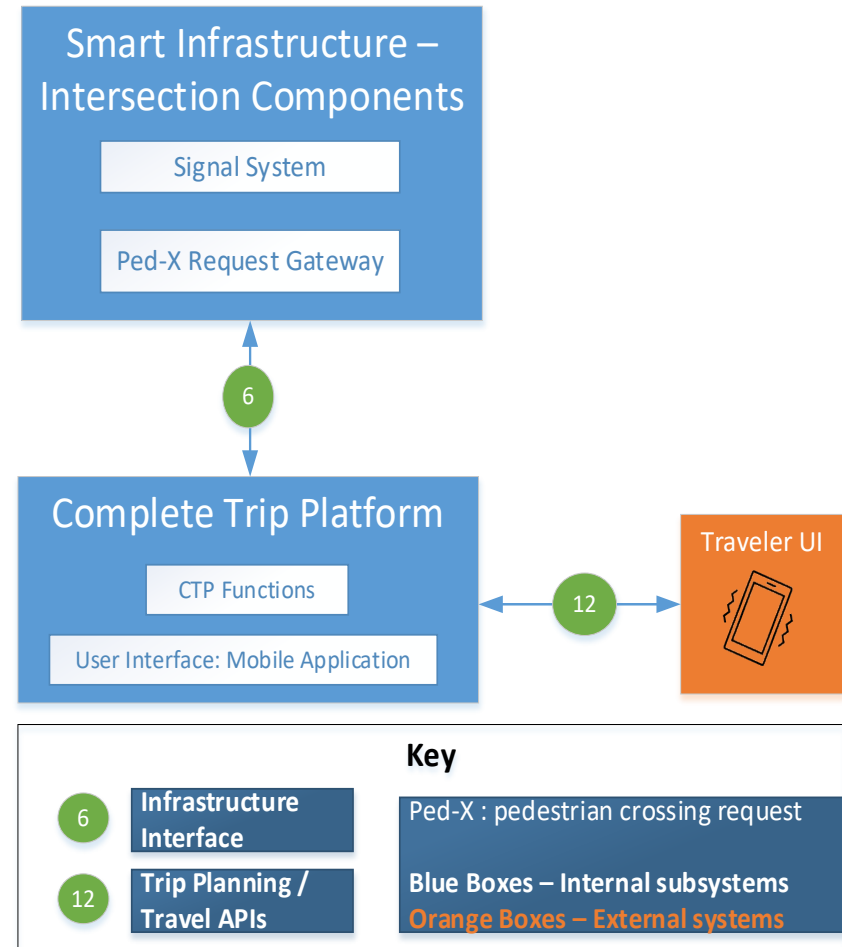
- Interface to standardized traffic and pedestrian signal controllers to trigger a request for pedestrian signal to cross the street.



Main and Best



Ellicott and High



# Support Environment

Ongoing physical infrastructure improvements in Middle Main

High-speed internet access in Fruit Belt

NFTA Bus Shelter Updates

Ongoing automated vehicle testing activities

# System Scenarios and Use-Cases

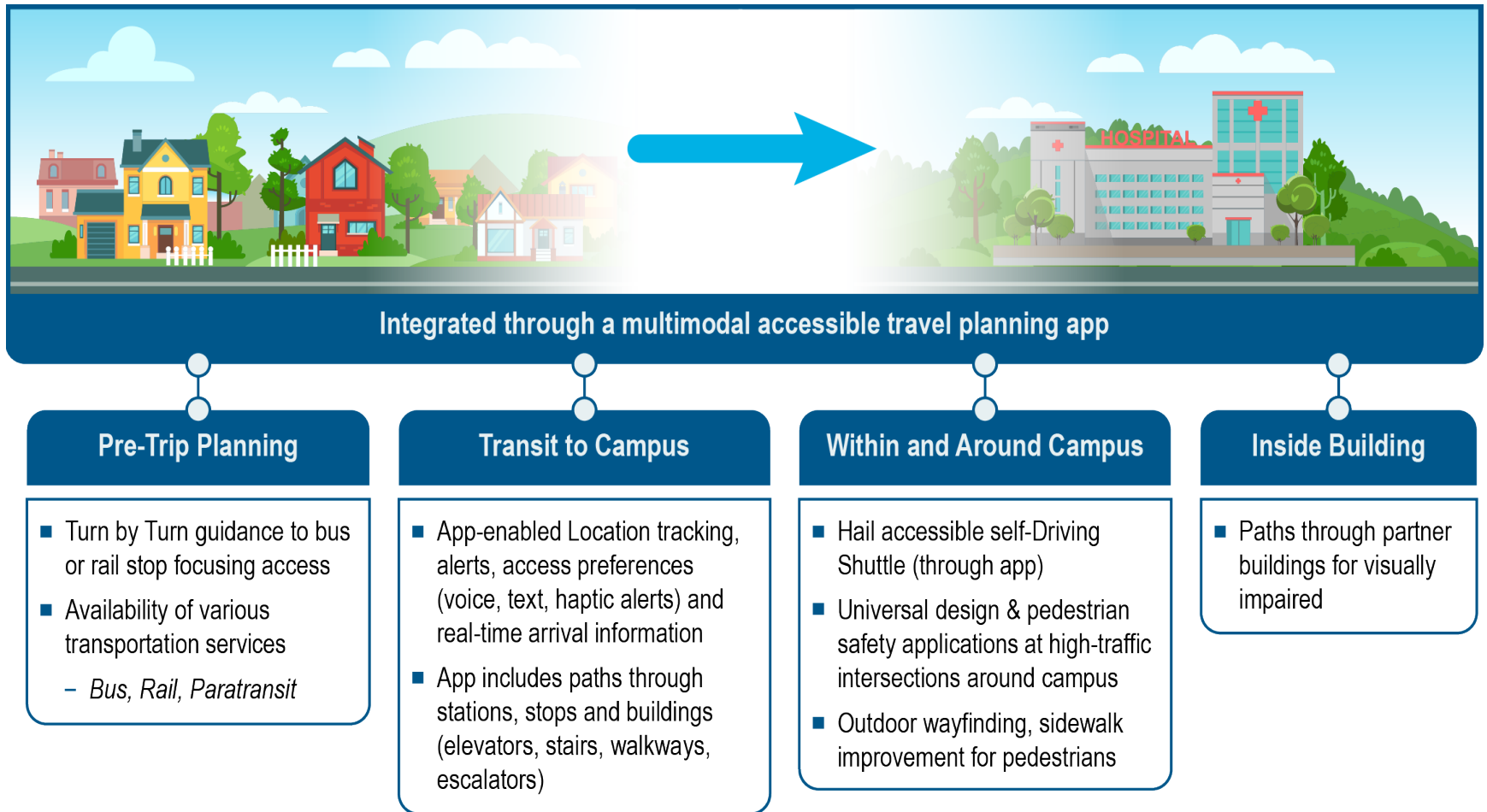
Deepak Gopalakrishna, ICF

Adel Sadek, UB

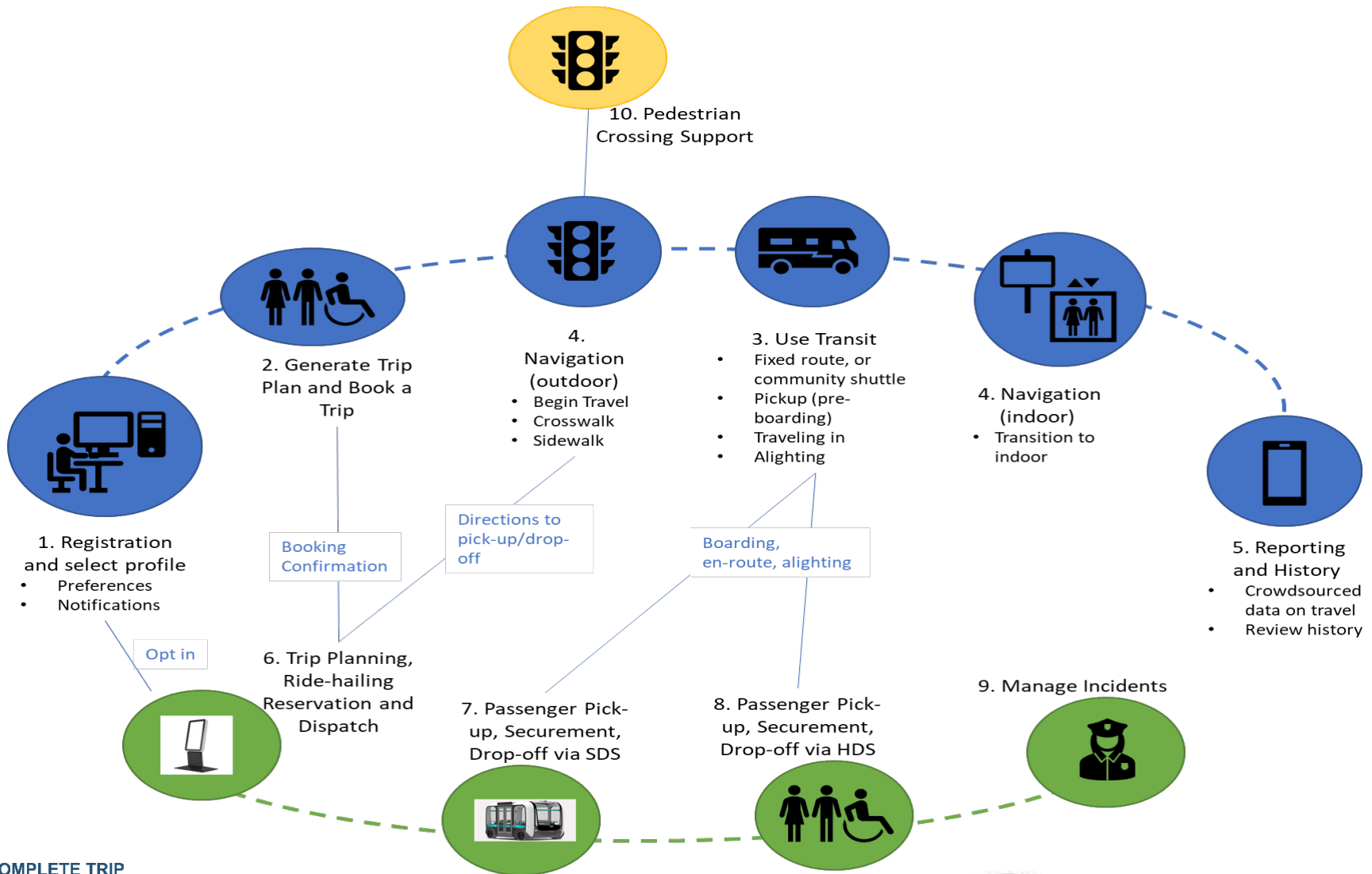
Polly Okunieff, ICF



# A Complete Trip Scenario from a Traveler's Perspective



# Use-Case View of the Complete Trip



# Typical User Scenarios

- **Lisa Michaels** – Power wheelchair user, volunteer at Oishei Children’s Hospital
- **Jessica Benz** –Employed at the Roswell Park Cancer Institute, deaf since birth, highly proficient in ASL

# Lisa Michaels – Needs

## ▪ Accessibility Needs:

- Accessible pathways
- Most efficient route / minimum transit modes
- Accessible transportation needs
  - Mobility Device: Power Wheelchair
- Preferred Drop-Off Point: Main Accessible Entrance

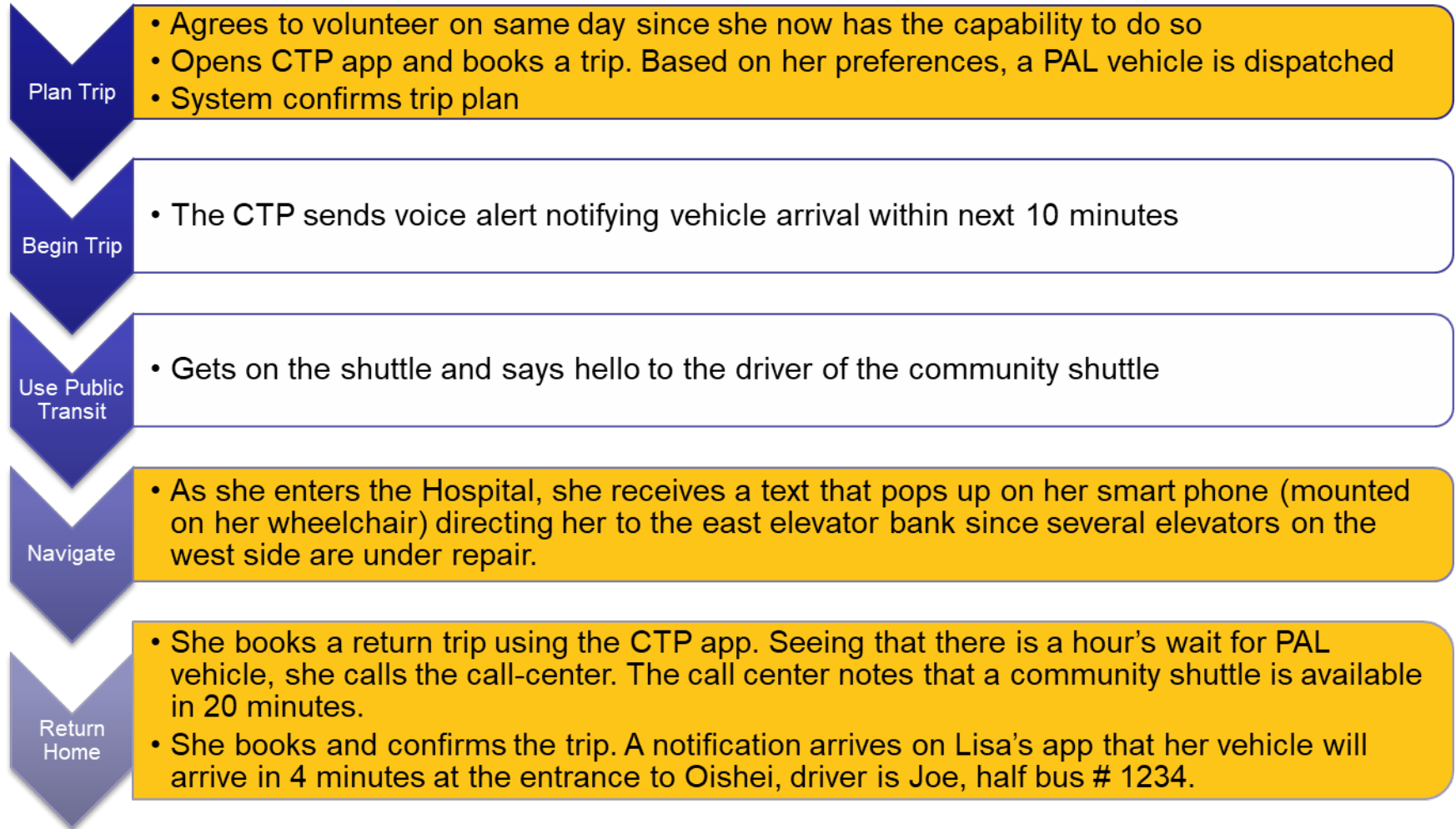
## ▪ Communication and Information Needs:

- Preferred Comm. Method: Text
- Secondary Comm. Method: Call to Mobile Phone
- Frequency/Type of Information Needed:
  - Audible notifications
  - Arrival time and delays
    - Notification Time: 10 mins before arrival
  - Elevator outages
  - Obstacles in path of travel
    - Weather, work zones, closed entrances
  - Other Information Needed:
    - Types of Transit Stops (shelter vs. no shelter)

Lisa is 20 years old, attends the University of Buffalo, and volunteers at the Oishei Children's Hospital.

- A person who is completely paralyzed and **uses power wheelchair.**
- Active member of community.
- Uses technology, primarily Apple products (MAC and iPhone).
- **Relies on NFTA Paratransit Access Line (PAL) for transit needs**
- Volunteers and is asked frequently to fill in for volunteer slots; not able to confirm her schedule unless she is able to book NFTA **PAL trip in advance**

# Lisa Michaels - Trip Experience with System



# Jessica Benz – Needs

## ▪ Accessibility Needs:

- Most efficient route / minimum transit modes
- Text-based notifications

## ▪ Communication and Information Needs:

- Preferred Communication Method: Text
- Type of Information Needed:
  - Trip delays
  - Elevator/escalator outages
  - Maximum walking time
  - Name of transit stops
  - Estimated time of arrival at destination
  - Transit vehicle / shuttle arrival time
    - Automatic notification 10 minutes before arrival

Jessica Benz, 24 yrs old and lives in University Heights District with a roommate.

- Currently employed as an IT Systems Analyst for the Roswell Park Cancer Institute.
- Uses the NFTA Metro/light rail to commute to work, boarding at the University Station and exiting at the Allen-Medical Campus Station.
- Is nervous about commuting home at night, particularly when she is required to wait for the metro.
- Has been deaf since birth, but is highly proficient in ASL and can read lips.
- Exploring new technologies and software phone apps that will support her lifestyle and travel preferences.

# Jessica Benz - Trip Experience with System

## Plan Trip

- Within the CTP app, Jessica generates a stored trip to and from work and sets notifications to alert her when her train is delayed.
- Jessica has a smart watch that includes a vibration alert that she set up to be triggered when a CTP notification is received.

## Begin Trip

- She opens the CTP app on her phone, logs in and pulls out the stored trip plan which she named Daily Commute.
- A few notifications appear about light rail delays, elevator/escalator outages, and the building where she works.
- She sees that there is a train in 2 minutes and in 10 minutes.

## Use Public Transit

- The trip plan shows her the ETA to her destination station.
- She cannot receive real time information in the station, but the CTP shows her the stops and estimates of the time until arrival at her destination station based on the schedule information.

## Navigate

- Jessica exits the light rail at the Allen-Medical Campus station and takes the escalator up to the ground level.
- She arrives at the main entrance to Roswell 4 minutes later.

## Return Home

- By the time she leaves work it is dark, Jessica is concerned about walking to the light rail station.
- Decides to take the Self-Driving Shuttle, which stops about 1/2 a block from where she works and will take her to the train station.
- She reviews the CTP website for details and locates the stop.
- She receives a 10-minute alert to the arrival of her shuttle and it now has 2 passengers. She gets on the shuttle to the train station.

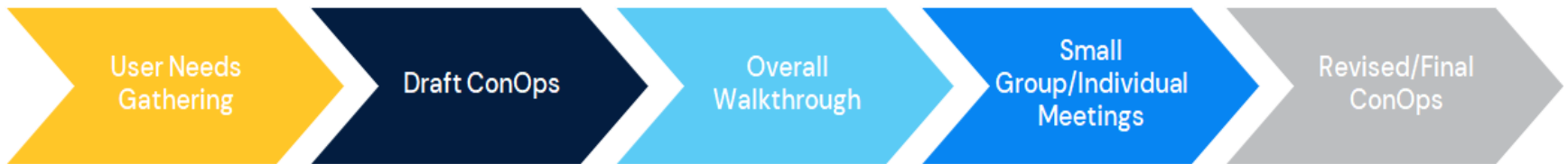
# Stakeholder Engagement

**Jaime Hamann-Burney, BNMC Inc.**  
**Deepak Gopalakrishna, ICF**



# Stakeholder Engagement

Communities, agencies and users engaged throughout the process so far and will continue to be engaged over the next few months to refine the concept.



# Thank you.

## Institutional Interviews/Meetings

- NITTEC
- City of Buffalo
- NFTA
- Buffalo Niagara Medical Campus (BNMC) Inc.
- Greater Buffalo Niagara Regional Transportation Council
- NYSDOT
- USDOT
- Erie County Office for People with Disabilities
- Erie County Senior Services

## BNMC Partner Meetings

- Visually Impaired Advancement (VIA)
- Kaleida Health
- University at Buffalo
- Buffalo Hearing and Speech Center (BHSC)
- Roswell Park Comprehensive Cancer Center

## Community organizations and groups

- Heart of the City Neighborhoods (HOCN)
- Fruit Belt Community Land Trust
- Western NY Independent Living (WNYIL)
- Local Initiatives Support Corporation (LISC) WNY
- Western NY Deaf Access Services
- Employment Consortium
- Northeast ADA Center

# Stakeholder Engagement – What we Heard

## Key Messages

- Flexibility in services and systems based on user preferences
- Accommodate non-smartphone users
- Leverage local resources as much as possible – 211 call center, local vans, buses
- Coordinate with ongoing physical improvements. Great opportunity to tie in physical improvements with technology
- Support independent travel
- Increase ability of users to make spontaneous trips
- Support transit and not replace transit with other modes
- Not just a BNMC system but a system for the community and for Buffalo
- Accommodate needs for service animals
- Support caregiver travel planning/support
- Consider costs (both for traveler and agency)



## Resulting User Needs

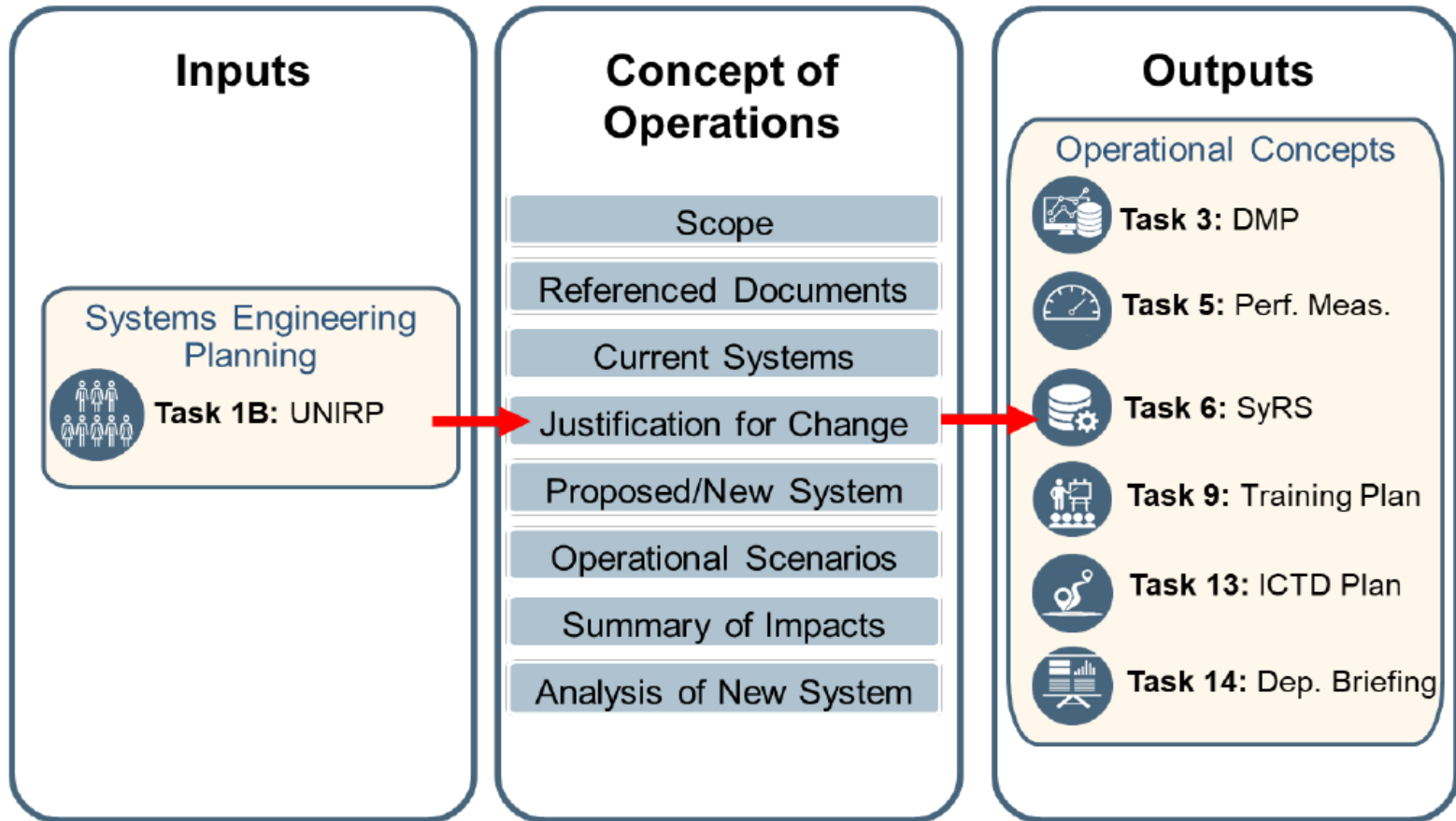
- 37 User-Related Needs in following areas
  - Travel needs and traveler information
  - Assistive technology compatibility
  - Service integration
  - Trip booking
  - Trip costs
  - Use of transit and shuttles
  - Wayfinding – Outdoor
  - Wayfinding-Indoor
  - Vulnerable Road User (VRU) safety
  - Notification and alerts
  - Adverse weather
  - Nighttime travel
  - Customer Points of Contact
  - Training
  - Low-tech or no-tech access
  - Caregiver support

# Ongoing Stakeholder Engagement

- Continue to seek out opportunities to present concept to stakeholders in Buffalo.
  - Part of overall outreach efforts
- Establishing a more recurring mechanism for community organization engagement during Phase 1 development.
  - Potentially set up of an advisory council/group
- Continue critical stakeholder meetings.
  - Quarterly meetings with selected groups
  - SyRS Walkthroughs
  - Individual meetings and concept discussions

# Next Step

- Continue Phase 1 activities to develop the final concept deployment plan (T13) building off the foundational ConOps presented today.



# Stakeholder Q&A

- Please keep your phone muted
- Please use chatbox to ask questions
- Questions will be answered in the order in which they were received

# Stay Connected

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## For more information please contact:

Elina Zlotchenko, ITS JPO  
ITS4US Program Manager and Buffalo Site COR  
[Elina.Zlotchenko@dot.gov](mailto:Elina.Zlotchenko@dot.gov)

Deepak Gopalakrishna, ICF  
ITS4US Buffalo Project Manager  
[Deepak.Gopalakrishna@icf.com](mailto:Deepak.Gopalakrishna@icf.com)

Visit the Complete Trip - ITS4US Deployment Program Website and FAQs:  
<https://its.dot.gov/its4us/>  
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