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ITS World Congress

ITS for Underserved Communities: An Overview of the U.S. DOT's ITS4US Deployment Program

September 21, 2022

ITS4US Program Video

https://youtu.be/cLJx0MOjY2o

Agenda

- ITS4US Program Background
- ITS4US Site Summaries
  - Georgia Department of Transportation (GDOT)
  - Heart of Iowa Regional Transit Agency (HIRTA)
  - Niagara Frontier Transportation Authority (NFTA)/Buffalo
  - University of Washington (UW)
- Q&A

ITS4US Program Background

Program Overview

- A USDOT Multimodal Deployment effort, led by ITS JPO 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

Spur high-impact integrated Complete Trip deployments nationwide

Identify needs and challenges by populations

Develop and deploy mobility solutions that meet user needs

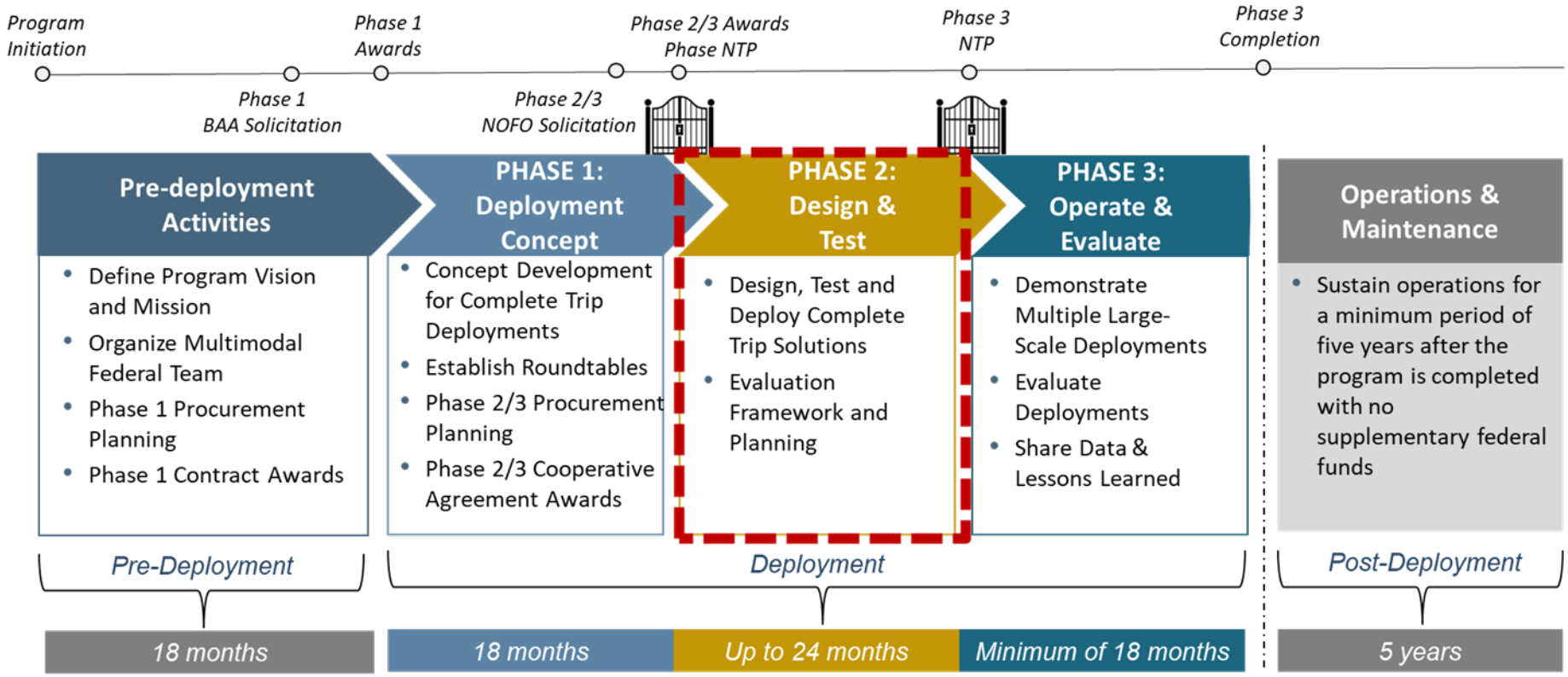
Measure impact of integrated deployments

Identify replicable solutions and disseminate lessons learned

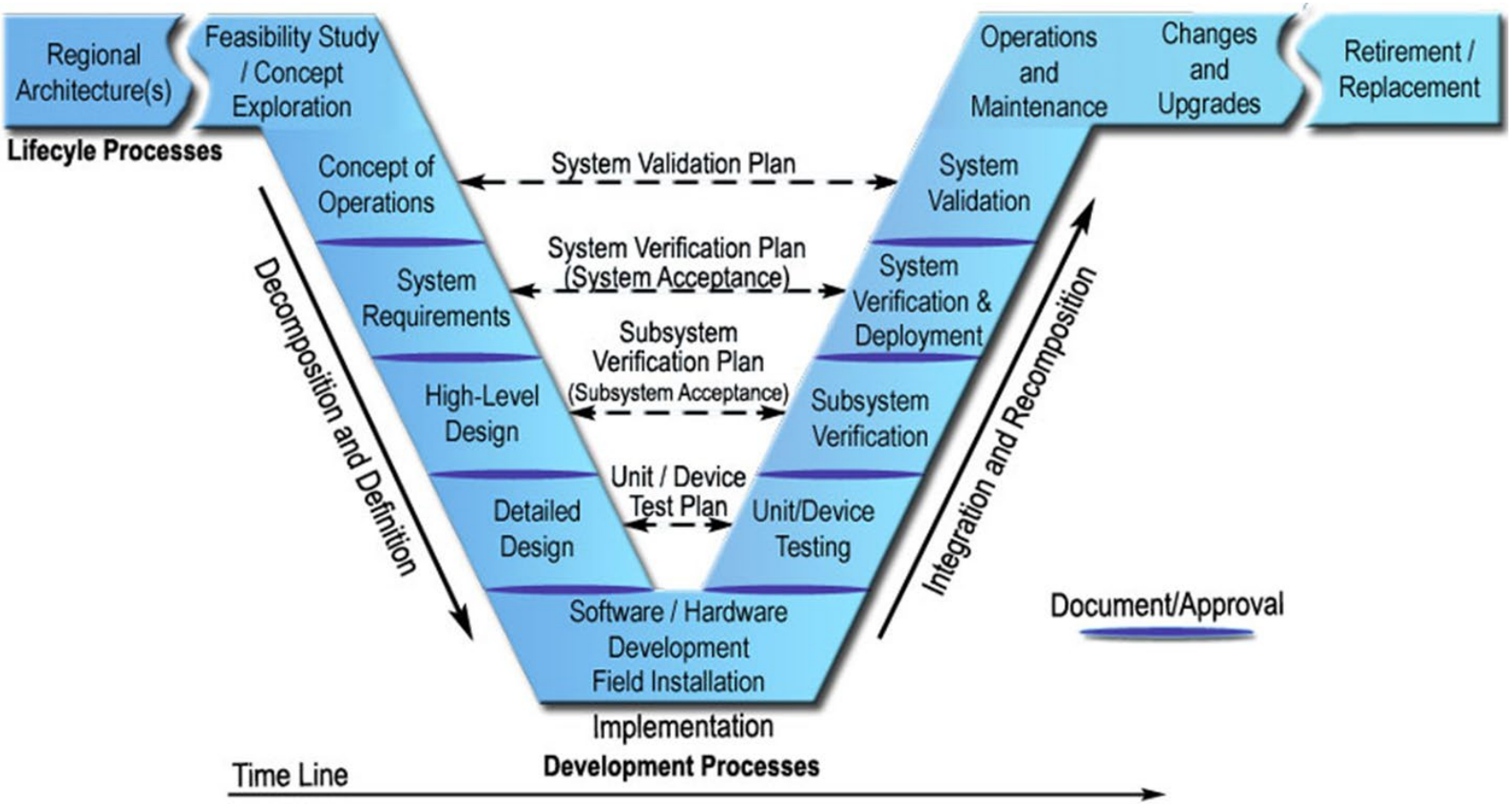
ITS4US Program Fundamental Elements

- Site deployments will be real-world environment **deployments**
- Serve as replicable models and remain in operation
- There are **multiple** site deployments
- Unique solutions to address critical, local challenges
- Deployments are expected to be both **large-scale and multi-modal**
- **Large-scale** implies deployments will have measurable impact
- Sites will deploy **multiple technologies and modes**

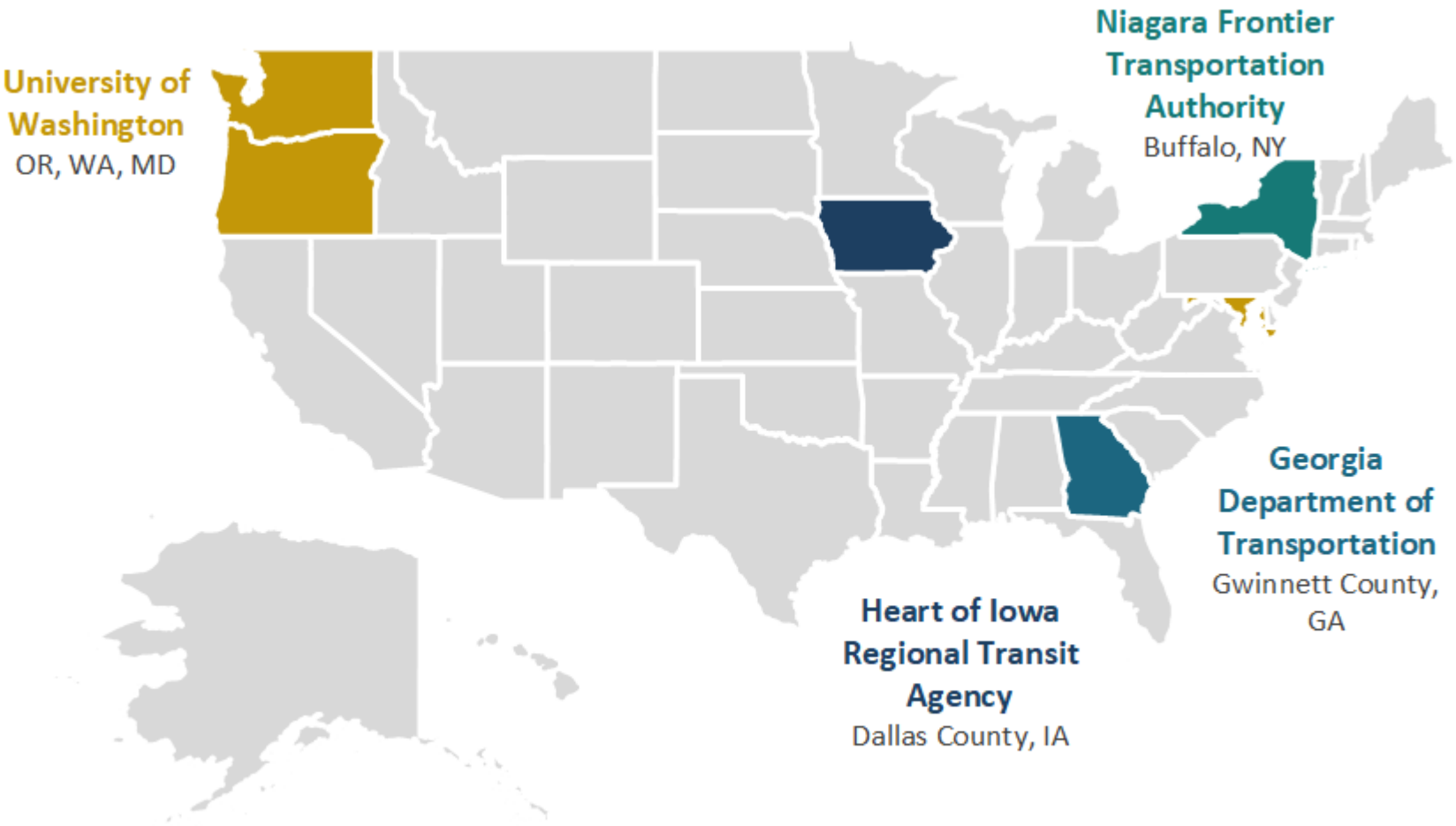
Deployment Phases



Systems Engineering "Vee" Diagram



Phase 2 and 3 Awardees



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Georgia Department of Transportation (GDOT)

Safe Trips in a Connected Transportation Network (ST-CTN)

Maria Roell (Atlanta Regional Commission)

Maria Roell

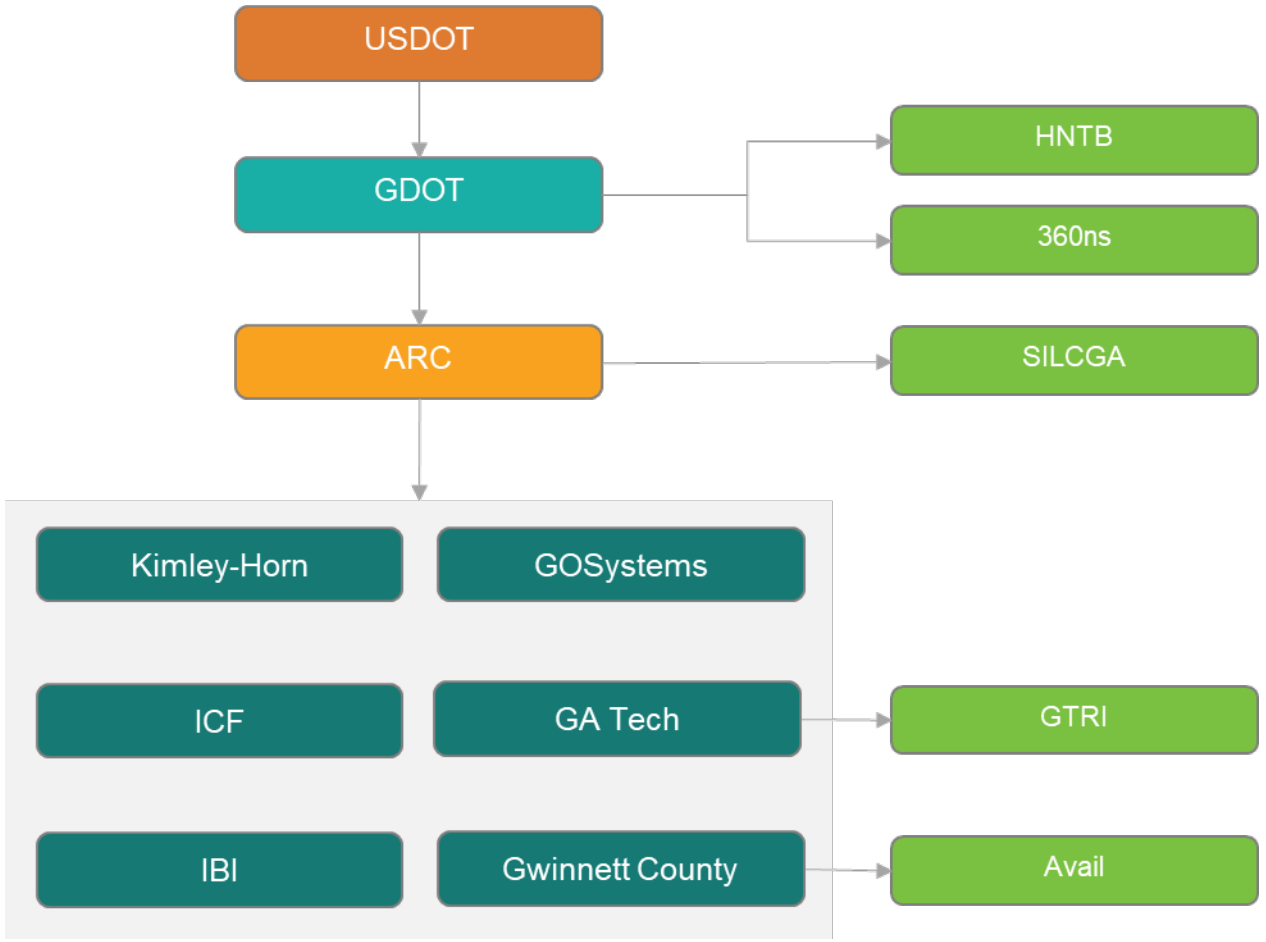
Co-Deployment Lead GDOT Site
Atlanta Regional Commission

Safe Trips in a Connected Transportation Network (ST-CTN)

- Deployment area: Gwinnett County, Georgia
- Uses a mobile application with ability for users to
  - Create personalize trips plan information
  - Receive alternative trip routes
- Comprised of an integrated set of advanced transportation technologies including:
  - Connected vehicles
  - Transit signal priority
  - Machine learning
  - Predictive analysis

Deployment Concept – Phase 2/3 Project Team

Safe Trips in a Connected Transportation Network (ST-CTN)



Deployment Concept - Goals

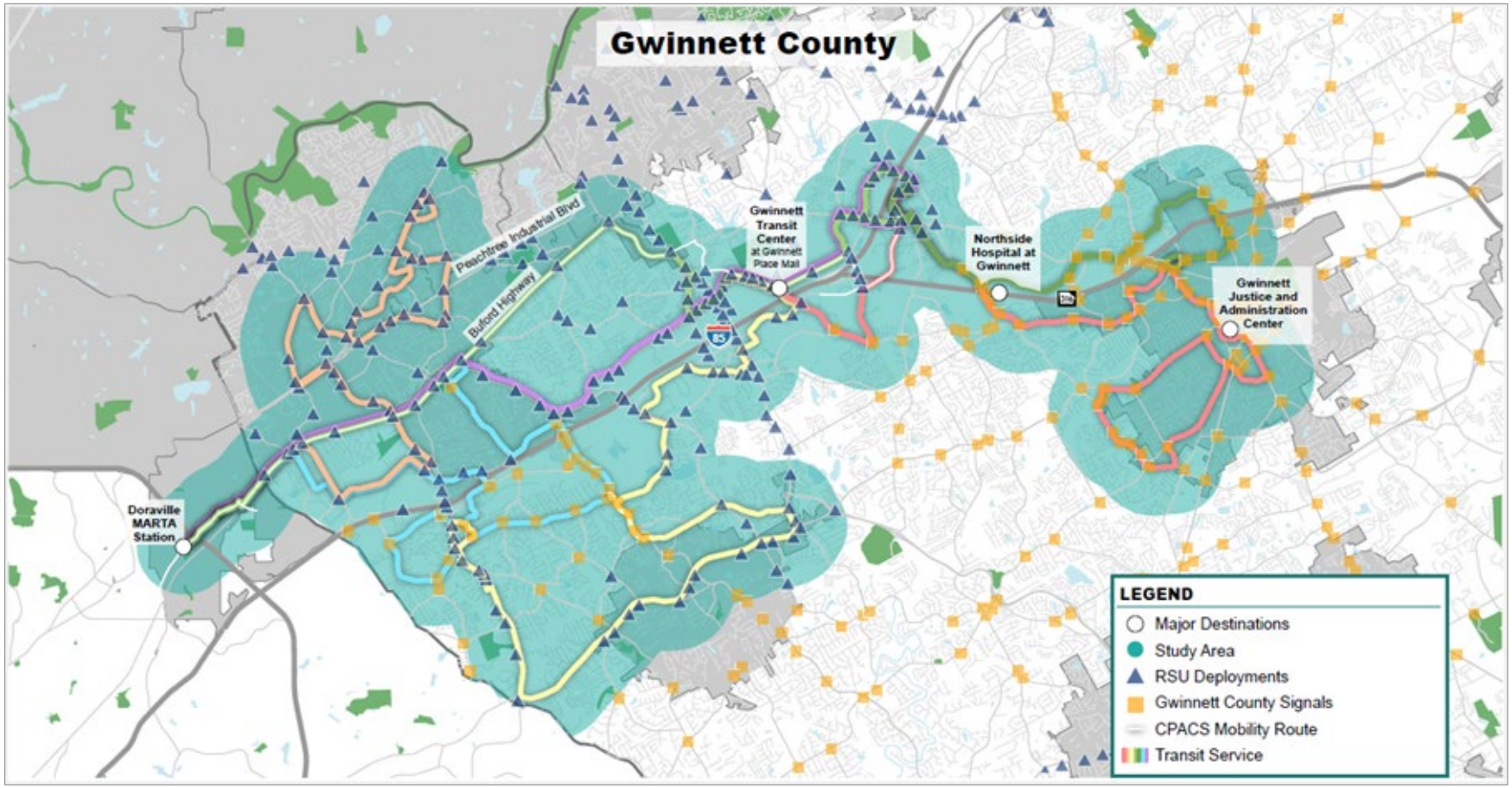
Goal 1: Enhance multimodal complete trip experience with the ST-CTN system functions and features, particularly for underserved communities.

Goal 2: Enhance safety for ST-CTN system users, particularly for underserved communities.

Goal 3: Improve reliability for system users, particularly for underserved communities.

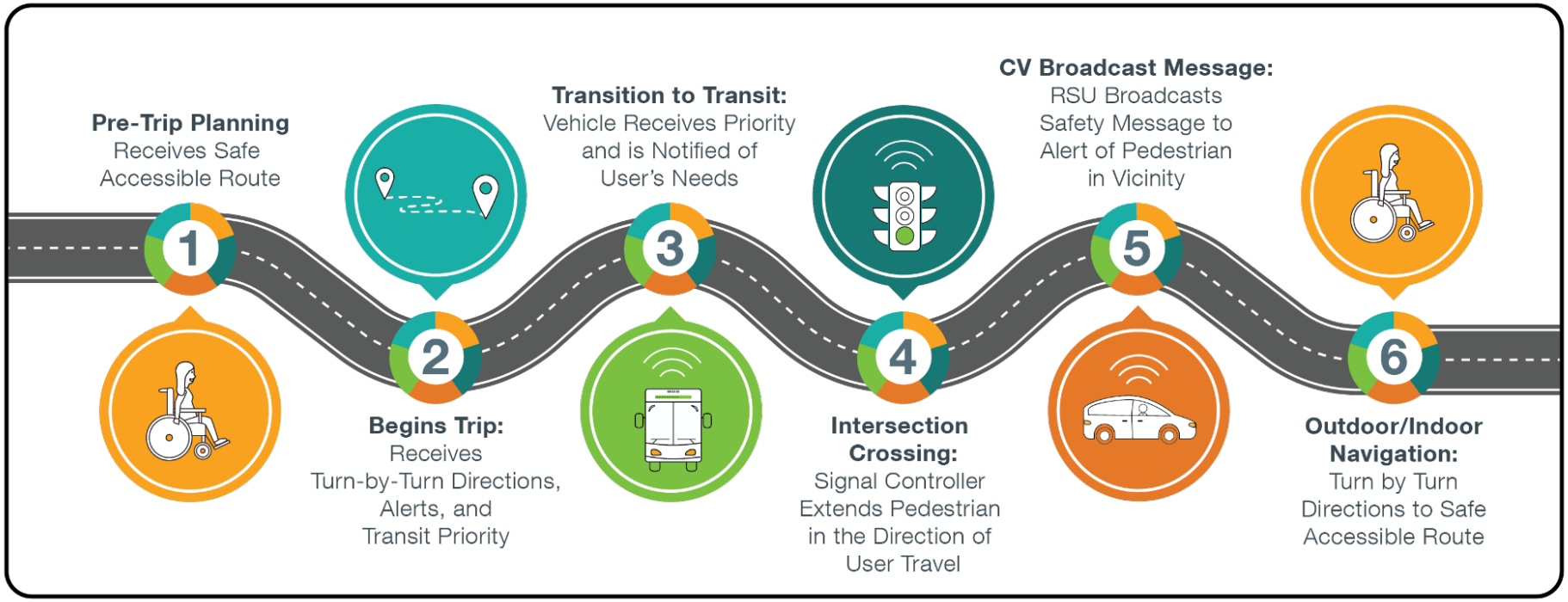
Goal 4: Improve mobility and accessibility for system users, particularly for underserved communities.

Deployment Concept – Deployment Area

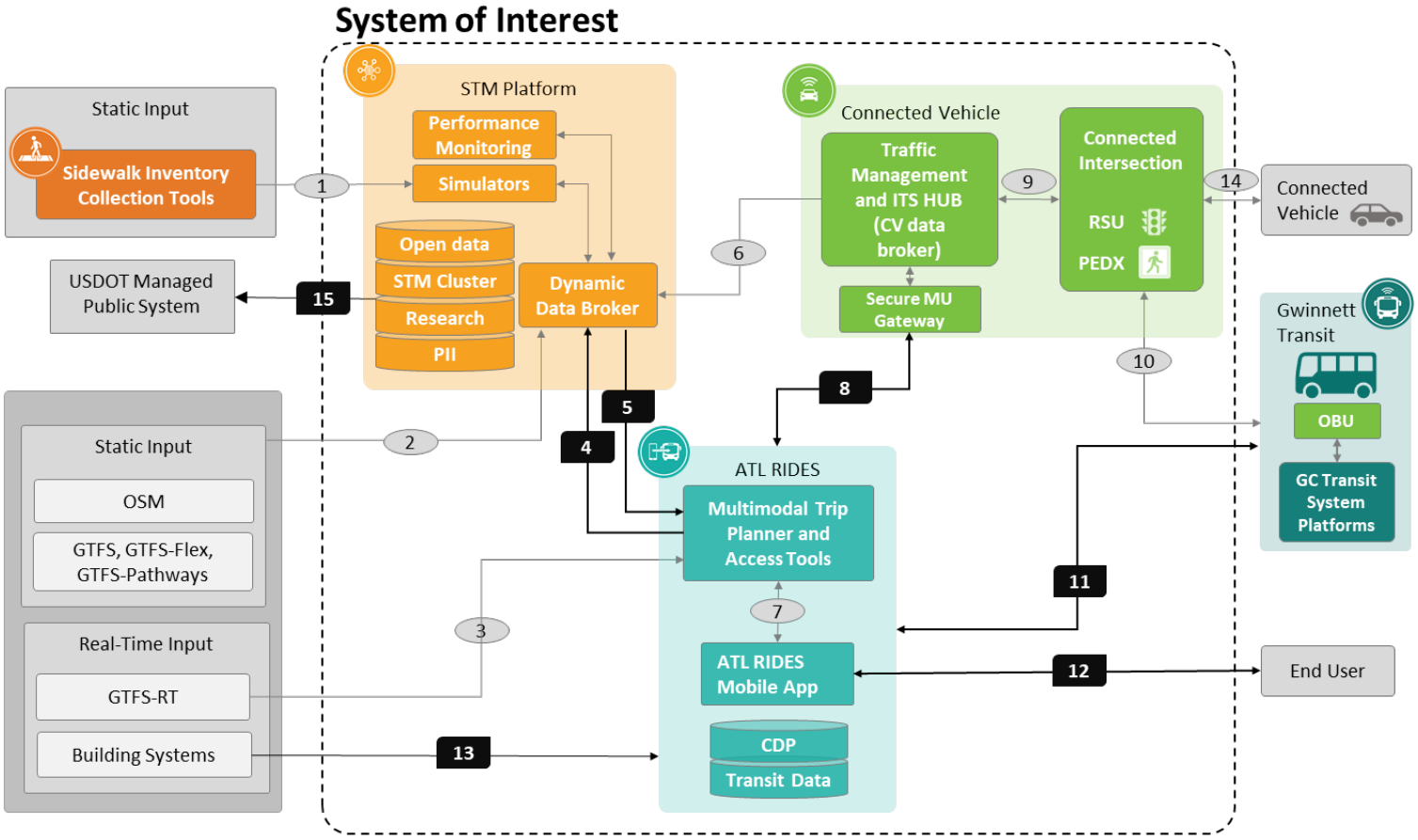


Deployment Concept – Project Overview

Safe Trips in a Connected Transportation Network



Technical Approach – Context Diagram



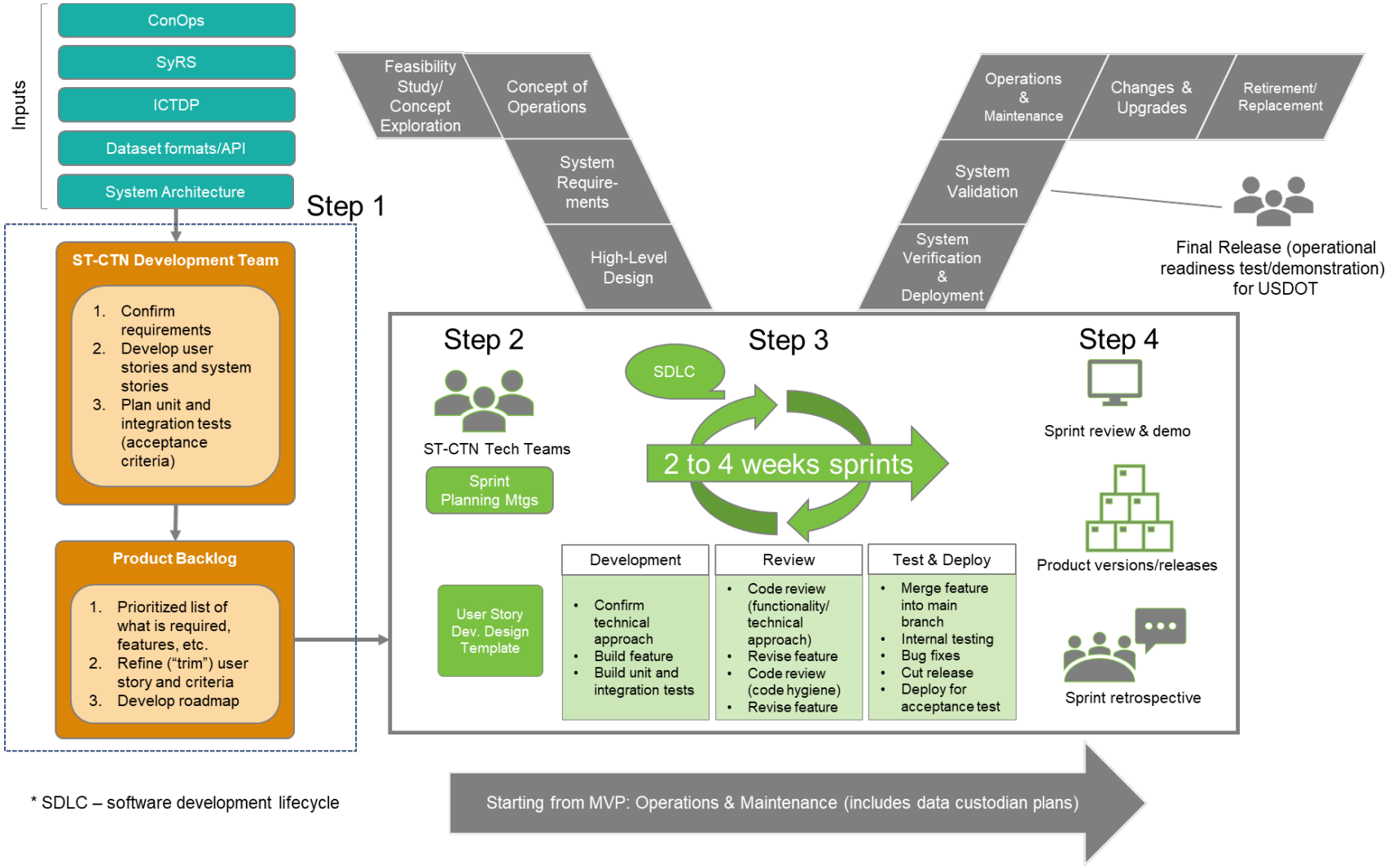
No Change to Data Exchange

New or Upgraded Data Exchange

MU = mobile unit
OBU =onboard unit
RSU = roadside unit

CDP = connected data tools
PEDX = pedestrian signal crossing
PII = personally identifiable data

Technical Approach – Hybrid SE and Agile



* SDLC – software development lifecycle

Phase 2 Milestones

MILESTONE	% COMPLETE
Phase 2 Objectives	
ATL RIDES subsystem functionality supporting customer account management.	100%
Customer accounts (250 users recruited prior to Phase 3).	25%
Space-Time Memory subsystem impedance values for trip routing and execution.	100%
Functionality and equipment installed in Gwinnett County Transit vehicles to support TSP and connection protection.	100%
Sidewalk data collected in the project boundaries.	100%
Facilities outfitted with sensors for indoor navigation.	80%
Operations and maintenance processes (including software updates).	100%
Performance Management Dashboard data ingestion, curation, and analytical processes.	80%

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Heart of Iowa Regional Transit Agency (HIRTA)

Health Connector for the Most Vulnerable: An Inclusive Mobility Experience from Beginning to End

Santosh Mishra, IBI Group

Santosh Mishra

Systems Engineering Lead
Heart of Iowa Regional Transit Agency

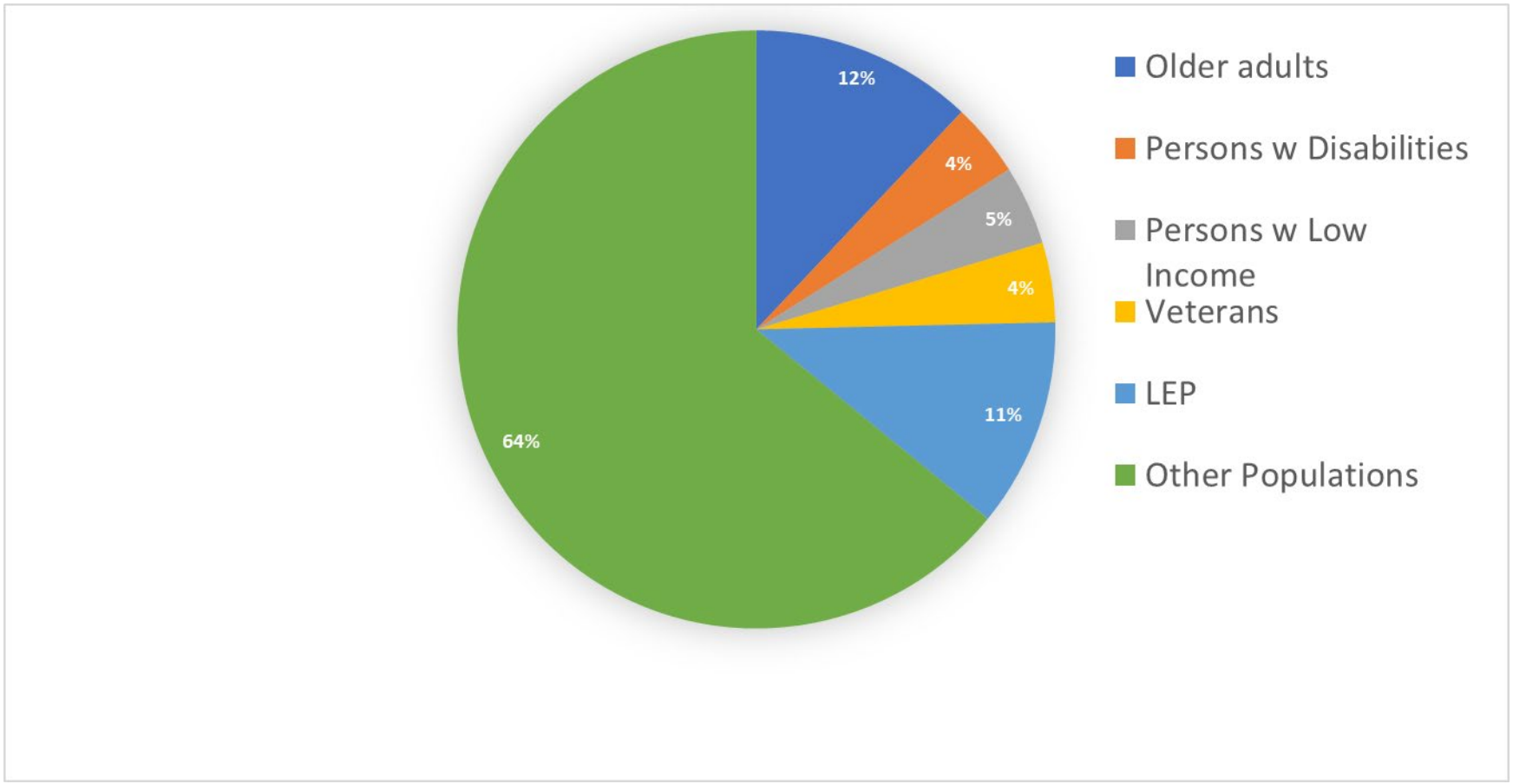
Health Connector for the Most Vulnerable

- Deployment area: Dallas County, Iowa
- Implement a scalable and replicable solution enabling transportation access to healthcare for all underserved populations and their caregivers
  - Use advanced technologies to resolve barriers
- Include information and wayfinding services to guide each step of user's trip
- Provide enhanced access to healthcare options for all travelers in Dallas County, a mostly rural county

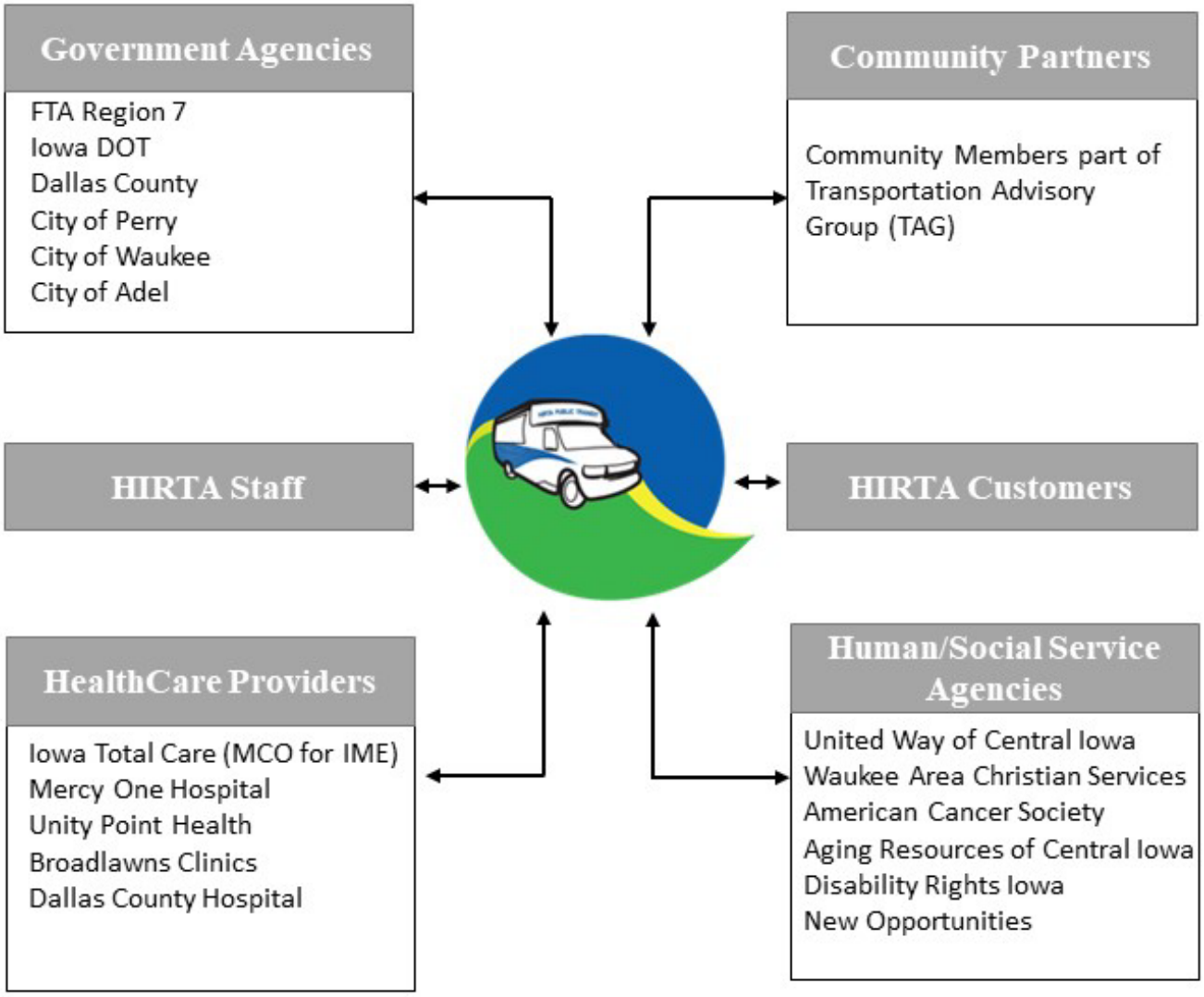
HIRTA and Dallas County Overview

- HIRTA provides demand response services to population in 7 county areas, including Dallas County
- Dallas County grew 36% in the last decade
- Coordination of medical transportation services for underserved a major challenge

Dallas County Underserved Population



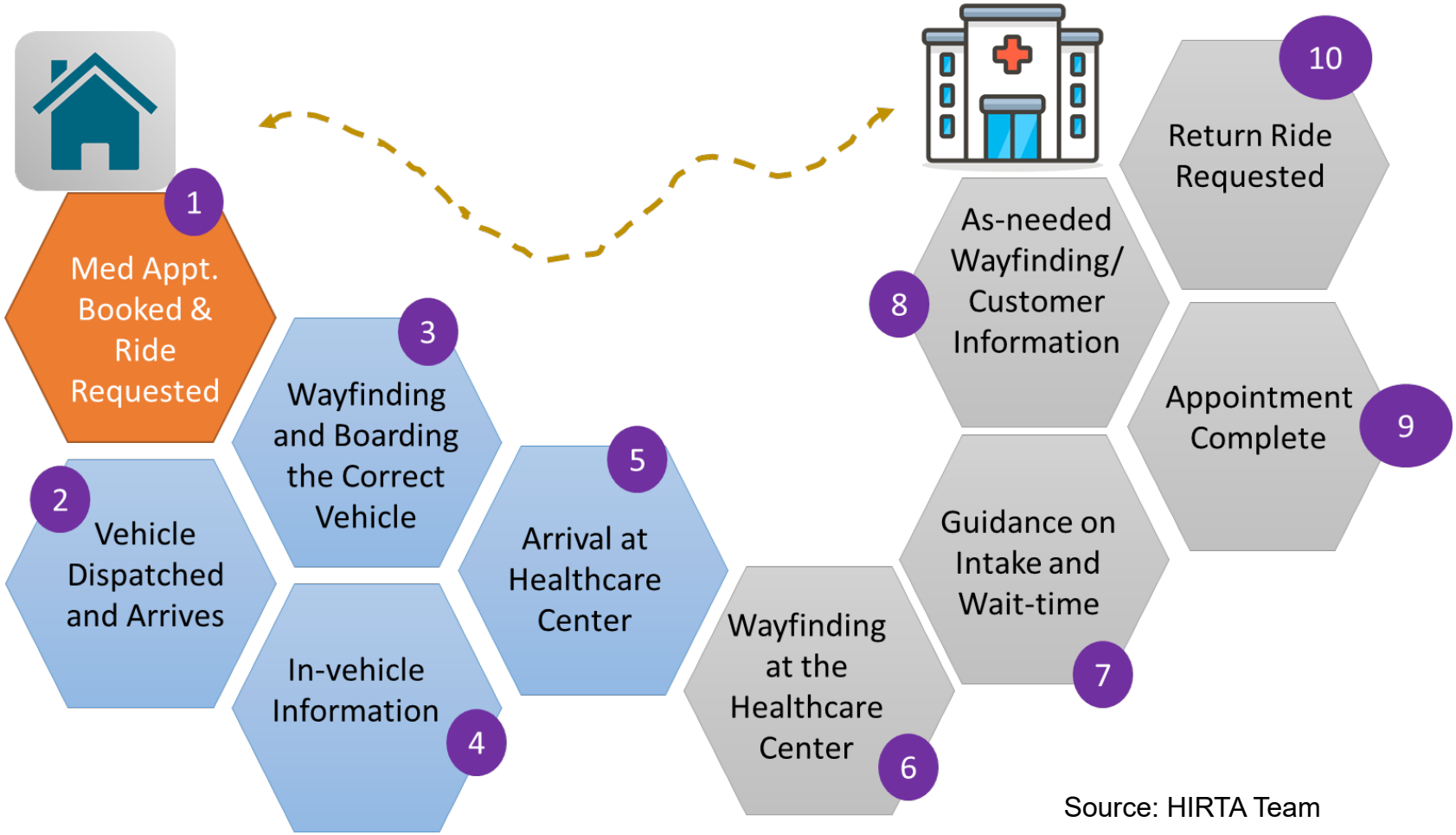
Stakeholders



High-Level Findings from Stakeholders

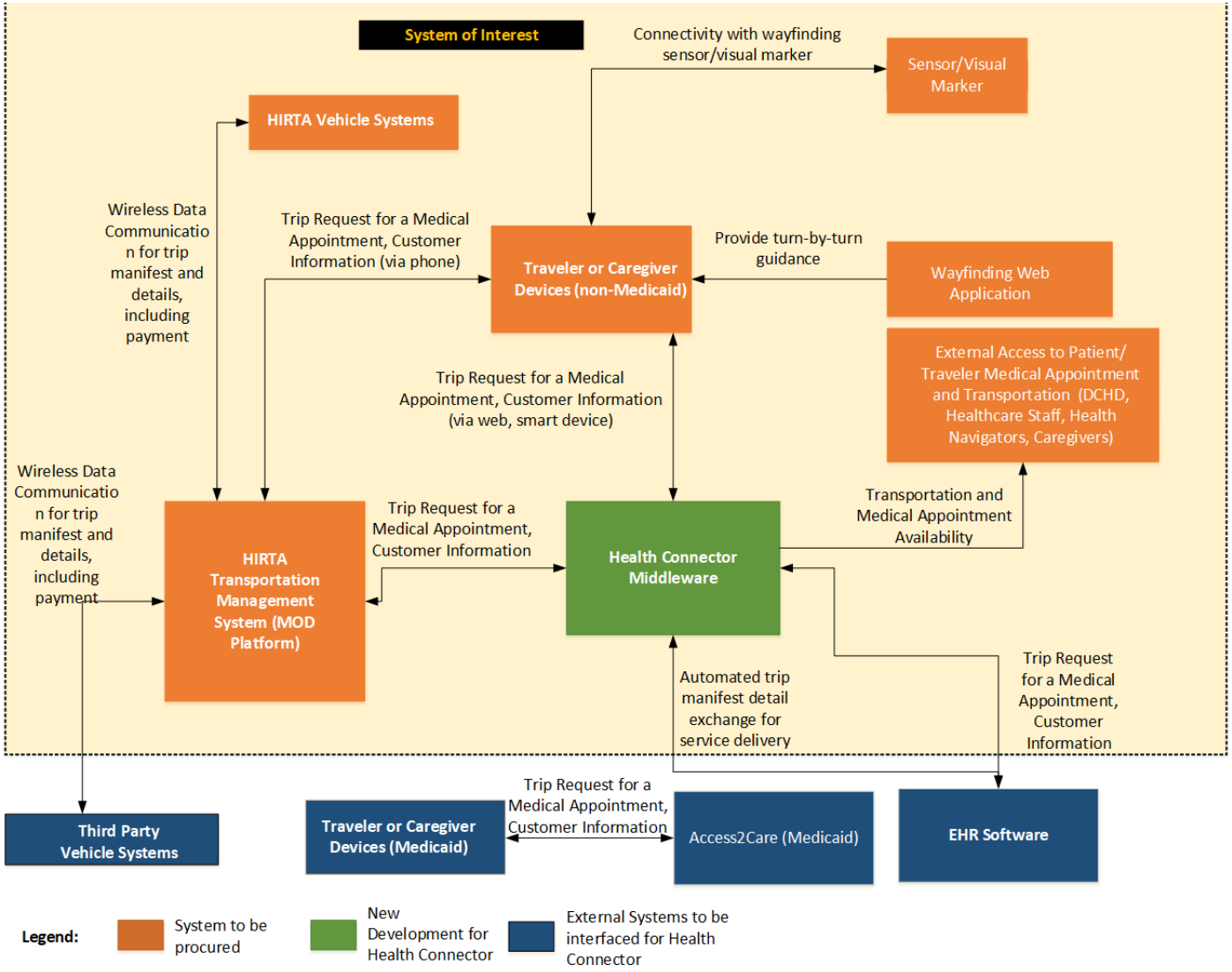
- Lack of awareness on transportation options
- Lack of integrated booking and trip management experience
- Limited capabilities in current modes to meet the needs of underserved
- Limited wayfinding capabilities
- Service management challenges with return trips
- Same day and after hour service issues
- Limited data sharing and reporting to measure the performance of healthcare transportation

Concept Overview



Source: HIRTA Team

System Overview



At-Scale Deployment

Line Item	20% At-Scale Deployment	50% At-Scale Deployment	100% At-Scale Deployment
Service Area	Within 5 miles of City of Perry, Dallas County	Cities of Waukee, Adel and Perry, Dallas County	Entire Dallas County
Number of healthcare facilities	1	2	4
Max number of HIRTA vehicles	2	5	10
Number of contractor vehicles	1	2	5
Max number of trips (HIRTA vehicles)	20	50	100
Max number of trips (contractor vehicles)	5	10	20
Vehicle devices	2	5	10
Number of kiosks	2	2	2
Visual markers for wayfinding			
Vehicles (inside and outside)	4	10	20
Healthcare facility (indoor and outdoor)	20	50	150
Fixed pickup spots	5	15	30

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Niagara Frontier Transportation Authority (NFTA)

Complete Trip Deployment in Buffalo, NY

Deepak Gopalakrishna, ICF

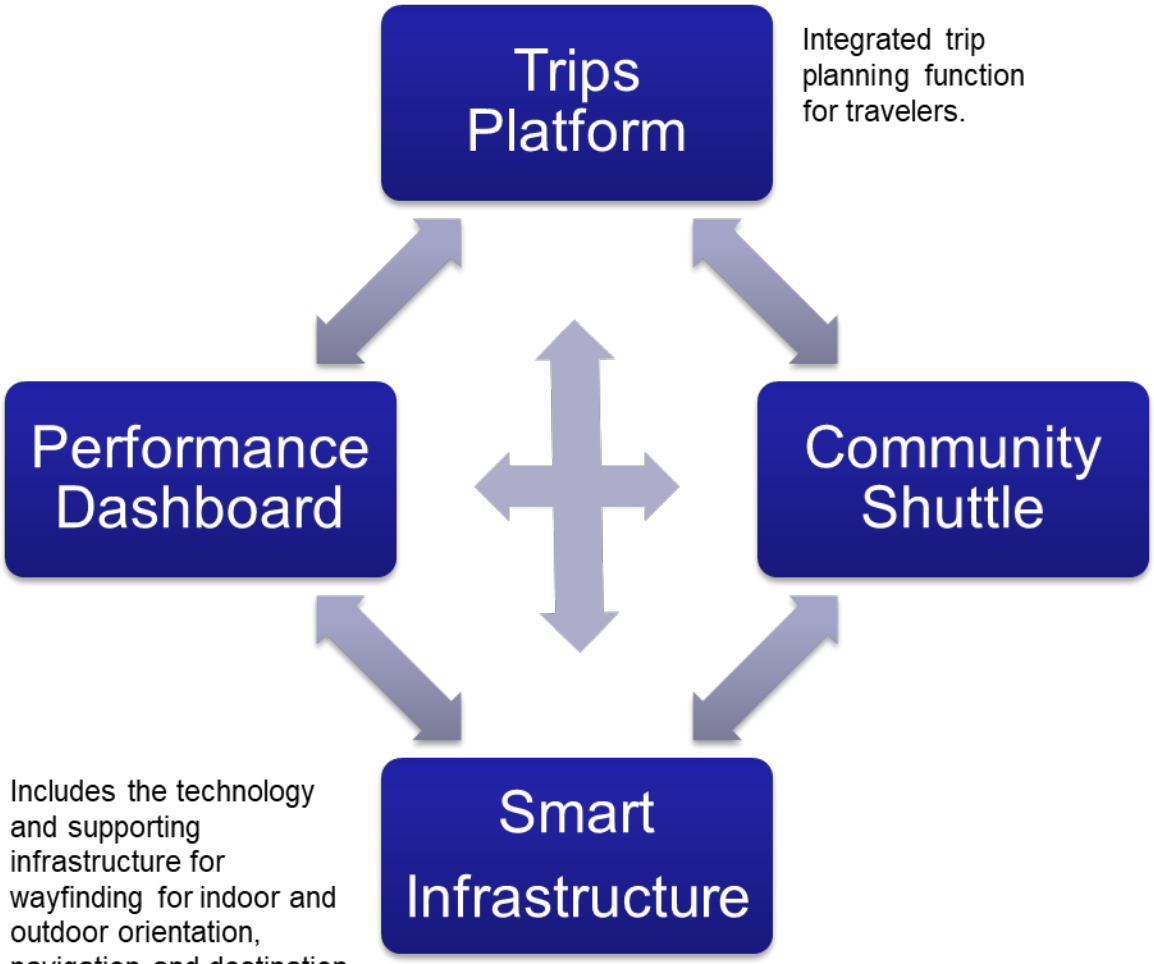
Deepak Gopalakrishna

VP, ICF

Complete Trip Deployment in Buffalo, NY

- Deployment area: Buffalo Niagara Medical Campus
- Deploys new and advanced technologies to address existing mobility and accessibility challenges
- Integrates accessible trip planning too with
  - Current transit services
  - Indoor/outdoor wayfinding
  - On-demand shuttle service
  - Intersection pedestrian safety technologies
- Factors in travelers' preferences and accessibility-related needs for comprehensive trip planning

System Overview



Deployment Objectives

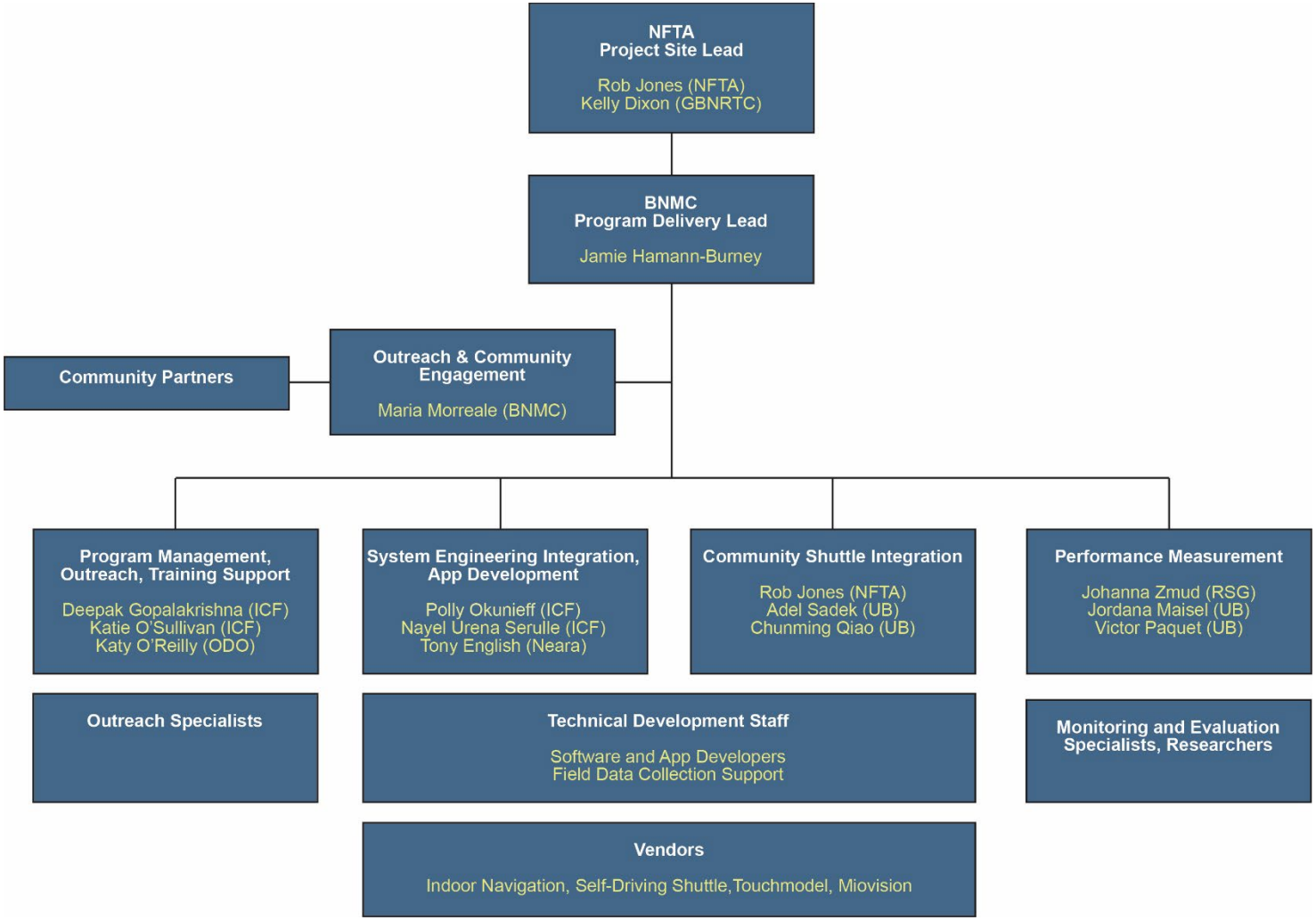
Consistent, continuous trips to, from, and within the BNMC area.

Online and offline ways to receive real time information on services, and infrastructure usability and accessibility.

Trip paths that are **safe, accessible, and compatible** with user-defined preferences and capabilities.

Integrated, flexible, demand-responsive, end-to-end transit options for the community.

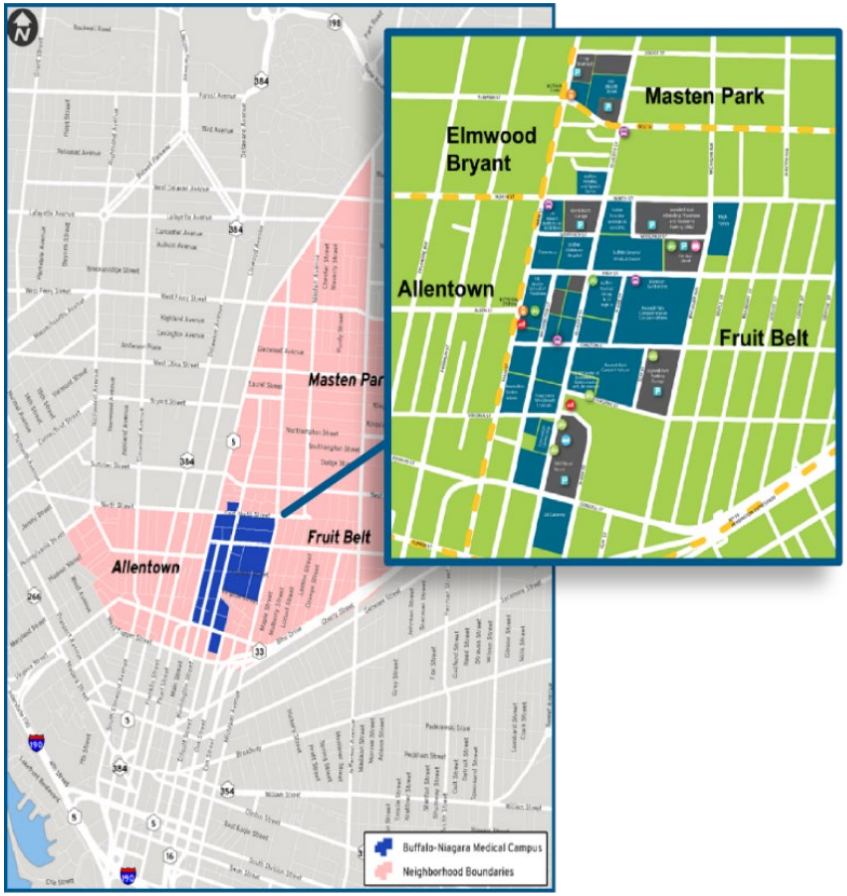
Team Organization



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.



Target Users

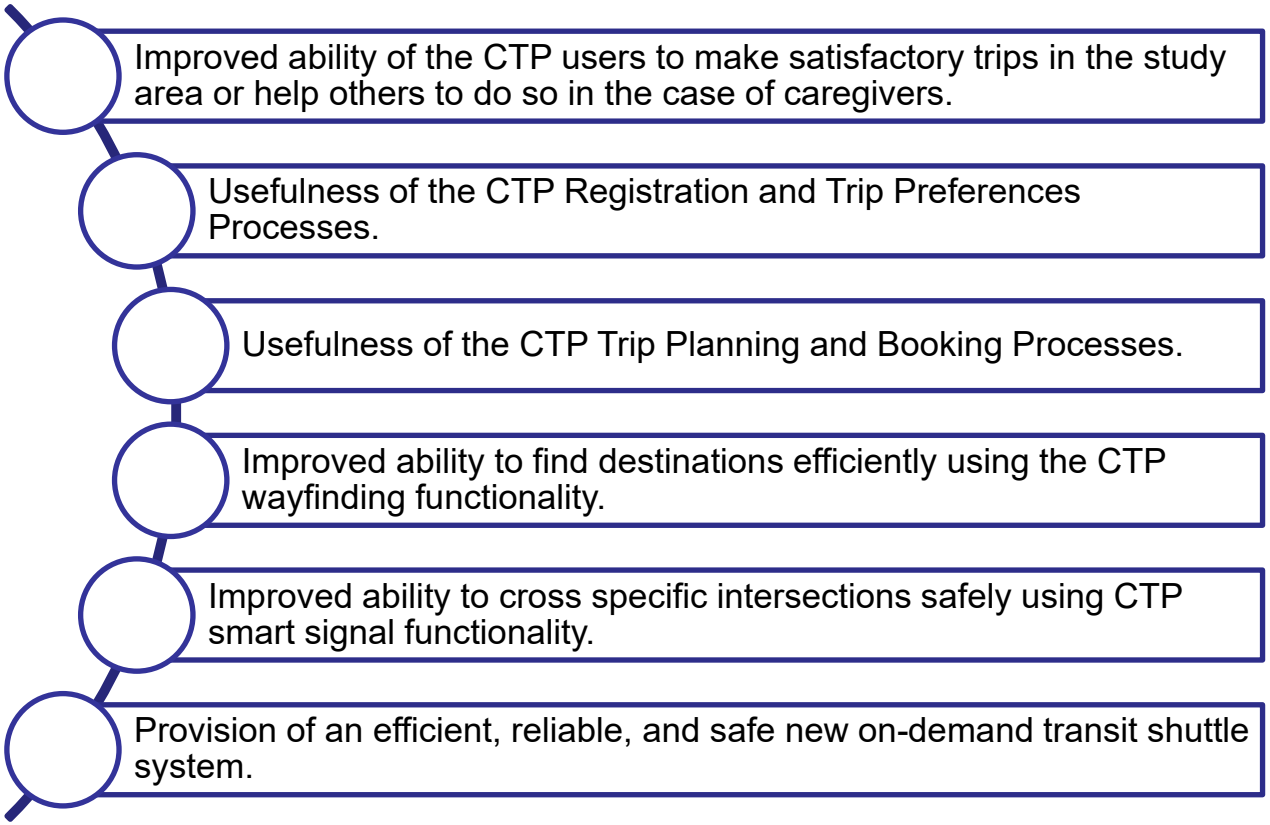
Target Users	Populations of Interest
Persons with Disability (PWD) ▪ Mobility ▪ Vision ▪ Cognitive ▪ Hearing	General Population (Patients, Visitors and Workers at BNMC Partner agencies)
Low Income	Residents of adjacent Fruit Belt, Masten Park & Allentown
Older Adults	Neighborhoods and across Buffalo using BNMC services, transit facilities and healthcare
Limited English Proficiency (LEP)	

At-Scale Deployment Summary

Deployment Element	Estimated Number
Participants	100 participants during Phase 2 to support development and testing of the system and its components. 300-500 participants total in Phase 3 (including Phase 2 participants). Final number will be dependent on the number of people interested in participating. Outreach and recruitment efforts will focus on obtaining the highest and most diverse number of participants possible.
Beacons/Smart Signs	Under 100 devices. The final number is unknown at the time and will be determined once the facilities are measured.
Touch Models	1 model as part of this pilot (location to be determined in Phase 2). Note that pilot will leverage the efforts of an external study that is placing another model at the Innovation Center on the BNMC.
TIH	2 hubs, with location to be determined in Phase 2.
PED-X Intersections	2 intersections, Main St. & Best St. and Ellicott St. & High St. 2 National Transportation Communications for Intelligent Transportation System Protocol (NTCIP) Supported MioVision platform to serve as a communications broker / gateway (one per intersection, total number: 2).
Vehicles	A maximum of 4 shuttles , a combination of SDS and HDS. Phase 2 will start with 2 shuttles for testing and integration efforts, and 2 additional shuttles will be added in Phase 3. SDS Vehicles: 1-2 (note: the number will depend on the procurement) HDS Vehicles: 2-3 depending on the service plan and demand.
Online/Offline Platforms	1 CTP website and mobile application. 1 Performance Dashboard.

Performance Measures and Outcomes

The performance measures listed below were developed based on 10 use cases and the data that will be available. Note that **each measure has a set of metrics and targets** that allows the research team to assess each measure.



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University of Washington

ITS4US Deployment Project: Transportation Data Equity Initiative

Anat Caspi, PhD, UW

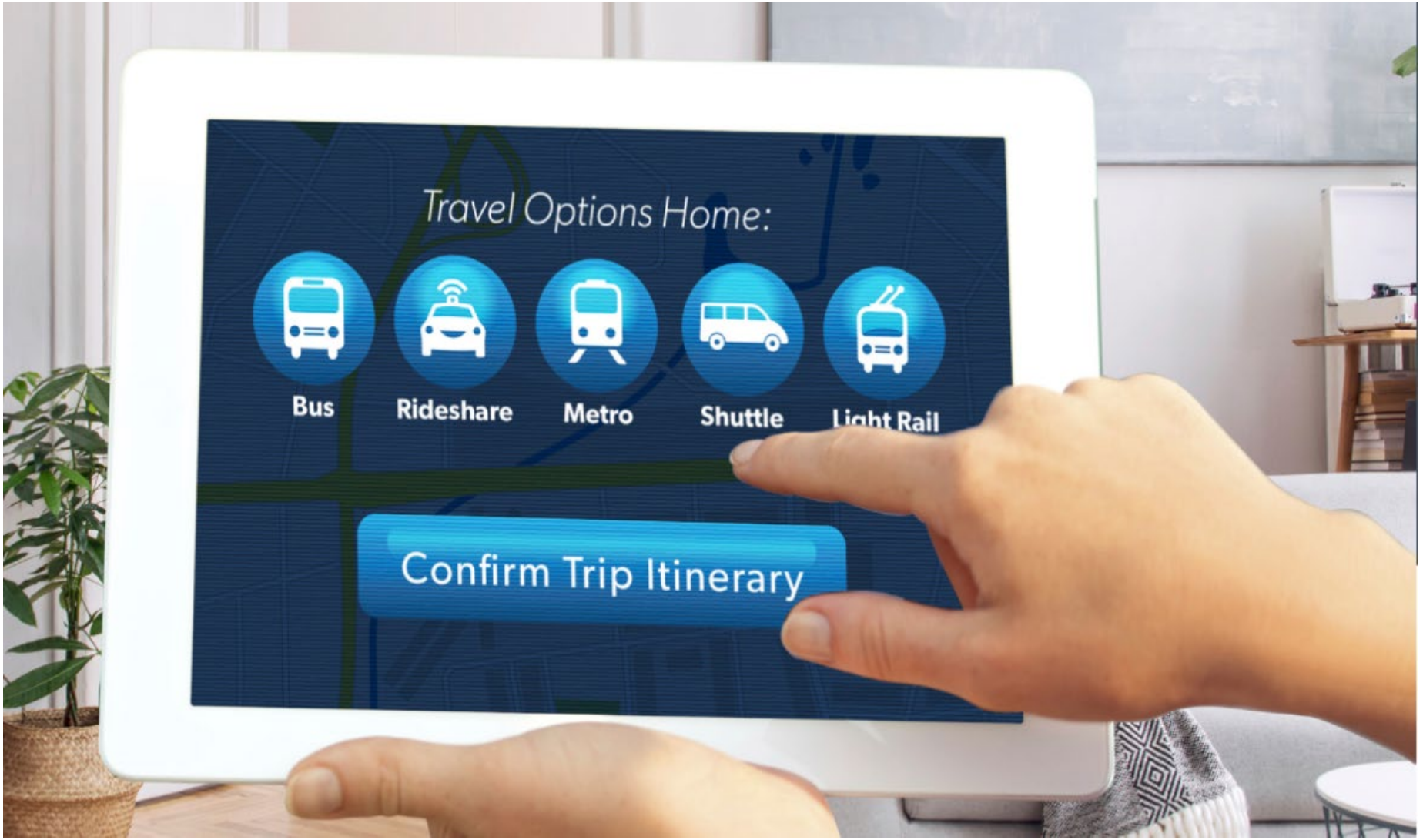
Anat Caspi, PhD

PI, Deployment Lead
University of Washington

Transportation Data Equity Initiative

- Deployment area: Washington, Oregon, and Maryland
- Create tools and infrastructure for public and private data sharing for interoperable transportation data that provide equitable navigation and discovery outcomes for all travelers irrespective of location, income, or disability
- Includes three main activities:
  - Work with existing standards committees to refine the OpenSidewalks, GTFS-Flex, and GTFS-Pathways data standards
  - Develop tools to collect, store and share the data generated using these data standards
  - Demonstrate uses of the three data using three unique accessible mobility applications

Trip Information Gaps



Using a tool like directions on Google Maps doesn't really help me get around. Actually sometimes this does more harm than good. I'm sent down streets I can't cross, or up inclines that are impossible to climb. It can be deeply frustrating.

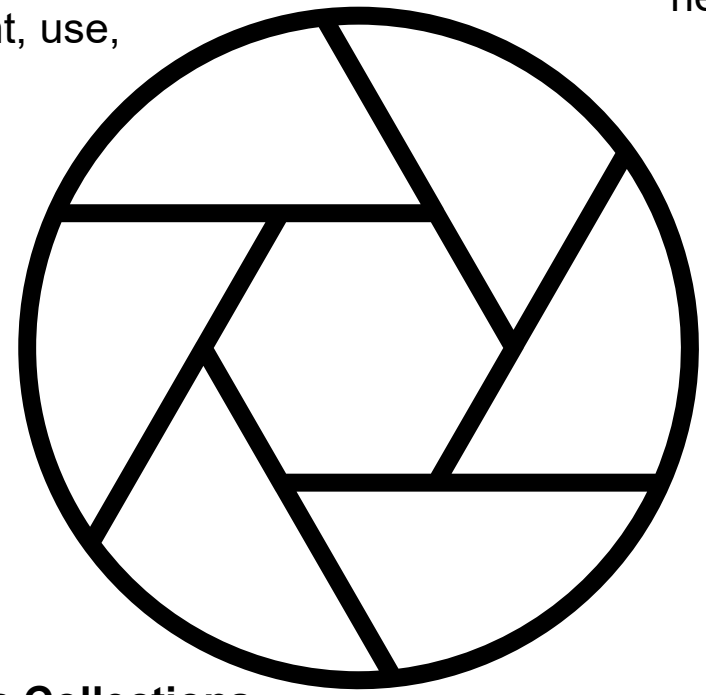
"

Traveler Quote

Deployment Approach

Thriving Diverse Community
Creating a diverse data stewardship community working to center the voices of all travelers, focused on mobility data creation, maintenance, measurement, use, and improvement.

Mobility Data Specifications
Pragmatic extension and updates to designed to meet producer, developer and traveler needs.



High Quality Data
Build usable tools to enable data collection and vetting for diverse data tenants.

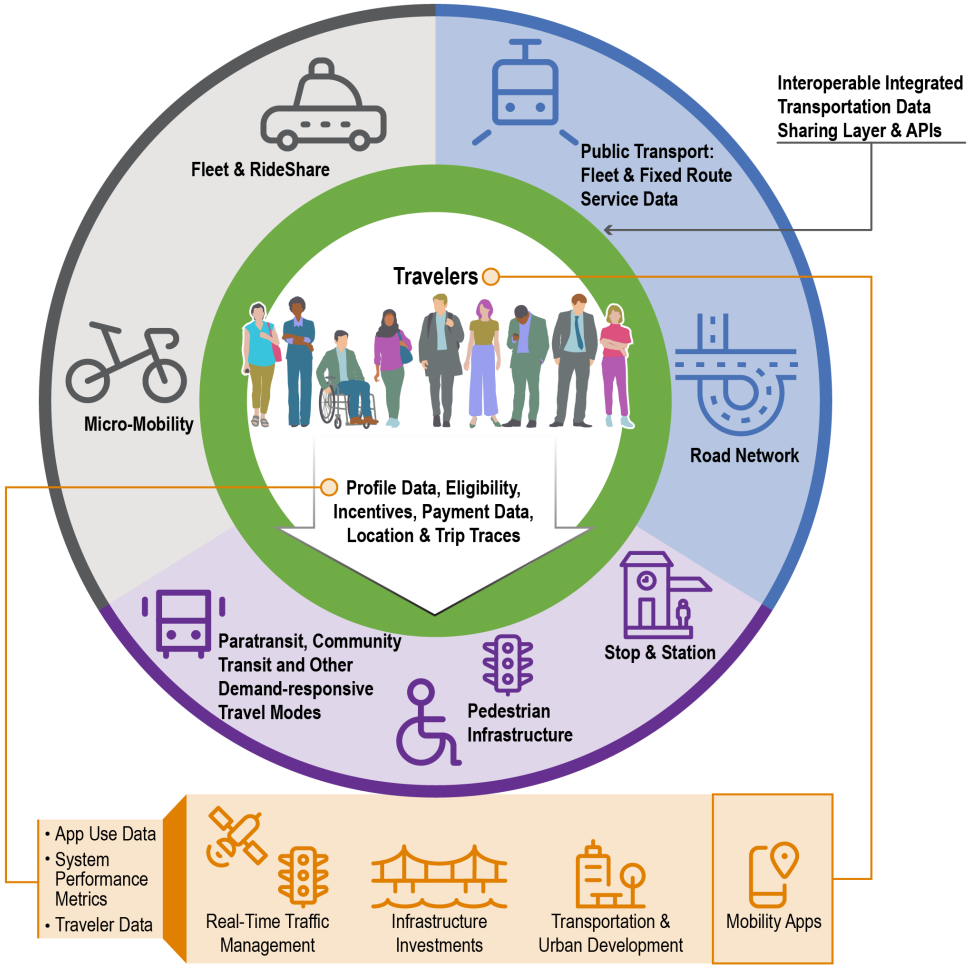
Demonstrative Data Uses
Build demonstrative data consuming applications to demonstrate the utility and resilience of the data infrastructure in varied traveler settings.

Responsible Data Governance
Build provenance tools and best practices to encourage meta data collection, confidence metrics, safe and private interoperability across agencies and regions.

Pilot Data Collections
Build Demonstrative datasets in pilot regions to demonstrate use of built data infrastructure.

Transportation Data Equity Initiative Overview

All travelers need useful travel data they can trust.



Main Project Goals

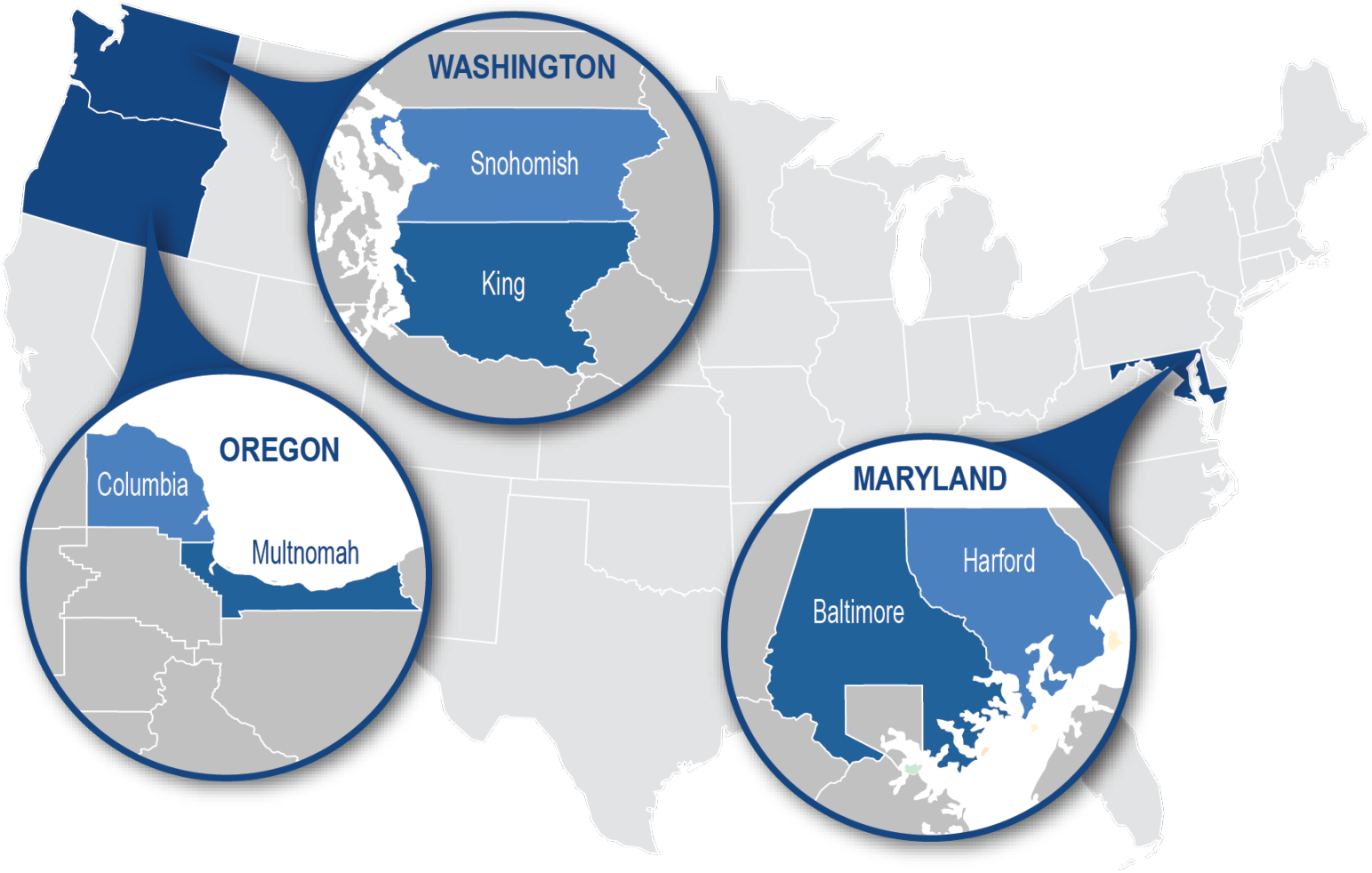
This project is designed to create, modify and improve data standards and data integration, validation and maintenance tools necessary for modern applications to provide mobility benefits more equitably.

Transportation Data Equity
an initiative by TCAT & UW TRAC

TCAT The Taskar Center for Accessible Technology

Coordinate collaborative releases of data standards	Publish and maintain interoperable data infrastructure	Deploy and sustain three accessible mobility applications
OpenSidewalks	Data Collection	Multimodal AccessMap
GTFS-Pathways	Data Vetting	Soundscape
GTFS-Flex	Data Provisioning Services	Audium

Deployment Sites



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https://its.dot.gov/its4us/

Questions & Answers