



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 graphic with a dashed orange line and two red location pins, suggesting a route or journey.

University of Washington  
Phase 1 Performance Measurement and  
Evaluation Support Plan Webinar

November 1, 2021

# Agenda

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- **Purpose of this Webinar**

- To share the submitted Performance Measurement Plan from the University of Washington with the stakeholders of the project and ITS4US community.

- **Webinar Content**

- Complete Trip – ITS4US Deployment Program Overview (Kate Hartman)
- Site Orientation & Deployment Concept Overview (Anat Caspi)
- Performance Measurement and Evaluation Support Plan (Mark Hallenbeck)
- Stakeholder Q&A
- How to Stay Connected (Kate Hartman)

- **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

# Program Overview

**Kate Hartman, ITS JPO/FHWA, Site COR**

# ITS4US Program Overview

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- 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***

# The Complete Trip Concept

*Complete Trip:* An individual's ability to go from origin to destination reliably, spontaneously, confidently, independently, safely, and efficiently without gaps in the travel chain.



# 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

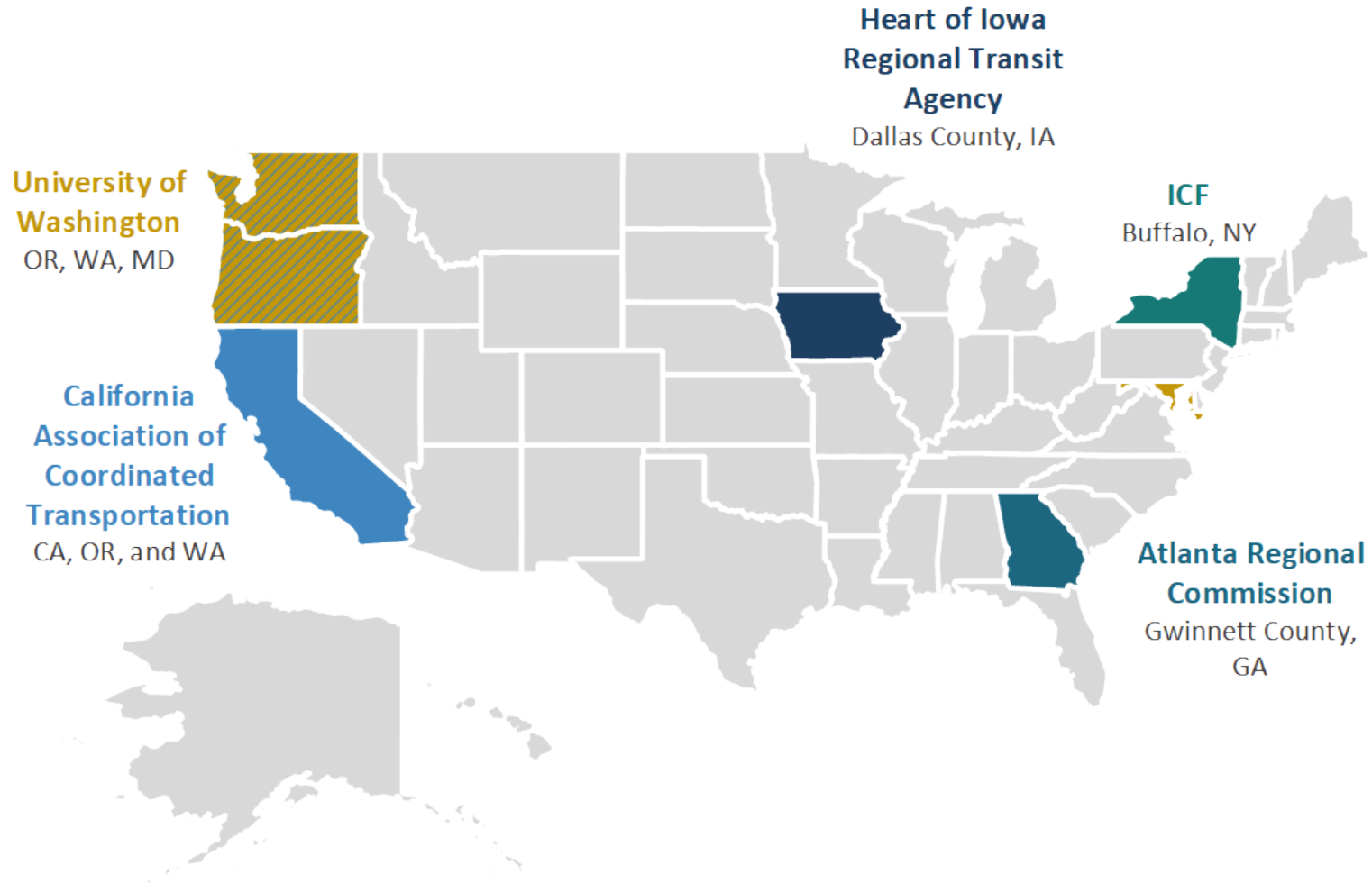


Measure impact of integrated deployments

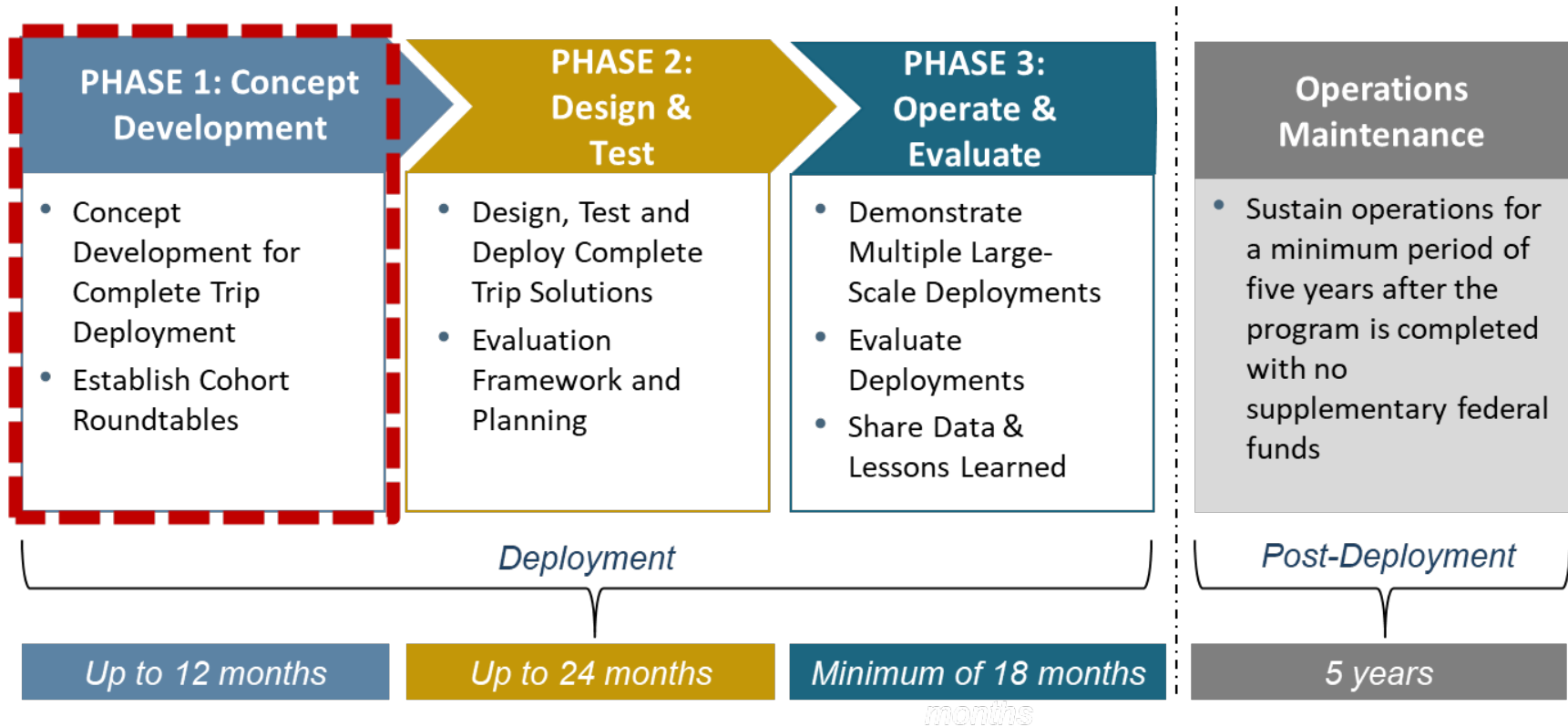


Identify replicable solutions and disseminate lessons learned

# Complete Trip Phase 1 Awardees



# Deployment Phases



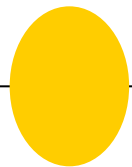


# UW Transportation Data Equity Initiative Overview

Anat Caspi, PI



# Introduction to the Transportation Data Equity Initiative



Anat Caspi, PhD,  
Taskar Center for Accessible Technology  
University of Washington, 2021-07-26



**TCAT** The Taskar Center for Accessible Technology

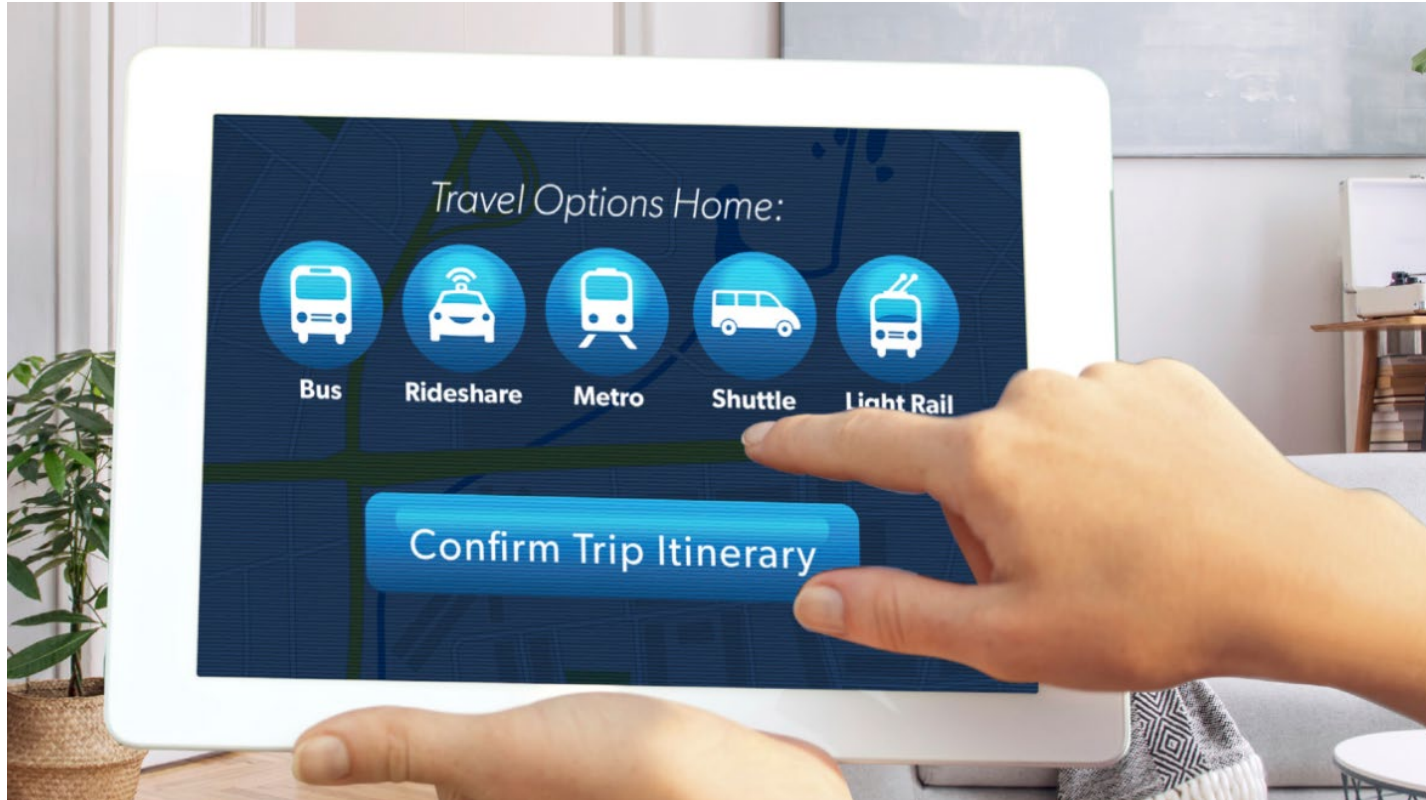


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# Complete Trip Information Gaps



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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

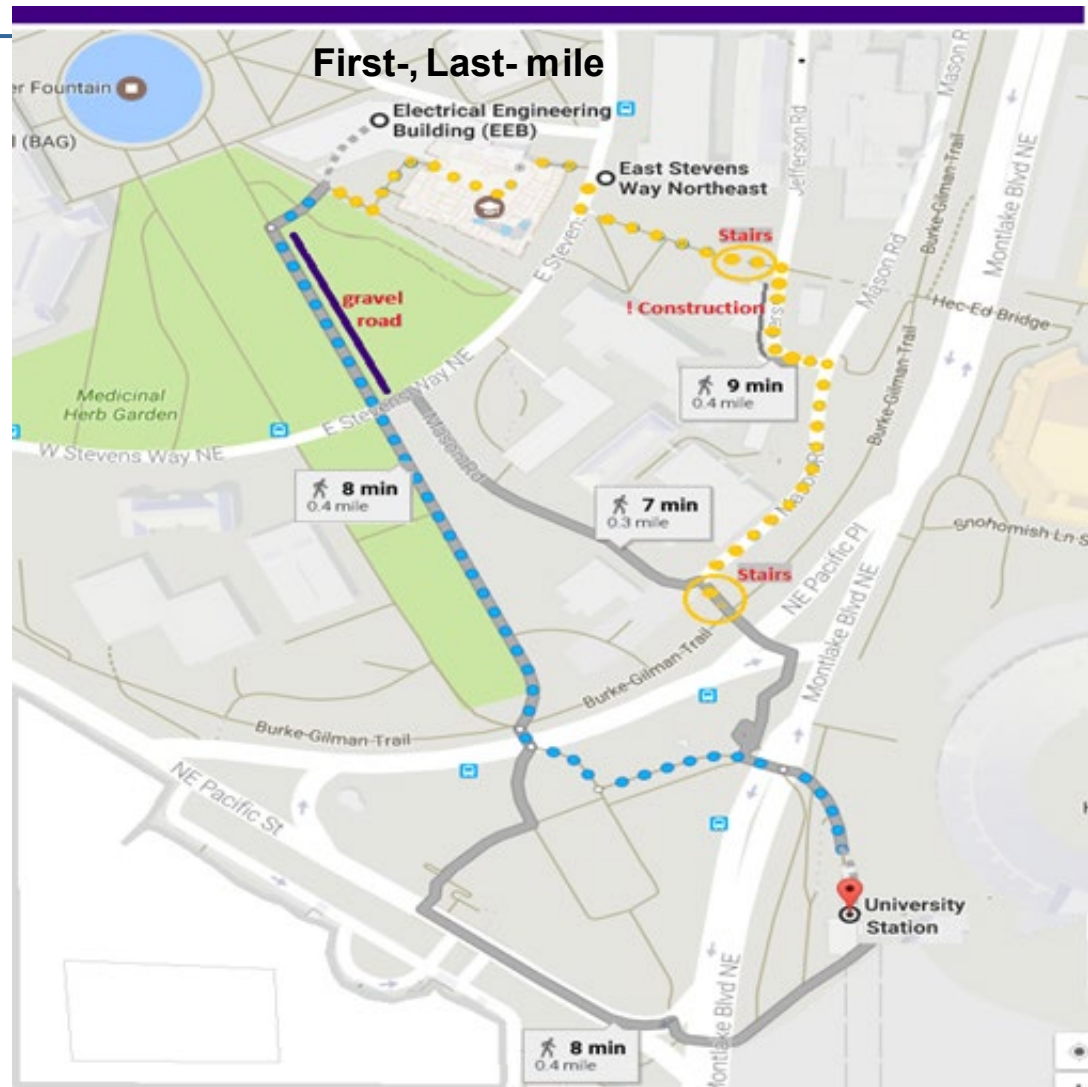
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# Current “Pedestrian” Trip Planning





## What information do people want?

We talked to people. And they do not agreed about what information they need, including people in groups normally treated as a monolith like manual wheelchair users.

The TDEI follows a **participatory design** approach.





## Current “accessibility” Resources

Static maps that are:

- Cluttered
- Complex
- Moderately accurate
- Difficult and costly to maintain
- Non-routable

(PDF)

# Barriers for Travelers with Specific Travel Preferences or Requirements

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**Accessible sidewalk routes remain largely unknown, particularly when factoring in user-specific preferences.**

**Flexible paratransit service is not shared in a standard format, even among agencies that utilize GTFS.**

**Transit station pathways and features are not currently available in digitized 3D formats.**

**Limited mobile applications exist to create accessible Complete Trip information across multimodal links.**



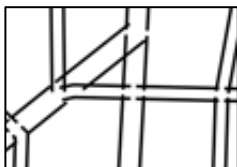
# Current Challenges with Sidewalk and Transit Data

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- **Siloed systems**
- **Data is not standardized**
- **Data differs in availability based on geography**
- **Data about infrastructure rarely describes connectivity of paths or transportation network**

**Seattle:**

**disconnected centerlines**



**Portland:**

**polygons with holes in them for planters**



**San Francisco:**

**just the curbs and they're not even right**

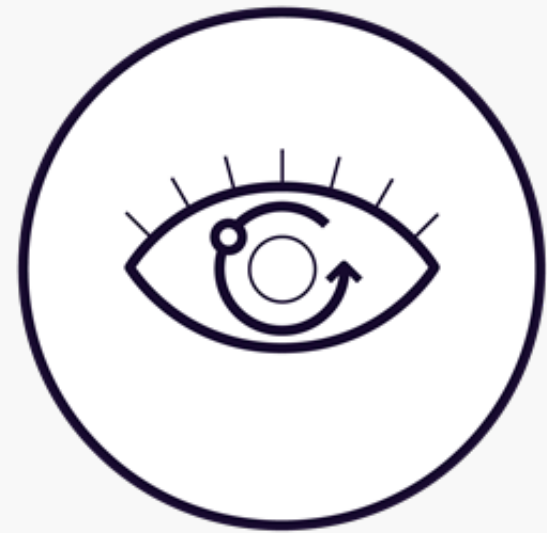


## Our Vision

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The UW ITS4US project envisions a world where people can choose from multiple options for travel, whether by walking, rolling, cycling, carpooling, and specifically **using public or on-demand transit.**

Our team strives to make it **easy and efficient for travelers of all abilities and means** to access the complete trip wherever they go.



TDEI motivation I : Behind every useful mobility app is a **complex data pipeline**. To provide reliable & intuitive travel discovery and directions, public agencies and private companies need **shared data and tools to represent all travel environments and services**.

# What is a Data Pipeline?

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- A data pipeline is a set of actions that receive raw data from disparate sources, may clean, denoise and manipulate the data, and finally move the data to a destination for storage, query and analysis.
- What happens to the data along the way depends upon the business use case and the destination itself.



## Focus: travel environments/services

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### OpenSidewalks-Sidewalks and Pedestrian Paths

GTFS-Flex - Partly adopted, not representative of community interests

GTFS-Pathway - not fully representative of communities of interest

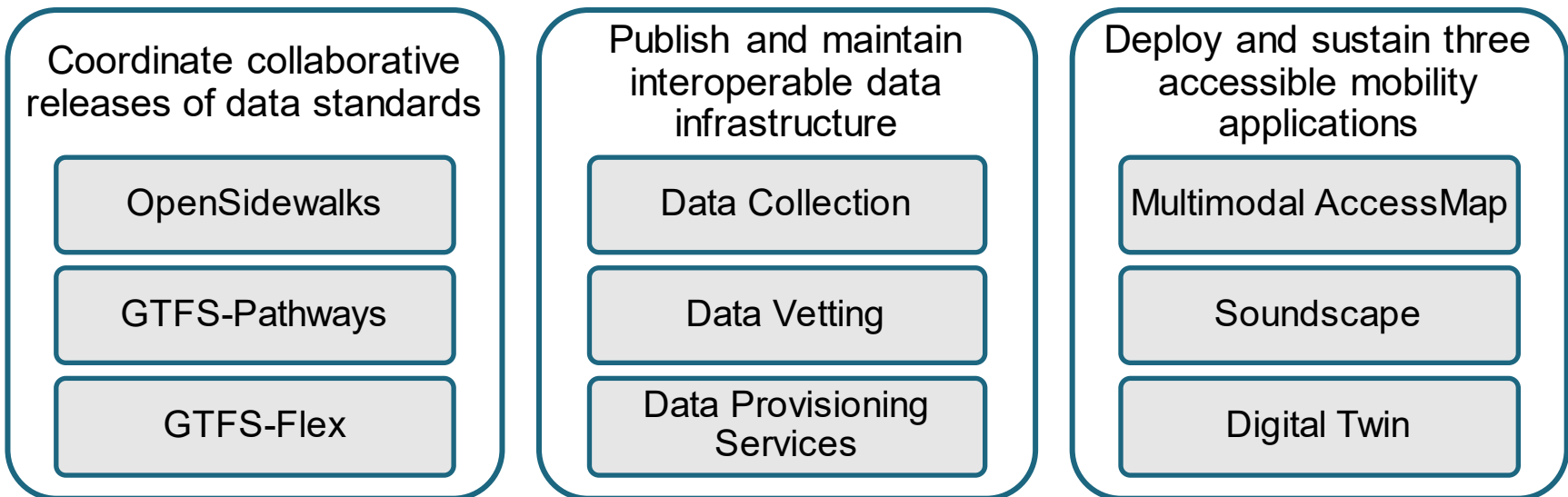


TDEI motivation II : Reliable, **objective, detailed consistent, standardized** shared data and tools can enable neutral data analysis, to better understand travel barriers and inequities, and to improve data-driven resource allocation.

Specifically: No subjective labeling (accessible/inaccessible)

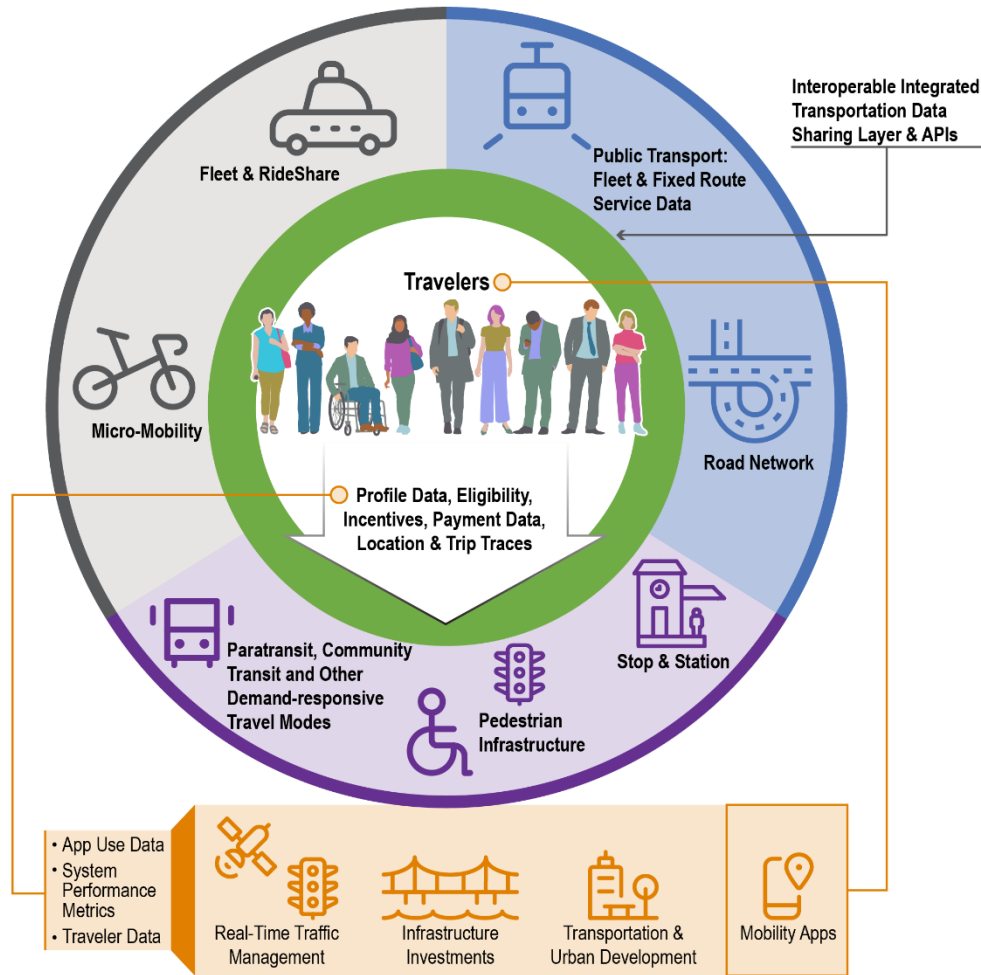
# UW ITS4US Project Main Goals

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.



# Complete Trips Informed by Data Standards

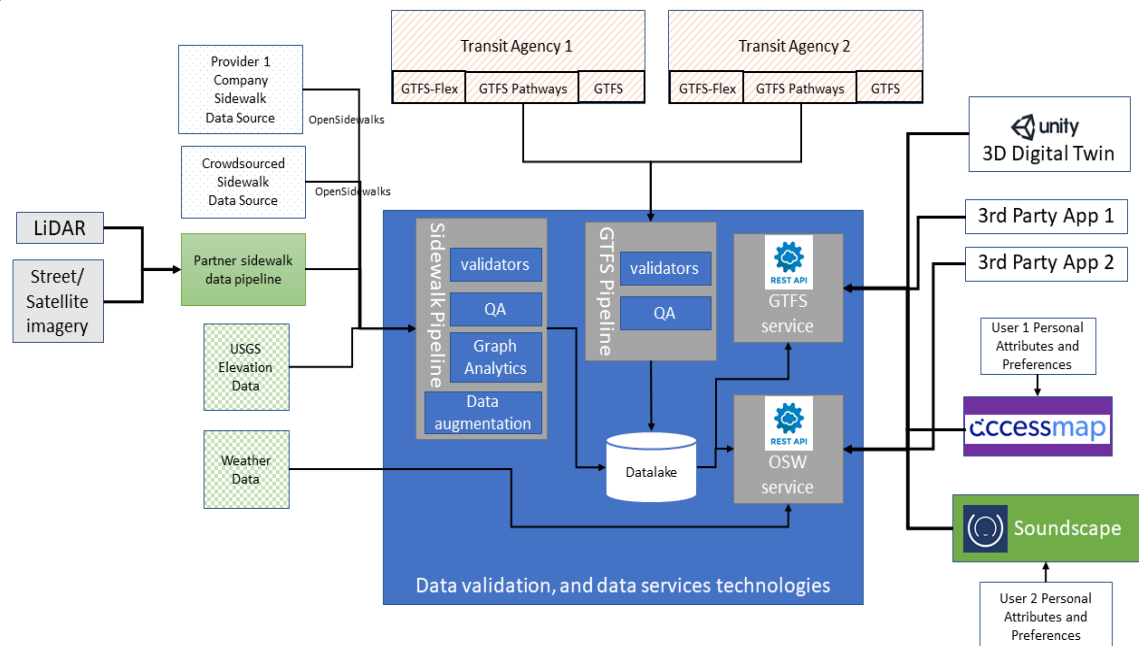
**Problem:**  
*All travelers* need usable information they can trust.





# Integrated Deployment

- Our data standards and data tools work directly to generate the data our user facing applications require to meet user needs
- Our partnerships with industry are designed to scale that data nationally, with supporting data licensing agreements
- Our applications demonstrate the use of the APIs – and are designed to lead to large numbers of additional, nationally available applications



## Our Regional Foci and Partners



Baltimore and Harford Counties, MD



Multnomah and Columbia Counties, OR



King and Snohomish Counties, WA



Source: Geology.com

# Anticipated Benefits

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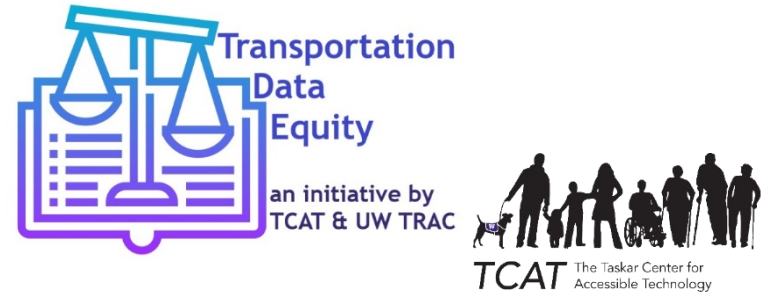
- Defined **data standards specifications** to provide data format and content guidance for data sharing
- Ease of **geographic scalability**
- **Expandable solutions** enabled through community of third-party application developers
- **Increased access** to transit services by riders
- Improved capabilities for infrastructure owner operators to **document and receive feedback** on their infrastructure assets
- Improved **Complete Trip experience** for users with specific travel preferences
- Improved **pathway user experience** for pedestrians
- Improved **transit experience** for users who require fixed or on-demand transportation service information
- Improved experiences **navigating transit stations and facilities**
- Defined **single integration point** for interested data producers, contributors, and aggregators to send their data

# Performance Measurement Plan Overview

Mark Hallenbeck, Project Management Lead

# Performance Measures Aimed At Project Goals

Expanded view of goals to account for project areas of interest.



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Coordinate collaborative releases of data standards

- OpenSidewalks
- GTFS-Pathways
- GTFS-Flex

Publish and maintain interoperable data infrastructure

- Data Collection 2
- Data Vetting 3
- Data Provisioning Services 4

5

Deploy and sustain three accessible mobility applications

- Multimodal AccessMap
- Soundscape
- Digital Twin

# Measuring Project Success

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- Evaluation Design
  - Not a before / after evaluation
    - Most of these data simply don't exist right now
  
- Are we succeeding in generating the building blocks of the system we envision?
  - Status of data and system deployment
    - Is the system likely to continue to grow?
    - Data availability / quality / use
  - Level of acceptance and participation

# Measuring Project Success

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- Data required are mostly generated as part of the operation of the system being built for the project
  - There is relatively little “extra” data collection
    - Surveys of stakeholders/users
    - Some lab / limited field testing
  
- Use data we are already generating to help manage the project
  - How well are our data tools working?
  - How much data have we generated?
  - Is the data service being used?
  - Is the data service supplying data to applications efficiently?

# Measuring Project Success

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- Are the data we are collecting meeting user needs?
  - Does everyone agree with those standards?
- Status of the data collection / generation effort?
  - How much has been collected?
- Status of the vetting process needed to quality check / maintain the data?
- Are the data readily & efficiently accessed by applications?
- Do the demonstration apps function as intended?



# Performance Measures – Data Standards

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- Data standards meet user needs & are widely adopted
  - Stakeholder surveys
    - Separate surveys for each data standard
      - Do the data in the standard close the identified information gaps?
  - Are agencies/jurisdictions using the refined standards?
    - Number of agencies/jurisdictions submitting data
      - Growth in number over time
    - Data available from TDEI

# Performance Measures – Data Generation

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- Data Quality meets needs –  
(Data Tools Work Well)
  - Stakeholder survey of data quality and availability
    - Both data producers and data users/vetting partners
  - Number & nature of errors reported from both manual vetting software for OSW & automated vetting of GTFS-Flex and GTFS-Pathways

# Performance Measures – Data Generation

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- Data are Widely Available (within 6 counties)
  - Number/percentage of jurisdictions / organizations / agencies participating
  - Number/percentage of transit centers in the dataset
  - Percentage of centerline miles of roadway evaluated for sidewalks
  - Completeness of routable OSW data
  
- FYI - Report number of agencies outside of 6 counties submitting data

# Performance Measures – Data Generation

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- Uploading of data
  - Number/percentage of uploads without errors
  
- Vetting feedback is being responded to
  - Number of vetting checks by data owner
    - Vetting API keeps track of bi-directional communication
  - (Stakeholder survey RE: feedback process)

# Performance Measures – Data Vetting

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- Number/fraction of agencies actively vetting data
  - (Vetting APIs)
- Community groups participating in the vetting process
  - Number of organizations actively submitting vetting responses
    - (Vetting APIs)

# Perform. Measures – Data Service Provision

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- API Performance
  - Response time
  - Network latency
  - Availability (up time)
  - Number of 3<sup>rd</sup> party developers participating
    - API keys requested / used
  - Stakeholder (app developers) perception
    - Survey responses
- Data security
  - Performance and reporting of routine data security audits

# Performance Measures – Demonstration Apps

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- For demonstration applications only
  - Mostly Multi-Modal AccessMap and Digital Twin
- Number/fraction of routing errors
  - Lab tests – done during design & testing
    - need controlled conditions to understand ground truth
- Number of application users & uses
  - Reporting of usage patterns

# Performance Measures – Demonstration Apps

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- User satisfaction with applications
  - (stakeholder survey – all 3 apps)
  
- Travel Outcomes
  - Limited volunteer field test (Multi-modal AccessMap)
  - Number of routes planned / completed
  - Number of off-route notifications
  - Number of help request screens accessed
  - Number and type of unidentified hazards



# Confounding Factors

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- Data standards will continue to evolve
  - Our evaluation is at a single state in time
- Different results will occur on different blocks
  - Difficult to summarize in terms of availability
- For vetting, can we find organizations? Are they nationally available?

# Confounding factors

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- Data service performance will change over time with data size and application load
- Biggest mobility changes will occur from future application delivery
  - Our applications are not designed to capture data from specific users

# Data Collection, Sharing and Reporting Plan

Mark Hallenbeck, Project Management Lead

# Data Collection Plan

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- Data for evaluation comes from five sources:
  - 1) Summaries of data collected and store in the TDEI
  - 2) Data process statistics generated and reported by the software being developed for this project for management purposes
  - 3) Lab tests
  - 4) Stakeholder surveys (co-design, or final evaluation)
  - 5) Baseline census / map data

# Performance Measurement Data Sharing and Reporting

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- Summary reports and statistics to be shared with the independent evaluation team quarterly
  - Raw data available when requested
- Data reporting will not occur until systems are deployed and/or data are being collected
- During Phase 3 – we will announce new data availability as it goes live

# Next Steps

Anat Caspi, PI

# Next Steps

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- Baseline organization, census and map data being collected
  - Identification of baseline centerline street map and associated pedestrian ways
  - Identification of transit centers and transit center operators
- Co-design with app developers, transit organizations, and end-users and their advocates, to agree on prioritized data standards and Phase 2 design/survey work
- Develop inference algorithms to generate data
  - A Phase 2 activity

# Next Steps

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- Schedule
  - Data sharing is not expected to occur in earnest until mid- to late-Phase 2
  - We need to generate data first, and must have early systems in operation



# Stakeholder Q&A

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- Please keep your phone muted
- Please use chat box 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:

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Visit the Complete Trip - ITS4US Deployment Program Website and FAQs:  
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