Agenda

- **Purpose of this Webinar**
  - To share the submitted Integrated Complete Trip Deployment Plan from ARC with the stakeholders of the project and ITS4US community.

- **Webinar Content**
  - Complete Trip – ITS4US Deployment Program Overview (Karen Timpone)
  - Deployment Concept Overview (Kofi Wakhisi)
  - Summary of Phase 2 and 3 Technical Approach (Polly Okunieff and Maria Roell)
  - Summary of Phase 2 and 3 Schedule and Costs (Natalie Smusz-Mengelkoch)
  - Stakeholder Q&A
  - How to Stay Connected (Karen Timpone)

- **Webinar Protocol**
  - You are welcome to ask questions via chatbox
  - The webinar recording and the presentation material will be posted on the ITS4US website
Program Overview

Karen Timpone, FHWA, Office of Safety
Site COR
ITS4US Deployment 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

Diagram:
- Program Initiation
- Phase 1: BAA Solicitation
- Phase 1: Deployment Concept
- Phase 2/3: NOFO Solicitation
- Phase 2: Design & Test
- Phase 3: Operate & Evaluate
- Phase 3 Completion
- Operations & Maintenance
- Post-Deployment
- Pre-deployment Activities
  - Pre-Deployment
  - 18 months
  - Extended to 16 months
  - Up to 24 months
  - Minimum of 18 months
- Minimum of 5 years
Summary of Phase 1 Deployment Concept

Kofi Wakhis, Project Manager
Alan Davis, State Traffic Engineer
Underserved Communities of Interest

- People with Disabilities
  - Mobility
  - Vision
  - Cognitive/developmental
  - Hearing
- Older Adults
- Limited English Proficiency (LEP) Communities
- Low-Income Populations
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 – Project Overview

Safe Trips in a Connected Transportation Network

1. Pre-Trip Planning: Receives Safe Accessible Route
2. Begins Trip: Receives Turn-by-Turn Directions, Alerts, and Transit Priority
3. Transition to Transit: Vehicle Receives Priority and is Notified of User’s Needs
4. Intersection Crossing: Signal Controller Extends Pedestrian in the Direction of User Travel
5. CV Broadcast Message: RSU Broadcasts Safety Message to Alert of Pedestrian in Vicinity
6. Outdoor/Indoor Navigation: Turn by Turn Directions to Safe Accessible Route
Deployment Concept – Deployment Area
Deployment Concept – Phase 2/3 Project Team

Safe Trips in a Connected Transportation Network (ST-CTN)
Deployment Concept – Leveraging Existing Programs

- ATL Rider Information and Data Evaluation System
- Connected Vehicle Regional Deployment Program
- Sidewalk Inventory Tools
- Gwinnett Connected Vehicle Techn Master Plan
- Space-Time Memory Platform
Summary of Phase 2 and 3 Technical Approach

Polly Okunieff, System Development Lead
Maria Roell, Concept Development Lead
Technical Approach – Context Diagram

System of Interest

- Static Input
  - Sidewalk Inventory Collection Tools
    - USDOT Managed Public System
- Dynamic Data Broker
  - Open Data
  - STM Cluster
    - Research
    - PII
- STM Platform
  - Performance Monitoring
  - Simulators
- Connected Vehicle
  - Traffic Management and ITS HUB (CV data broker)
    - Secure MU Gateway
- Connected Intersection
  - RSU
  - PEDX

ATL RIDES
- Multimodal Trip Planner and Access Tools
- ATL RIDES Mobile App
  - CDP
  - Transit Data

Gwinnett Transit
- OBU
- GC Transit System Platforms

End User

Legend:
- # No Change to Data Exchange
- # New or Upgraded Data Exchange

Abbreviations:
- MU = mobile unit
- OBU = onboard unit
- RSU = roadside unit
- CDP = connected data tools
- PEDX = pedestrian signal crossing
- PII = personally identifiable data
Technical Approach – Decision Gates

**PHASE 1**
- Concept Development
  - Decision Gate

**PHASE 2**
- Design/Build/Test
  - Decision Gate

**PHASE 3**
- Operations & Evaluation
  - Decision Gate

Is the concept ready for deployment?

Does the system function safely and as expected?

Is the system ready to be transitioned into routine operational practice?

Routine Operations

Post Deployment

Transition
# Technical Approach – Deployment Elements

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<tr>
<th>Deployment Elements</th>
<th>Quantity</th>
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</table>
| Signalized Intersections             | Centrally controlled signalized intersections: 356  
RSU equipped signalized intersections: 215  
Signalized intersections along transit routes: 209  
RSU equipped signalized intersections along transit routes: 132 |
| GCT Vehicles / Routes               | Fixed Routes: 7 routes  
Fixed Route Transit Vehicles: 38  
Vehicles equipped with On-board Units (OBUs) for TSP: 38  
Vehicles supporting Connection Protection: 38 |
| Facilities with Indoor Navigation Support (Beacons) | Number of facilities: 2  
(MARTA Doraville Station and Gwinnett Justice Administration Center) |
| Inventory of Sidewalk                | approximately 2,000 linear miles                                                                 |
| Project Study Area                  | 90 sq miles                                                                                       |
Technical Approach – Hybrid SE and Agile

**Inputs**
- ConOps
- SyRS
- ICTDP
- Dataset formats/API
- System Architecture

**Step 1**
**ST-CTN Development Team**
1. Confirm requirements
2. Develop user stories and system stories
3. Plan unit and integration tests (acceptance criteria)

**Product Backlog**
1. Prioritized list of what is required, features, etc.
2. Refine (“trim”) user story and criteria
3. Develop roadmap

**Step 2**
**ST-CTN Tech Teams**
*SDLC*
- User Story, Dev, Design Template
- Sprint Planning Mtgs
- 2 to 4 weeks sprints

**Step 3**
- Development
  - Confirm technical approach
  - Build feature
  - Build unit and integration tests
- Review
  - Code review (functionality/technical approach)
  - Revise feature
- Test & Deploy
  - Merge feature into main branch
  - Internal testing
  - Bug fixes
  - Cut release
  - Deploy for acceptance test

**Step 4**
- Sprint review & demo
- Product versions/releases
- Sprint retrospective

*SDLC – software development lifecycle*
Technical Approach – Testing

- Revised Code
- Revised Test Cases

Integration Testing Processes
- Merge feature branch code into main branch
- Deploy to QA environment for internal testing
- Integration testing
- Bug Fixes if required
- Cut a release with new feature(s)

Product Version (or interim version)

Updated documents
- API spec
- Design and Code detail
- Issue tracker

Controlled Field Testing
- Sprint review & demonstration
- Alpha/Beta testing

Operational Readiness Testing
- Test Cases tied to operational performance metrics

Decision Point

Includes Bench testing

Bug fixes if required (may go to sprint planning for scheduling)

Release
Technical Approach – Data

Collection

- Use existing data resources and tools (e.g. GDOT/ARC Data Sharing Program)
- Establish technical channels to collect data from system

Operations and Maintenance

- Use existing operations, monitoring and maintenance resources (e.g. GCT call center, GCDOT CV data management portal)
- Leverage data curation plans for each data set to support Evaluation and disseminate open data to USDOT Open Data Portal

Evaluation

- Monitor Performance Management Dashboard
- Evaluating system performance
Technical Approach – Engagement

Stakeholders
- ARC Aging & Independence Services
- Georgia Tech Office of Disability Services
- Gwinnett Place CID
- GA Department of Education
- MARTA Accessibility Council Board
- Southeastrans
- Vocational Rehab Gwinnett County Schools
- Bobby Dodd Institute
- The Exceptional Foundation of Atlanta
- Spectrum Autism Support Group
- GA Council on Developmental Disabilities
- Bennett’s Place
- The Arc Georgia
- Creative Enterprises
- GA Department of Behavioral Health and Developmental Disabilities

Training Partners
- Tools for Life
- disABILITY Link
- GA Vocational Rehab
- GA Department of Health
- Center for Pan Asian Community Services
Technical Approach – Outreach

- Deployment Website
- Social Media
- On-Site Events
- Public Meetings
- Local Community Outreach
- Conferences
- Webinars
- Industry Journals

SAFE TRIPS IN A CONNECTED TRANSPORTATION NETWORK

The federal Complete Trip – ITS4US Deployment Program supports independent accessibility for all travelers through innovative partnerships, technologies, and practices – increasing accessibility and equity for all.

The Atlanta Regional Commission (ARC), Georgia Department of Transportation (GDOT), the Atlanta-Region Transit Authority (ARTA), and Gwinnett County are one of only five groups nationally to receive ITS4US Deployment Program funding with an investment of $8.3 million. This program intends to show how innovative technologies solutions can be leveraged to support accessibility and equity in the under-served transportation community.

ARC led the concept development (first phase, ending May 2022) of the Safe Trips in a Connected Transportation Network (ST-CTN) project. GDOT, leading Phases 2 (2022 – 2024) and 3 (2023 – 2024), is seeking input for the ST-CTN project to design, install, and evaluate the deployment within Gwinnett County, GDOT and ARC partnered with Georgia Tech and Hitachi Consult to ensure that the project’s full potential is realized as it expands throughout entire Atlanta and beyond. Through this collaboration, all communities across the state will have access to the benefits of this system with minimal upfront costs, especially those participating in CMMR, the Regional Connected Vehicle Program.

SAFE TRIPS IN A CONNECTED TRANSPORTATION NETWORK CONCEPT

The ST-CTN concept will support safe and complete trips for all travelers through:
- Real-time information, including roadwork conditions, and tailored to the user’s specific needs
- Connected vehicle integration for extremely pedestrian signals and alerting drivers to their presence
- A mobile app, available in multiple languages, that helps travelers find the safest routes, safely cross intersections, request transit connections, and identify safe boarding locations
- Wayfinding and navigation for all walking paths, ensuring more reliable intermodal connections
- A prioritization system that gives buses running backed/scheduled higher priority when a valentine red stick is on the bus or waiting at a stop

Example ST-CTN ‘One-Pager’
Performance Measures – Complete Trip

CT-PM-1: Enhance Traveler Experience
- Users' ability to program and complete trips using the ST-CTN
- Users’ perception of ST-CTN performance for route and system accessibility; system functions and features; complete trip experience
- Improvement in travel time and number of accessible destinations
- Adoption rate of the ST-CTN system

CT-PM-2: Improve Accessibility with ST-CTN
- Users’ ability to access employment and other types of trips
- Users’ perception of quality-of-life improvement

CT-PM-3: Enhance Complete Trip Pedestrian Safety
- ST-CTN system impact to user perception of safety

CT-PM-4: Enhance Fixed-Route Transit
- Changes in fixed route ridership due to the ST-CTN system
Performance Measures – Connected Vehicles

CV-PM-1: Enhance Safety and Awareness with Connected Vehicles
- ST-CTN system impact to user perception of safety
- Number of completed crossings within walk time
- Enabled connected vehicle speeds during PSM broadcast messages

CV-PM-2: Improve Transit Reliability
- Transit schedule adherence
- User wait times
- Missed connections
Participant Eligibility and Recruitment

- Ability for the participant to provide legal consent and for the individual to have taken the end user trainings
- Leverage existing programs by working with organizations that serve communities of interest

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<thead>
<tr>
<th>Subgroup</th>
<th>Participant Minimum Target</th>
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<tbody>
<tr>
<td>3A – End User Trainers</td>
<td>40</td>
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<td>3B – End Users with Mobility, Vision, and/or Hearing Disability</td>
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<td>3C – End Users with Cognitive/Developmental Disability</td>
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<td>3D – Older Adults</td>
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<td>3E – End Users with Limited English Proficiency</td>
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<td>3F – End Users with Low Income</td>
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<td>3G – General End Users</td>
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Technical Approach – Post Deployment

- Governance Partners
  - GDOT
  - ATL
  - Gwinnett County

- ARC will procure support services to maintain and operate navigation application

- All owner operators will maintain their respective subsystems
  - ARC can provide financial aid through the Transportation Improvement Program (TIP), if necessary.
Phase 2 and Phase 3 Deployment Schedule

Natalie Smusz-Mengelkoch, Deputy Project Manager
# Phase 2 Schedule Overview

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<th>ACTIVITY</th>
<th>P2 Y1 Q1</th>
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<th>P2 Y1 Q3</th>
<th>P2 Y1 Q4</th>
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**COMPLETE TRIP**

U.S. Department of Transportation
ITS Joint Program Office
Phase 3 Schedule Overview

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<td>Updated PMESS with Progress/Risk Summary, Site Performance Measurement Dashboard, Updated PMESP, Updated DMP, Public-Facing Data</td>
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<td>TASK F - PARTICIPATION IN STANDARDS DEVELOPMENT</td>
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# Phase 3 At-Scale Milestones

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<tr>
<th>MILESTONE</th>
<th>% COMPLETE</th>
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<tbody>
<tr>
<td><strong>MILESTONE #1 – PHASE 3 NTP (GO LIVE)</strong></td>
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<tr>
<td>Begin 18-month deployment.</td>
<td>GO LIVE</td>
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<tr>
<td>ATL RIDES subsystem functionality supporting customer account management.</td>
<td>100%</td>
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<tr>
<td>Customer accounts (250 users recruited prior to Phase 3).</td>
<td>25%</td>
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<tr>
<td>STM impedance values for trip routing and execution.</td>
<td>100%</td>
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<tr>
<td>Functionality and equipment installed in GCT vehicles to support TSP and connection protection.</td>
<td>100%</td>
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<td>Sidewalk data collected in the project boundaries.</td>
<td>100%</td>
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<tr>
<td>Facilities outfitted with sensors for indoor navigation.</td>
<td>80%</td>
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<tr>
<td>Operations and maintenance processes (including software updates).</td>
<td>100%</td>
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<tr>
<td>PMD data ingestion, curation, and analytical processes. (except full verification of operational data collection and analysis processes)</td>
<td>80%</td>
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<tr>
<td><strong>MILESTONE #2 – PHASE 3 NTP+60 DAYS</strong></td>
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<tr>
<td>Facilities outfitted with sensors for indoor navigation.</td>
<td>100%</td>
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<td>PMD with verification of operational data collection and analysis processes.</td>
<td>100%</td>
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<td>Customer accounts (500 users).</td>
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<tr>
<td><strong>MILESTONE #3 – PHASE 3 NTP+180 DAYS</strong></td>
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<tr>
<td>Customer accounts (1,000 users).</td>
<td>100%</td>
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Phase 2 and Phase 3 Cost Estimate

Natalie Smusz-Mengelkoch, Deputy Project Manager
Kofi Wakhisi, Project Manager
Cost Overview

- **Collaborative.** Costs were developed collaboratively by the ST-CTN project team through a series of technical team workshops and focused component meetings.

- **Comprehensive.** Reflects all necessary labor and expenses to successfully deliver Phases 2 and 3.

- **Cost Analysis Performed.** All project team member costs and assumptions were reviewed and approved by the team to ensure costs are calculated accurately, fair, reasonable, and complete.

- **Consensus.** All ST-CTN team members reviewed and supported costs prior to submittal.
## Cost Overview

<table>
<thead>
<tr>
<th>ST-CTN Milestone</th>
<th>Total Budget</th>
<th>Cost Share</th>
<th>Federal Share</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase 2 - Design, Build, and Test</strong></td>
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<tr>
<td>2A - Program Management</td>
<td>$ 609,916</td>
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<tr>
<td>2B - System Architecture and Design</td>
<td>$ 547,432</td>
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<tr>
<td>2C - Data Management Planning</td>
<td>$ 196,212</td>
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<tr>
<td>2D - Acquisition and Installation Planning</td>
<td>$ 770,982</td>
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<tr>
<td>2E - Software Development and Integration</td>
<td>$ 4,112,787</td>
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<td>2F - Participant and Staff Training</td>
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<tr>
<td>2G - System Test Planning</td>
<td>$ 315,320</td>
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<td>2H - Installation and Operational Readiness Testing</td>
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<tr>
<td>2I - Maintenance and Operations Planning</td>
<td>$ 66,825</td>
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<td>2J - Stakeholder Outreach</td>
<td>$ 406,642</td>
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<tr>
<td>2K - Performance Measurement and Independent Evaluation Support</td>
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<td>2L - Participation in Standards Development</td>
<td>$ 65,513</td>
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<td><strong>Phase 2 Budget</strong></td>
<td>$ 7,633,202</td>
<td>$ 1,526,640</td>
<td>$ 6,106,562</td>
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<td><strong>Phase 3 - Operate, Maintain, and Evaluate</strong></td>
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<td>3A - Program Management</td>
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<td>3B - System Operations and Maintenance</td>
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<td>3C - Stakeholder Outreach</td>
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<td>3D - Performance Measurement and Independent Evaluation Support</td>
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<td>3E - Post-Deployment Transition Planning</td>
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<td>3F - Participation in Standards Development</td>
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<td><strong>Phase 3 Budget</strong></td>
<td>$ 2,430,798</td>
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<td>$ 1,944,639</td>
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<td><strong>Phase 2 and 3 Budget Summary</strong></td>
<td>$ 10,064,000</td>
<td>$ 2,012,800</td>
<td>$ 8,051,200</td>
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</tbody>
</table>
ST-CTN – Maximum Potential

Demonstrated Commitment and Competency through Phase 1

- Committed Project Team and Stakeholders
- Strong relationships with advocacy groups
- Concept development allowed us to define the best solution

Technical Expertise and Experience

- Technical experts engaged throughout concept development
- Separated the research and development so research enhances product
- Post-deployment transition anticipated to be smooth (total lower cost of ownership) due to leveraging existing initiatives and governance structures

Exceeding Expectations

- ST-CTN project aligns perfectly with Complete Trip – ITS4US Deployment vision
- Lead transition to GDOT will facilitate replication and scalability
- Significant interest in expansion from other communities
Stakeholder Q&A

- 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

For more information please contact:

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Visit the Complete Trip - ITS4US Deployment Program Website and FAQs:
https://its.dot.gov/its4us/
https://www.its.dot.gov/its4us/its4us_faq.htm