Smart Mobility Hubs
Interface Control & System Design Documents
SPEAKERS

ANDREW WOLPERT
Deputy Program Manager, City of Columbus
adwolpert@columbus.gov

JEFF KUPKO
Michael Baker International
SMH Project Manager, City of Columbus
jeffrey.kupko@mbakerintl.com

MATT GRAF
Technical Lead, HNTB
mgraf@hntb.com

JESSICA BAKER
Systems Engineer, HNTB
jebaker@hntb.com
TODAY’S AGENDA

01 | PURPOSE OF THIS WEBINAR
   • Share project activities from Smart Columbus with stakeholders

02 | WEBINAR CONTENT
   • Smart Mobility Hubs Project Overview
   • Smart Columbus Smart Mobility Hubs Project Interface Control Document
   • Site Installation Plans
   • Smart Columbus Smart Mobility Hubs System Design Document
   • Stakeholder Partnerships
   • Lessons Learned
   • Questions

03 | WEBINAR PROTOCOL
   • All participant microphones have been muted during the webinar in order to reduce background noise
   • Questions are welcome via Questionpod for use during the Q&A Section
   • The webinar recording and presentation materials will be posted on the Smart Columbus website
CURRENT SYSTEM

- Fixed route bus service
- Transit System Redesign
- Park-and-ride and transit facilities
- CMAX Bus Rapid Transit
- Public 4G Wi-Fi provided at transit centers and on buses
CHALLENGES

Current system gaps in service:

- Trips are not being optimized for ride-sharing, including microtransit
- Unbanked users and users without smartphones are excluded from first-mile, last-mile travel options
- Limited safety features at transit facilities
**GEOGRAPHIC FOCUS**

**Linden Area**
- Support CMAX
- Bridge first-mile/last-mile gap
- Link to jobs and services

**Easton Area**
- Provide last link to jobs
- Enable modal transportation in Easton area
‘MAAS’ MEANS FOR COLUMBUS

MOBILITY PROVIDERS

- Carshare
- COTA
- Scooter/Bikeshare
- Taxi/Limo
- Paratransit
- Car/Vanpool

OPERATING SYSTEM

ACCOUNT-BASED CPS

TRAVELERS USING MMTPA

SMART MOBILITY HUBS
PROJECT STATUS
• Last webinar – 10/24/18 on System Requirements
• Validated and on-boarded IKE Smart City as kiosk vendor
• Finalized development of site plans
• Procurement for installation contractor
• Launched Multimodal Trip Planning Application (Pivot)
MaaS

• An ecosystem of mobility whose system elements are themselves systems
• Synthesizes transportation services, digital information systems and modifications to infrastructure
Systems Engineering Life Cycle Progression

- Business and mission analysis
- Stakeholder needs and requirements definition
- Concept development
- System requirements
- Regional ITS Architecture
- Interface control
- System design
TRANSPORTATION SYSTEMS INTERFACES

- COTA public transit with real-time display
- Bike-share docking station
- Dockless parking zones
- Car-share parking
- Legacy bike racks
- Park and ride
- EV charging stations
- Autonomous shuttle
TRANSPORTATION SYSTEMS INTERFACES

- Designated zones for pickup and drop off for ride-share mobility providers Uber, Lyft and taxi companies
Delivering on-demand Traveler information at the interactive kiosk through key interfaces.

**INFORMATION SERVICES INTERFACES**

**Comprehensive trip planning**
- Traveler access to MMTPA/CPS
- Traveler access to toll-free telephone trip booking

**Emergency services**
- Traveler access to the Columbus and Franklin Emergency Call Centers (location-based)
- First responder(s) and the SMH facility

**Application-based services**
- Traveler access to local entertainment, planned events, business listings (dining, shopping, etc.)

**Administrative communications**
- Kiosk administrator human interface to the kiosk's central management system.
Briefing on ICD context
- Source destination
- Functions
- Processes
- Datasets
- Layer standards and protocols
• Kiosk and MMTPA
• Kiosk and CPS
• Personal information device and MMTPA via the Wi-Fi
• Kiosk Wi-Fi and personal information device
• Kiosk and the kiosk’s central management system
• Smart Columbus Operating System and the kiosk’s central management system
EMERGENCY CALL BUTTON (ECB) SERVICE

- Traveler ECB Activation
- Alarm notification, acknowledgement
- Audiovisual activation and traveler audio updates
- Incident command information presentation to first responders
- Emergency operations

Human interfaces
- Traveler and kiosk
- ECC operations and kiosk
- ECC, first responder and facility

Digital interfaces
- Kiosk and ECC
- Kiosk and Kiosk CMS
- Kiosk CMS and OS
INSTALLATION PLAN
Developed for each of the six SMH locations including:

- Existing site conditions
- Proposed amenities
- Construction notes
- Construction requirements
- Construction standard details
- Construction quantities
CONSTRUCTABILITY

- Help designer identify constructability issues
- Ensure ADA and right-of-way compliance
- Generate quantities and construction cost estimates
- Allow contractors to develop bid prices
- Used for “as built” plan records

Verify ADA path and Right-of-Way
KIOSK INSTALLATION PLAN

- Detailed kiosk installation plans were developed by kiosk vendor – SMH installation plan included kiosk footprint to verify clearances for placement and available power sources.
SUPPORTING EFFORTS

- Survey and subsurface utility exploration work was performed for locations lacking detailed record plans.
SMH signage details were created for fabrication of non-standard signage.
SMH signage details were created for fabrication of non-standard signage
• Coordination of concurrent area construction project at Columbus State Community College site

• Locating equipment to meet ADA and right-of-way requirements

• Identifying available power sources for field equipment
- Plan design package was posted for bid proposals, but none were received
- Project team evaluated options to amend and rebid or construct using City resources

<table>
<thead>
<tr>
<th>Rebid</th>
<th>City forces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertisement process would take too long</td>
<td>Construction, maintenance, and operation admins felt their staff had capacity to complete tasks within schedule</td>
</tr>
<tr>
<td>No apparent changes to plans to make project more desirable for contractors</td>
<td>Existing sign operations capable to produce required non-standard signage</td>
</tr>
<tr>
<td>Make use of existing task order contract for placement of concrete</td>
<td></td>
</tr>
</tbody>
</table>

- Project team elected to use City resources to construct and inspect project
COMPREHENSIVE MOBILITY SITE MAP
DESIGNING KEY SERVICES

**ENABLERS**  
Policy, Project Agreements, System Interfaces

**CONTROLS**  
Design Considerations, Concerns and Constraints

**INPUTS**

**Program objectives**
- Mobility services
- Customer service

**System engineering artifacts**
- Concept of Operations
- System Requirements
- Systems Architecture and Standards Plan
- Interface Control Document
DESIGNING KEY SERVICES

System Decomposition
- Interactive kiosk
- Mobility infrastructure
- Mobility hubs

Guiding Principles
- Traceability to user needs
- Traceability to requirements
- Traceability to interfaces
Rational and Conclusions

- Bike-share docking stations
- Ride-share, park and ride
- Kiosks and ECB services
- Signage and accessibility
- Electric vehicle charging stations
- Future enhancements
STAKEHOLDERS & LESSONS LEARNED
STAKEHOLDER DISCUSSIONS

Stakeholders included

- COTA
- St. Stephens Community House
- Columbus State Community College
- Columbus Metropolitan Library
- Experience Columbus/IKE Smart City

Input on the following documents

- ICD
- SDD
- Installation Plan
LESSONS LEARNED

• Stakeholder contracts

• USB charging stations

• In-house construction
WHERE WE GO FROM HERE

- **Test Plan**
  - June 2019 – September 2019

- **Deploy / Installation**
  - September 2019 – December 2019

- **Testing**
  - December 2019 – February 2020

- **SMH Go Live**
  - February 2020
HOW TO STAY CONNECTED

USDOT SMART City
Challenge Program Inquires:
Kate Hartman, Chief - Research, Evaluation and Program Management
Intelligent Transportation Systems
Joint Program Office
Kate.Hartman@dot.gov

SMART Columbus Inquires:
Alyssa Chenault, Communications Project Manager
anchenault@columbus.gov

Webinar recording and materials will be available at smart.columbus.gov

Upcoming Smart Columbus Webinars

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTA Test Plan and Report</td>
<td>10/2/2019</td>
</tr>
<tr>
<td>MAPCD - Test Plan and Results + O&amp;M Plan</td>
<td>10/8/2019</td>
</tr>
<tr>
<td>MMTPA/CPS Test Plan and Project Update</td>
<td>10/29/2019</td>
</tr>
<tr>
<td>CVE - Interface Control and System Design Document (FINAL)</td>
<td>11/12/2019</td>
</tr>
<tr>
<td>Final Safety Management Plan</td>
<td>11/19/2019</td>
</tr>
<tr>
<td>CEAV - Presentation of Linden Deployment</td>
<td>12/3/2019</td>
</tr>
<tr>
<td>Final Demonstration Site Map and Installation Schedule</td>
<td>12/10/2019</td>
</tr>
</tbody>
</table>
Public comment period open for the SMART MOBILITY HUBS Interface Control and System Design Documents:

September 18, 2019 – October 2, 2019

Where to find it:
- View the ICD and SDD at: https://smart.columbus.gov/programs/smart-city-demonstration
- Scroll down and click SMART MOBILITY HUBS

How to comment:
Please email comments to: kldepenhart@columbus.gov
  - Subject line: Smart Mobility Hubs Comments
  - Include your contact information
  - State whether or not you represent a vendor interest
QUESTIONS?
SIGN UP FOR OUR E-NEWSLETTER

CONTACT:
SmartColumbus@columbus.gov
columbus.gov/smartcolumbus

@SmartCbus

LEARN MORE
This material is based upon work supported by the U.S. Department of Transportation under Agreement No. DTFH6116H00013.

Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the U.S. Department of Transportation.