

Linden Self-Driving Shuttle

Talking Points and Frequently Asked Questions

Key Messages

- Purpose: Better connect Linden residents to community resources and the CMAX line by delivering an innovative first mile/last mile solution that helps address the neighborhood's mobility needs.
- Responsive to community needs: Feedback from Linden residents helped us select this route that helps connect residents to community resources.
- Safety: An operator will be on board each shuttle at all times. Operation will fully comply with the State of Ohio's executive order requiring the vehicle to be overseen by a person.

Technology

- Self-driving vehicles combine sensors and intelligent software to help the vehicle understand where it is and when to accelerate or stop for something in its path.
- EasyMile's self-driving shuttle uses multiple layers of redundant systems in order to maximize the safety of passengers and road users like sensors, LiDARs, cameras, GPS, odometry, and inertial measurement unit for ensure it follows the route and avoids obstacles. For example, LiDAR uses laser light pulses to detect the outline of people crossing the road.
- The shuttle will never exceed 25 mph and will typically travel around 15 mph. If an operator takes over the operation of the vehicle, it will travel at 3 mph, about the walking rate of a pedestrian.
- EasyMile is the most widely deployed self-driving vehicle in the world with over 230 self-driving vehicles in 26 countries. They have an excellent track record with no reported safety incidences.

Linden

- Using innovative mobility solutions to address real community needs like those in Linden were central tenets to our Smart City Challenge application and credited for Columbus winning the grant. Six out of eight Smart Columbus projects directly impact Linden. Linden deserves to benefit from this investment.

- Attendees at the Smart Columbus Connects Linden community meeting in February 2017 indicated they wanted to be better connected to St. Stephen's Community House and the Linden Transit Center. This feedback helped inform the selection of the Linden route.
- Linden is a community with transportation assets and gaps. Linden has the CMAX rapid transit line that can connect residents to jobs and services in other parts of the city quickly. A first mile/last mile transportation gap exists at St. Stephen's— we heard directly from residents who said there have been times they've been unable to accept as much food from the food pantry as they needed, because they had no way to get it to the bus stop at Cleveland Ave, 0.5 miles away.
- Linden residents have shown an interest and need for new mobility solutions. When Lime scooters launched, Linden was the highest utilization neighborhood outside of Downtown.

Operators

- Smart Columbus is committed to having an operator on board at all times for its self-driving shuttle pilots, including the Linden route.
- Smart Columbus believes in the importance of operators beyond their ability to oversee the self-driving technology and intervene, if necessary. They assist people with disabilities, women with children, and senior passengers in boarding and off-boarding; answer questions about the vehicle technology; give directions; look out for, thwart and report criminal behavior; assist in natural disasters and other emergencies.
- EasyMile is working with local mobility start-up EmpowerBus to staff and operate the shuttles. Up to 5 new full-time operators will be hired from the community to operate the shuttles. Operators will be paid \$15-\$16 an hour with medical and dental insurance.

Implementation

- The shuttle features a ramp for accessibility, can hold up to 12 passengers, is free to the public, and is anticipated to service the community from 6am-8pm seven days a week.
- The vehicle will be tested without passengers on public streets for several weeks before opening to the public.
- We anticipate the shuttle to launch before the end of the year.
- Prior to launch, we will be conducting door-to-door outreach along the route and hosting viewings of the shuttle to share information about the shuttle and the technology, and to answer questions from residents.

Frequently Asked Questions

Where will the shuttle service?

The proposed route for the shuttle will have stops at Linden Transit Center, Rosewind Resident Council, Douglas Community Recreation Center, and St. Stephen's Community House.

What are the hours of operation?

The shuttle is anticipated to run from 6AM-8PM, 7 days a week.

How long will it take to ride the shuttle?

A shuttle will arrive at a stop every 12 minutes to pick up new passengers. It will take 24 minutes to ride from the Linden Transit Center to St. Stephen's Community House.

Are there restrictions for riding the shuttle?

Children under 12 years old require adult supervision to ride. Children 12 years old and older are welcome to ride the shuttle independently. Passengers are allowed to ride the shuttle for one full loop (example: from Linden Transit Center back to the Linden Transit Center). After the one full loop, the passenger will be asked to exit the shuttle.

Is there a cost to ride the shuttle?

No, the shuttle will operate free of cost to passengers for the duration of the pilot.

What are the project objectives?

- Connect the community to jobs and services
 - Community centers
 - Opportunity centers
 - Food sources
 - Support services
 - Smart Mobility Hubs
 - Public transit
- Improve safety and mobility of travelers by mitigating first mile/last mile challenges
- Encourage transit use by expanding locations served and implementing efficient schedules and integrated solutions
- Reduce traffic congestion and greenhouse gas emissions in the region

How does self-driving technology work?

Self-driving vehicles combine sensors and intelligent software to help the vehicle understand where it is and when to accelerate or stop for something in its path.



I heard that sensors on self-driving vehicles can't detect darker skin. Is that true?

Research on algorithmic bias has been published, but [further research is merited](#).

EasyMile's self-driving shuttle uses multiple technologies like sensors, LiDAR, cameras, GPS, odometry, and inertial measurement unit for ensure it follows the route and avoids obstacles. LiDAR uses laser light pulses to detect the outline of people crossing the road regardless of their skin color.

How are passengers kept safe as the new technology is tested?

An operator will always be on board to oversee the technology and intervene, if needed. Smart Columbus has also developed a thorough test plan that the vehicles will need to go through prior to launch.

What vendor will service the Linden route?

Smart Columbus has selected EasyMile as the vendor to service the Linden route. City Council approved the selection of EasyMile on May 20th agenda. The EasyMile shuttle can hold up to 12 people and provides accessibility for those with mobility challenges. EasyMile is the most widely deployed self-driving vehicle in the world with over 230 self-driving vehicles in 26 countries. They have an excellent track record with no reported safety incidences.

EmpowerBus, a local social enterprise focused on providing upward mobility for all, where each of their vehicles are a community where we have an obligation to treat one another with respect, appreciate our differences, celebrate our successes, and champion our neighbors and friends, will staff and operate the shuttles. Up to 5 new full-time operators will be hired from the community to operate the shuttles. They will work with pillars in the community like St. Stephen's, New Salem, and the Area Commissions to share the job postings. Operators will be paid \$15-\$16 an hour with medical and dental insurance. In comparison, operators for COTA's micro-transit pilot in Grove City, COTA Plus, earn \$13 an hour and fixed route operators earn \$18.57 an hour. Operators will need to have a valid driver's license, be able to pass a drug and background test, and have a high school diploma or equivalent. Operators will receive a customized training provided by EasyMile as well as receive Smith System certification.

What training will an operator receive?

EasyMile is currently developing its training plan. It's anticipated to be finalized in September 2019. Operators will be required to receive training in the following areas:

- Assist and interact with passengers, including providing mobility assistance during passenger boarding and alighting, as necessary
- Provide accurate basic information about the vehicle, the purpose of the route, and the Smart Columbus program
- Receive and record passenger feedback
- Operate a ramp, door and charging station
- Perform road testing of a vehicle
- Have a working knowledge of vehicle equipment
- Perform clean-up, including bodily fluid
- Intervene in vehicle operations, if necessary

How does self-driving technology affect the workforce of the future?

The Workforce Development Board of Central Ohio, in partnership with Smart Columbus and United Way of Central Ohio, has commissioned research by The Ohio State University's Ohio Education and Research Center (OERC) to examine future job opportunities for central Ohio residents brought about by technology and innovation. The research will seek to identify future jobs in industries related to intelligent transportation systems, electrification, internet of things, financial services and healthcare. It will also address the skills needed to fill those jobs, and gaps in current local training programs.

DriveOhio also has a workforce development initiative that is focusing on

- Preparing people for the emerging jobs of tomorrow
- Transitioning disrupted employees into new jobs
- Ensuring equitable access to mobility for education, work

- Attracting jobs in the smart mobility industry to Ohio

What happened to the Easton route?

In Columbus' Smart City Challenge application, project leaders initially explored the prospect of deploying a self-driving shuttle in the Easton area. Surveys of potential riders and industry research revealed that technical and safety barriers would lead the intended route there to fall short of the goal of connecting residents to jobs and services in that specific area.

What other routes were considered?

- Hammond Center to Carepoint East
- Maloney Health Center to Kroger
- OSU West

What vendors responded to the RFI?

Through the RFI process, the City was fortunate to receive five responses to the RFI that help inform the project, current capabilities, and the ability of the technology to navigate the proposed routes. The vendors that responded were:

1. 2getthere
2. First Transit / EasyMile
3. Ohmio
4. Navya
5. Stantec / EasyMile

Are there lessons learned from the Smart Circuit route that will be applied to the Linden route?

- Created processes for the first time around safety, customer service and data management
- Collaboration between public sector and private sector to answer questions that have never been asked before
- Engaging stakeholders along the route early and often helps the surrounding community embrace the new technology

What will happen after the pilot is over?

The pilot is anticipated to last one year. During the pilot, we will be collecting data related to ridership and customer satisfaction. We will share our findings with the community and stakeholders to aid in determining next steps.