

Strategic Mobility Initiatives

Ann Arbor SPARK would like to put forth the following proposals for the consideration of the local development finance authority (LDFA) Board to be supported as strategic projects benefiting the Ann Arbor region.

Ann Arbor has a robust connected infrastructure which gives the city an advantage in attracting companies and projects advancing connected and autonomous vehicle deployment to the area. The following recommendations for projects utilize and contribute to the existing smart city infrastructure.

The goals of these projects align with those of our partners like the focus on safety through the city of Ann Arbor's vision zero initiative, experiment with new mobility service to solve mobility challenges, and creating an avenue to make more data driven decisions for our mobility future. They also engage with the enterprises that are coming out of our very own innovation ecosystem. Thus creating a living lab for deploying innovative local technologies to benefit our society.

We have included relevant letters of support from partner organizations. These include City of Ann Arbor, AAATA(TheRide), MEDC-PlanetM, UMTRI, Mcity, and ACM. All three projects leverage funding and/or in-kind support from additional sources.

1. Autonomous Shuttles in Downtown Ann Arbor

This project looks at exploring pilot operations for autonomous May Mobility shuttles moving people around the Ann Arbor downtown area. The route will connect the Blake Transit Center, Amtrak train station, Kerry Town, University of Michigan central campus, and other key downtown areas.

Background: The Michigan Economic Development Corporation (MEDC) has awarded a \$300,000 grant, available through PlanetM to fund initiatives associated with the Ann Arbor Mobility Transformation (AAMT) program (see below for details). The money was split between Ford Smart Mobility and Deloitte consulting to develop pilots for the city of Ann Arbor based on the work conducted during the 90-day pilot workshop period. Deloitte Consulting through their stakeholder discussions identified a downtown autonomous shuttle pilot as a strong viable, supported option.

Goal: Autonomous vehicles are a way forward for the mobility and technology hub in downtown Ann Arbor to provide a uniquely useful future mode. This shuttle service will complement TheRide's current bus route serving downtown which is currently underutilized. It will allow for more flexibility in meeting first- and last-mile needs of the downtown residents and employees for travel within the city.

A dynamic on-demand AV shuttle allowing for various types of trips in the city center will best connect people traveling between major destinations like Chicago and here, as well as within Ann Arbor itself. Major events like our Art Fair, Michigan sporting events, and conferences like A2tech360 would benefit from enhanced options for longer-term safer plus more independent kinds of transit through automated testing, in helping visitors as well as residents to get around more easily. The project will also launch an ADA accessible autonomous vehicle within the fleet

and work towards more seamless integration between the exiting transit route and the on-demand system.

Building off of the Downtown Development Authority's Circulator study, which showed re-inventing traditional fixed route alternatives to be both cost-prohibitive, and not able to fully meet the community needs, a higher-level autonomous pod car addresses present as well as prospective ridership demands. In addition to providing solutions for existing gaps in the mobility network today, with the large flow of pedestrians, cyclists, and other vulnerable road-users going to and from the city center, campus and nearby areas, preparing and practicing for progressively greater safety in driving delivers the ultimate service for shared, accessible transport.

Value:

- Encourage downtown employees and residents to utilize shuttles for intra-city travel. The autonomous vehicle would help encourage a mode shift away from personal cars towards shared services.
- Collect trip data to inform future strategy on integration of fixed and on-demand services.
- Augment visibility of the city by deploying autonomous technology in downtown for a specific use case to test if an on-demand shuttle system will be the best transportation mode choice in a dense urban environment.
- Impact talent attraction and retention goals especially in the technology and mobility sector.
- Support education and research around autonomous vehicle deployment both for stakeholders and for the community.

Partners

Michigan Economic Development Corporation PlanetM: Project funder

Interested in advancing innovative mobility pilots that improve the mobility options and accessibility for all across Michigan. They have supported the AAMT project with an initial pilot grant.

Ann Arbor SPARK: Project Administrator

Interested in advancing mobility pilots in Ann Arbor that by establishing the area as a desired place for innovation, business expansion and growth, and for talented people to live and work. SPARK approached MEDC for the initial 300,000\$ grant. We are also approaching LDFA for an additional grant for the project. SPARK is the fiduciary body for the grants as well bringing the different project partners together.

The University of Michigan's Mcity: An advisor and co-funder of the project.

Interested in conducting research and data collection through the project that can advance connected and autonomous deployments. In addition to usage/operation data from May Mobility, data can be collected at key intersections using cameras/lidars to understand background traffic patterns, road user behaviors, and their interactions with the autonomous shuttles. In addition, Mcity can work with UMTRI and May Mobility to add DSRC capabilities to the autonomous shuttles to enable better scheduling and coordination with the AAATA buses, and possibly other V2X functions such as V2P safety and using SPAT for efficient operations.

Deloitte Consulting: Project Management

Responsible for project management and day to day project activities. Deloitte will also advise stakeholders on a communications strategy to increase awareness about autonomous technology

for the targeted employees and deploy a digital platform (Sprinklr) for ongoing engagement on owned social channels as well as analyzing and reporting user sentiment from digital and social listening data.

Ann Arbor Area Transportation Authority (TheRide): Project Partner + possible Phase 2 funder

This shuttle service will complement TheRide's existing bus route serving downtown which is currently underutilized. The pilot will allow for more flexibility in meeting needs of the area residents and employees for intra-city travel, and better supports travel demand between start-up and core business, neighborhood shopping, and multimodal passenger train travel at Amtrak's station. TheRide will provide guidance and support on the route development, successful performance metrics, and service integration with transit service.

MayMobility: Service Provider

May Mobility has been identified as the preferred provider as they have successfully demonstrated service in dense urban environments like Detroit and Columbus. MayMobility services will include:

- Work with partners to develop the route of the shuttles and install necessary infrastructure
- Manage operations for 4 shuttles which will include one meeting ADA accessibility requirements.
- Develop success metrics with partners and provide data like ridership, wait time, autonomous heatmaps, user feedback, and battery utilization.
- Provide a user app and API to track the shuttles and request on-demand access.
- Work with TheRide on integration of service with transit service

Total Project budget: \$750,000

May Mobility: 4 autonomous shuttles (one is ADA accessible): \$600,000

TheRide: Operations + integration: \$50,000

Deloitte: Project management + Communications and Education strategy: \$100,000

Funding

Planet M funding: \$142,000 currently. Could raise funding to \$300,000

MEDC Additional funding opportunities: \$50,000-150,000

Mcity Funding: \$100,000-\$200,000

LDFA Funding: \$200,000

Opportunity to bring some private funders for advertising &/Or charge tickets/ subscription fees.

Timeline: Project Launch – infrastructure setup: Summer/Fall 2019

Service Deployment – Fall/Winter 2019

Pilot Period – One year from the start of service deployment

Year 2: Review metrics to continue/expand service – supported by AAATA

About AAMT: The Ann Arbor Mobility Transformation (AAMT) program started in March 2018 through a public-private partnership consisting of the City of Ann Arbor, University of Michigan, Ann Arbor SPARK, AAATA, DDA, Ford Smart Mobility and Deloitte Consulting's Future of Mobility practice. The thesis behind the program is that the path to optimizing value through mobility relies on integrating data from mobility solutions into a centralized digital platform so that City Planners (and transportation users, eventually) can make more informed decisions on how, where and when to deploy and use mobility services and innovations

Development and validation of intelligent connected intersections for safer roads

This project is being developed in conjunction with Derq to deploy a combination of traffic analytics, safety analytics, and active safety capabilities via a single real-time AI platform. Derq, in partnership with the City of Ann Arbor and leading hardware partners would deploy sensors and an edge computing platform at a network of intersections in Downtown Ann Arbor to enable live, 24/7 monitoring.

Opportunity: Downtown Ann Arbor has a vibrant and robust mobility ecosystem, enabling a combination of private vehicles, commercial / public vehicles, public transit, pedestrians, and cyclists to move about the city. The volume of road users inherently leads to a range of conflicts, from traffic congestion to fender benders to potentially life-threatening accidents, which Ann Arbor strives to eliminate through their commitment to the Vision Zero initiative.

While traffic analysis and associated mitigation has traditionally been based on costly one-time studies, partnering with Derq offers the City of Ann Arbor an opportunity to monitor and analyze traffic and safety live, 24/7. Analysis and insights from Derq's platform can be used to better inform decisions that impact safety and efficiency, and to understand their impact without commissioning follow-up studies. The same platform can also be used to enable V2X communications and active safety alerts with connected vehicle partners such as UMTRI, helping to expand operations to Downtown Ann Arbor and alerting them in real-time to avoid potential crashes.

Goal: This project will work to improve safety across a network of signalized intersections in Downtown Ann Arbor using Derq's real-time AI platform. The platform will provide a combination of traffic analytics (e.g., lane-level traffic counts and traffic flow) and safety analytics (e.g., red light violations, near-miss tracking and heat maps, collision reporting) by tracking, classifying, and predicting vehicle and pedestrian/cyclist movement. This analysis will be used to inform future planning and implementation of road safety initiatives undertaken by the City of Ann Arbor, improving efficacy in protecting vulnerable road users.

The platform will also be capable of enabling V2X mobility and safety applications for connected vehicle partners through its infrastructure-based road user intent prediction capabilities. Alerts can be delivered to properly equipped connected vehicles almost 2 seconds in advance of a predicted collision, providing sufficient reaction time to avoid potential crashes, furthering Ann Arbor's Vision Zero initiative. V2X mobility applications may be included in this phase and future phases based on timelines of UMTRI and other potential partners such as Ann Arbor's public transit fleets.

Value:

- The solution will improve safety and traffic flow in Downtown Ann Arbor, supporting the Vision Zero initiative
- A single platform can be leveraged for traffic analytics, safety analytics, and V2X active safety, improving ROI and enabling additional partners to join future project phases
- Derq may be able to leverage existing hardware (e.g., detection cameras, RSUs) that is already deployed
- Focusing on a network of intersections will improve insights/outcomes vs. deploying at a single intersection by providing an improved understanding of downtown traffic flow

- The deployment of intelligent connected intersections for safer roads helps an Ann Arbor-based mobility startup (Derq) further their mission to improve safety and efficiency of roads in Michigan
- Derq is committed to pursuing a new project manager in Michigan to support this project (0.5 FTE)

Project partners:

City of Ann Arbor: The project is supported by the City of Ann Arbor as it aligns with their Vision Zero goals. Ann Arbor will be providing guidance on which intersections are picked and in-kind support in the form of installation labor associated with deploying the technology.

UMTRI: As Downtown Ann Arbor gets equipped with fiber UMTRI will be able to expand the Ann Arbor Connected Vehicle Test Environment (AACVTE) to downtown. Their vehicles will be able to communicate with Derq’s platform deployed across a corridor of signalized intersections through V2X technology, providing valuable alerts to the vehicles to reduce crashes in real-time and helping to gather data on intersection and pedestrian safety.

MCity: MCity is supportive of deploying technologies researched and developed at their locations in a real-world environment. Derq is one such technology that is being deployed at MCity and could have quantifiable immediate impact on vehicle and pedestrian safety on the streets of Ann Arbor.

Derq: Derq has been identified as the primary service provider based on their track record of success with similar deployments, their leading IP, and their commitment to improving the safety and efficiency of roads in Michigan. Services will include:

- Working with the City of Ann Arbor and select hardware vendors to deploy their platform across select intersections in Downtown Ann Arbor
- Providing the City of Ann Arbor with an interactive dashboard and analytics tool to generate insights related to traffic and safety analysis
- Aligning on success metrics that will improve the safety and efficiency of connected intersections
- Developing a plan to expand deployment and further improve safety with the City and additional partners

Total Project Budget: \$560,000 for 5 intersections

Project Management + Testing / Commissioning + Training: \$90,000

Equipment, Software Licenses, & Maintenance: \$370,000 (\$74,000/intersection)

Installation: \$100,000 (\$20,000/intersection)

Funding

City of Ann Arbor In Kind Funding: \$100,000 (site prep & install)

LDFA Funding: \$200,000

To be Secured: \$260,000

UMTRI: Participation of vehicles for data collection

Opportunity to expand with additional partners (e.g., V2X operations, additional intersections)

Development and validation of an autonomous sweeper

This project is being developed under the Transatlantic Automated Driving Alliance developed between Ann Arbor SPARK and AMZ Saxony. The goal of this alliance is to develop joint R&D Projects between Ann Arbor and German companies focused on connected and automated vehicle development. (See more background below)

Opportunity: Ann Arbor has a robust connected infrastructure which gives the city an advantage in attracting companies and projects advancing connected and autonomous vehicle deployment to the area.

Goal: Street sweepers are well-established, especially in urban areas and for cleansing in industrial or special transport sites such as airports. Yet, these vehicles have to be controlled by highly experienced staff, operating over 30 actuators. Also, in basic driving assistance systems, no sensors are implemented, detection of dirt and consideration of traffic is therefore completely in hand of the operator. An autonomous sweeper will tackle these challenges providing more operational efficiency.

Value:

- Increased efficiency of operations and reduce operator costs.
- Increased cleaning efficiency
- Reduction of misjudgment by the operator

Participating companies include: Faun(Germany), Fusion Systems (Germany), New Eagle(Ann Arbor), Trillium Secure(Ann Arbor), ACM (Ypsilanti) and Mcity (Ann Arbor)

Project Budget:

Total Budget: 2,500,000 Euros

German Government contribution: up to 1 million euro/per project

German companies provide 1:1 match – up to 1 million euro/per project

Michigan Companies budget: 750,000\$

PlanetM Contribution: 300,000\$

LDFA Contribution: Possibly 150,000\$ - 200,000\$

Mcity & ACM contribution: Track time for research, development, testing and validation.

City of Ann Arbor contribution: Pilot opportunity in downtown Ann Arbor

Background: Transatlantic Automated Driving Alliance

Ann Arbor SPARK has developed a partnership with AMZ Saxony in Germany to develop joint R&D Projects focused on connected and automated vehicle under a program called TADA (Transatlantic Automated Driving Alliance) <https://www.amz-sachsen.de/projekte/aktuelle-projekte/>.

This project has been developed under this alliance with Michigan and German companies participating. The projects can be maximum 3 years in duration. There is a commitment from the German government for up to 1million Euro per project with a 1:1 match required for German companies. Michigan companies will be supported through money raised in Michigan by PlanetM and other organization support.