

Westminster Autonomous Corridor

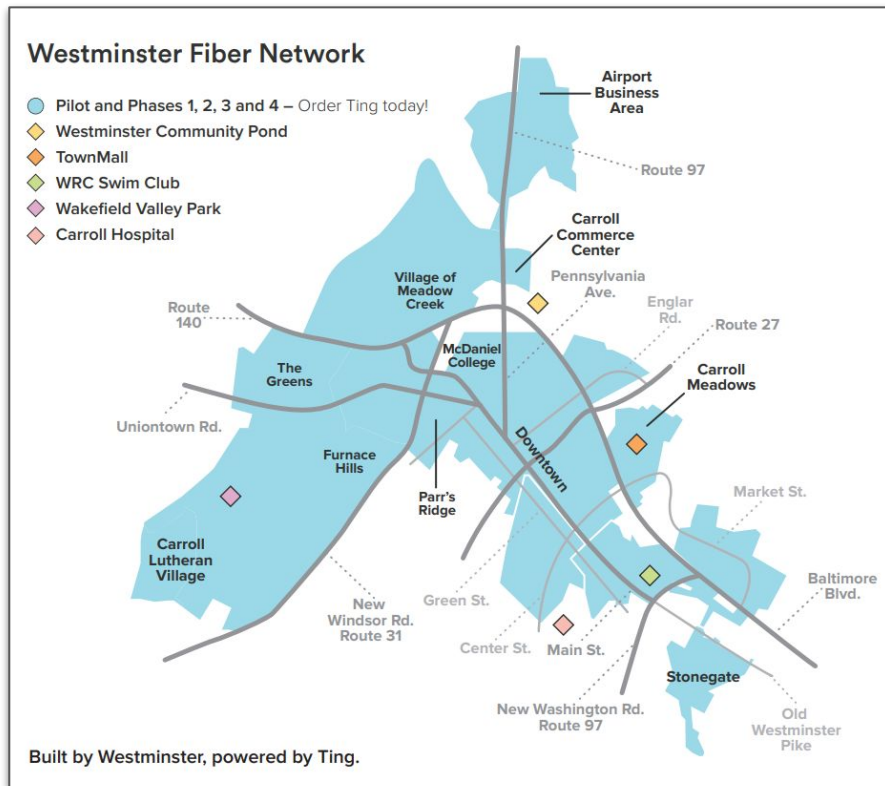


Graham Dodge, Executive Director
gdodge@magicinc.org

magic
INNOVATION • EDUCATION • INCUBATION

Lightspeed Fiber Internet Access

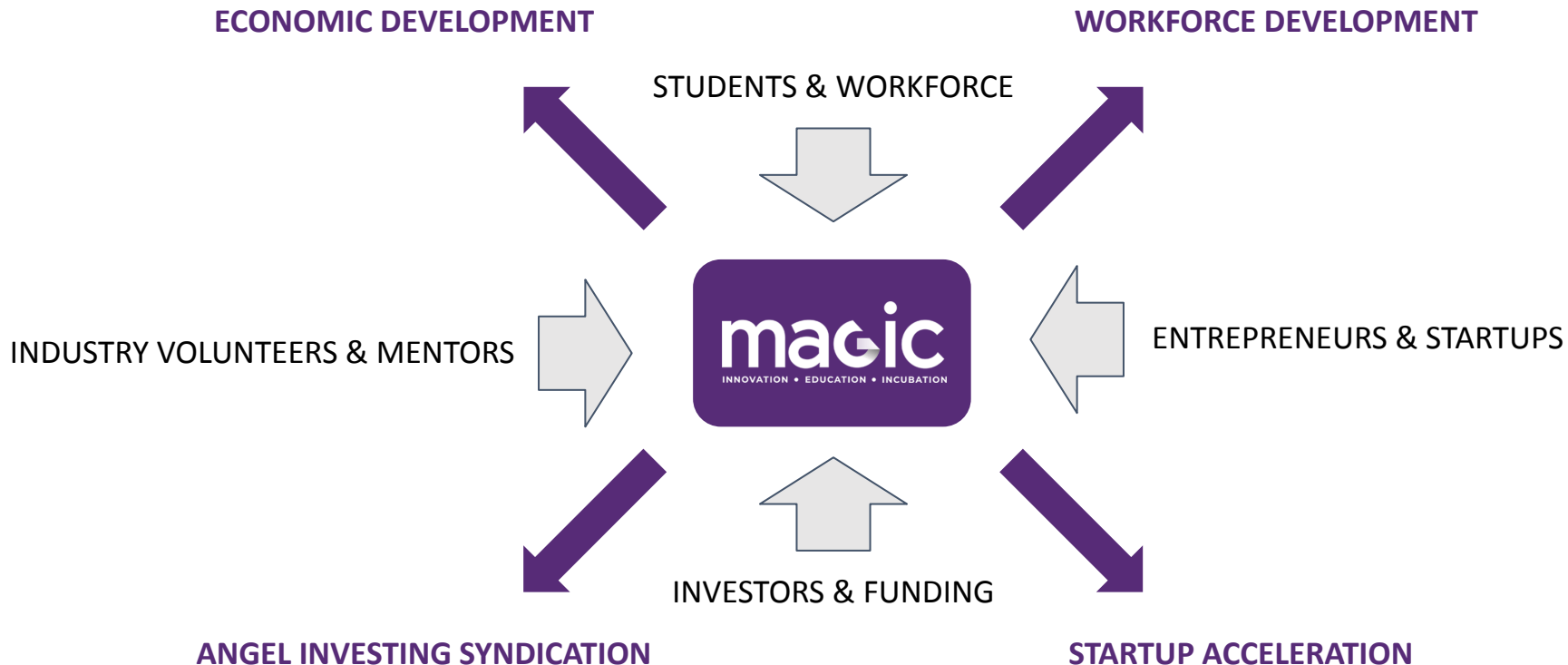
- The Westminster Fiber Network was built and is owned by the City of Westminster.
- Ting Internet leases the fiber, providing reliable internet access at a fair price with amazing customer service.
- The first customer was lit in 2015.
- Ting now services over 2,000 customers!



MAGIC IS A 501(c)3 NON-PROFIT ORGANIZATION...

INNOVATION • EDUCATION • INCUBATION

- Healthy Smart Home
- Autonomous Corridor
- Esports Arena
- Cybersecurity
- Game Development
- App Development
- Data Science
- Autonomous Robotics
- 1 Million Cups Westminster
- Westminster Angel Network
- \$1M Perks Program
- Free Consultations



MAJOR FUNDING PROVIDED BY:



HILL DEVELOPMENT GROUP



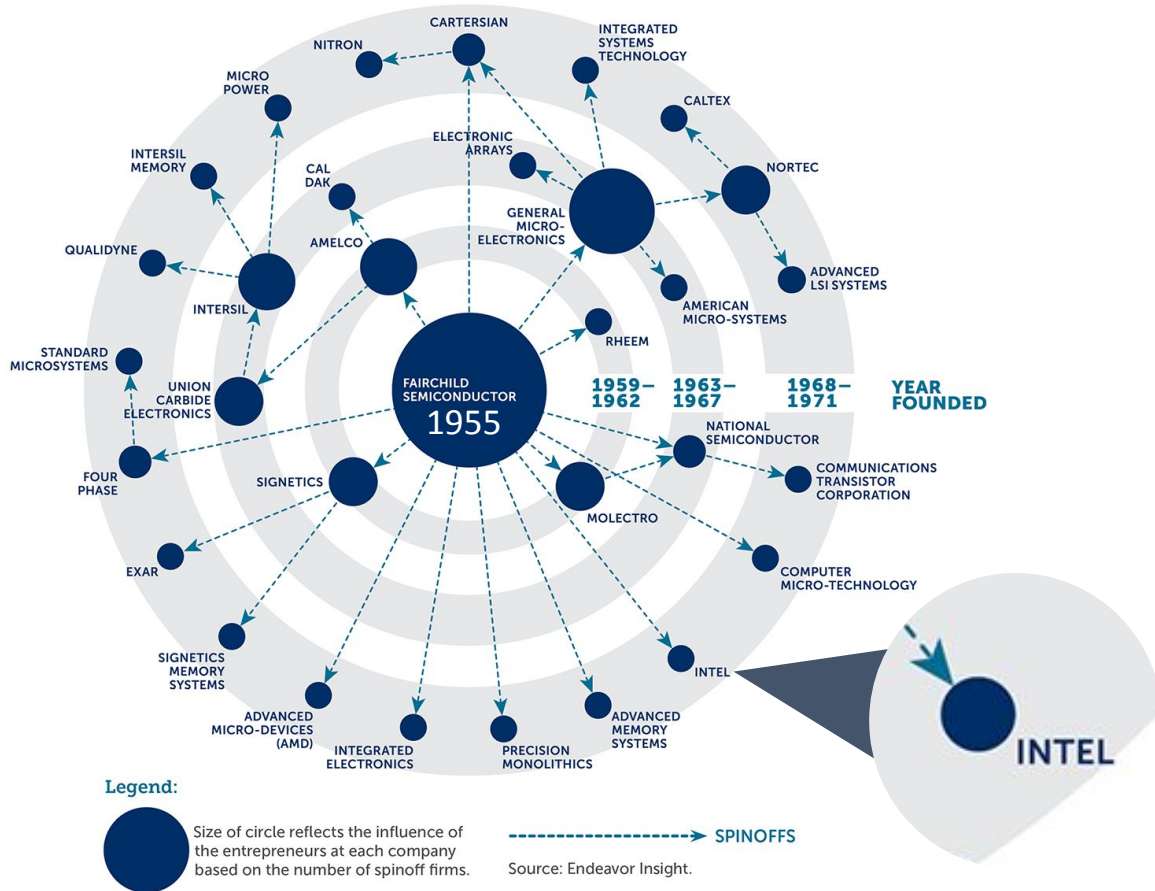
Harold Glen and Audrey G Benson
Trumpower Foundation



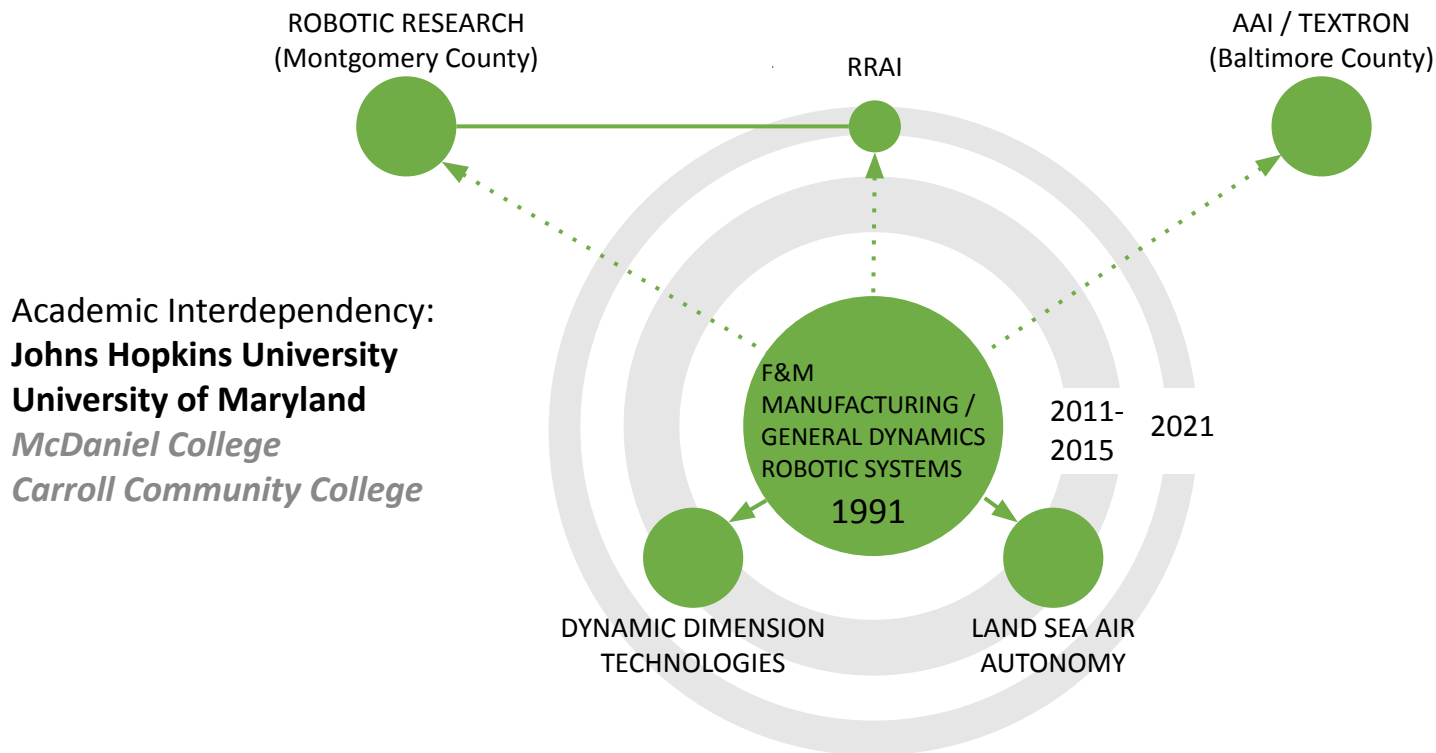
Which of these downtown Main Streets is home to the world's largest technology companies?

THE CREATION OF SILICON VALLEY: GROWTH OF THE LOCAL COMPUTER CHIP INDUSTRY

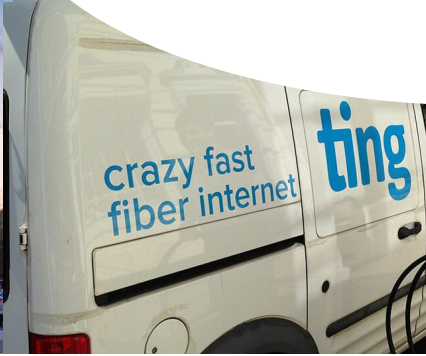
Academic
Interdependency:
Stanford University



GROWTH OF AUTONOMOUS ROBOTICS INDUSTRY IN CARROLL COUNTY



#SiliconMainStreet



- LEVERAGE OUR \$16MM INVESTMENT IN MUNICIPAL GIGABIT FIBER
- LEVERAGE EXPERTISE OF TECHNOLOGY WORKFORCE
- REVERSE FLOW OF COMMUTERS, RETENTION OF 'GEN Z', NET POSITIVE JOB GROWTH
- CREATE INFRASTRUCTURE FOR INNOVATION & DATA COLLECTION
- INCREASE REAL ESTATE REVENUE



WHAT IS AN AUTONOMOUS CORRIDOR?

- OPERATIONAL DESIGN DOMAIN FOR **CONNECTED & AUTONOMOUS TRANSPORTATION**
- **DIGITAL TWIN** MUNICIPAL TECHNOLOGY INFRASTRUCTURE
- CV2X WIRELESS EDGE NODE **SMART CITY NETWORK** ON TOP OF SYMMETRIC GIGABIT FIBER NETWORK





- DOOR-TO-DOOR, **ON-DEMAND TRANSIT** ANYWHERE WITHIN THE CORRIDOR
- SHARED **REAL-TIME SURVEILLANCE & SIMULATIONS** WITH PUBLIC WORKS, PUBLIC UTILITIES, PUBLIC SAFETY
- **FUTURE PROOFING** FOR DRONE DELIVERY, DRONE FREIGHT, AND URBAN AIR MOBILITY (VTOL, FLYING TAXIS, ETC)
- INDUSTRY SECTOR & ACADEMIC **INTERDEPENDENCY**

- For every \$1 spent on public transportation, city businesses sales increase by \$3 *
- For every \$1 spent in government technology, cost efficiencies improve by \$3 **

*American Public Transportation Association, “Public Transportation Facts,”

<https://www.apta.com/news-publications/public-transportation-facts/>

** Min-Seok Pang, Ali Tafti, M. S. Krishnan. “Do CIO IT Budgets Explain Bigger or Smaller Governments? Theory and Evidence from U.S. State Governments,” <https://doi.org/10.1287/mnsc.2015.2164>

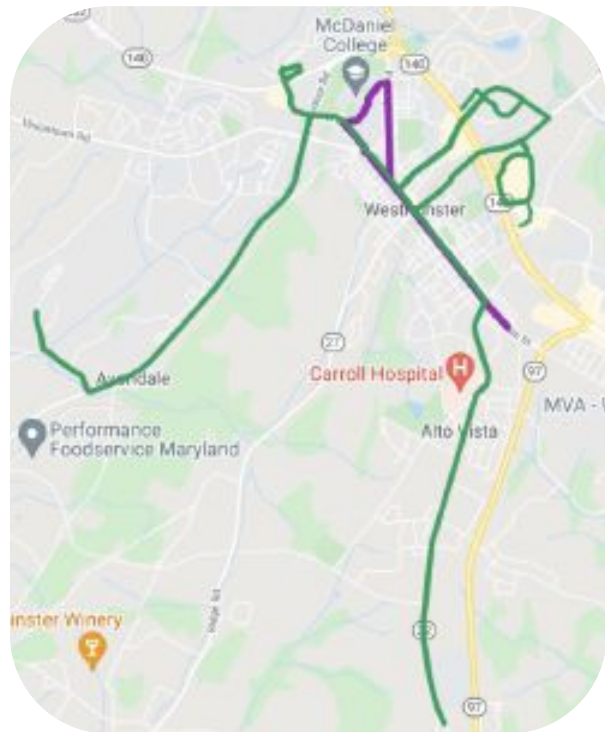
PHASE ONE COMPLETE!

Phase 1:

- Cost: \$25,000 plus \$125,000 In-Kind
- Live Demonstrations, LIDAR Scanning and Aerial Scanning
- Virtual Simulation Video
- Feasibility and Market Research

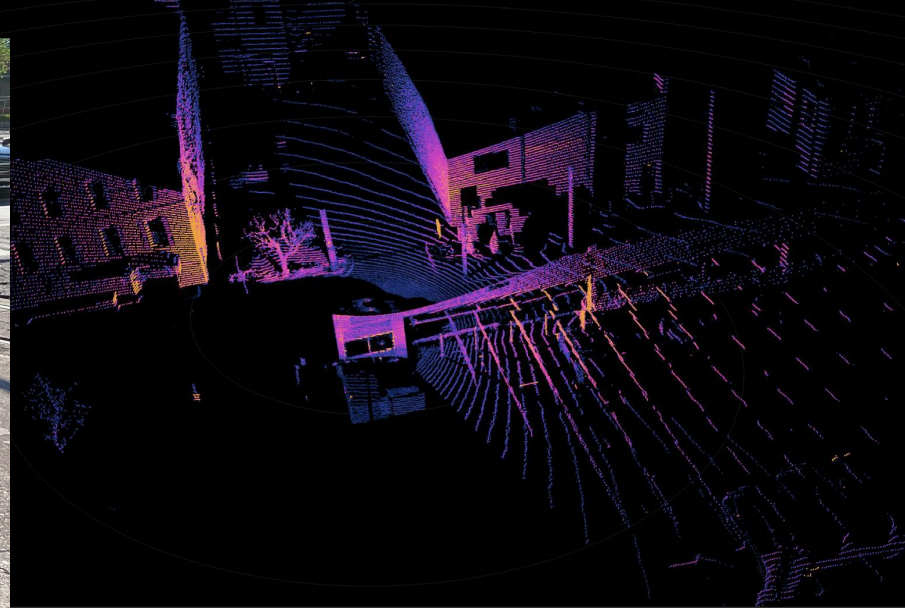
Other Accomplishments:

- Joined MDOT CAV Working Group
- Presented to ARTBA and AGC Conferences
- National Media Attention
- Kick Robotics / TEDCO Grant Award Partner
- Established relationships with Johns Hopkins APL and Institute of Assured Autonomy (IAA)



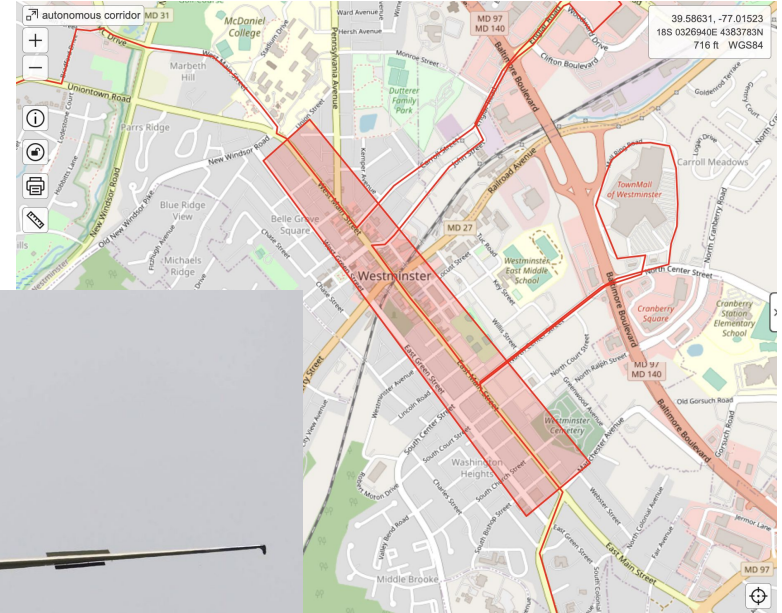
- Purple Line / Short Range
- Green Line / Extended Range



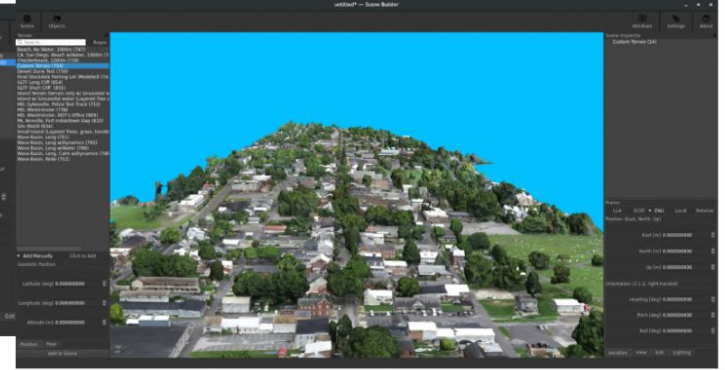




Civil Air Patrol
U.S. Air Force Auxiliary

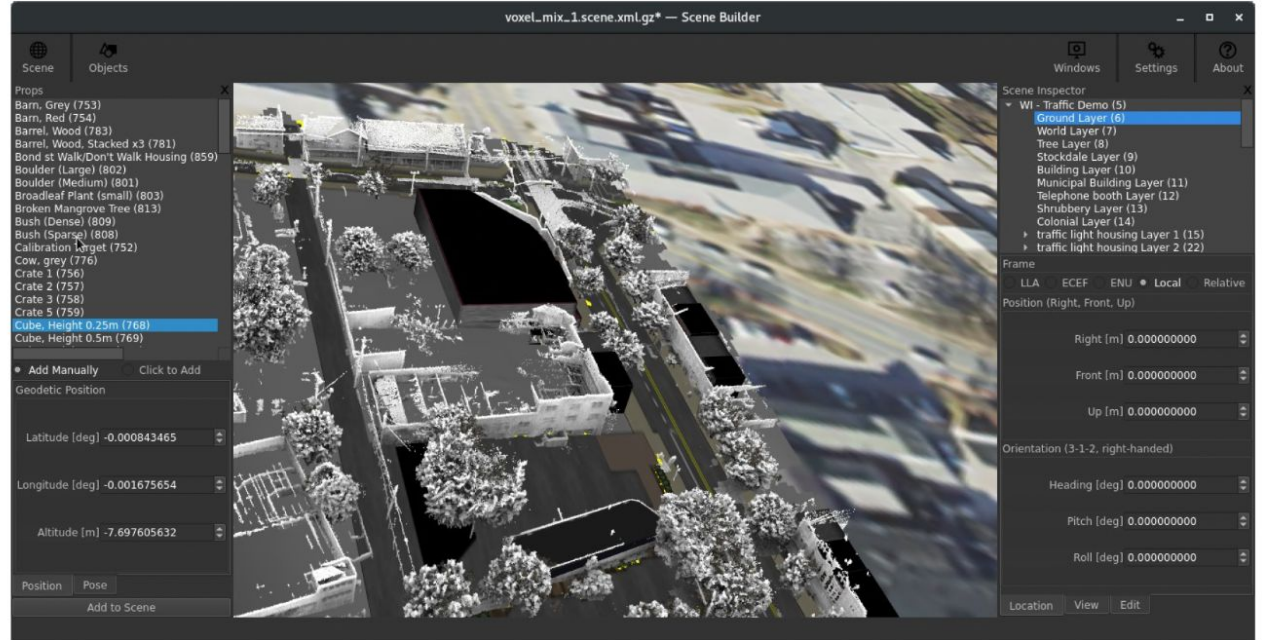






High resolution imagery captured from Drones, piloted by MD Civil Air Patrol, U.S. Air Force Auxiliary, for City of Westminster Digital Twin Autonomy Corridor Project.

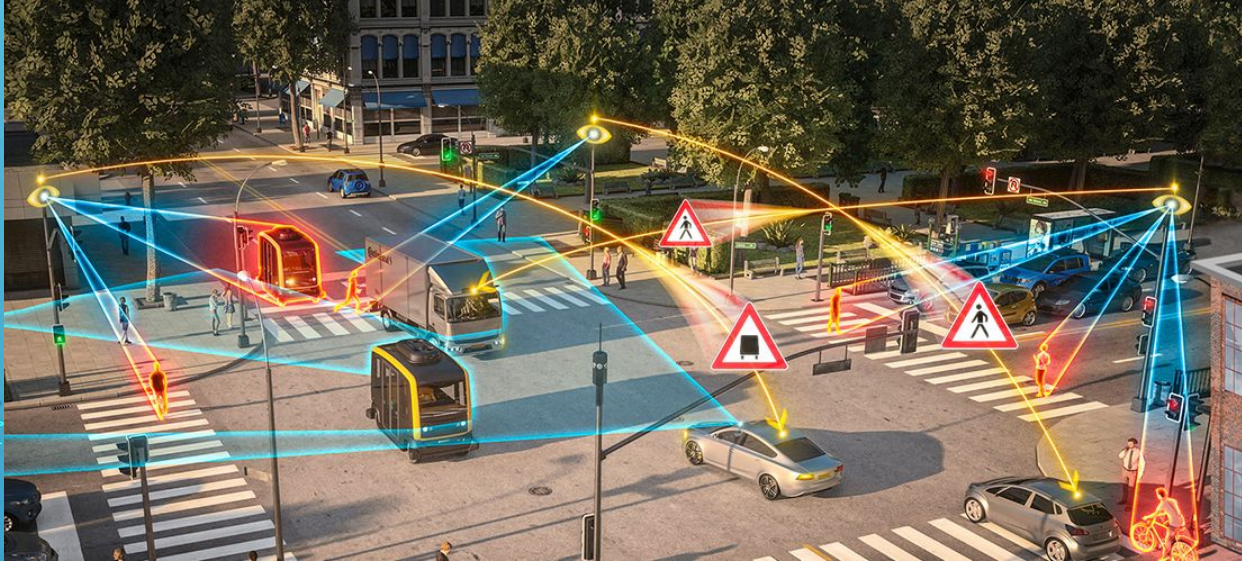
Photogrammetry processing and conversion to 3D geometry for visualization in VxSIM™



AUTONOMOUS ROBOTICS INNOVATION CENTER (ARIC)



Digital Twins



- Fully synthesized Digital Twin of Main St between Longwell and John/Bond
- City Terminal / Seat of VxSIM Digital Twin
- 3 upgraded Smart Traffic Lights
- Build out IT & Wireless Infrastructure



- Purchase of AV / EV vehicles
- SAVI Students (Paid Internships)
- Expansion of Digital Twin
- Additional Smart Traffic Lights

- Direct Benefit: Fares, Sponsorships, Licensing, Carbon Credits: **\$1MM/year**
- Indirect Benefit: Reduced damage costs (CO₂, NO_x emissions), Biz Spending, Gov Savings: **\$3MM/year**

Digital Twin & Autonomous Corridor Uses:

- Infrastructure for Connected Autonomous Transit and Drone Delivery (Beyond Line of Sight Certifications)
- Data Gathering and Diagnostics for Public Safety & Public Works
- Simulations, Assessments and Forecasting for Planning & Zoning (animations of detours, changing traffic patterns, construction projects, etc)
- Wireless Infrastructure for City-wide WiFi connectivity, Promotes Advantages of our Gigabit Fiber
- New Revenue Streams, Creates High Paying Jobs
- Supports Local Businesses, Stimulates Economic Development

How many vehicles will be needed to serve population within 11 mile corridor given 10-15 minute availability and arrival times?

- At least 4 short range <25MPH + 4 extended range >25MPH, limited hours of operation

What is the market opportunity for virtual tolls and digital twin licensing?

- Some interest by public works and utilities for refined GIS mapping capabilities, monitoring tree/foliage encroachment, virtual training, traffic pattern simulation.
- Remote/virtual testing and policy development by 3rd parties
- Unknown / speculative: CV2X tolls? Metaverse / VR gaming?

What are the grid resiliency (Net Metering) benefits from a fleet of EVs?

- In Maryland there are regulatory constraints that do not allow Net Metering with EV Chargers

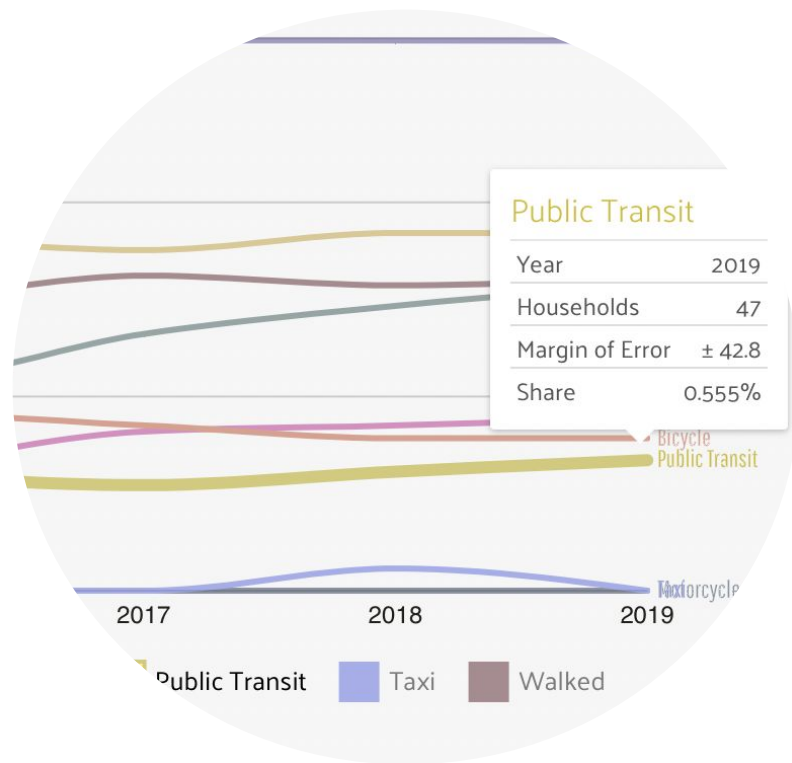
PHASE 1 RESEARCH QUESTIONS

What is the opportunity for Technology Tourism?

- Case studies
 - KC Startup Village has since generated hundreds of millions in funding to local tech companies
 - Yellowstone / Olli: 2 vehicles, 3 months served 10,000 passengers, 4,000 trips, 2,100 miles
 - Safety survey: 60% felt safe prior to riding, 95% felt safe after riding.

How will our autonomous solutions impact transit equity?

- <1% households using current public transportation options, >25% are elderly or disabled
- Improved door-to-door access for hard to reach residents on narrow streets/alleys
- Increased connectivity to employment opportunities and resources (BERC, Miller Center, etc.)
- Safe transportation for vulnerable roadway users and pedestrians



STUDENT TRANSPORTATION:



ACCESSIBILITY & SPECIAL NEEDS TRANSPORTATION:



AUTONOMOUS DELIVERY:



UTILITY & SAFETY DISPATCH / WORKFORCE TRANSPORTATION:



Board of County Commissioners

Edward C. Rothstein
President



Carroll County Government

225 North Center Street
Westminster, Maryland 21157
410-386-2043; 1-888-302-8978
fax 410-386-2485
MD Relay 711/800-735-2258

July 15, 2021

RE: Letter of Support - Mid-Atlantic Gigabit Innovation Collaboratory's Autonomous Corridor Project - Rural Maryland Prosperity Investment Fund (RMPPIF) grant

To Whom It May Concern,

As President of the Carroll County Board of Commissioners, I am happy to write this letter of support for the Mid-Atlantic Gigabit Innovation Collaboratory's (MAGIC) Autonomous Corridor Project. The project provides an opportunity to solve transportation problems in the community and attract new businesses and residents to Carroll County.

MAGIC has a track record of success in Carroll County, building a community of support for local businesses and promoting the City of Westminster's gigabit fiber network in order to make our rural community a more desirable place to live and work. This project would be a continuation of its endeavors to drive economic development and improve quality of life for both city and county residents. On behalf of the Carroll County Government, I support MAGIC's efforts.

This project will be a great step forward for Carroll County and for the State of Maryland as a whole. Carroll County Government is about the Autonomous Corridor project and supports MAGIC's pursuit of this RMPPIF funding opportunity.

Thank you for your consideration.

Sincerely,

Edward C. Rothstein (COL, Ret.)



Larry Hogan
Governor
Boyd K. Rutherford
Lt. Governor
Gregory Slater
Secretary

January 11, 2022

Nuria Fernandez
Administrator
Office of the Administrator
Federal Transit Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Administrator Fernandez:

The Maryland Department of Transportation (MDOT) supports the Mid-Atlantic Gigabit Innovation Collaboratory's (MAGIC) application for the Federal Transit Administration's Enhancing Mobility Innovation Competitive Funding Opportunity to assist in their efforts for the Autonomous Corridor Project in Westminster, Maryland.

This project has the potential to enhance innovative transportation in the community, encourage economic development, and provide residents of Carroll County more opportunities for a safe, reliable, equitable and accessible mobility ecosystem.

As co-chairs of the *Maryland Connected and Automated Vehicles Working Group (CAV WG)*, we appreciate the Maryland-focused collaborative effort with MAGIC and its project partners. MAGIC and Dynamic Dimension Technologies are both active members of the CAV WG and have presented Westminster project information several times since inception. MDOT has collaborated with MAGIC, the City of Westminster, and Perrone Robotics throughout Maryland's process of permitting highly automated vehicle (HAV) for their demonstration on public roadways in the City of Westminster. We stand ready to continue with this coordinated approach in sharing information, resources, and potential opportunities for CAV testing, research, and implementation in Maryland.

MDOT strongly supports the Autonomous Corridor Project and will continue to provide staff support for planning and implementation efforts. We are confident of the value of this project to the State, as well as to other partners, as it is already viewed within Maryland as a positive model for integrating CAV for community needs.

Thank you for your consideration.

Respectfully,

Christine Nizer
Administrator
Motor Vehicle Administration

James F. Ports, Jr.
Executive Director
Maryland Transportation Authority

CITY OF WESTMINSTER
45 West Main Street
Westminster, Maryland 21157



TELEPHONE:
Local (410) 848-9000
Baltimore Line (410) 876-1313
www.westminstermd.gov

January 6th, 2021

U.S. Department of Transportation
Federal Transit Administration
Office of Research, Demonstration and Innovation
1200 New Jersey Avenue, SE
Washington, DC 20590

To Whom It May Concern,

I am writing this letter of support for the Mid-Atlantic Gigabit Innovation Collaboratory's efforts for their Autonomous Corridor Project and their application for Federal Transit Administration Enhancing Mobility and Innovation grant funding. This project will both solve transportation problems in the community and attract new businesses and residents to Westminster.

MAGIC has a track record of success in Westminster, building a community of support for local businesses and promoting the City of Westminster's gigabit fiber network in order to make our rural community a more desirable place to live and work. This project would be a continuation of their endeavors to drive economic development and improve quality of life for the city's residents and county residents alike. On behalf of the City of Westminster, we support their efforts.

This project will be a great step forward for Westminster, Carroll County, and the State of Maryland as a whole. The City of Westminster is excited to be a partner of the Autonomous Corridor project and is in full support of MAGIC's pursuit of this funding opportunity.

Thank you for your consideration.

Sincerely,

Dr. Mona Becker
Mayor



January 24, 2022

Westminster City Council,

Spectrum Support is writing to you in support of the Phase 2, Autonomous Corridor project that is taking place in the City of Westminster, MD. I had the opportunity to learn of this project from a presentation at Carroll County's Transitioning Youth Council meeting and had the honor of meeting with Vince Brusio to learn more about this embarkment.

Spectrum Support is a nonprofit organization whose mission is helping people with disabilities live, learn, work, and engage in their communities, encouraging and supporting them to live their best lives. To do this, the City of Westminster would benefit from more access to reliable and affordable transportation. The only way for people to fully engage within their community and belong, is by having access to said community. The Autonomous Corridor project is another way for people to access the community safely, timely and the same as other community members.

Individuals enrolled in our organization receive funding from the Developmental Disabilities Administration (DDA) a stated funded waiver program with the vision to have people with developmental disabilities live full lives within their communities. Currently, through this funding we can subsidize some of the cost of transportation to assist the people enrolled in our programs to access the community. We currently use Carroll Transit System (CTS), however the demand and availability of CTS is extremely limited and the transportation barriers for this population continues to be the number one problem area. We need the City of Westminster, to have multiple modes of transportation to decrease this barrier for the aging and disability communities.

The Autonomous Corridor project is an exciting opportunity to increase reliable transportation to the people of Westminster. Spectrum Support strongly supports this project and feel as if it will be a benefit to the City of Westminster.

Sincerely,

Sarah Pryor
Director of Youth and Employment Services
443-813-0211

2 Park Center Court, Unit 3
Owings Mills, MD 21117
T: 410-795-6543
F: 410-795-6544
info@spectrum-support.org



January 24, 2022

Dear Westminster City Council,

Boys & Girls Club of Westminster, Inc. is writing in support of Phase 2 of the Autonomous Corridor project that is being considered for implementation in the City of Westminster. We were very interested in the project when Vince Brusio met with our staff last week to present the details and benefits of the project. This project will be a positive step for Westminster in addressing the transportation barriers that currently exist in the community.

Boys & Girls Club of Westminster provides healthy, supervised after-school programs and activities to youth in Carroll County. Our mission is "to inspire and enable all young people, especially those who need us most, to realize their full potential as productive, responsible and caring citizens." We accomplish this mission by providing a safe place to learn and grow, and develop ongoing relationships with caring adult professionals. Boys & Girls Club of Westminster currently serves over 400 Carroll County youth annually.

Engaging caring adult professionals to act as mentors to at-risk youth in the community in an important part of our mission. Most of our mentors/staff are students at McDaniel College and many of them do not have transportation to get from the College to the Boys & Girls Club. Providing daily transportation for them has become a challenge and added expense for us. Boys & Girls Club of Westminster also partners with Carroll County Public Schools to transport youth to the Clubs after school, however bus seats from each school are limited. Each year we have a waitlist of students who need transportation to attend the Club. These transportation barriers significantly limit our ability to serve youth in the community who need our services. Unfortunately, the current transportation options in Westminster have serious gaps and have not been reliable for our students or staff.

The Autonomous Corridor Project is a great opportunity to increase access and reduce transportation barriers within the City of Westminster. Boys & Girls Club would utilize this mode of transportation, especially for our college staff traveling to and from McDaniel college each weekday. We are a strong advocate for this project and look to utilizing the services that the project will provide.

Sincerely,

Erin Bishop
Marketing Director
Boys & Girls Club of Westminster, Inc.

LETTERS OF SUPPORT



January 21, 2022

Westminster Common Council,

EMILY L. MILLER, PRESIDENT/CEO
Gregory T. Miller, President/CEO

BOARD OF DIRECTORS
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William T. Fawcett, Vice-Chair
Paul B. Miller, Treasurer
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Brian M. Sargent
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Elizabeth P. Hargrave
Christa R. Sime
Matthew J. Sargent
Robert Sargent
Robert Sargent, Jr.
Robert T. Sargent
Marion J. Sargent, Jr.

HEADQUARTERS
320 Old Frederick Road
Frederick, MD 21703
Phone: 410-363-3889
Fax: 410-363-1770
info@penn-mar.org
www.penn-mar.org



Penn-Mar Human Services is writing to you in support of Phase 2 of the Autonomous Corridor project to be implemented in the City of Westminster, MD. Our Chief Strategy Officer has had the opportunity to learn of the Autonomous Corridor project through a recent presentation at Carroll County's Transitioning Youth Council meeting and has spoken in depth with project. Penn-Mar Human Services believes the project will begin to address many of the transportation barriers that the people we support often experience when attempting to access their communities.

Penn-Mar Human Services is an organization driven by passion and guided by purpose. Our focused and highly dedicated team believes in supporting people with intellectual and developmental disabilities on their own unique journeys to achieve their personal best. Part of that journey is having the ability to connect to their communities through employment, social engagements and through activities of daily living. Penn-Mar currently operates in-home, community-based day services and employment County. Much of the services and supports we provide occur in the City of Westminster.

Penn-Mar currently partners with Carroll Transit System (CTS) to support people with developmental disabilities to access our services as well as community. Due to limited CTS availability, Penn-Mar also has to maintain a fleet of vehicles to ensure quality supports and access to people's communities. Transportation barriers are often the number one issue driving with developmental disabilities. There is a great need for additional safe transportation options for people with disabilities to access their communities.

The Autonomous Corridor project is an exciting opportunity to increase access and reduce transportation barriers in the City of Westminster. Penn-Mar Human Services strongly supports the project and looks forward to a time where it will benefit those we support.

The official Registration and financial information of Penn-Mar Organization may be obtained from the Pennsylvania Department of State by visiting our toll free website under the Maryland Charitable Organizations Act are available from the Office of the Secretary of State for the cost of copying and postage.

A copy of our current financial statements to available upon request by contacting Penn-Mar Organization, Inc. Documents and information submitted to the State of Maryland Secretary of State for the cost of copying and postage.

Sincerely,

Gregory T. Miller
CEO and President of Penn-Mar Human Services



Building the Future

Carroll County Public Schools

125 N. Court Street | Westminster, MD 21157

410-751-3000

410-751-3034 TTY

410-751-3008 FAX

Steven Lockard, Ph.D.
Superintendent

February 4, 2022

To Whom It May Concern,

Carroll County Public Schools (CCPS) is writing to you in support of the Autonomous Corridor project to be implemented in the City of Westminster. The Autonomous Corridor will provide additional opportunities for our students, including those with disabilities, to access the world work, resources, and the greater community upon exiting from CCPS. Transportation can be a barrier at times for our graduates. The Autonomous Corridor will help provide an additional access with significant opportunities for people with disabilities in our community.

As identified in the CCPS Strategic plan, we strive to provide multiple pathway opportunities for student success, strengthen productive family and community partnerships, develop and support a successful workforce, and establish safe, secure, healthy, and modern learning environments. We value community participation and establish partnerships that ensure our students graduation and exit our system college, career, and community ready. The Autonomous Corridor project directly connects to each pillar in our strategic plan along with our values and beliefs.

We are very excited to support this work and we look forward to the implementation of future phases of this project.

Sincerely,

A handwritten signature in black ink, appearing to read 'Steve Lockard', written over a horizontal line.

Dr. Steven A. Lockard
Superintendent of Schools