



CONNECTED VEHICLE POOLED FUND STUDY (CV PFS) MEETING

2025



★ NATIONAL  HARBOR ★



★ AMERICAN WAY ★

WHAT'S INSIDE

- **Welcome Message**
- **About National Harbor**
- **CV PFS Background**
- **Connected Vehicle Technologies Showcased**
- **Key Technologies at National Harbor**
- **Test-Bed Benefits**
- **Demonstration Location**
- **Return on Investment**
- **Collaborative Partners**
- **Thanks to our Event Partners**
- **Wrap up**

WELCOME TO MARYLAND!



Welcome to the Maryland Connected and Automated Vehicles (CAV) Working Group Demonstration; a collaborative event designed to highlight the transformative potential of connected vehicle (CV) technology in real-world scenarios. This initiative brings together federal, state and local governments, academic institutions, and technology partners to showcase how vehicle-to-everything (V2X) communication advances road safety, streamlines traffic flow, and sets the stage for a smarter, more connected transportation future in Maryland.

ABOUT NATIONAL HARBOR

Situated on the banks of the historic Potomac River and just minutes from the nation's capital, National Harbor is a waterfront destination unlike any other. National Harbor is home to two of Maryland's Four Diamond rated hotels—Gaylord National Resort and Convention Center, the East Coast's largest non-gaming hotel and convention center and has almost 2,000 hotel rooms and 660,000 sq. ft. of meeting space and MGM National Harbor, an integrated luxury casino resort with renowned chef-driven restaurants, a 3,000-seat state-of-the-art theater and one of the largest gaming floors outside of Las Vegas. The vibrant Waterfront District features boutique shops, restaurants and entertainment options along picturesque promenades. The iconic Capital Wheel, a 180-ft observation wheel, Tanger National Harbor's 85 designer brands, and a robust calendar of events round out this destination that welcomes more than 15.2 million visitors a year.

The National Harbor location was strategically selected for its ability to integrate the latest in smart city technologies and its proximity to local and regional transportation networks. Key factors in the decision include:

Purpose-Built with the Latest Traffic Signal Technology:

National Harbor was designed with cutting-edge traffic signal systems, making it an ideal location for integrating advanced transportation technologies.

Fiber Optic Communications:

The area's infrastructure includes fiber optic communications that enable high-speed, reliable data transfer, essential for real-time traffic management, public services, and communication systems.

Destination Point for Local & Regional Travelers:

National Harbor serves as a key destination for both local and regional travelers, offering easy access from major highways and public transportation options, including a water taxi service that connects it to Alexandria, Virginia.



CV PFS BACKGROUND

The Maryland Department of Transportation (MDOT), Prince George's County Department of Public Works and Transportation (PG County DPW&T), Morgan State University, and the University of Maryland will demonstrate Maryland's progress in deploying Connected Vehicle-to-Everything (C-V2X), Vehicle-to-Infrastructure (V2I), and Infrastructure-to-Vehicle (I2V) communications technology. These technologies aim to enhance transportation safety, efficiency, and mobility.

This demonstration will showcase real-world applications of CV technology, foster inter-agency collaboration, and provide valuable insights for future deployments in Maryland.



CONNECTED VEHICLE TECHNOLOGIES SHOWCASED

Vehicle-to-Infrastructure (V2I): Enables communication between vehicles and roadside infrastructure like traffic signals and sensors.

Vulnerable Road User (VRU): Alerts for pedestrians and other at-risk road users in high-traffic areas.

Emergency Vehicle Preemption/Traffic Signal Priority (EVP & TSP): Coordinates signals to give priority to emergency vehicles and transit, ensuring smoother response times and more efficient operations.

Roadway Hazard Alerts: Real-time warnings about road conditions and potential hazards.

*In art, the hand can never execute anything
higher than the heart can imagine*

-Ralph W. Emerson

KEY TECHNOLOGIES AT NATIONAL HARBOR

Several state-of-the-art technologies will be demonstrated at National Harbor, illustrating their ability to improve safety, efficiency, and mobility through dynamic V2X communication:

Light Detection and Ranging (LiDAR) & Vulnerable Road User (VRU) Applications:

- Detects and identifies vehicles, pedestrians, and other objects in and around the roadway.
- Enhances situational awareness for both connected and autonomous vehicles, enabling predictive responses from infrastructure.

Roadside Units (RSUs):

- Transmit real-time information, including traffic signal status, road hazard warnings, and pedestrian safety alerts, to vehicles and digital signage.
- Gather vehicle data to aid infrastructure managers in optimizing traffic flow and reducing delays.
- Facilitate Emergency Vehicle Preemption (EVP) and Transit Signal Priority (TSP) functionalities.

On-Board Units (OBUs):

- Receive messages on traffic signal timing, safety alerts, vehicle trajectories, and potential collision risks.
- Facilitate vehicle participation in signal priority requests and emergency response coordination.

Vulnerable Road User (VRU) Detection and Alerts:

- AI-powered cameras, LiDAR systems, and V2X communication work together to identify pedestrians within crosswalks, intersections, and transit zones.
- Alerts are sent to both connected vehicles and infrastructure systems to prevent accidents, particularly in populated, high-risk areas.

Emergency Vehicle Preemption (EVP) & Transit Signal Priority (TSP):

- Send Signal Request Messages (SRM) via OBUs to provide emergency vehicles (ambulances, fire trucks, police) with green lights at intersections, reducing response times and preventing secondary collisions.
- Send SRM via OBUs for Transit Signal Priority (TSP), enabling buses to request extended green lights or early green phases, improving schedule reliability.

TEST-BED BENEFITS

Real-World Testing of Smart Technologies:

By implementing cutting-edge technologies like smart traffic management, connected vehicle infrastructure, and RSU communication systems, National Harbor offers a real-world environment to test and evaluate how these systems perform under different conditions. This provides valuable data and insights that can be used to improve and refine these technologies before they are deployed in other regions.

Collaboration and Knowledge Sharing:

National Harbor's collaboration with Prince George's County, State Highway, and private-sector partners facilitates the exchange of knowledge and best practices. These partnerships enable the testing of new solutions, while also providing the region with valuable expertise in traffic coordination, RSU security, and data management systems.

Proven Solutions for Other Communities:

The successful deployment of smart city technologies in National Harbor can serve as a model for other urban areas looking to implement similar solutions. As a test-bed, National Harbor's experiments with real-time data, smart infrastructure, and sustainable practices help other cities and regions develop strategies for modernizing their own infrastructure.

Data-Driven Innovation:

National Harbor's use of big data and IoT sensors provides insights that can drive further innovation and improvements in urban planning, transportation, and sustainability. This approach enables National Harbor to act as a living laboratory for urban innovation, testing technologies that can lead to more sustainable, efficient, and connected communities.

Attracting Investment and Partnerships:

By showcasing its forward-thinking approach to urban development, National Harbor positions itself as an attractive location for investment and partnerships with technology providers, researchers, and government entities. The test-bed opportunities also attract companies that want to collaborate on innovative projects, creating a hub for technological development and research.

DEMONSTRATION LOCATION

The demonstration takes place at National Harbor, a 350-acre waterfront destination just outside Washington, D.C. Developed by Peterson Companies in 2008, National Harbor serves as a vibrant hub for tourism, business events, and entertainment in the D.C. area. This public-private partnership between Prince George's County Government and Peterson Companies has seen significant investments in fiber optic networks and advanced Intelligent Transportation System (ITS) technology. These improvements are part of an overarching goal to establish a resilient, smart infrastructure that prioritizes safety and efficiency in this busy area, aligning with Vision Zero objectives.





151 St. George Blvd & American Way

Conference

Demo Area

Parking for event

RETURN ON INVESTMENT

The integration of connected vehicle technologies at National Harbor offers significant long-term benefits, not only for the local community but for broader regional transportation management. The key ROI outcomes include:

Improved Traffic Flow and Reduced Delays: With real-time data sharing between vehicles, infrastructure, and roadside units, traffic flow can be optimized, leading to shorter commute times and more efficient use of the road network.

Enhanced Safety: The deployment of V2I, and VRU technologies will reduce the risk of collisions, particularly in high-traffic or high-risk areas such as intersections and pedestrian zones.

Cost Savings: Efficient management of traffic infrastructure through predictive analytics and real-time updates can reduce the operational costs for maintenance, emergency response, and transit services.

Vision Zero Goals: By enhancing traffic safety and reducing crashes, the connected vehicle systems directly contribute to meeting Maryland's Vision Zero goals, which aim to eliminate all traffic-related fatalities and serious injuries.

- Performance Measures -

The connected vehicle technologies deployed at National Harbor are evaluated based on their impact on key performance indicators (KPIs), including:

Traffic Efficiency: Measurement of traffic flow improvements through reduced congestion, travel time, and delays.

Safety Performance: Evaluation of accident reduction, particularly for vulnerable road users (pedestrians, cyclists), as well as emergency vehicle response times.

System Reliability: Assessment of system uptime and the effectiveness of real-time communication between vehicles and infrastructure.

User Feedback: Gathering insights from commuters, transit users, and emergency responders to gauge the effectiveness of the deployed technologies in real-world scenarios.

These metrics allow stakeholders to understand the real-world benefits and challenges of connected vehicle infrastructure, providing data to refine future deployments and investments.



★ NATIONAL  HARBOR ★

COLLABORATIVE **PARTNERS**

The Maryland Department of Transportation (MDOT), local agencies, and academic and research institutions have united to improve road network management, enhance compliance, and support Maryland's Vision Zero goal of reducing motor vehicle crashes. This partnership focuses on using data to drive smarter decisions and advance connected vehicle initiatives across the state.

This event serves as a critical forum for stakeholders to align goals, exchange insights, and shape future policies, funding priorities, and deployment strategies for connected vehicle infrastructure. By working together, Maryland's transportation community is laying the groundwork for a safer, more efficient, and data-driven future.

SPECIAL THANKS TO OUR EVENT SUPPORTERS

We also wish to recognize and express our gratitude to the vendors who have supported this event:



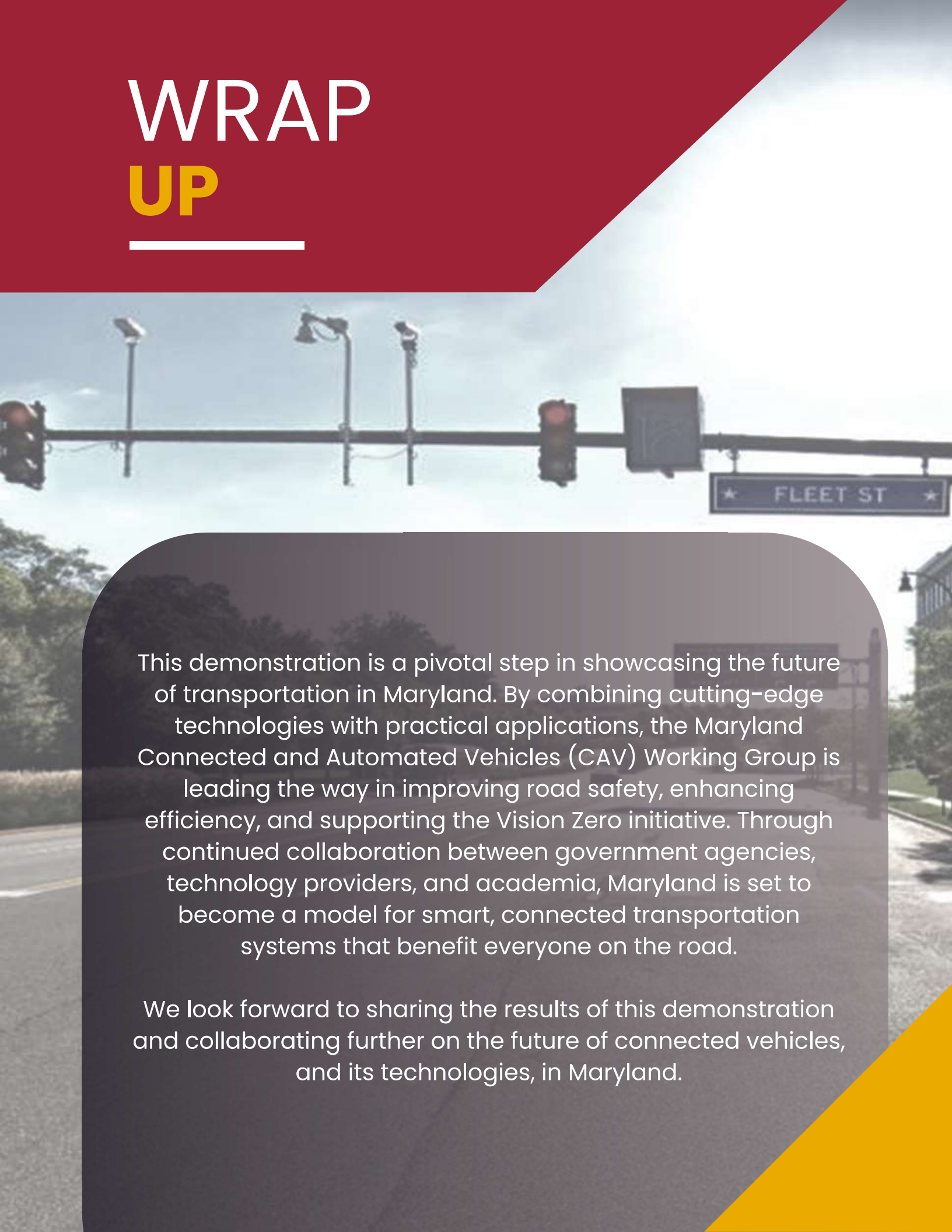
MARYLAND TRANSPORTATION RESEARCH
& ARTIFICIAL INTELLIGENCE LABORATORY



Your support and collaboration are critical in advancing the deployment of connected vehicle technology and contributing to the success of this demonstration.



WRAP UP

A photograph of a street intersection. In the foreground, a horizontal traffic light pole spans across the frame. It features several traffic lights and a rectangular sign. To the right, a blue street sign with white text reads 'FLEET ST' flanked by two white stars. The background shows a clear blue sky, some trees, and a building on the right side. The overall scene is a typical urban intersection.

This demonstration is a pivotal step in showcasing the future of transportation in Maryland. By combining cutting-edge technologies with practical applications, the Maryland Connected and Automated Vehicles (CAV) Working Group is leading the way in improving road safety, enhancing efficiency, and supporting the Vision Zero initiative. Through continued collaboration between government agencies, technology providers, and academia, Maryland is set to become a model for smart, connected transportation systems that benefit everyone on the road.

We look forward to sharing the results of this demonstration and collaborating further on the future of connected vehicles, and its technologies, in Maryland.



*Visit us again
soon!!*