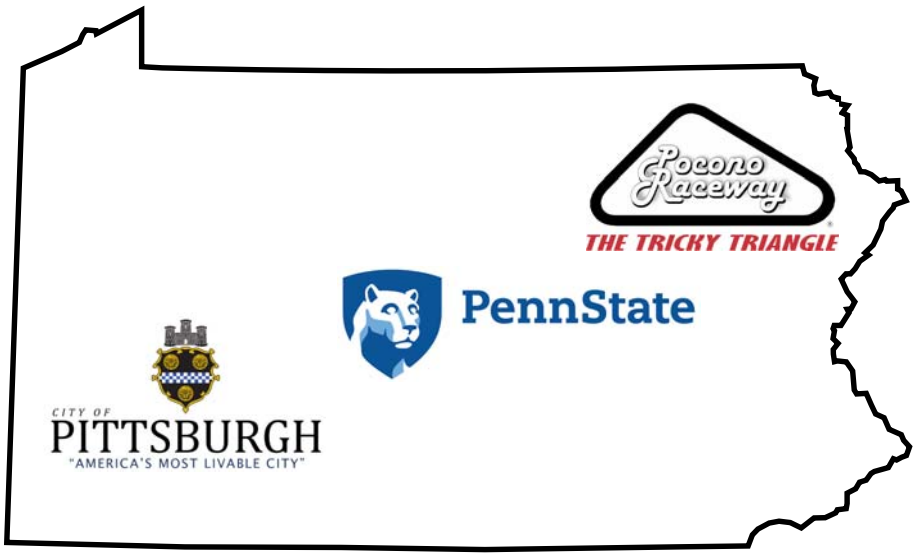
Designation of Automated Vehicle Proving Grounds Pilot

submitted by:

pennsylvania
DEPARTMENT OF TRANSPORTATION

LESLIE S. RICHARDS, SECRETARY

with Testing Partners



and Technical Research & Resource Partners

Penn

Carnegie Mellon University

PENNA TURN PIKE

Application to U.S. DOT | December 19, 2016

I. Executive Summary

The request for the designation of automated vehicle proving grounds within Pennsylvania represents the commonwealth's latest effort aimed at maintaining its position as a national leader in encouraging and promoting the safe development of this emerging technology.

In responding to USDOT's solicitation of proposals, we believe that **Pennsylvania has brokered an innovative approach** that encompasses a variety of facilities allowing testing within a wide array of environments and conditions under varying degrees of testing maturity. These include closed tracks such as **Pocono Raceway,** with the capabilities of accommodating high-speed testing, platooning, and a multitude of at-grade intersection configurations, to closed tracks at **Penn State** that are geared toward testing transit and commercial vehicles. A third area includes the excellent, real-world challenge of operating on the **public streets of Pittsburgh**, where testers such as Uber have already been busy testing in live traffic and in a variety of real-world conditions that HAVs must eventually master, including inclement weather, topography, and other transportation challenges, such as negotiating bridges, tunnels, and the city's active bicycle culture.

Our partners include not only representatives of the testing facilities described above, but also the Pennsylvania Turnpike Commission and research experts from the world of academia such as Carnegie Mellon University (CMU), the University of Pennsylvania, and their combined partnership with USDOT, the University Transportation Center (Mobility 21). The relationships among these various industry players is further explained and described in succeeding sections of our proposal.

OUR GOALS

- ✓ Advancing HAV technology
- ✓ Promoting safety and the benefits of HAV technology
- ✓ Open data sharing and management for our testing partners and the public
- ✓ Encouraging testing in various geographies, weather conditions, and at different levels of testing maturity

OUR STRENGTHS

- ✓ PennDOT as a convener
- ✓ Safety emphasis
- ✓ Statewide in scope
- ✓ Scalability of approach
- ✓ Sharing of data
- ✓ State HAV policy and infrastructure already in place

Why It Works

Our proposal features a collaborative process involving government, industry, and academia. We believe this is a logical framework that can lay the foundation for future success. In its recent guidance, **NHTSA has identified that there needs to be a lead agency in every state. PennDOT has taken that role as it relates to HAVs in Pennsylvania to ensure safety in testing and the sharing of knowledge and data.** PennDOT views its role as a

OUR APPROACH

This application joins three proving ground applications under one umbrella application to create a unique approach based on PennDOT's alignment with NHTSA's recommendation for one lead HAV agency in each state. We believe that each partner application stands on its own merit and should not be disqualified if US DOT does not select our umbrella application. However, we believe that the Community of Practice benefits greatly from coordinated and joint efforts of three proving grounds that each offer a different environment for testing and the ability to share resources and data to maximize safety throughout the testing process.

facilitator or convener – an entity that is uniquely positioned to provide oversight and legal support to testers and testing facilities alike. This role puts us in contact with each of our designated partners and in a position to understand what they're doing and promote their efforts, all while breaking down governmental barriers that can have an unintended consequence of stifling innovation and progress.

Our partners too bring various strengths to the application. As not all partners have expertise in all areas of HAV testing, a matrix approach combines the strengths of each into a more compelling application, overall. Having PennDOT in a lead role will allow our partners to look to us for interpretations of the Vehicle Code as it relates to the appropriate testing and deployment of HAVs. This will help prevent testers from running afoul of codes and regulations – or practices that could allowing testing in a manner that would compromise safety.

The accompanying table depicts the Department, its partners (in both testing and research), and the various areas of expertise each entity brings to the application. It shows that **together, we are stronger than the sum of our individual parts**. All of our partners are critical elements of this application.

Table 1: Matrix of Expertise/Team Strengths

Required Expertise		Partners					
		Testing Facilities			Technical Support & Resources		
Administration	✓	✓	✓				
Legal	✓						
Legislative/ Policy	✓				✓		
Research			✓		✓	✓	✓
Safety	✓	✓	✓	✓	✓	✓	✓
Security	✓						
Technical			✓	✓	✓	✓	✓
USDOT Guidance	✓				✓		
Testing Facility		✓	✓	✓			
Add'l Testing Equipment	✓				✓		

PennDOT is not a newcomer to the advancement of HAV technology. To ensure our agency is properly poised to be a leader in HAV development, we have reorganized our staff to commit greater resources and attention to autonomous and connected vehicle programs. Staff participates on numerous committees devoted to the development of this

technology, and we actively support the Community of Practice through such initiatives as the AASHTO SPaT challenge, and in discussing lessons learned through our recent Harrisburg deployment. Our partners have also been promoting HAVs through national presentations, TRB meetings, and regional meetings (e.g., Transportation Engineering and Safety Conference). Pennsylvania is also a member of the Smart Belt Coalition, which is a grassroots partnership between the states of Michigan, Ohio, and Pennsylvania to prioritize and advance HAV initiatives for the region.

Our work in the development of HAV policy will be foundational to USDOT's proposed designation of proving grounds within the state. For example, one of the legacies of our recent work in developing HAV policy is that **we have the benefit of already having a fully functioning Policy Task Force**, composed of a range of complementary interests (government, academia, manufacturers, etc.), elements of which will be recast as part of a new "Pennsylvania Proving Ground Safety Advisory Committee" that would serve as a liaison between the testing facilities and the Community of Practice.

II. Approach

Figure 1: Proving Ground Structure

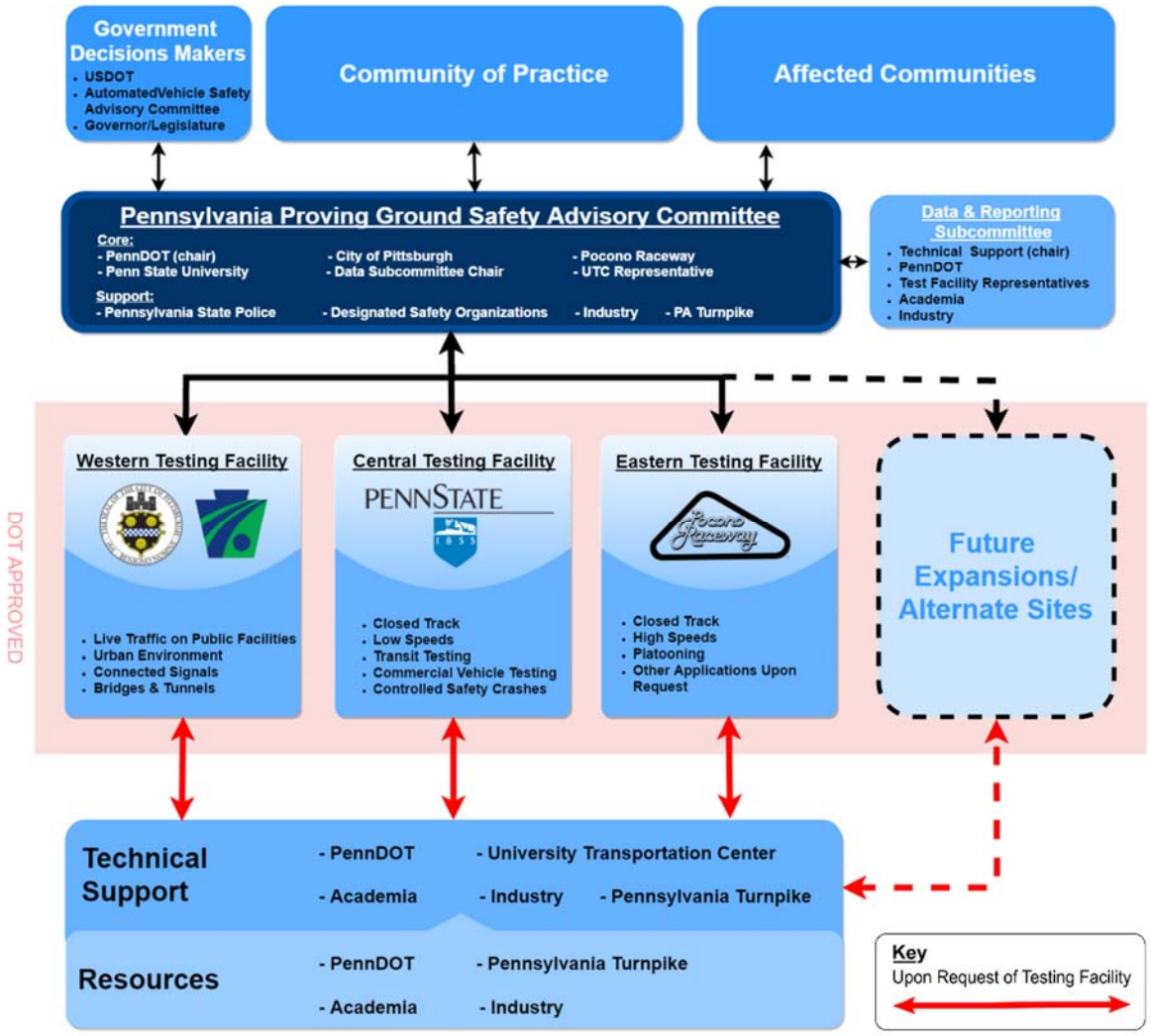


Figure 1 above outlines our innovative approach that would serve to allow HAV testing and data collection to be performed in a safe and efficient manner that results in the promotion of data sharing and sharing of best practices. The concept as shown is centered on a Pennsylvania Proving Ground Safety Advisory Committee. While PennDOT is shown as a chair of this group, other partners would have equal participation. The collaborative nature of this arrangement will make testing in Pennsylvania that much stronger. **Our framework also naturally allows for the sharing of knowledge and data, as PennDOT and its partners all participate in various committees and organizations, all of which would help inform a Community of Practice**. The figure also acknowledges that if testing is performed in a public environment (as opposed to a closed track, etc.) it will be important to sell the benefits of HAV to local municipalities. PennDOT has the infrastructure and personnel already in place to accomplish this. The figure also proposes a subcommittee on data collection. PennDOT seeks to ensure that the data it collects and maintains is transparent and able to be shared. The figure highlights the three testing facilities; the discrete benefits of testing at each are further explained throughout our proposal.

Figure 2: Tester Flow

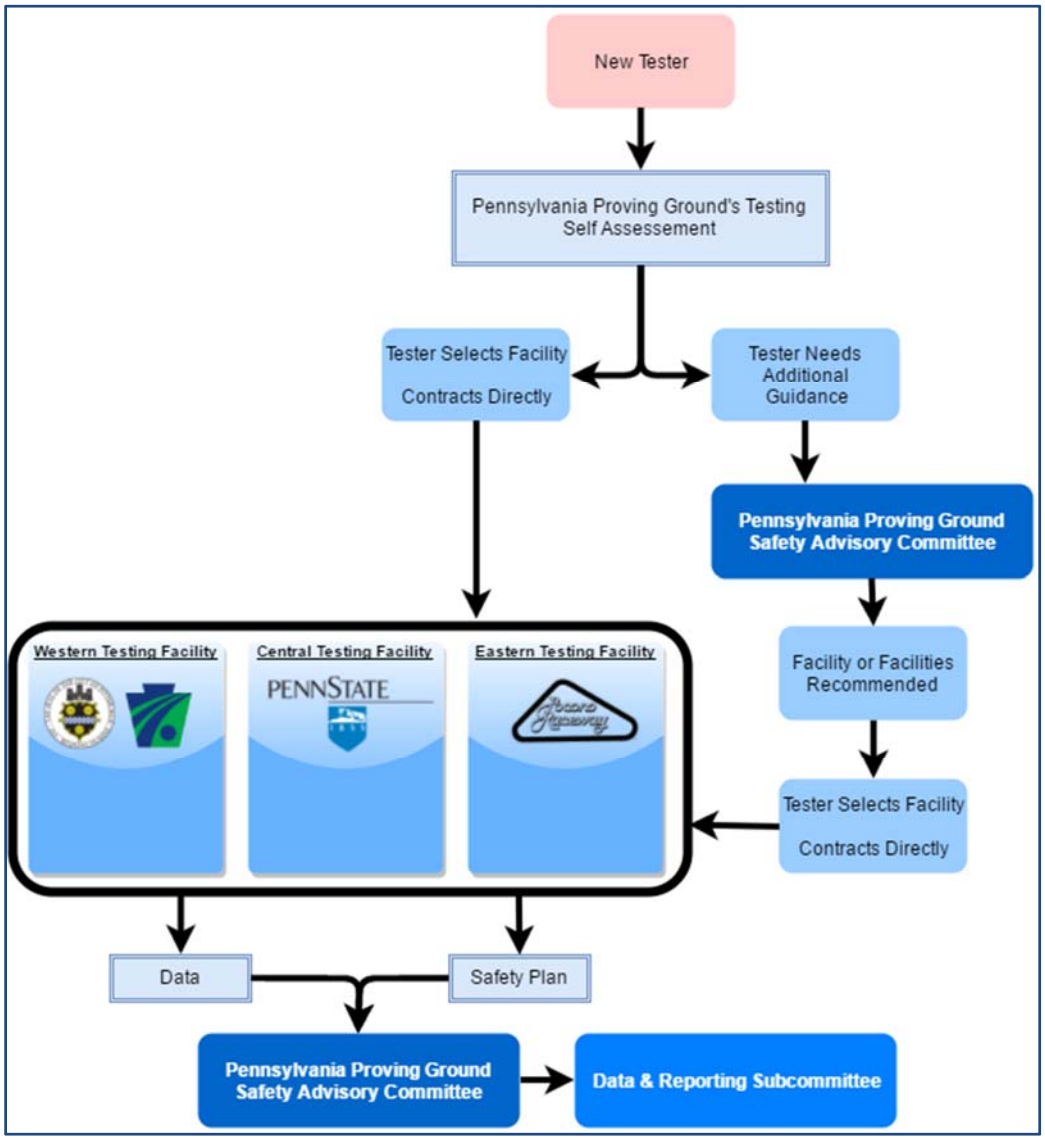


Figure 2 above demonstrates our vision of how an applicant would approach PennDOT in determining what facility it would use, and how the tester would interact with PennDOT and our Safety Advisory Committee. **The proposed framework minimizes any bureaucratic processes that could squelch or discourage testers interested in testing HAVS in Pennsylvania**. **The self-assessment as shown in the flow chart could be performed through an online platform in a checklist format to help guide the tester as to what facility they may wish to contact and use**. This process could be achieved within minutes, and without any human involvement. If a tester needs additional guidance, more formal contact with the committee would be made to direct the tester to the most appropriate testing facility alternative. It is important to note that the contracting would occur directly with the facility. The Safety Advisory Committee would also ensure that an exchange of safety data/testing results occurs across our various partnerships and does not occur within a vacuum. This represents a vitally important role for the Safety Advisory Committee.

This framework as proposed will encourage testing in Pennsylvania by ensuring that any procedural bottlenecks in initiating HAV testing are minimized. The flow chart demonstrates the collaboration that would occur among all the entities that are involved in performing, hosting, and managing the testing process. The relationships inherent in this process as designed to ensure that collaboration takes place.

III. Address Selection Criteria

This section of the proposal systematically addresses the selection criteria noted in USDOT's solicitation of proposals. Each subsection documents how PennDOT as the lead agency, along with its various partners, satisfy the criteria.

A. Mandatory Criteria

1. ***A Designated Safety Officer responsible for the entity's safety management plan and who will participate in the Community of Practice's regular quarterly meeting of Safety Officers.***

PennDOT's Mark Kopko will serve as the department's Safety Coordinator. He is the manager for Advanced Vehicle Technology and would also convene quarterly meetings with our partners' Safety Officers. An additional point of contact would be Glenn Rowe, P.E., who is PennDOT's Chief of Highway Safety and Traffic Operations.

The **City of Pittsburgh's** Safety Officer will be the incoming director of the new Department of Mobility and Infrastructure, to be announced in early January 2017. At Carnegie Mellon, the Safety Officers will be Dr. Raj Rajkumar, Director, T-SET UTC, and George Westinghouse, Professor of Electrical and Computer Engineering.

At **Penn State University's** Larson Transportation Institute, Steve Williams, LTI's operations manager will serve as Safety Officer, while Dennis Kovalich, LTI's test track manager, will act as on-site Safety Officer.

Pocono Raceway has designated its Senior Director of Facility Operations as its Safety Officer. The Senior Director of Operations or his designee and the client using the track develops a Safety Management Plan that best suits the type of driving, the speed, the course utilized and the amount of safety deliverables needed by third parties. The approach is customized to handle the approach and request of the user of the facility.

2. Commitment to sharing the entity's approaches to safety and safety data generated through testing and application.

As documented in Section 2 of our proposal, one of the key roles of our proposed Safety Advisory Committee will be to serve as a clearinghouse of information related to safety data and testing results. Furthermore, any data provided to or generated by us or our partners will be shared in NHTSA-required format where applicable.

B. Proposed Contributions

1. The extent to which the applicant meets the above eligibility and administers an established automated vehicle program, either independently or through a partnership.

PennDOT will challenge the partners and work with them on their respective programs as requested. PennDOT, along with the City of Pittsburgh and Carnegie Mellon University, has joined with the PA Turnpike Commission in developing a Joint Connected Vehicle Strategic Plan that sets a consistent vision and direction for the state.

PSU's test track presently includes many of the core capabilities needed to perform connected, automated, and autonomous vehicle tests. Most critical to all these tests are:

- The ability to ensure access control, i.e., the ability to prevent any unauthorized access to the track from non-test vehicles. (This enables safety-critical tests to be performed safely away from public exposure.)
- The ability to control pavement surfaces, including pavement markings, signage, signaling systems, and even wetting or icing the surface (in winter weather) under controlled conditions.

Additionally, the track supports many core capabilities that are essential to advanced vehicle testing, such as DRSC, vehicle mapping, and electrification and charging systems.

2. The capability of the applicant to provide leadership in making national and regional contributions to the solution of both long-range and immediate mobility challenges through the testing and deployment of automated vehicle technology.

PennDOT's contributions to the advancement of HAV technology are numerous and far-reaching. Our staff has brought leadership to the industry on a national stage, through its involvement in such committees as:

- I-95 Corridor Coalition Traveler Information Services Committee (co-chair);
- Connected Vehicle Pooled Fund Study / AASHTO Deployment Coalition;
- US DOT Vehicle-to-Infrastructure Deployment Coalition;
- AASHTO Sub-committee on Traffic Engineering;
- AASHTO Sub-committee on TSMO.

Our partners augment our qualifications. For example, the City of Pittsburgh and CMU have collaborated over the past several years on the development and implementation of Adaptive Signal Control Systems, Connected Vehicle Technology, and Connected and Autonomous Vehicle Policy in an urban setting. These projects have included many "SmartPGH" branded projects, such as the pilot program for the Surtrac Adaptive Signal Control

System in the East Liberty neighborhood of Pittsburgh, the City's proposal for USDOT's Smart City Challenge in late-2015 and throughout much of 2016, and the recently-awarded Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) grant for expansion of Adaptive Signal Control Systems and Smart Streetlights throughout a number of "smart spine" corridors within Pittsburgh.

Additionally, Pocono Raceway, given its intrinsic relationship with OEM automakers and their suppliers means that testing in the field of motorsports helps drive technology developments throughout the industry. The vehicles that are tested at the racetrack cannot be tested in a laboratory or live roadway test simulation and so Pocono fulfils a specific role as part of our application in that regard.

3. ***The applicant's proposed contributions to the Community of Practice. Examples include established safety management plans, access to testing data, engagement with stakeholders, or ability to generate results that have broad applicability.***

Our autonomous vehicle policy task force has served as a benchmark not only for entities within Pennsylvania but also for our other state DOT peers. The task force's role will expand beyond that of policy analysis and development as the technology and its development continues to evolve. The General Assembly is expected to enact authorizing legislation that will give PennDOT more power to adopt policies overseeing more advanced HAV testing. As part of the task force's infrastructure, a web site and an internal project SharePoint site have been developed to serve as a clearinghouse and repository for news and information related to the industry. Also, members of our ITS Pennsylvania Chapter are actively involved in our State Transportation Innovation Council (STIC), where ideas can be evaluated and implemented.

In addition to the City of Pittsburgh and CMU's Safety Officers attending Quarterly Meeting of Safety Officers and Safety Partners convened by PennDOT, they will also serve as conveners of quarterly local meetings focused on the City of Pittsburgh and autonomous testing in urban environments. These convenings are likely to include City of Pittsburgh staff from the Department of Mobility and Infrastructure, the Department of Public Works, the Department of City Planning, and the Mayor's Office as well as technical experts and researchers from Carnegie Mellon University, the University of Pittsburgh, the Southwestern Pennsylvania Commission (SPC), and Pittsburgh-based companies like Uber and Rapid Flow Technologies.

Furthermore, the City of Pittsburgh has already spearheaded a pioneering effort to develop the Western PA Regional Data Center (WPRDC), a one-stop shop for all the City and County's current collected data, which is accessible by the public in an open, machine-readable format.

4. ***The applicant's ability and willingness to maintain a working relationship with the Department's relevant research program offices, including potential participation in conferences, meetings, joint research efforts, and submission of significant activity reports to the DOT on a routine basis.***

PennDOT already has active involvement within many organizations, including TRB and ITS America. Secretary Richards has also been a sought after speaker at conferences on the development of HAV technology. The City of Pittsburgh and Carnegie Mellon University have already developed substantial collaborative relationships with USDOT and FHWA and have attending numerous conferences and conducted projects together in recent years. In fact, Dr. Raj Rajkumar has been invited on multiple occasions to serve as a speaker and/or panelist at USDOT

functions, including the introductory convening for the Smart City Challenge. Both the City of Pittsburgh and CMU would be pleased to continue and deepen such relationships. PSU is committed to working with USDOT in developing appropriate policies and procedures to execute prescribed tests as part of its Laboratory Research Safety Plan. Pocono Raceway is committed to fostering relationships with PennDOT, its partners, and USDOT.

C. Commitment to Safety

1. ***The demonstrated capability to control risks through the implementation of robust safety precautions through a published safety management plan in all proving ground testing and operations.***

PennDOT and its partners all maintain and enforce their respective safety plans.

As the USDOT Technologies for Safe and Efficient Transportation University Transportation Center (TSET-UTC), Carnegie Mellon's autonomous transportation research has focused primarily on safety, in 5 specific areas: In-Vehicle Technologies, Infrastructure Technologies, Human-Vehicle Interactions, Mobility/Data Analytics and Policy.

The City of Pittsburgh has partnered with the experts at CMU specifically to ensure that safety precautions are prioritized as the primary concern in autonomous vehicle testing in our dense, multi-modal urban setting. Both City of Pittsburgh staff and experts from CMU would participate in PennDOT's Proposed Safety Advisory Committee to ensure that collaborative safety management plans were agreed upon in thoughtful, fully informed manner prior to testing.

In State College, the PSU test track features a two-person safety management team for all automated vehicle testing at its closed-loop test track. The school's Safety Policy ensures that all projects administered at its test track are consistent with university policy, and that all safety expectations are clearly communicated to all responsible parties before testing is undertaken. The school's College of Engineering develops the mission and vision for safety and security for all laboratories and research space. An integrated Safety Plan (ISP) ensures that safety and health within each unit of the school are well managed.

Pocono Raceway has a strong commitment to the safety of racing, spectators, and those that may use the facilities for HAV testing. It has the technical expertise that can be shared and incorporated into new technology testing on a designated proving ground.

2. ***Demonstrate that specific safety considerations have been met over the course of operation, including safety of proving ground personnel, safety protocols when making use of public roads, and attention to safe design, deployment, and operations of automated devices.***

State law currently allows for self-driving vehicles as long as there is a driver available behind the steering wheel to react to unexpected events. Current policy guidance recommends that testers in Pennsylvania be able to demonstrate to the Department that it can set up, manage, and run a safe and successful testing operation on the state's highways.

The City of Pittsburgh's Department of Mobility and Infrastructure will work closely with PennDOT and USDOT to and testing firms to methodically document and demonstrate to the Department that, collaboratively, our

partners can and will set up, manage, and run a safe and successful testing operation in an urban setting. Penn State has safety management protocols for its LTI test track and in testing on the local roadways of State College.

Pocono Raceway is already a thought leader in the field of motorsports safety and commits to share established safety management plans, grant access to non-proprietary testing data, and engage with stakeholders.

D. Research, Application, and Data Sharing

1. The extent to which the State or locality can provide applicable solutions for the broader region and surrounding corridor for improved mobility through the advancement of automated vehicle technology.

A hallmark of our application includes the ability to test in different environments: live traffic, closed track/low speed, and closed track/high speed. Moreover, our application offers "scalability," or the ability to expand our network into other facilities and corridors.

Though spanning a relatively small geography footprint, Pittsburgh boasts a range of densities across its 90 neighborhoods. The City of Pittsburgh is home to a dense downtown business district, urban neighborhoods, streetcar suburbs, and post-war bedroom communities. Steep topography, rivers, and other natural and man-made boundaries have created a patchwork of neighborhoods with a range of densities, which make Pittsburgh the ideal city for simulating a variety of locales, climates, and levels of density.

Additionally, Pittsburgh is in a moment of shared vision. The leaders of the City, County, Commonwealth, corporate interests, anchor non-profit institutions, and philanthropies have not worked so closely together in generations. Given this shared vision, we believe lessons learned in Pittsburgh will be more easily exported to our surrounding municipalities in Allegheny County, and throughout Pennsylvania.

The LTI test track at Penn State has the potential to spread testing capabilities into the surrounding community, including the Penn State Campus, the surrounding local community, and nearby interstate highway systems. This is particularly useful because its garage and gated area can serve as a vehicle parking/storage, work, and data-collection facility, while at the same time allowing users access to a variety of road environments for testing.

Pocono Raceway (known colloquially as "the Tricky Triangle") offers a wide range of testing possibilities in addition to the ones noted previously. The Pocono track is notable in that it includes a 3,740-foot-long straightaway (longest in the nation for NASCAR), which offers an excellent environment for testing high-speed platooning and braking, and simulated work zones with long tapers similar to an interstate. The long straightaway could also allow for testing speeds up to 85 mph (as some toll roads in Texas already allow for this rate of speed), or simulated ramps on and off an interstate at real speeds. In another application, the track's three different angle curves could be used to test vehicles such as dump trucks with blind curves.

Additionally, Pocono's interior roadway network inside the Triangle could serve a variety of intersection mark-ups, including T-intersections, 3- or 4-way intersections, etc. Pocono also includes a mix of paved and gravel surface parking lots, which would be excellent assets to use in testing automated valet service, particularly on surfaces that do not contain any roadway markings. Considering all of these testing options, Pocono offers a range of real-

world operating conditions for testing. To build a facility from scratch that could match the features Pocono currently offers would take years to complete.

2. ***The demonstrated research and extension resources available for carrying out activities and programs as they relate to automated vehicle advancements.***

PennDOT enjoys having the support of three major academic institutions and proving grounds, as well as Pocono Raceway as a testing facility. Our partners are recognized veterans and leading researchers in the field of HAV technology, including Carnegie Mellon and Pitt University in Pittsburgh (as well as the Traffic21 Institute and Metro21), and Penn State University in State College. Additional resources are available from the City of Pittsburgh, the University of Pittsburgh, and Allegheny County via the Western PA Regional Data Center (WPRDC). Resources are also available from the Surtrac pilot project in East Liberty and the upcoming ATCMTD project relating to Adaptive Signal Control Systems, DSRC units, and Smart Streetlights.

Our resources also include a fleet of dump trucks, snow plows, loaders, and salt spreaders. Our partner at the Pennsylvania Turnpike Commission adds an additional 3,600 units of fleet equipment, including dump trucks, attenuators, and pool cars.

In addition to the equipment we have available, our partners at PSU and Pocono offer the testing environments for this equipment. Testing on public streets within the City of Pittsburgh occurs on roadways that are owned and maintained by the City and the Commonwealth. In short: we have the vehicles and related equipment necessary in order to test the infrastructure (V2I applications).

3. ***The degree to which the applicant can disseminate results of automated vehicle research through a statewide or region-wide education program to support the national deployment of automated vehicle technology.***

As a state department of transportation, the reach of PennDOT's organizational network is vast. The department is organized into 11 engineering districts to localize its engineering and maintenance functions and also maintains maintenance facilities in all 67 Pennsylvania counties. PennDOT also has a Press Office that serves as the public face of the department, along with a community relations coordinator (CRC) in each of the engineering districts. These CRCs oversee the districts' public outreach activities and programs.

Within state government, the department also has existing relationships with its sister agencies such as the Department of Community and Economic Development, and the Pennsylvania State Police. Additionally, PennDOT is supported by 24 planning partners – a network of MPOs and RPOs that collaborate with us in support of our mission as it relates to our planning and programming activities. In addition, PennDOT has recurring contact with over 11 million vehicle owners and can also leverage our relationships with municipal and modal associations.

The City of Pittsburgh and CMU will contribute all local data, research, and findings regarding the urban area of Pittsburgh toward PennDOT's larger state-wide education and informational programming. At PSU, the school has enjoyed a 50-year history of working collaboratively with PennDOT in advancing the state of the art and state of the practice in transportation. Pocono Raceway's natural relationship with the OEM manufacturers and their

suppliers gives them access to a national platform for sharing data and information related to safety and testing results. Pocono's partners have extensive research and technical manuals at the track that allow for driving technology development for race vehicles and automated vehicles alike.

4. A commitment to open data and sharing performance metrics and results of objective tests.

PennDOT has the physical infrastructure, or data farm, to house all the data related to HAV testing and development and is committed to sharing all the data provided by the proving ground facilities.

The City of Pittsburgh has spearheaded a pioneering effort to develop a data-sharing infrastructure for the region. Together, with partners at Allegheny County, the University of Pittsburgh, the Richard King Mellon Foundation, and the Heinz Endowments, it successfully built the Western Pennsylvania Regional Data Center (WPRDC). Pittsburgh's City Council unanimously passed Open Data legislation in February 2014 with input from local and national experts including professionals at the Sunlight Foundation. This legislation requires records to be "open by default" and established a process for identifying and approving datasets for publication through the WPRDC.

E. Demonstrated Investments

In facilitating automated vehicle testing, applicants demonstrate a commitment through one or more of the following:

1. Capital improvements to the proving ground(s) to advance automated vehicles

PennDOT is committed to providing the City of Pittsburgh with signals, fiber, and buses. Through our Green Light-Go Program we have a specific funding mechanism for local municipalities to deploy ITS and HAV technologies. In 2017, the City of Pittsburgh's Capital Budget aims to allocate $75.9M in funding for capital projects and to continue Mayor Peduto's commitment to developing a long-term maintenance and investment plan for the City's assets. This includes $15.1M for street resurfacing, providing for more than 60 miles to be completed. The City's budget for street resurfacing has more than doubled since 2014.

In Monroe County, Pocono Raceway lies within PennDOT Engineering District 5-0. The raceway has an excellent working relationship with the district, as it offers Variable Message Boards to help guide special event traffic to and from the site. Portable traffic signals could be loaned out and shared with Pocono for maintenance activities, and signal equipment could be acquired in support of HAV testing and research. Pocono Raceway in 2013 completed a multi-million dollar repaving project on its road courses, and all road courses were widened by 30 feet. Pocono Raceway is committed to making the necessary capital expenditure to maintain its status as an approved Autonomous Vehicle Proving Ground. Underdeveloped or not yet developed property within the Pocono Raceway property may be available for future use as testing needs evolve.

2. Authorization for the proving grounds to address regulatory challenges associated with higher levels of automation.

PennDOT would be very pleased to work with the proposed proving ground facilities, USDOT, and variety of other partners statewide and nationwide to address regulatory challenges, and opportunities, at all governmental levels associated with higher levels of automation.

3. Testing or deployment underway to determine automated vehicle technology feasibility.

In September 2016, Uber deployed a small-fleet of self-driving vehicles from their Advanced Technologies Center in Pittsburgh's Lawrenceville neighborhood. The driver-assisted testing of their autonomous vehicles remains ongoing. On a smaller scale, CMU has tested autonomous vehicle technology on and around the Pittsburgh-based campus for decades.

In State College, Penn State researchers are developing software using the Robot Operating System that allows interaction between either a simulated or live vehicle and a simulation of virtual traffic elements. The goal of this integration of a traffic simulator (AIMSUN) with live vehicle data is to develop tools that allow an understanding of how to model, then predict, and then control traffic behaviors that result from autonomous and/or connected vehicle technologies. The scope of this work includes integration of traffic simulation software to enable synchronization of the simulation software with vehicle and infrastructure signaling elements that are operating "life" at the LTI test track.

F. Readiness

1. Designated facility is open for testing, or the ability of the applicant to demonstrate that the facility will be open for testing by January 1, 2018.

The following already-completed, PennDOT-supported deployments attest to our readiness to continue leading HAV testing within the state:

- ✓ Liberty Corridor
- ✓ DSRC Deployment to Airport (http://transportation.house.gov/)
- ✓ Baum/Center Deployment
- ✓ 2015 ITS America demonstrations
- ✓ FHWA AID (McKnight Corridor Deployment) 2014
- ✓ Legislative Autonomous Vehicle Demonstration (June 1, 2016)
- ✓ City of Harrisburg Capital Complex Deployment (9/28/2016) fastest deployment of DSRC technology in PA (6 weeks from inception to demonstration). Worked with the City, PennDOT, and Industry.
- ✓ The City of Pittsburgh $10.8 million FHWA ATCMTD grant for "Smart Spine" corridors.
- ✓ PennDOT I-76 Parallel corridors to deploy DSRC on 154 intersections with DSRC technologies.

2. The facility supports testing by multiple users, or the data generated by the proving ground is shared openly to the public.

PennDOT collects and maintains enormous amounts of data on its system and users. This will be shared with FHWA and our partners, as appropriate. The City of Pittsburgh collects and maintains its data via the previously mentioned Western PA Regional Data Center. In addition, all data provided to, or generated by, the City of Pittsburgh will be shared with USDOT as well as PennDOT/FHWA and statewide partners, where appropriate, in NHTSA-required format where applicable.

3. Designated facility provides a Designated Point of Contact (DPOC).

At PennDOT, the designated point of contact will be Glenn Rowe, P.E., Chief, PennDOT Highway Safety and Traffic Operations. Designated points of contact for each of partners include the following:

- City of Pittsburgh: Alex Pazuchanics; alex.pazuchanics@pittsburghpa.gov
- Penn State University: Eric Donnell; edonnell@engr.psu.edu
- Pocono Raceway: Kevin Henry: kevinh@poconoraceway.com

4. If making use of public roads, the applicant demonstrates that it has engaged with any affected communities and can show that it is actively working with those communities to address any concerns.

State policy recommends that HAV testers shall define and document the ODD for each HAV that will be tested using public trafficways. Based on the ODD, the HAV should obey governing traffic laws and follow the rules of the road for the region of operation. In light of Uber's September 2016 announcement of automated vehicle testing downtown Pittsburgh, the City has worked closely with residents to address safety concerns and will continue to do so as additional firms move toward testing under the Proving Ground effort. No incidents have been recorded related to the testing.

Our application also documents letters of support from relevant surrounding communities, such as the City of Pittsburgh and the Borough of State College.

Pocono Raceway operates a closed track facility outside of the public domain.

G. Adherence to Laws, Regulations, and Federal Policy

1. The degree to which the application addresses how the automated testing facility will adhere to all state and local laws and Federal regulations.

As the owner and maintainer of nearly 40,000 linear miles of roadway in Pennsylvania, PennDOT will retain its traditional responsibility for traffic laws and enforcement, and motor vehicle insurance and liability regimes. PSU is also a closed course but is testing HAV transit vehicles already and is abiding by relevant laws. Pocono is a closed course.

2. If making use of public roads, the applicant demonstrates adherence to those primary subject areas outlined in NHTSA's policy for automated vehicles for any testing or deployment of L3-L5 systems on public roads.

State policy recommends that HAV testers shall self-certify that they have met the requirements of enacted Pennsylvania legislation governing HAV testing. Moreover, the state's Vehicle Code (Title 75) requires that vehicles be driven by a licensed driver, in the driver's seat.

Small and Disadvantaged Business Participation

PennDOT has established a Disadvantaged Business Enterprise (DBE) Program in accordance with the regulations of USDOT, 49 CFR Part 26 (Part 26). The department receives federal financial assistance from USDOT, and as a condition of receiving this assistance, the department has signed an assurance that it will comply with Part 26.

PennDOT has given greater attention to the issue of diversity in its hiring and procurement. This includes outreach to the disadvantaged business community. A recent series of facilities contracts for example included nearly 34 percent being awarded to certified small businesses and nearly 13 percent having a commitment to engage small businesses.

Our transportation secretary, Leslie Richards, is a sought after speaker at conferences on the development of HAV technology. Ms. Richards in fact was recently honored as Female Innovator of the Year for a Government or Non-Profit with 2,500 employees and Female Executive of the Year in the same category by the international Stevie Awards for Women in Business.

Our partners exhibit varying degrees of diversity in their business practices.

At PSU, their test track team has generally been able to complete its automated-connected vehicle research/development/testing using its own full-time staff and graduate students. The institution is open to including a minority institution or business partner in its work and is committed to identifying those partners.

Pocono Raceway's Chairman of the Board is Marylouise McNally. Pocono Raceway is in fact the only NASCAR racetrack that is headed by a woman. More importantly, a recent study by East Stroudsburg University found that Pocono Raceway contributes $257.5 million to the income of Northeast Pennsylvania residents, supports 2,750 jobs, and generates almost $15 million in tax revenue for the Commonwealth of Pennsylvania and $8 million of tax revenue for local and federal governments. The designation will likely compound these numbers, helping the racetrack to support the tenants of the Obama Administration's **"Ladders of Opportunity"** for many. An increase in income for residents, supporting more jobs and generating more revenue for local, state, and federal governments can be realized through the expansion of the mixed-use of the facility and schedule of operations beyond major motorsport events.

IV. Conclusion

PennDOT is in the unique and advantageous position to fulfil our NHTSA-defined role as the lead agency for advancing HAV technology in Pennsylvania. As a supporter and facilitator for the proposed proving grounds, PennDOT will work closely with the USDOT to ensure an emphasis on safety, innovation, sharing and management of data, and a focus on minority business involvement. The collaborative relationships we have with our partners allow us to work with HAV testers immediately in an environment custom-tailored to the testers' needs. The scalability of our approach ensures that the investments we make today will be able to be expanded to other test tracks and corridors across the state over time.

Appendix: Letters of Support

Our application is supported by the following agencies and professional societies:

- ✓ **PennDOT Secretary of Transportation**
- ✓ **Senator John Rafferty**
- ✓ **Representative Mark Keller**
- ✓ **City of Pittsburgh/Mayor Peduto's Office**
- ✓ **Allegheny County**
- ✓ **Carnegie Mellon University**
- ✓ **ITS-PA**
- ✓ **Mid-Atlantic Section of the Institute of Transportation Engineers (MASITE)**
- ✓ **Pennsylvania Turnpike Commission (PTC)**
- ✓ **University of Pittsburgh**
- ✓ **Southwestern Pennsylvania Commission (SPC)**
- ✓ **Urban Redevelopment Authority of Pittsburgh**
- ✓ **University of Pennsylvania**

Letters of support from these entities can be found in the attached appendix.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
HARRISBURG, PENNSYLVANIA 17101-1900

OFFICE OF
SECRETARY OF TRANSPORTATION

December 19, 2016

The Honorable Anthony Foxx, Secretary
U.S. Department of Transportation
1200 New Jersey Ave SE
Washington, D.C. 20590

RE: Designation of Automated Proving Ground Pilot

Dear Secretary Foxx:

On behalf of the Pennsylvania Department of Transportation (PennDOT), I am writing to express our agency's support for the designation of automated vehicle proving grounds in Pennsylvania, or what we have informally billed as "Pennsylvania's Highly Automated Vehicle (HAV) Network."

PennDOT's leadership in the arena of HAV technology has prompted new cooperation among state, municipal, and private interests across the state who are united by a desire to see HAV technology advance in Pennsylvania. This includes our application partners: Pocono Raceway, Pennsylvania State University, and the City of Pittsburgh.

USDOT's announcement for the proposed designations comes at an opportune time for Pennsylvania. Earlier this year, Uber launched its self-driving car service in Pittsburgh, introducing HAV to the general public and in the challenging operating environment that is western Pennsylvania. Also earlier this year, our state's Autonomous Vehicle Task Force completed a months-long project to create recommended policy that would guide the oversight of HAV testing within the state. Our general assembly is expected to revisit the issue when it convenes early in the new year.

We believe the partnership between the commonwealth, municipal government, and private interests, coupled with the testing facilities and their varied geography and operating environments, makes our proposal a compelling one for the USDOT designation.

The big winner will be our society at-large, with the improved safety, mobility, and economic benefits that HAV technology promises to offer. We believe that PennDOT's ongoing leadership, coupled with a USDOT designation of our network of testing facilities, will serve as a catalyst for progress and provide a further boost to the momentum we're already enjoying in promoting this technology. I trust that our proposal makes a strong case for selecting Pennsylvania's "HAV Network" for designation as autonomous vehicle testing facilities.

Thank you for your consideration of our proposal. We look forward to a favorable reply.

Sincerely,

Leslie S. Richards, Secretary
Pennsylvania Department of Transportation

44TH DISTRICT
JOHN C. RAFFERTY, JR.

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HARRISBURG, PA 17120-3044
(717) 787-1398
FAX (717) 783-4587

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610-831-8830
FAX 610-831-8837

☐ THE SHOPPES AT PUGHTOWN
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POTTSTOWN, PA 19465
610-469-8390
FAX 610-469-8394

INTERNET EMAIL ADDRESS:
jrafferty@pasen.gov
WEBSITE:
senatorrafferty.com

Senate of Pennsylvania

COMMITTEES

TRANSPORTATION, CHAIRMAN
JUDICIARY, VICE CHAIRMAN
APPROPRIATIONS
BANKING & INSURANCE
CONSUMER PROTECTION & PROFESSIONAL LICENSURE
LAW AND JUSTICE

ADVISORY COUNCIL FOR THE SOUTHEASTERN VETERANS' CENTER
JOINT STATE GOVERNMENT COMMISSION, VICE CHAIRMAN
PENNSYLVANIA COMMISSION ON CRIME AND DELINQUENCY
PENNSYLVANIA COMMISSION ON SENTENCING
TARGETED COMMUNITY REVITALIZATION AND CRIME PREVENTION ADVISORY COMMITTEE
STATE TRANSPORTATION COMMISSION

December 15, 2016

The Honorable Anthony Foxx
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Dear Secretary Foxx:

I write to convey my support for the Pennsylvania Department of Transportation's (PennDOT) application for the U.S. Department of Transportation's (USDOT) Solicitation of Proposals for Designation of Automated Vehicle Proving Grounds Pilot.

PennDOT developed a visionary proposal that incorporates the necessary stakeholders from government, academia and industry in promoting the testing and advancement of Highly Automated Vehicle (HAV) technology.

PennDOT's role as a convener and facilitator of the development of HAV technology within Pennsylvania is in alignment with the National Highway Traffic Safety Administration's recent guidance, which noted a lead agency for HAV technology within each state. With this application, PennDOT continues its leadership role in promoting this technology within Pennsylvania while ensuring that public safety is maintained.

The suggested methodology outlined in PennDOT's proposal will bring many benefits to Pennsylvania and for the expansion of HAV technology in general. The matrix approach that PennDOT proposes to employ ensures that collaboration is built-in between government, academia and industry. The scalability of the proposed approach also means that success within the initial three testing facilities can eventually be expanded to include other facility types and operating environments.

Thank you for your continued leadership in the United States and for your efforts to advance HAV technology. I hope you consider the merits of this proposal and thank you in advance for your consideration. If you have any questions, please contact Mr. Nolan Ritchie of my staff at (717) 787-1398.

Very Truly Yours,

John C. Rafferty, Jr.

JCR/nrr

JOHN J. TAYLOR, MEMBER

☐ ROOM 214, RYAN OFFICE BUILDING
PO BOX 202177
HARRISBURG, PENNSYLVANIA 17120-2177
PHONE: (717) 787-3179
FAX: (717) 260-6519

DISTRICT OFFICES:
☐ 2901 E. THOMPSON STREET
PHILADELPHIA, PENNSYLVANIA 19134
PHONE: (215) 425-0901

☐ 4725-27 RICHMOND STREET
PHILADELPHIA, PENNSYLVANIA 19137
PHONE: (215) 744-2600

☐ 4117 LONGSHORE AVENUE
PHILADELPHIA, PENNSYLVANIA 19135
PHONE: (215) 708-3139

House of Representatives
Commonwealth of Pennsylvania
Harrisburg

COMMITTEES:

TRANSPORTATION, CHAIRMAN
STATE TRANSPORTATION COMMISSION, MEMBER
LIQUOR CONTROL, MEMBER

email: jtaylor@pahousegop.com
www.RepTaylor.com

December 15, 2016

The Honorable Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Subject: Designation of Automated Vehicle Proving Grounds Pilot

Dear Secretary Foxx:

We are writing to convey our support for PennDOT's application for the U.S. Department of Transportation's Solicitation of Proposals for Designation of Automated Vehicle proving Grounds Pilot.

In responding to USDOT's solicitation, PennDOT has developed a visionary proposal that incorporates the necessary stakeholders from academia, state government, and industry in promoting the testing and advancement of highly automated vehicle (HAV) technology.

PennDOT's role as a convener and facilitator of the development of automated vehicle technology within Pennsylvania is in alignment with NHTSA's recent guidance. Federal policy issued in September noted that there should be a lead agency for HAV within each state. With this application, PennDOT continues its leadership role in advancing this technology within Pennsylvania while ensuring that public safety is continuously maintained.

The suggested methodology outlined in PennDOT's proposal will bring many benefits to Pennsylvania and for the advancement of HAV technology in general. KThe matrix approach that PennDOT proposes to employ ensures that collaboration is "built in" between government, academia, and industry. The "scalability" of the proposed approach also means that success within the initial three testing facilities can eventually be expanded to include other facility types and operating environments. As such, the proposal offers a platform for future success.

Thank you for your continued leadership in the United States and for your efforts to advance automated vehicle technology. We hope you consider the merits of this proposal and thank you in advance for your consideration.

Sincerely,

JOHN J. TAYLOR, Member
House of Representatives
177th Legislative District

WILLIAM F. KELLER, Member
House of Representatives
184th Legislative District

JJT:nsc

CITY OF PITTSBURGH

"America's Most Livable City"

Office of Mayor William Peduto

December 16, 2016

The Honorable Anthony Foxx
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Dear Secretary Foxx:

On behalf of the residents and stakeholders of Pittsburgh, it is my pleasure to present the City of Pittsburgh's application for U.S. Department of Transportation's Solicitation of Proposals for Designation of Automated Vehicle Proving Grounds Pilot. As you may note, we are submitting our application in partnership with a larger, statewide coalition of applicants who have been coordinated by our own Pennsylvania Department of Transportation (PennDOT).

The City of Pittsburgh and our whole State of Pennsylvania have been inspired to think big by your recent Smart City Challenge competition. In responding to USDOT's solicitation, the City of Pittsburgh, PennDOT, and all our PA coalition members have together developed a visionary proposal that we feel strongly and safely promotes the testing and advancement of highly automated vehicle (HAV) technology.

While we did not emerge victorious from the Smart City Challenge, we were thrilled to be awarded $11 million for our *SmartPGH* initiative through FHWA's ATCMTD program. Now, the "Proving Ground" solicitation offers us a clear path forward to further advance HAV technologies first proposed by the City of Pittsburgh the Smart City competition.

Thank you for your continued leadership in the United States and for your efforts to advance automated vehicle technology. Please do not hesitate to contact me or my Chief of Staff Kevin Acklin at 412-255-2626 or kevin.acklin@pittsburghpa.gov if you are in need of any additional information.

Thank you for your consideration.

Sincerely,

Mayor William Peduto
City of Pittsburgh

512 CITY-COUNTY BUILDING 414 GRANT STREET PITTSBURGH, PENNSYLVANIA 15219
Phone: 412-255-2626 | Fax: 412-255-8602

COUNTY OF ALLEGHENY

RICH FITZGERALD
COUNTY EXECUTIVE

December 15, 2016

The Honorable Anthony Foxx, Secretary
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Secretary Foxx:

I am writing to convey my support for the City of Pittsburgh and the Pennsylvania Department of Transportation's (PennDOT) application for the U.S. Department of Transportation's Solicitation of Proposals for Designation of Automated Vehicle Proving Grounds Pilot.

PennDOT, the City of Pittsburgh and their coalition of applicants have developed a visionary proposal that incorporates the necessary stakeholders from academia, state government, and industry in promoting the testing and advancement of highly automated vehicle (HAV) technology. PennDOT's role as a convener and facilitator of the development of automated vehicle technology within Pennsylvania is in alignment with NHTSA's recent guidance. Federal policy issued in September noted that there should be a lead agency for HAV within each state. With this application, PennDOT continues its leadership role in advancing this technology within Pennsylvania while ensuring that public safety is continuously maintained. The suggested methodology outlined in the proposal will bring many benefits to Pennsylvania and for the advancement of HAV technology in general. The matrix approach proposed to employ ensures that collaboration is built in between government, academia and industry. The scalability of the proposed approach also means that success within the initial three testing facilities can eventually be expanded to include other facility types and operating environments. As such, the proposal offers a platform for future success.

Thank you for your continued leadership in the United States and for your efforts to advance automated vehicle technology. I encourage your positive review and recommendation of this proposal. As always, please do not hesitate to contact me should I be able to provide any additional information, or answer any questions. Thank you in advance for your consideration.

Sincerely,

Rich Fitzgerald

Rich Fitzgerald

OFFICE OF THE COUNTY EXECUTIVE
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Technologies for Safe & Efficient Transportation

THE NATIONAL USDOT UNIVERSITY TRANSPORTATION CENTER FOR SAFETY

Carnegie Mellon University | UNIVERSITY of PENNSYLVANIA

The Honorable Anthony Foxx
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

December 19, 2016

Dear Secretary Foxx:

I am writing to express my support for the City of Pittsburgh and PennDOT's applications for the U.S. Department of Transportation's Solicitation of Proposals for Designation of Automated Vehicle Proving Grounds Pilot.

In responding to USDOT's solicitation, the City of Pittsburgh, PennDOT, and their coalition of applicants have developed a visionary proposal that incorporates the necessary stakeholders from academia, state government, and industry in promoting the testing and advancement of highly automated vehicle (HAV) technology.

Over the last four years, Carnegie Mellon University and T-SET, the National USDOT University Transportation Center for Safety have worked collaboratively with both the City of Pittsburgh and PennDOT on several HAV initiatives. In 2014, CMU completed the Connected and Automated Vehicles Vision for 2040 with PennDOT. This past year, CMU supported the City of Pittsburgh's bid in the Smart City Challenge. Furthermore, CMU has a seat on PennDOT's Automated Vehicle Policy Task Force and the SMART BELT Coalition (multi-state CAV corridor initiative between MDOT, ODOT, and PennDOT).

PennDOT's role as a convener and facilitator of the development of automated vehicle technology within Pennsylvania is in alignment with NHTSA's recent guidance. Federal policy issued in September noted that there should be a lead agency for HAV within each state. With this application, PennDOT continues its leadership role in advancing this technology within Pennsylvania while ensuring that public safety is continuously maintained.

Thank you for your continued leadership in the United States and for your efforts to advance automated vehicle technology. I hope you consider the merits of this proposal and thank you in advance for your consideration.

Respectfully,

Raj Rajkumar
Director

Intelligent Transportation Society ITS PENNSYLVANIA

www.itspennsylvania.com

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Pennsylvania Turnpike Commission

The Intelligent Transportation Society of Pennsylvania is a non-lobbying, non-profit, 501(c)3 organization of public, private, and academic sector organizations.

December 19, 2016

The Honorable Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Secretary Foxx:

It is with great pride that the Pennsylvania chapter of ITS America endorses the Pennsylvania Department of Transportation's (PennDOT) application for Designation of Automated Vehicle Proving Grounds Pilot. This application epitomizes what ITS Pennsylvania (ITSPA) is dedicated to: advancing research, development, and deployment of Intelligent Transportation Systems (ITS) to improve the nation's surface transportation system.

PennDOT has developed a visionary proposal that incorporates the necessary stakeholders from academia, state government, and industry in promoting the testing and advancement of highly automated vehicle (HAV) technology. PennDOT's role as a convener and facilitator of the development of automated vehicle technology within Pennsylvania is in alignment with NHTSA's recent guidance. Federal policy issued in September noted that there should be a lead agency for HAV within each state. With this application, PennDOT continues its leadership role in advancing this technology within Pennsylvania while ensuring that public safety is continuously maintained. The suggested methodology outlined in PennDOT's proposal will bring many benefits to Pennsylvania and for the advancement of HAV technology in general. If awarded, ITSPA and its members stand ready to provide technical assistance to PennDOT and other involved stakeholders.

ITSPA is excited to provide support of this application. ITSPA commits our organization's support to further the proposed efforts in this application. We look forward to hearing soon about PennDOT's progress in this unique endeavor. Please do not hesitate to contact me should you have any further questions or concerns.

Thank you for your consideration,

Laurie Matkowski

Laurie Matkowski
President, ITS Pennsylvania
lmatkowski@dvrpc.org

Mid-Atlantic Section of ITE

December 15, 2016

USDOT Proving Ground Letter of Support

The Honorable Anthony Foxx
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Re: Designation of Automated Vehicle Proving Grounds Pilot

Dear Secretary Foxx:

I am writing to convey my support for PennDOT's application for the U.S. Department of Transportation's Solicitation of Proposals for Designation of Automated Vehicle Proving Grounds Pilot.

In responding to USDOT's solicitation, PennDOT has developed a visionary proposal that incorporates the necessary stakeholders from academia, state government, and the industry in promoting the testing and advancement of highly automated vehicle (HAV) technology.

PennDOT's role as a convener and facilitator of the development of autonomous vehicle technology within Pennsylvania is in alignment with NHTSA's recent guidance. Federal policy issued in September noted that there should be a lead agency for HAV within each state. With this application, PennDOT continues its leadership role in advancing this technology within Pennsylvania while ensuring that public safety is continuously maintained.

The suggested methodology outlined in PennDOT's proposal will bring many benefits to Pennsylvania and for the advancement of HAV technology in general. The matrix approach that PennDOT proposes to employ ensures that collaboration is "built in" between government, academia, and the industry. The "scalability" of the proposed approach also means that success within the initial three testing proving grounds can eventually be expanded to include other facility types and operating environments. As such, the proposal offers a platform for future success.

Thank you for your continued leadership in the United States and for your efforts to advance automated vehicle technology. I hope you consider the merits of this proposal and thank you in advance for your consideration. If you have any questions, comments, or concerns, please feel free to contact me via phone (717.221.2056) or e-mail (jbergsten@mbakerintl.com). Thank you.

Sincerely,

Jeffrey G. Bergsten

Jeffrey G. Bergsten, P.E.
2016 MASITE President

MARK P. COMPTON
Chief Executive Officer
Pennsylvania Turnpike Commission
PO Box 67676, Harrisburg PA 17106-7676
P: 717.831.7370 | E: mcompton@paturnpike.com

December 14, 2016

The Honorable Anthony Foxx
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Re: Designation of Automated Vehicle Proving Grounds Pilot

Dear Secretary Foxx,

The Pennsylvania Turnpike Commission (PTC) supports the Pennsylvania Department of Transportation's (PennDOT) application for the U.S. Department of Transportation's Solicitation of Proposals for Designation of Automated Vehicle Proving Grounds Pilot.

PennDOT's proposal incorporates stakeholders from academia, state government and industry to promote the testing and advancement of highly automated vehicle (HAV) technology. The PTC is actively working with PennDOT and its partners to prepare for the legal, legislative, policy and technical aspects of HAV technology testing and implementation in the Commonwealth of Pennsylvania.

The PTC agrees with PennDOT's approach to facilitate the development of automated vehicle technology within Pennsylvania through the creation of a Proving Ground Advisory Committee that represents the aforementioned partners, covers diverse geographic regions, includes rural and urban settings and accommodates multi-modal needs. With this application, PennDOT advances its leadership role in promoting this technology within Pennsylvania while ensuring that public safety remains a top priority.

The methodology outlined in PennDOT's proposal will bring many benefits to Pennsylvania and further the advancement of HAV technology. The Proving Ground Advisory Committee will ensure the community of practice is represented and that the safety, mobility and security needs of all are considered. The "scalability" of the proposed approach also means that success within the initial three testing facilities can eventually be expanded to include other facility types and operating environments.

Thank you for your continued leadership in the United States and for your efforts to advance automated vehicle technology. I hope you consider the merits of this proposal and thank you, in advance, for your consideration. If you have any questions, comments or concerns, please feel free to contact me or Stacia Ritter of my staff at (717) 831-7053 or you may e-mail her at sritter@paturnpike.com.

Sincerely,

Mark P. Compton
Chief Executive Officer

University of Pittsburgh

Community and Governmental Relations

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Pittsburgh, PA 15260
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Paul A. Supowitz
Vice Chancellor

December 16, 2016

The Honorable Anthony Foxx
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Dear Secretary Foxx:

I am writing to convey support for the City of Pittsburgh and PennDOT's applications for the U.S. Department of Transportation's Solicitation of Proposals for Designation of Automated Vehicle Proving Grounds Pilot.

In responding to USDOT's solicitation, the City of Pittsburgh, PennDOT, and their coalition of applicants have developed a visionary proposal that incorporates stakeholders from academia, state government, and industry in promoting the testing and advancement of highly automated vehicle (HAV) technology.

PennDOT's role as a convener and facilitator of the development of automated vehicle technology within Pennsylvania is in alignment with NHTSA's recent guidance. Federal policy issued in September noted that there should be a lead agency for HAV within each state. With this application, PennDOT continues its leadership role in advancing this technology within Pennsylvania while ensuring that public safety is continuously maintained.

The suggested methodology outlined in PennDOT's proposal will bring many benefits to Pennsylvania and for the advancement of HAV technology in general. The matrix approach that PennDOT proposes to employ ensures collaboration between government, academia, and industry. The scalability of the proposed approach also means that success within the initial three testing facilities can eventually be expanded to include other facility types and operating environments. As such, the proposal offers a platform for future success.

Thank you for your continued leadership and for your efforts to advance automated vehicle technology. I hope you consider the merits of this proposal and thank you in advance for that consideration.

Sincerely,

Paul A. Supowitz
Vice Chancellor for Community and Governmental Relations

SOUTHWESTERN PENNSYLVANIA COMMISSION

Two Chatham Center · Suite 500 · 112 Washington Place · Pittsburgh, PA 15219-3451

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Officers:

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Washington County
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Allegheny County
Rich Fitzgerald
Secretary-Treasurer

Executive Committee:

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Governor's Office
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PA Dept. of Community & Economic Development
Johnna A. Pro

PA Dept. of Transportation
James D. Ritzman

Executive Director
James R. Hassinger

December 15, 2016

The Honorable Anthony Foxx
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Dear Secretary Foxx:

The Southwestern Pennsylvania Commission (SPC) is pleased to support the City of Pittsburgh and the Pennsylvania Department of Transportation's (PennDOT) applications for the U.S. Department of Transportation's (USDOT) Solicitation of Proposals for Designation of Automated Vehicle Proving Grounds Pilot Program. As a facilitator of regional partnerships, SPC is committed to assist the City and PennDOT with the implementation of new technologies and new approaches to improve transportation system performance.

In responding to USDOT's solicitation, the City of Pittsburgh, PennDOT, and their coalition of applicants have developed a visionary proposal that incorporates the necessary stakeholders from academia, state government, and industry to promote the testing and advancement of highly automated vehicle (HAV) technology.

PennDOT's role as a convener and facilitator of the development of automated vehicle technology within Pennsylvania is in alignment with the National Highway Traffic Safety Administration's recently issued Vehicle Performance Guidance for Automated Vehicles, which noted the need for a lead agency for HAV within each state. With their application, PennDOT continues its leadership role in advancing this technology within Pennsylvania while ensuring its longstanding commitment to public safety.

The suggested methodology outlined in PennDOT's proposal will bring numerous benefits to Pennsylvania and for the advancement of HAV technology in general. The matrix approach that PennDOT proposes to employ ensures that collaboration is integrated between government, academia, and industry, and that the success within the initial three testing facilities can be expanded to include other facility types and operating environments. SPC looks forward to these long-term and successful collaborations. The visionary proposal that the City and PennDOT have submitted helps advance our region's adopted transportation plan and we are very supportive of this work in the region.

Thank you for your national leadership in fostering the safe deployment of advanced automated vehicle technologies and your consideration of this next step forward.

Sincerely,

James R. Hassinger, Ph.D., AICP
Executive Director

Urban Redevelopment Authority of Pittsburgh

412.255.6600
200 Ross Street
Pittsburgh, PA 15219
ura.org

December 14, 2016

The Honorable Anthony Foxx
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Re: US DOT Designation of Automated Vehicle Proving Grounds Pilot

Dear Secretary Foxx:

On behalf of the Urban Redevelopment Authority of Pittsburgh (URA), I am writing to convey my support for the City of Pittsburgh and PennDOT's applications for the U.S. Department of Transportation's Solicitation of Proposals for Designation of Automated Vehicle Proving Grounds Pilot.

The URA has supported efforts to expand mobile and field robotics research and commercialization in Pittsburgh for nearly twenty years, beginning with the purchase and renovation of the NASA Robotics Engineering Consortium facility in Lawrenceville, which is now home to the National Robotics Engineering Consortium through a lease to Carnegie Mellon University. In addition to this catalytic early engagement, the URA remains active in supporting the robotics industry in Pittsburgh through investments in other sites where field robotic testing continues to take place, including infrastructure for Uber's HAV technology testing.

In responding to USDOT's solicitation, the City of Pittsburgh, PennDOT, and their coalition of applicants have developed a visionary proposal that incorporates the necessary stakeholders from academia, state government, and industry in promoting the testing and advancement of highly automated vehicle (HAV) technology. PennDOT's role as a convener and facilitator of the development of automated vehicle technology within Pennsylvania is in alignment with NHTSA's recent guidance that there should be a lead agency for HAV within each state.

The suggested methodology outlined in PennDOT's proposal will bring many benefits to Pennsylvania and for the advancement of HAV technology in general. The matrix approach that PennDOT proposes to employ ensures that collaboration is "built in" between government, academia, and industry. The "scalability" of the proposed approach also means that success within the initial three testing facilities can eventually be expanded to include other facility types and operating environments. As such, the proposal offers a platform for future success.

Thank you for your continued leadership in the United States and for your efforts to advance automated vehicle technology. I hope you consider the merits of this proposal and thank you in advance for your consideration.

Sincerely,

Robert Rubinstein
Acting Executive Director

Penn
UNIVERSITY of PENNSYLVANIA

December 19, 2016

The Honorable Anthony Foxx
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Re: Designation of Automated Vehicle Proving Grounds Pilot

Dear Secretary Foxx:

We are writing to convey our support for PennDOT's application for the U.S. Department of Transportation's Solicitation of Proposals for Designation of Automated Vehicle Proving Grounds Pilot.

The University of Pennsylvania has researchers across the Schools of Business, Design, Medicine, and Engineering working on the policy, planning, design, and testing of autonomous vehicle technologies. We also have a several facilities and labs—including a 23-acre campus testing grounds and a national University Transportation Center focused on technology and safety—where we conduct regular tests of automated technologies. Our faculty, facilities, and students will benefit from PennDOT's designation as an Automated Vehicle Proving Grounds.

In responding to USDOT's solicitation, PennDOT has developed a visionary proposal that incorporates the necessary stakeholders from academia, state government, and industry in promoting the testing and advancement of highly automated vehicle (HAV) technology. PennDOT's role as a convener and facilitator of the development of automated vehicle technology within Pennsylvania is in alignment with NHTSA's recent guidance. Federal policy issued in September noted that there should be a lead agency for HAV within each state. With this application, PennDOT continues its leadership role in advancing this technology within Pennsylvania while ensuring that public safety is continuously maintained.

The suggested methodology outlined in PennDOT's proposal will bring many benefits to Pennsylvania and for the advancement of HAV technology in general. The matrix approach that PennDOT proposes to employ ensures that collaboration is "built in" between government, academia, and industry. The "scalability" of the proposed approach also means that success within the initial three testing facilities can eventually be expanded to include other facility types and operating environments. As such, the proposal offers a platform for future success.

Thank you for your continued leadership in the United States and for your efforts to advance automated vehicle technology. We hope you consider the merits of this proposal and thank you in advance for your consideration. If you have any questions, comments, or concerns, please feel free to contact us or Erick Guerra at erickg@design.upenn.edu. Thank you.

Sincerely,

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