Department of Transportation - Solicitation of Proposals for Designation of Automated Vehicle Proving Grounds Pilot

Overview

Southern Arizona Research and Testing Proving Grounds (SmART) is a P3 partnership in Tucson, Arizona. The group is led by Tech Parks Arizona at the University of Arizona (UA). The initial public and private partners include: Pima County, City of Tucson, Pima Community College, Pima Association of Governments, Arizona Department of Transportation and Musselman Honda Circuit. Additional public and private partners are being considered that would add to the breadth and depth of testing, evaluation, and sustaining capabilities. The SmART proposal is comprehensive in providing the requested criteria in the USDOT solicitation as well as including additional components to enhance the capabilities, services, workforce development and outreach of the proving grounds. Specifically, SmART is a collection of graduated roadway facilities, which enable effective, cost-efficient testing and evaluation of HAV systems, subsystems and components.

Tucson is a leader in innovation and the collaborative transformation of "big ideas" to physical reality. The SmART P3 partnership is an example of the great cooperation amongst diverse organizations in the region. The following sections provide a brief description of the existing assets and established partnerships in the region.

The UA Tech Park mission is providing testing, demonstration and evaluation capabilities for technology companies. An example is the Solar Zone, established in partnership with Tucson Electric Power (TEP). Today, Phase 1 encompasses 173 acres of multiple solar technologies providing energy into the local utility grid. This is one of the largest solar testing, demonstration and evaluation sites in the world. It has been nationally recognized as a leader by the solar and utility industries. In addition, ongoing research is conducted on-site by the University of Arizona providing data to inform TEP about the efficiency of each solar technology. This includes environmental data about weather conditions and cloud prediction for management of electricity into the grid. SmART is organized in a similar manner – industry needs and requirements, University research collaboration, and shared benefits. Tech Parks Arizona will serve as the Administrator on this project.

Figure 1 Solar Zone at the UA Tech Park

Global Advantage is a business development program designed to assist fast-growing technology companies in developing and demonstrating their products and services to the North American market. Global Advantage offers companies a "soft landing" program that includes assistance with product development, marketing and manufacturing. The program has a strong focus on recruiting international companies from Canada, Germany, Israel and Mexico with a special emphasis on companies in the fields of intelligent transportation systems and smart vehicles.

The Arizona Center for Innovation (AzCI) is a business incubator at the UA Tech Park. AzCI works with new and start-up technology companies to commercialize products and services. Through its Mentored Launch program, AzCI provides training and workshops for entrepreneurs and companies in developing and implementing their business model. The Center hosts an annual SBIR/STTR conference, which would provide great synergy in collaborating with companies engaged in HAV testing and evaluation. AzCI can assist in bringing new HAV technology and technology companies to market.

The University of Arizona (UA) is the State of Arizona's land grant university and a Top-25 research institution (NSF evaluation). As a land grant institution, the UA mission includes making new technology available to the general public for broader applications and benefits. This began with agriculture and has moved into all areas of research within the institution. The University of Arizona has established the Transportation Research Institute (TRI), an interdisciplinary research entity to research and address the mobility, safety and environmental challenges of a rapidly evolving transportation ecosystem. Leading researchers in the areas of transportation systems, public health and safety, atmospheric science, and planning contribute to the research of the transportation ecosystem. In conjunction with the City of Tucson, the TRI operates the "Living Lab" that gathers real time traffic data to support a myriad of research, including connected vehicle technology, traffic modeling, and simulation. In partnership with Arizona Department of Transportation (ADOT) and Maricopa County DOT (MCDOT), the TRI established and operates the Connected Vehicle Test Bed in Anthem, Arizona – one of seven recognized test beds in the United States. The College of Engineering also has recognized expertise in systems engineering and safety requirements for connected and automated driving systems.

Figure 2 University of Arizona

An industry group of stakeholders, **Smart Vehicles and Intelligent Transportation** (SVIT), is actively working in the region to connect programs and initiatives to increase capacity and stakeholder involvement and the emerging autonomous vehicle industry cluster in the region. SVIT forms the core partnership discussed in this proposal. It includes Tech Parks Arizona, The University of Arizona, Pima Community College, Pima County, City of Tucson, Pima Association of Governments and industry members. Another industry cluster closely associated is the **Southern Arizona Logistics Education Organization (SALEO)**, which supports the trucking and logistics industry in the region. SVIT is the primary organizing group for the SmART Proving Grounds proposal. The group will oversee the Safety and Data Committees described in the proposal.

Musselman Honda Track is a race track located in southeast Tucson approximately five miles from the UA Tech Park. The track hosts several sanctioned organized racing competitions. The track includes meeting space, simulators, lighting, Wi-Fi, an observation tower, timing and scoring transponders, radios and headsets for communication and a track sound system. The track is used for testing and demonstration by local law enforcement, BMW USA, Sports Car Club of America and major auto manufacturers.

The City of Tucson, encompasses 236 square miles and has been a leader in the implementation of transportation and mobility technology. It has been recognized with numerous awards such as the Digital Cities award and 4th most employment accessible transit system in the country. The City is committed to continuing its leadership as an innovator and is actively working for designation as a Smart City. In 2012, the City Council passed the Open Government and Open Data Resolution to make all government data open and accessible to the public. The City is providing three corridors for HAV testing as part of the SmART Proving Grounds.

Figure 3 City of Tucson

Pima County is an area of almost 9,200 square miles. The County adopted an Economic Development Plan - 2015 through 2017, an outgrowth from the initial plan adopted in 2012. The County has placed great emphasis on development of a logistics center around Tucson International Airport. This plan includes construction of a new 16 mile auxiliary highway, the Sonoran Corridor. The Sonoran Corridor will be a "smart" highway with embedded infrastructure to accommodate connected and autonomous vehicles. The Sonoran Corridor when completed will connect with Science Park Drive at the UA Tech Park – connecting two of the proposed testing locations of SmART.

Arizona Department of Transportation (ADOT) is a multimodal transportation agency responsible for planning, building and operating the state of Arizona highway system, building and maintaining bridges, the Grand Canyon Airport and the state's motor vehicle division. ADOT has five strategic focus areas: safety, workforce development, infrastructure and health, innovation and financial resource management.

The Pima Association of Governments (PAG) is the region's federally funded metropolitan planning organization. The organization manages several initiatives and programs in the region including long-range transportation planning and Intelligent Transportation Systems (ITS). PAG has included long-range planning for connected and autonomous vehicles as part of its transportation committees and is an active partner with the TRI and City of Tucson research, development, and testing activities.

Pima Community College (PCC) is a two-year college serving the greater Tucson area. The college offers several associate degrees as well as workforce development, career training programs, continuing education and adult education. The college will work nationally with other educational programs to develop curriculum in this industry. Pima works with the Joint Technology Education District (JTED), which provides Career and Technical Education (CTE) programs for high schools. This provides the opportunity to develop a workforce continuum and employee pipeline. PCC is part of the USDOT University Transportation Center led by the University of Southern California. Pima currently has programs in vehicle technologies, truck operations, and information systems/cybersecurity that are well positioned to support the development of the workforce that will be required to support automated driving technologies.

Figure 4 2016 Racing the Sun, Race Day

Racing the Sun is a statewide STEM program in Arizona. High school students design, build and race solar go-karts, while incorporating engineering, business, math, technology and entrepreneurship skills to successfully compete in a high-tech economy. Industry and University mentors lend their expertise in helping teams with technical questions to considering autonomous vehicles as part of the program. The program is another educational component of the SmART proposal.

Southern Arizona is home to the **Caterpillar Proving Grounds** and **Komatsu Proving Grounds**. Both companies test and engineer their advanced mining vehicles before transitioning them into production. In the case of Caterpillar, the Tucson Proving Grounds is one of eight research centers world-wide. The Komatsu Arizona Proving Grounds is the primary testing facility for US operations of the company and has an existing partnership with the UA College of Engineering.

Figure 5 Caterpillar Proving Grounds

Safety Officer and Commitment to Safety

Designated Safety Officer

Safety is the most critical component of any HAV test and evaluation program. Early results of research, testing and analyses have the ability to inform policies and guidelines as this industry continues its rapid progression. SmART's commitment to providing timely and accurate data, test plans, and analyses can provide incomparable guidance to federal, state and local policy as well as influence standards for safety within the industry.

The SmART partners have committed to the development of a Safety Committee. The Safety Committee will be a sub-committee under SVIT. This Committee is responsible for all aspects of the safety program and its components. The group will incorporate best practices from other industries, SAE International, and the National Institute of Standards and Technology (NIST), which have played significant roles in defining connected and autonomous vehicle standards and guidance. This is the baseline from which the committee will operate, with a commitment to incorporate a broader approach and timely response to safety issues as they emerge.

The Arizona Department of Transportation (ADOT) will provide the Safety Officer for SmART. The department will appoint a designated person as the lead who will manage the Safety Committee. ADOT brings great expertise in identifying and mitigating safety risks on roadways. The individual designated for this position has several years of experience and certifications in transportation. Their resume is included at the end of the proposal as Appendix I.

Commitment to Safety

SVIT, will convene a Safety Committee representing the multiple partners and stakeholders that are part of SmART. The Safety Committee will meet bi-monthly to review test data and discuss emerging safety concerns based on qualitative and quantitative analyses. This review will serve as a basis for determining additional criteria, standards or metrics. If additional procedures or guidelines are required, the committee is expected to provide their findings within a 30 day review window. USDOT is requested to participate in these meetings as the overarching regulatory agency.

Safe Design, Deployment and Operation of HAV systems

Figure 6 inside the UA Cognitive and Autonomous Test CAT Vehicle

The committee, led by ADOT, will develop and implement an application process that incorporates providing notice to relevant agencies, SmART partners and community stakeholders such as neighbors or business along the testing route. Notification includes date and time of testing and safety standards in place during the testing period. Experts from the University and industry will conduct an initial review of the technology and determine if safety issues are adequately addressed based on the description and other background material provided as part of the application process.

Once approved, the technology will be assigned a testing location based on its SAE levels of automation or the road conditions, or environment the entity is requesting. The Safety Officer for the facility will work with technology principals to discuss testing and evaluation as well as expected metrics. Once the program is sufficiently outlined in the application and approved, testing can commence.

Proving Ground Personnel

SmART intends to operate a flexible program where, test personnel provide support in alignment with the technology and metrics outlined in the application process. Available personnel include research experts from the UA and other institutions so that the readiness of the technology is thoroughly vetted. In addition, SmART may include recognized industry experts as part of the team.

SmART will work with the UA and Pima Community College to integrate students in the collection of data and provide technical assistance during testing. Observation data is crucial as well as data collected by sensors. Students will be supervised by a graduate student or professor. Additional personnel will be certified safety employees of the testing facility.

All personnel participating in onsite testing and evaluation are required to undergo training through orientations, workshops and other programs to continuously inform and remind personnel of necessary and applicable procedures. Training programs will be developed in conjunction with the risk management groups for educational institutions, industry and government in order to provide as comprehensive of a program as possible. Training will be updated annually if not more often to ensure new standards are constantly adopted and implemented.

Documented Safety Compliance

The designated Safety Officer for each facility is responsible for guiding users through the entire testing and evaluation process from submission of an application to summary of data results. Before testing begins in a location, the facility safety office is responsible for reviewing applications and ensuring public notices are issued as required by the safety standards adopted by SmART. The facility safety officer will ensure all personnel meet and maintain adopted safety standards and required training. Testing facility safety officers have responsibility to submit documentation certifying which standards were met, describing issues or concerns encountered and that required data are collected. These reports will be reviewed during the Safety Committee bi-monthly meetings as part of the ongoing compliance monitoring process.

In an effort to promote transparency and community outreach, safety training, documents, data, recommendations and protocol will be made available to the public. Each testing facility is responsible for ensuring testing data is submitted as part of the collective SmART database. Some information will be disseminated through scholarly articles. Other components may become part of broader recommendations and incorporated into regulatory guidelines. Documentation will be made available via a website developed and maintained specifically for SmART.

Adherence to Laws, Regulations and Federal Policies

SmART has incorporated several components of the NHSTA *Federal Policy: Accelerating the Next Revolution in Roadway Safety* as part of its safety management plan described in this proposal. As part of the safety plan, SmART will adhere to all local, state and Federal laws and regulations. The Safety Officer, led by ADOT will provide the primary interface with regulatory agencies for assuring compliance. If conflict between technology, laws and regulations emerges, the Arizona Department of Transportation, the City of Tucson and Pima County have committed to resolve such issues jointly (Appendix II). SmART acknowledges that HAV technology is moving faster than policy and regulation and commits to resolving these issues in a timely and effective manner to ensure reliable operations of the SmART testing facilities and capabilities.

Department of Transportation Engagement and Relationship

Engagement with USDOT and its entities is crucial to the success of the SmART Proving Grounds and USDOT's ability to keep abreast of this rapidly evolving technology and its potential impact on public safety. SmART will provide several opportunities and tools to ensure consistent and continuous communication with USDOT. In exchange, SmART requests a designated point of contact responsible for communicating within USDOT. An important engagement tool is the Technology Transportation Summit, hosted annually by PAG. This event is a great forum at the national level to highlight USDOT SmART Proving Grounds.

Meetings and Reports

Monthly: SmART will establish a monthly call with USDOT to discuss progress and activities at the Proving Grounds.

Quarterly: Quarterly, in-person meetings will be offered. This can be the USDOT contact traveling to Tucson, members of the Tucson team traveling to USDOT or a video conference call. The quarterly meetings will have a stronger focus on data sharing and safety protocols.

Bi-annual: Activity reports will be submitted twice a year to provide documentation of activities and data analysis. Activity reports will identify on-going issues where USDOT assistance or guidance is required as well as pertinent trends SmART sees emerging. Performance metrics tracked and included in the bi-annual report will include data such as: number of technologies tested, technology classification using SAE standards, number and diversity of companies (e.g., large, small-businesses, minority-owned, and technology type) utilizing the Proving Grounds, and the quantity of successful tests conducted.

Annually: SmART will provide an annual report summarizing key points included in the bi-monthly report, as well as any new safety standards recommended for implementation, key trends in test results, and emerging technology trends. USDOT will be welcomed to supplement the annual reporting process with a site visit to review results in greater depth. SmART encourages the annual visit to coincide with the annual Technology Transportation Summit.

Joint Research

The University is a leader in optics with one of the top three colleges in the world. The College of Engineering has distinguished research faculty who are actively involved in HAV research and/or related systems and components.

Historically, the UA has collaborated with industry, government and academia. This culture is endemic amongst its faculty and staff. This is best portrayed by BIO5, a multi-college and department collaboration center, CyVerse a multi-institution data mining and management initiative and the new Arizona Transportation Research Institute (TRI). A partnership between the UA College of Engineering and City of Tucson, dating back to 1988, has provided engineering students a Learning Lab for traffic management integrating live traffic and signal data from a significant portion of a major arterial road (Speedway Boulevard).

Figure 7 UA Professor Dr. Jonathan Sprinkle and the CAT vehicle

Local government is an active participant in joint research. Both the City of Tucson and Pima County are willing participants in testing new technology that improves safety and mobility. This willingness in recent years has resulted in traffic systems testing, partnering with industry to improve transportation systems and other projects. As part of SmART, local government is agreeing to participate in joint research and share data.

Data Sharing

SmART will include a Data Committee, to work with partners to ensure timely and easy access to data. They will develop guidelines and protocols to meet these goals and encourage data format compatibility with USDOT and its partners. Additionally, the Data Committee will work with industry, government and academia to develop and integrate processes for when and how to “scrub” proprietary data and make it

(or at least portions) publicly available through CyVerse. SmART will work specifically with USDOT on addressing and resolving issues with proprietary data.

Data access is easily provided through the use of a web based data portal. The portal will include safety plans, which will hosts in addition to the data, safety plans, safety operations, educational and outreach material and best practices. If desired by USDOT, relevant test data can be provided to the Open Source Application Development Portal (OSADP), which has a successful history as an online collaborative environment and software repository for connected vehicle Dynamic Mobility Applications (DMA). The OSADP has been successful in sharing basic safety message (BSM) data from the Connected Vehicle Pilot Deployment Program in Michigan for additional research and analysis.

CyVerse, a University of Arizona $100 million cyber computing system funded by the National Science Foundation (as iPlant), provides extensive data storage, outward facing data portals for open sharing, and potential for machine learning. SmART is a natural collaborator with this initiative due to the vast quantities of test data generated, collected, analyzed and shared. Data collection can also be managed through the TRI as part of their student learning lab in partnership with the City of Tucson.

Establish an Automated Vehicle Program

SmART is developing an innovative approach to the Proving Ground. There are several testing locations distributed throughout the Tucson/Pima County region. The program is designed to provide a "step-up" approach similar to the technology commercialization process. Determination of the utilized "track" is based on the highly automated vehicle (HAV) capabilities as provided in the SAE definition for levels of automation. Each "track" can accommodate different types of vehicles, including freight vehicles. Special emphasis will be placed on the logistics industry as Tucson is a hub for freight, particularly with produce and exports to and from the Mexican market.

Each track provides the critical components outlined in the NHTSA *Federal AV Policy: Accelerating the Next Revolution in Roadway Safety*. As the tested vehicle platform or component matures, it would progress through a continuum of testing tracks, each providing an increased level of difficulty to further access the capability of the vehicle or technology. The locations and capabilities include:

The UA Tech Park at Rita Road: SAE Levels 0 – 5

The UA Tech Park is recognized nationally as one of the top ten university research parks in the US. The Park is 1,365 acres and provides three different testing scenarios for HAV.

- Science Park Drive is a three mile paved roadway. This road runs from the eastern boundary of the Park to the western and connects two primary arterial roads in the region. This road is the primary access point into the facility and used daily by thousands of employees. Planning is underway to realign and widen Science Park Drive. As part of those improvements, Science Park Drive will become the first segment of the Sonoran Corridor and a highly capable test bed with embedded sensors for monitoring and tracking HAV on the roadway.

Figure 8 UA Tech Park

- The Solar Zone Road is a one mile paved road. This road connects to Science Park Drive and experiences significantly lower levels of vehicular traffic. This road can be sequestered and is used by heavy equipment that is being deployed in the Solar Zone.
- The Urban Test Facility is an enclosed testing location which can mimic an urban environment with traffic signs and other roadway objects. The area is a 4.2 acre site that is 380 feet by 385 feet. The site is shielded by a fence around the entire test area. This is under lease with a company at this time, but arrangements can be made to use this space.

All roads are private and the Park has the capacity to segregate portions of roadway to limit traffic during testing. All test areas are open and ready for operations.

University of Arizona: SAE Levels 0 – 5

Arizona Governor Doug Ducey, issued Executive Order (2015-09) in August 2015 to support testing of HAV on state university property. This Executive Order enabled companies such as Uber and Google to conduct pilot programs on university property with or without a driver present in the vehicle. The UA Tech Park is included in this Executive Order.

Mussleman Honda Circuit: SAE Levels 2 – 4

The track is a 1,264m x 10m asphalt track, incorporating an increased degree of difficulty with several turns built into the layout. The track contains a 200M x 40M skidpad and a 640 acre off-road park. The off-road park meets criteria outlined in the NHTSA *Federal AV Policy: Accelerating the Next Revolution in Roadway Safety* to provide off-road testing for HAVs. The facility is open and ready for testing.

Figure 9 Musselman Honda Circuit

City of Tucson Deployment Corridors: SAE Levels 0 – 5

Three deployment corridors are selected to act as "test beds" for HAVs. The corridors are unique in the traffic situations they are capable of supporting. Investments in intelligent infrastructure, secure data communications, and other transportation enhancements are being made, and more are planned. The City hopes to secure matching federal funding in 2017 to deploy additional infrastructure such as sensors and other technologies to advance implementation and safety of HAV.

- The 4-mile Speedway Corridor averages 40,000-50,000 average daily vehicle trips (ADT). It borders the University of Arizona campus and is a primary arterial for commuters traveling into and out of downtown.
- The Maclovio Barraza Parkway is a 4-mile controlled access expressway between downtown Tucson and Davis Monthan Air Force Base to the southeast. It provides longer distances between traffic signals and higher speeds, and less traffic with 11,000-23,000 ADT.
- The UA Tech Park Corridor, a 12 mile corridor located just off of Interstate-10, has access to a mix of smaller suburban and rural streets outside of the UA Tech Park, averaging 10,000-13,000 daily vehicle trips, that are particularly congested during morning and evening commutes. (This area is also part of a recently awarded US DOT Mobility on Demand Sandbox project.)

Pima County Sonoran Corridor: SAE Levels 0 – 5

The Sonoran Corridor is the County's planned connection between I-19 and I-10. This corridor is a significant component of Pima County's broader economic development plan to increase and support logistics in the region. The Arizona Department of Transportation (ADOT) has designated the Corridor as a state route and Congress designated it as a high priority, international freight corridor. Preparations

are underway with the environmental studies in progress. The Corridor when completed will connect with Science Park Drive at the UA Tech Park (outlined above). The Sonoran Corridor is expected on completion to be the first smart freight corridor in the US.

The Tucson region is a world leader in autonomous systems. SmART will use these systems in addition to the facilities described above to assist and report testing conditions and results. This rapidly growing industry is incorporating sensors that can be flown overhead as opposed to being on the ground or embedded in the roadway. Use of these systems will enable additional testing conditions for HAVs.

Administration of the SmART Grounds

SmART is a partnership of municipalities, industry and academia. It is led by Tech Parks Arizona and assisted by TRI, City of Tucson, Pima County, PAG, ADOT and Musselman Honda as part of SVIT. The partnership is developing guidelines for implementation of an automated vehicle program. This includes regulatory requirements for insurance, policies for vehicle operation with and without a driver, driver requirements and an application process. The group will develop guidance to be used by USDOT in implementing federal policy for the testing and demonstration of HAVs. The implementation of recognized standards will assist in moving the industry away from self-certification and ensure jurisdictional compatibility.

SVIT and the Safety Committee will oversee development and adoption of initial procedures and policies by January 1, 2017. Administration of this program will be evolving to keep pace with technology. Safety is the highest priority in reviewing or implementing changes in administration of SmART. SVIT meets monthly and will include on at least on a quarterly basis, if not more often, an administrative review of the program.

Leadership and Outreach

Figure 10 2016 Technology and Transportation Summit

The vision for SmART is to be a leading Center of Excellence in autonomous vehicles. SmART is committed to open and ongoing engagement with all stakeholders. The team recognizes that the technology, policies and safety considerations will advance only if there is on-going and continuous dialogue and data sharing. CyVerse (noted below) provides a data option, particularly with the analytical and machine learning components of the program. In addition, SmART will develop and implement a website that provides easy and open access to safety policies, safety plans and engagement with stakeholders and the general public. Other content to be considered includes presentations, reports or scholarly articles that lead to broader dissemination. PAG, one of the SmART partners, organized an annual summit, the **Technology and Transportation Summit**, launched in October of 2016. The summit included representatives from industry, academia and government (city,

county, state, and federal participation). Panel sessions focused on emerging technology in the HAV industry, public policy, management of data and research. Plans are underway for the Summit in 2017 with a focus on logistics and transportation. The Summit is expected to expand to two days next year. The second day will be designated as "Demo Day" where a variety of autonomous vehicle manufacturers will demonstrate emerging technology. An expo is planned as part of the day with the goal of creating cross-collaboration in the region. It also serves as a great platform for engaging new stakeholders and partners who are not actively involved in this industry sector. As with the 2016 Summit exposition and exhibit hall, PAG will continue to encourage student participation through poster sessions, display tables, and the opportunity to present research findings with public agencies and industry.

In addition to the Summit, the partnership will implement the following:

Stakeholder Engagement:

- Local: SVIT will serve as the primary stakeholder engagement tool. The group is taking a strategic approach to its activities and is actively working to create collaborations throughout the region in this industry segment. The group determined short-term goals for its first year and will start to identify and work on long-term goals for the region. In addition, the group will implement a program of outreach to continue actively engaging industry and community in the SmART Proving Grounds.
- Regional: SmART will implement an aggressive campaign across the state to inform and engage a broader stakeholder group. This includes educating and working with state government and industry. SmART will seek partnerships with other universities with similar research, testing and demonstration capabilities. The TRI Director is a member of the state Self-Driving Vehicle Oversight Committee and in that capacity works directly with senior state officials on this topic.
- National: SmART will actively participate in national conferences. Participation includes attendance as well as presenting workshops and serving on panels. SmART will seek national partnerships with programs such as CU-ICAR at Clemson University.

Education:

- Joint Technology Education District (JTED) is the Career and Technology Education district in Southern Arizona. JTED trains students in automotive technology and engineering. Partnership with them provides the first step in building both educational programs and the workforce required to serve the HAV industry.
- Pima Community College (PCC) is a partner in the formation of SmART. This past year PCC initiated a new OEM auto technician program with MOPAR. In addition, the College offers training and certifications in areas such as aviation and its first responders program. Students can serve in roles assisting in development of safety protocols, data collection and analysis in working with HAVs. Pima Community College additionally serves as the minority institution for the Regional 9 University Transportation Center led by the University of Southern California.

Figure 11 UA CAT Vehicle 2015 Researchers

- The University of Arizona College of Engineering graduates over 500 undergraduate and 200 graduate students annually. The College of Optics through Engineering offers an undergraduate program. Annually it graduates over 65 masters and Ph.D students. The University is home to one of the leading optical sciences colleges and with an interdisciplinary culture can involve other colleges such as the James E. Rodgers College of Law and the College of Social and Behavioral Sciences and the College of Science as examples.

This educational continuum enforces and expands the workforce pipeline. This will contribute to state and nation wide education as partners across the state engage to implement programs. SmART will utilize data to build the learning experience and drive learning standards across the state and nation in this industry.

Leadership

The team brings significant leadership experience from a variety of programs and achievements. Many have been noted so far. USDOT should expect that SmART will promote its capabilities and achievements as a leader in HAV and testing and evaluation metrics.

Southern Arizona Research and Testing (SmART) Proving Grounds Proposed Relationship with US DOT and the Community of Practice

Southern Arizona Research and Testing (SmART) Proving Grounds Proposed Relationship with US DOT and the Community of Practice

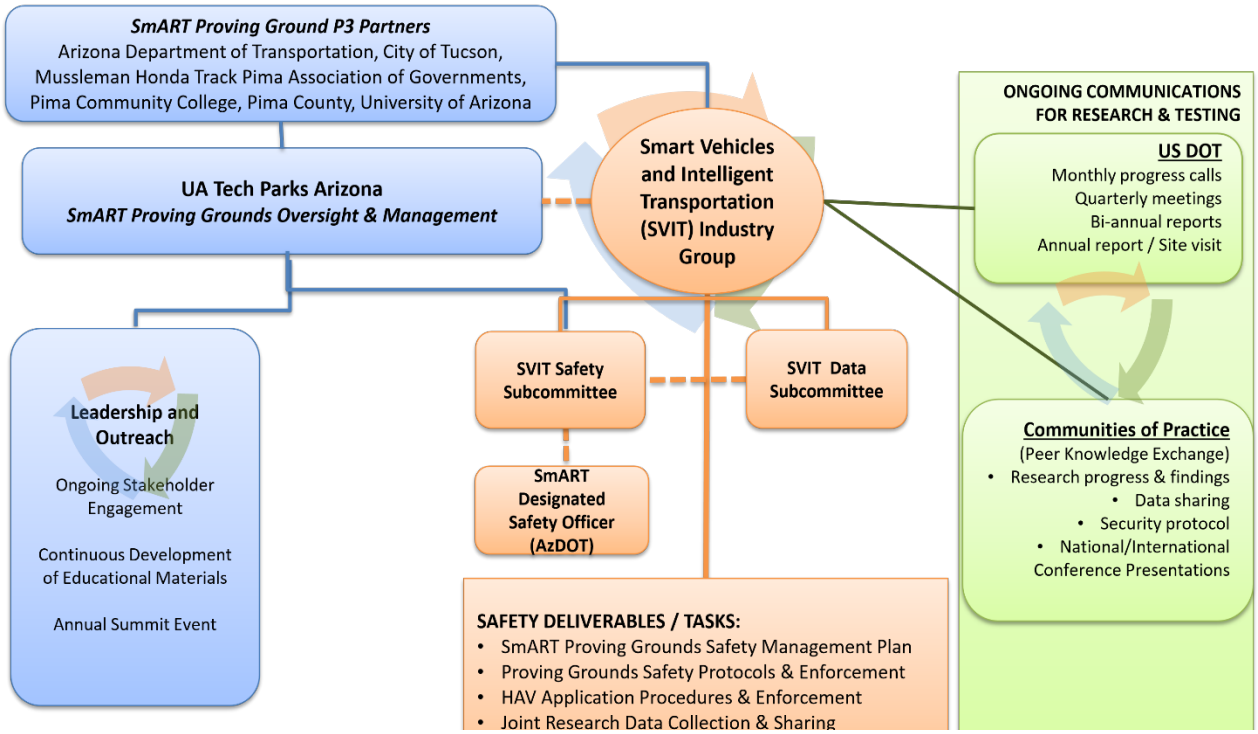

Figure 12 Southern Arizona Research and Testing (SmART) Proving Grounds Proposed Relationship with US DOT and the Community of Practice

Demonstrated Investments

SmART investments represent both public and private investment. To date the SmART Proving Grounds partners have invested $62 million in capital investment. The group expects to invest another $672.6 million in additional infrastructure.

SmART is planning to leverage P3 financing as it moves forward. Members of the SmART team are very knowledgeable about these partnerships and transactions. The group is actively working with organizations that are interested in this type of financing, particularly with the road improvements for Science Park Drive at the UA Tech Park and the Sonoran Corridor. These projects are expected to bring increased interest with designation of SmART as a USDOT Proving Ground.

Designated Contacts

City of Tucson: Jennifer Toothaker, Project Manager, City of Tucson Department of Transportation; Jennifer.toothaker@tucsonaz.gov; 520.837.6648

Musselman Honda Circuit: Charles Quiroz, Owner; charlie@mhcircuit.com; 520.245.5278

Pima Association of Governments: David Atler, Innovation Director; datler@pagregion.com; 520.495.1443

Pima Community College: Dr. Ian Rourk, Vice President for Workforce Development; irourk@pima.edu; 520.206.6424

Pima County: Dr. John Moffatt, Economic Development Director; john.moffatt@pima.gov; 520.724.4444

UA Tech Park: Bruce A. Wright, Associate Vice President, University of Arizona; wrightb@email.arizona.edu; 520.621.4088

University of Arizona Transportation Research Institute: Dr. Larry Head, Director, Transportation Research Institute; klhead@email.arizona.edu; 520.621.2264

Smart Vehicles and Intelligent Transportation: Molly Gilbert, Director of University and Community Engagement, Tech Parks Arizona; mgilbert@uatechpark.org; 520.382.2486

Appendix I – Safety Officer Resume and Qualifications

Herman R. Bernal

Arizona Department of Transportation (ADOT)

State Safety & Security Oversight (SSO) Program Manager

206 S. 17th Avenue Mail Drop 310B

Phoenix, Arizona 85007

Cell: (602) 881-9747

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Summary of Qualifications and Certifications:

- Federal Transit Administration Transit Safety Security Program (TSSP-Certification Rail and Bus)
- World Safety Organization Certification (WSO-Rail and Bus)
- Certified Safety/ Security Specialist (CSS-Rail and Bus)
- Certified Safety/ Security Director (CSSD-Rail and Bus)
- Certified Safety and Security Manager (CSSM)
- U.S. Department of Transportation and Transportation Safety Institute, Safety and Security Certification
- U.S. Department of Labor Occupational Safety and Health (OSHA) Certification
- Incident Investigation Certification (IIC), Federal Emergency Management Agency (FEMA) U.S. Department of Homeland Security
- Incident Command System Certification (ICSC), Federal Emergency Management Agency (FEMA) U.S. Department of Homeland Security
- National Incident Management Systems Certification (NIMS), Federal Emergency Management Agency (FEMA) U.S. Department of Homeland Security
- Continuity of Operations Certification (COOP), Federal Emergency Management Agency (FEMA) U.S. Department of Homeland Security
- U.S. Environmental Protection Agency & Maricopa County Air Quality Department Certification
- AMTRAK, TSA & Railroad Safety Training Certification

Federal Transit Administration

- Appointed by the U.S. Secretary of Transportation Anthony Fox to the Federal Transit Advisory Committee for Safety (TRACS) Representative
- FTA Highway/Rail Grade Crossing Committee
- Transportation Security Administration & National Transportation Safety Board Strategy Project Sub-Working Group (Transportation Cyber Security Awareness and Outreach)

Federal Railroad Administration

- ROW Fatality & Trespass Prevention Committee Member
-

Transportation Research Board (TRB) Committee Representative:

- Task Force on Transit Safety and Security
- Standing Committee on Light Rail Transit
- Transportation Safety Management

ADOT SSO Management:

- Arizona State Safety & Security Oversight Program Manager (SSO) for all rail fixed guideway systems in Arizona
- Drug and Alcohol Program Manager for Arizona Department of Transportation (ADOT) 5311 Programs
- Arizona Department of Transportation (ADOT) Multimodal Planning Division (MPD), Training Program Manager

Arizona Committee Representative

- President of Arizona Operation Lifesaver
- Arizona APTA Safety Culture Task Force Representative
- Arizona Transit Association (AzTA) Safety Partnering Representative
- Arizona Transit Association (AzTA) Legislative Committee Member
- Arizona Transit Association (AzTA) Board of Directors Committee Member

ADOT Committee Representative:

- ADOT Policies, Procedures, JSAs Standing Committee Representative
- ADOT Safety Rule Change Review Committee Representative
- ADOT Statewide Incident Review Board Representative
- ADOT Safety Council Representative for the MPD
- ADOT Facilities Safety Standing Committee Representative
- ADOT Vehicle/Equipment Safety Standing Committee Representative

Safety and Security Work History Overview:

- 26 years in Occupational Safety & Health overseeing Compliance, Risk Management, Security, Fleet Safety and Employee Supervision and Management
- 12 years Safety overseeing companies in excess of 320 employees, 100 fleet drivers, multiple locations of operations /shifts
- 2 years in the Personal Protection Equipment Industry as a Safety Consultant overseeing Product Development
- United States Navy (Corpsman)

Arizona Department of Transportation (ADOT)

State Safety & Security Oversight (SSO) Program Manager

Drug and Alcohol Program Manager over FTA 5311 Programs

November 2010 – Current

Job Duties:

- Administer safety and security oversight for all rail fixed guideway systems in Arizona.
- Serves as a liaison to the Executive Team by participating on several internal and external work groups and teams.
- Communicates with staff at all levels to convey the vision of ADOT.
- Monitors legislative and other developments that affect the program and ensures compliance with federal, state, and local laws, regulations, codes, and/or standards.
- Provides internal and external leadership to meet growth objectives and to ensure strength and operating efficiencies, including strategic planning direction.
- Conduct safety and security reviews of each rail fixed guideway systems.
- Review findings and recommendations and recommend corrective actions, to be taken by the transit agencies to address deficiencies.
- Yearly review, refine and update the Arizona Department of Transportation System Safety and Security Program Standard.
- Yearly review of each Raul Transit Agency (RTA), System Safety Program Plan, System Security Program Plan, Internal Safety and Security Audit Program, Hazard Management Process, Accident Notification Investigation and reporting, Incident Investigation Plan, Emergency Management Plan, and supporting documents and procedures; that complies with the Oversight Agency's Program Standard at each rail transit system.
- Review and approve internal audit schedule, notification, audit checklist, procedures, letter of certification and annual report of each rail fixed guideway systems.
- Attend all RTA, Hazard Management meetings, review and approve all hazard management meeting agendas, minutes, notifications, investigations, corrective actions, reports and plans.
- Perform ADOT Quarterly Hazard Management Meeting, as required by Federal Transit Administration (FTA) for all RTA's.
- Attend all Security Management meetings review and approve all security management meeting agendas, minutes, notifications, investigations, corrective actions, reports and plans.
- Review and approve all Accident, Incidents and Unacceptable hazardous conditions, notifications, fact reports, investigations, corrective actions plan, reports and final reports.
- Perform Three-Year On Site Safety and Security Review of each rail fixed guideway systems, complete a draft report and review corrective action plans developed from the review.
- Perform monthly review of Corrective Action logs.
- Perform monthly review of Hazard logs.
- Conduct onsite visits at each rail transit system to perform formal Safety and Security Review.
- Conduct safety audits according to the Internal Safety Audit Process detailed in the Arizona Department of Transportation System Safety and Security Program Standard.
- Review of each transit agency's operating and maintenance rules and procedures to determine if they are updated regularly and if training on these procedures is appropriate.
- Review of documentation and record keeping systems to ensure that safety and security plan implementation is being properly tracked and monitored.
- Meet with personnel, including management, to access the organizational commitment and ability to support safety functions.
- Perform monthly on-site observations of the system and facilities to evaluate the implementation of plans, procedures, and rules.
- Perform monthly Inspections of infrastructure and facilities, to ensure that maintenance best practices are being followed.
- Complete FTA Quarterly & Annual Reporting for State Safety Oversight SSO program information.
- Responsible for a diverse and complex program, often having a scientific or engineering orientation.
- Plans, organize, direct, coordinate and evaluate activities and projects in a multi-discipline planning organization.

Knowledge, Skills, and Abilities:

- Management of Transit Construction Projects
- Investigating Human Fatigue Factors
- Cognitive Interviewing
- Security and Emergency Response
- Transit Rail System Safety
- Transit System Safety
- Fundamentals of Bus Collision investigation
- Transit System Security
- Transit Bus System Safety
- Effectively Managing Transit Emergencies
- Rail Incident Investigation
- Federal Transit Administration Drug & Alcohol Program Management
- Knowledge and understanding of FTA & FRA rules, regulations and applicable standards (**49 CFR Part 659**), (**MAP-21**) and (**Fixing America's Surface Transportation (FAST) Act**).
- Knowledge and understanding of DOT, OSHA, EPA & DEQ rules, regulations and applicable standards.
- Select, supervises and evaluates the work of a multi-disciplined staff including planners, environmental specialists, engineers, and research analysts.
- Knowledge of planning administration practices and procedures.
- Knowledge of government organization, public finance and economics
- Practical application in the fields of safety compliance loss prevention and auditing.
- Coordinates multi-jurisdictional planning efforts.
- Prepare a variety of administrative reports.
- Attend training seminars and educational conferences.
- Understand Safety Terminology Pertaining to the Medical, Insurance and Legal fields.
- Above average written and oral communication skills.
- Competent with Microsoft Word, Excel, Windows, Power Point, Outlook, PC's and Mac.
- Strong negation skills.
- Proven success in profitable business management.
- Excellent organizational, leadership and time management skills.
- Strong problem solving and data analysis skills.
- Ability to compose and present reports to all levels of management.
- Ability to effectively lead and influence others in order to achieve results.
- The ability to self-start and work well in ambiguous situations as a team player.

Safety Security Training:

Rutgers University, National Transit Institute (NTI)

- Understanding ADA
- Assault Awareness and Prevention for Transit Operators
- Building Diversity Skills in the Transit Workplace
- Fundamentals of Transit Supervision
- Project Management for Transit Professionals
- Toolbox for Transit Operator Fatigue: Putting the Report into Action
- Building Diversity Skills in the Transit Workplace
- Harassment Prevention for Transit Supervisors
- Terrorist Activity Recognition and Reaction
- Management of Transit Construction Projects
- Pick Pocket and Identify Theft

- Crisis Communication for Transit Employees
- All-Hazards Awareness and Preparedness for Transit Employees
- Infectious Disease Awareness and Prevention
- Violence in the Transit Workplace Prevention, Response and Recovery
- Rail Operations Control Center Response to Weapons of Mass Destruction Incidents

Transportation Safety Institute (TSI)

- SMS Principles For Transit (Rail, Bus and Transit) - FT00564, Tier 1
- Rail Incident Investigation - FT00430, Tier I
- Transit System Security - FT00432, Tier I
- Transit Rail System Safety - FT00543, Tier I
- Effectively Managing Transit Emergencies - FT00456, Tier I
- Transit Rail Incident Investigation – FT00544 Tier II
- Transit Industrial Safety Management - FT00457, Tier II
- Advanced Rail Incident Investigation - FT00461, TSI - Tier III
- Technical Assistance for State Safety Oversight Personnel - FT00560 - Tier III
- Transit Rail System Safety & Security Audit Course - FT00547 - Tier III
- Transit Bus System Safety - FT00533
- Fundamentals of Bus Collision Investigation - FT00435
- Curbing Transit Employee Distracted Driving - FT00555
- Fatigue and Sleep Apnea Awareness for Transit Employees - FT00558
- Transit Response to Bus Hijackings - FT00463
- Transit Response to Rail Hijackings - FT00532

National Transportation Safety Board (NTSB)

- Cognitive Interviewing for Incident Investigators - IM401
- Advanced Cognitive Interviewing for Incident Investigators - IM401B
- Investigating Human Fatigue Factors - IM303
- Incident Investigation Orientation for Rail Professionals - RPH301

American Society of Safety Engineers (ASSE)

- Safety Management I - 64802
- Safety Management II - 65167
- Corporate Safety Management - 65532

Federal Emergency Management Agency (FEMA) U.S. Department of Homeland Security

- Incident Command System - ICS-100
- Continuity of Operations (COOP) - IS-546
- National Incident Management System (NIMS) - IS-700

Occupational Safety and Health Administration (OSHA)

- 30-hour OSHA Compliance Certification
- 10-hour OSHA Compliance Certification

National Center for Biomedical Research & Training

- Transit Terrorist Tool and Tactics

US Department of Transportation (USDOT)

- Fleet Safety & Understanding the DOT Certification

Federal Transit Administration (FTA)

- Federal Transit Administration Drug & Alcohol Program Management Certification
- FTA Supervisory Drug and Alcohol Reasonable Suspicion Awareness Certification
- FTA Substance Abuse Training

Community Transportation Association (CTA)

- Safety and Security Management

Arizona Division of Occupational Safety and Health (ADOSH)

- Arizona Workers Compensation Insurance Claims Management Practices/Advanced Issues Certification
- Concrete and Masonry in Construction Certification
- Construction Hazards Certification
- Occupational Health and Environmental Controls Certification
- General Safety & Health Provisions Certification
- Personal Protective Equipment Certification
- Hazard Communication Certification
- Confined Spaces in Construction Certification
- Excavation Safety Certification
- Fall Protection Certification
- Scaffolds Certification
- Stairways & Ladders Certification
- Walking and Working Surfaces Certification
- Fire Protection and Prevention Certification
- Materials Handling, Storage, Use, and Disposal Certification
- Lockout tag out Control of Hazardous Energy Certification
- Environmental Health Certification
- Heat Stress Prevention Certification
- Ergonomics Certification
- Machinery and Machine Guarding Certification
- Hand and Power Tool Safety Certification
- Forklift & Powered Industrial Trucks Train-the-Trainer Certification
- Demolition Certification
- Welding & Cutting Certification
- Workplace Violence Certification

JONATHAN ROTHSCHILD
MAYOR

CITY OF TUCSON
OFFICE OF THE MAYOR

255 WEST ALAMEDA
P.O. BOX 27210
TUCSON, ARIZONA 85726-7210
PHONE: (520) 791-4201
FAX: (520) 791-5348

December 19, 2016

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

SUBJECT: Support for Federal Designation of the SmART Proving Grounds

Dear Secretary Foxx:

The City of Tucson strongly supports the Tech Parks Arizona SmART Proving Grounds proposal. Such a designation fits into the vision enacted by Arizona Governor Douglas Ducey in 2015 in Executive Order 2015-09, which allows testing of self-driving vehicles in Arizona. Arizona embraces research and testing of self-driving vehicles because it will accelerate innovations in transportation, communications, and security technologies in Arizona and for the entire nation. Arizona enjoys an average of 310 sunny days each year, perfect conditions for testing sensor-rich highly autonomous vehicles (HAVs). Arizona also boasts a supportive economic climate, providing economic incentives at the state and local levels to assist companies through the various stages of technology development. Tech Parks Arizona has more than 20 years' experience supporting regional and national companies in technical innovation and advances, especially in the areas of advance testing and demonstration.

Deploying HAVs using a variety of testing conditions – including test tracks and urban and rural roads – will provide critical data and refinements. These data will ultimately be useful in local, regional, state, and national efforts to improve safety for pedestrians and passengers, greatly reduce or eliminate traffic incidents and congestion, reduce land use reserved for parking facilities, enhance options and access for the movement of people and goods throughout the state, and increase economic productivity.

In the spirit of this commitment to supporting HAV deployment, **the City of Tucson pledges to**:

- **Lead the development of a replicable application and review process for testing of HAV** on City of Tucson operated roadways;
- **Lead and assist partners with the development of standard policies and procedures** that may advance safe testing, deployment, and operation of highly autonomous vehicles (HAVs);
- **Participate in a region-wide Safety Task Force** with a designated representative;
- **Work with our public agency partners to standardize and maintain road infrastructure** that will support safe operations of HAVs and ensure the safety of human drivers; and,
- **Capture, store, and share data and research findings with the Proving Ground partners and the U.S. Department of Transportation.**

The SmART Proving Grounds would be a notable addition to Arizona's innovation achievements, particularly because of its connection to the University of Arizona (UA) located in Tucson, Arizona. **UA is a major research institution with internationally-renowned faculty experts and fielded solutions.** National and local cyber infrastructure architecture can tap into technologies developed at UA, such as: Connected Vehicle (UA Transportation Research Institute) and Autonomous Vehicle (Uber/Optics) technologies; urban data analytics (INSITE Center; College of Engineering/Metropia); open-data storage and management systems architecture and standards (iPlant, now known as CyVerse); and, technology transfer (Tech Launch Arizona).

Tech Parks Arizona at the University of Arizona works closely with UA researchers. It supports development across a broad range of technology sectors. It also provides an exceptional environment for the testing, independent evaluation and demonstration of new technologies. Its management and operation of the Arizona Center for Innovation, a business incubator, closely aligns technology development with technology commercialization.

The City of Tucson, Pima Association of Governments, and the University of Arizona have been collaborating since 1988 on a "Living Lab" corridor for research, analysis, and implementation of various transportation technologies and solutions to enhance efficiency and mobility throughout the region. We are practiced and able to share anonymized, secure data as part of this designation and research.

Lastly, the regional partnership received a U.S. DOT Mobility on Demand (MOD) Sandbox Program award to pilot technologies in an arterial area that will be utilized in the proposed SmART Proving Grounds. Receiving designation as an Autonomous Vehicle Proving Ground could help leverage the Federal investment in the MOD pilot by attracting additional funding, partnerships, and technology deployments. We believe this partnership signifies not only our commitment but also our effectiveness in researching and investigating new innovative approaches, to collaborating, and to sharing data.

We value the work your administration has initiated and accomplished and hope you will designate the Tech Parks Arizona SmART Proving Grounds to continue this legacy in our region.

Sincerely,

Jonathan Rothschild
Mayor

COUNTY ADMINISTRATOR'S OFFICE
PIMA COUNTY GOVERNMENTAL CENTER
130 W. CONGRESS, FLOOR 10, TUCSON, AZ 85701-1317
(520) 724-8661 FAX (520) 724-8171

C.H. HUCKELBERRY
County Administrator

December 19, 2016

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

Re: **Proposal for the SmART Proving Grounds in Tucson, Arizona**

Dear Secretary Foxx:

Pima County strongly endorses the attached proposal for the SmART Proving Grounds in Tucson, Arizona. The County has actively sought new transportation solutions to provide efficiency and mobility throughout the region. The County, in partnership with the City of Tucson, last year began developing a strategic plan to seek designation as a Smart City. The plan includes developing collaborative partnerships and identifying technology solutions to be implemented by local jurisdictions. This is a collaborative process with several stakeholders from academia, government and industry. The County is committed to implementing technology solutions and addressing jurisdictional policy to improve transportation.

Pima County's 2015-2017 Economic Development Plan included two components focused on transportation, and these components continue to be major points of emphasis in our recent Economic Development Plan update through 2018. The first is improving infrastructure, and the second is developing Tucson as a logistics center. Improved infrastructure includes embedding the technology today that will enable the highly autonomous vehicles (HAV) of tomorrow. One of the most significant infrastructure projects in development is the Sonoran Corridor, which was designated by Congress in the recent F.A.S.T Act as a high-priority international freight corridor. This plan includes construction of a new Parkway/Auxiliary Interstate Program and includes a number of jurisdictions, including the San Xavier District of the Tohono O'odham Nation. This new roadway is being designed as a "smart highway" with infrastructure that will support placement of sensors, Wi-Fi and other components necessary for HAV operation.

The SmART Proving Grounds is placing an emphasis on freight, which aligns with another component of the Pima County Economic Development Plan. Increased automation within the logistics industry will have a significant impact on the multimodal approach for the region. New automation will assist with border crossings for legitimate trade, improved time to market and, most importantly, improved safety for all vehicles on the road.

In support of the Proving Grounds, Pima County pledges to do the following:

- Review policies and procedures that may inhibit safe testing, deployment and operation of highly autonomous vehicles (HAV) and update these policies as appropriate.
- Commit to participate with a designated County representative in a region-wide Safety Taskforce.
- Commit to work with the City of Tucson and the Pima Association of Governments (the local MPO) to standardize and maintain road infrastructure that will support safe operations of HAV and ensure safety of human drivers.
- Develop an application and review process for testing of HAV on Pima County-managed roadways.
- Commit to sharing data with the Proving Grounds and US Department of Transportation.

We hope you will find the proposal meets the requirements of the US Department of Transportation and designate the proposed site and our region as a participant in the SmART Proving Grounds program.

Sincerely,

C.H. Huckelberry
County Administrator

CHH/dr

Attachment

c: Carmine DeBonis, Interim Deputy County Administrator for Public Works
John Moffatt, Director, Economic Development

Douglas A. Ducey, Governor
John S. Halikowski, Director

December 19, 2016

Secretary Anthony R. Foxx
1200 New Jersey Avenue SE
Washington, DC 20590

Dear Secretary Foxx:

The Arizona Department of Transportation (ADOT) supports the SmART application submitted by Tech Parks Arizona and its partners to secure designation as an Autonomous Vehicle Proving Ground Pilot project.

Arizona is a leader in the development and deployment of Highly Autonomous Vehicles (HAV). Last year, Governor Ducey issued Executive Order 2015-09 directing state agencies to take the necessary steps to support the testing and operation of HAV on public roads in Arizona. His order enabled companies to test driverless vehicles on state university property. It also established the Self-Driving Vehicle Oversight Committee. The committee is charged with advancing the testing and operation of self-driving vehicles on public roads.

Our strategic location within NAFTA provides an excellent opportunity for the USDOT to test and evaluate HAV technology, particularly as it relates to the movement of freight. The State of Arizona is home to several key interstate commerce and freight corridors. It is part of the CANAMEX corridor that extends through Arizona from Alberta, Canada to Guadalajara, Mexico.

Several industry leaders including Google and Uber are currently testing their HAV technologies in our state. We have worked closely with these companies to ensure that they have had access to public roads and have been able to test their vehicles in a safe environment.

The Arizona Department of Transportation (ADOT) is a partner in the Arizona Connected Vehicle Test Bed where connected vehicles and the Multi Modal Intelligent Traffic Signal System have been successfully demonstrated and evaluated by the USDOT.

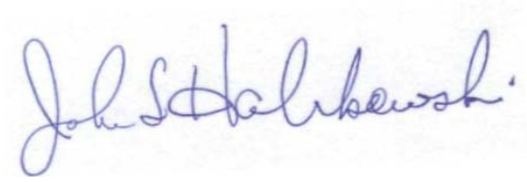
As a partner organization in SmART, ADOT will work cooperatively and collaboratively with Pima County, City of Tucson and University of Arizona to:

- Review policies and procedures that may inhibit the safe testing, deployment and operation of highly autonomous vehicles (HAV), and update these policies and procedures as appropriate;
- Commit to participate in a region-wide Safety Task Force with a designated representative from ADOT
- Work with the City of Tucson and Pima County to standardize and maintain road infrastructure that will support safe operations of HAV and ensure safety of human drivers
- Develop an application and review process for testing of HAV on University, City of Tucson and Pima County owned roadways
- Share data with SmART and the US Department of Transportation.

Specifically, as a SmART partner, the Arizona Department of Transportation (ADOT) will assign a designated Safety Officer to serve as a member of the Safety Task Force. This officer will have extensive experience, training and certification relevant to operation of the proving grounds and the testing activities.

The Arizona Department of Transportation endorses the SmART Proving Grounds proposal. It provides USDoT the opportunity to leverage the existing and emerging expertise, capabilities and infrastructure in our state to advance and accelerate the development of autonomous and connected vehicles.

Sincerely,



John S. Halikowski
Director
Arizona Department of Transportation

Cc: Governor Doug Ducey