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December 19, 2016

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

SUBJECT: San Diego Automated Vehicle Proving Grounds Pilot Designation

Dear Secretary Foxx:

The San Diego Association of Governments (SANDAG) is pleased to submit an application to the U.S. Department of Transportation (DOT) to designate the San Diego region as an Automated Vehicle Proving Grounds Pilot location.

SANDAG, in partnership with the California Department of Transportation District 11 (Caltrans) and the City of Chula Vista, will provide access to three distinct autonomous vehicle (AV) proving ground environments: the barrier-separated Interstate 15 Express Lanes; a segment of the South Bay Expressway in the U.S.-Mexico border region; and local streets and roads within the City of Chula Vista.

The San Diego region is an ideal proving ground location providing direct access to global leaders in the cybersecurity and wireless industries, as well as academic institutions at the forefront of robotics research and development. Further, SANDAG has demonstrated a commitment to advancing AV deployment as the first planning agency in the state to incorporate AV assumptions and resources into the region's long range transportation plan.

Through our experience with Integrated Corridor Management, SANDAG has a proven track record of leading a state-of-the-art demonstration project under a framework established by the U.S. DOT. One of the key functions that SANDAG provides is consensus building. Through a vast amount of public outreach, SANDAG helps to educate, inform, and enable the public to play an active role in the planning process. San Diego also is a region with a strong foundation for cross-agency collaboration, data sharing, and partnering with industry to overcome technical barriers. SANDAG looks forward to this new opportunity to partner with the U.S. DOT, and to participate in the Community of Practice, to improve mobility, efficiency, and safety across all modes and jurisdictions.

Sincerely,

Gary L. Gallegos

GARY L. GALLEGOS
Executive Director

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Executive Summary

The San Diego Association of Governments (SANDAG), in collaboration with the California Department of Transportation District 11 (Caltrans), and the City of Chula Vista are the sponsoring agencies comprising the San Diego Regional Proving Grounds (RPG) Team. The RPG Team is supported by a network of experienced public and private sector partners, uniquely qualified to support the planning, preparation, and execution of the U.S. Department of Transportation (DOT) Automated Vehicle (AV) Proving Grounds Pilot.

The San Diego region covers 4,200 square miles and is home to more than three million people living in the region's 18 cities and the unincorporated area of San Diego County. San Diego is the eighth largest populated city in the United States, and the second largest in California. San Diego is home to the busiest international border crossing in the Western Hemisphere and California's busiest commercial port of entry. Additionally, San Diego is a top ranked domestic travel destination in the country hosting 34 million visitors each year.

The San Diego region is recognized as a national high-tech hub and is home to Univeristy of Califorina, San Diego (UC San Diego), a world-class academic institute at the forefront of robotics research and development. In fact, UC San Diego's Jacobs School of Engineering has more computer science students than all of the other University of California schools combined. In addition, San Diego is home to the largest concentration of military in the world. The defense industry represents one out of every four jobs in the region with leaders in robotics and cybersecurity. Access to talent paired with one of the most sophisticated traffic management operations environments in the country, positions the San Diego region as an ideal location for an AV Proving Ground.

Three distinct proving ground environments are proposed (Figure 1): the state-of-the-art barrier-separated Interstate 15 (I-15) Express Lanes; a segment of the South Bay Expressway in the U.S.-Mexico border region; and local streets and roads within the City of Chula Vista. The RPG Team will provide staging facilities associated with each of the proving grounds, including participant access to secure garages, vehicle maintenance, surveillance, and office space. These staging facilities will be complemented with research labs and testing equipment provided by RPG sponsors and supporters. The scope of these associated facilities will be scaled to RPG usage.

In addition to providing a federal proving ground, the project team is equipped to assist with the open share of data and information to support the development and refinement of federal, state, and local policy. Two Designated Safety Officers will be responsible for Safety Management Plans, collaboration with U.S. DOT, and active participation in the Community of Practices' regular meeting of Safety Officers. A Caltrans Designated Safety Officer will be responsible for the I-15 Express Lanes and the South Bay Expressway. The City of Chula Vista will provide a Designated Safety Officer responsible for the City of Chula Vista proving ground.

SANDAG has a long history of partnering with the U.S. DOT to deliver innovative pilot projects, including the I-15 Integrated Corridor Management (ICM) Project and the "National Automated Highway System – Demo '97" when the region was designated as a host site for demonstrating the first self-driving vehicles along the I-15 corridor. SANDAG was selected to receive the first and only border-related Intelligent Transportation System (ITS) pre-deployment study funding in 2011 to design a "smart" border operational pilot which will include: variable tolling, accurate collection of border wait times with traffic probes, advanced traveler information, electronic screening,and other

Map Area
San Diego Region
Camp Pendleton
Oceanside
Vista
San Marcos
Carlsbad
Escondido
Encinitas
Solana Beach
Del Mar
Poway
Santee
San Diego
La Mesa
El Cajon
Lemon Grove
Coronado
National City
City of Chula Vista
San Diego
Imperial Beach
Tijuana, B.C.
UNITED STATES
MEXICO
Staging Facility – North:
Includes:
• Office space
• Secure parking
• Enclosed garage space
Staging Facility – Southeast:
Includes:
• Office space
• Secure parking
• Enclosed garage space
• 24-Hour surveillance
Staging Facility – Southwest:
Includes:
• Office space
• Secure parking
• Auto workshop
• Vehicle staging area
Figure 1
San Diego Regional Proving Grounds
December 2016
I-15 Express Lanes
South Bay Expressway
City of Chula Vista
Staging Facilities
1 Staging Facility – North
2 Staging Facility – Southeast
3 Staging Facility – Southwest
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG

technologies that will improve safety, security, mobility, and reduce emissions at the U.S.-Mexico border. SANDAG has developed strong advisory ties with the commercial trucking community related to the new border crossing initiative (referred to as the State Route 11 and Otay Mesa East Project) which will accommodate approximately 1.6 million commercial vehicles annually. Additionally, SANDAG recently completed its four-year federal certification review and was certified with no corrective actions required of SANDAG. This well-established relationship is a solid foundation for the AV Proving Grounds Pilot.

Supporting the San Diego RPG Team is a network of organizations that offer exceptional expertise to ensure the success of the federal proving ground concept. Local resources include the San Diego Supercomputer Center at UC San Diego and the Advanced Computing Environments Laboratory at San Diego State University, both of which are responsible for cutting-edge research in the cybersecurity field. UC San Diego also is home to "Contextual Robotics Institute" which draws together a core group of researchers from across engineering disciplines, computer and data sciences, and cognitive and neurosciences into a collaborative environment. The region also has an established entrepreneurial environment with companies in cybersecurity, software development, information technology, communications, and defense. The ecosystem includes incubators, financiers, experienced service providers and non-profits that support more than 100 firms. DENSO, Qualcomm, ESET, ViaSat, iboss, and Northrop Grumman, all industry leaders, also are headquartered in San Diego.

Letters of support from supporting organizations can be found here: sandag.org/SanDiegoRegionalProvingGrounds

Overview of the San Diego Regional Proving Grounds

RPG 1: I-15 Express Lanes

The I-15 Express Lanes corridor in San Diego County is recognized as one of the most innovative highways in the nation due to its advanced design and operational agility under a corridor management system. The 20-mile facility, running from State Route 163 in San Diego to State Route 78 in Escondido, is situated directly adjacent to the region's global hub of wireless and cybersecurity industries. In 2010, the I-15 corridor was selected as a pilot site for the development, implementation, and operation of an Integrated Corridor Management (ICM) System. Becoming operational in 2013, the I-15 ICM is predicated on an unprecedented institutional partnership between Caltrans, SANDAG, and the cities of San Diego, Poway, and Escondido that facilitates the multi-jurisdictional operations and management of the multimodal corridor.

With more than 20 access points, the I-15 Express Lanes facility provides vehicles a wide range of options for ingress and egress, including five direct access ramps that allow vehicles to enter the Express Lanes from surface and multi-level parking facilities at regional transit hubs. At a cost of $1.4 billion, the Express Lanes offer a freeway-within-a-freeway that is reconfigurable twice-daily, or during incident conditions by a barrier transfer machine; from a two-lane each direction configuration to a three-and-one facility for peak hour congestion relief. Adding to this is the concentration of static and dynamic traffic control devices combined with a mix of complex permissible maneuvers supported by unique lane striping. This facility provides opportunity for participants to exercise on-board, sensor-based learning systems.

The I-15 Express Lanes also are fully described in the cloud using Society of Automotive Engineers (SAE) "J" standards. This environment will be challenging for all machine-driven vehicles, SAE Level 3 through Level 5, enabling participants to demonstrate and prove core system requirements and edge conditions. An 11,000 square foot staging facility (Staging Facility North) located on three acres of land will be made available for offices, storage, maintenance, and secure parking.

Figure 2
Regional Proving Ground 1: I-15 Express Lanes

RPG 2: South Bay Expressway

The South Bay Expressway is a 10-mile tolled facility that provides access to the U.S.-Mexico border and is wholly owned and operated by SANDAG. The South Bay Expressway offers a multi-lane bi-directional 'at-speed' toll road facility, with limited development adjacent to the roadway itself. There are ten commercial vehicle traffic enforcement pull-outs, a six-lane toll plaza, six signal controlled interchanges, one surface parking lot, and a multi-tenant industrial park within two and a half miles of the facility. All traffic management assets will be available during testing, including closed circuit television (CCTV), speed detectors, toll plazas, dynamic message signs, and traffic signals. The facility has 14 interchanges, 18 toll gantries, plus 6 toll plaza gantries, all of which are to be fitted with dual radios (DSRC & 5G) for participants to load custom proving ground applications during testing. Additionally, the Toll Operations Center maintains a secure 24/7 surveillance of the facility. Participants will have access to supporting systems and asset data during proving ground testing. Staging Facility Southeast is located adjacent to the State Route 125 (SR 125) less than a mile from the Chula Vista Auto Park, and would provide participants with office space, maintenance, storage, and secure parking.

Figure 3
Regional Proving Ground 2: South Bay Expressway

RPG 3: City of Chula Vista

Bisected by SR 125, the City of Chula Vista is the second largest city within the San Diego region, comprising nearly 10 percent of the regional population. Inclusion of the city provides an opportunity for transition testing from the RPG-2 proving ground to AV testing on a diverse network of local streets and roadways along with supporting infrastructure.

From the traditional grid patterned streets of the historical west side to the master-planned Smart Growth communities in the eastern territories, the variety of facilities provides a robust environment for an AV test bed. The City of Chula Vista is one of the only cities in San Diego with developable land. New development will include 20,000 housing units, 30 additional miles of local roads, and a university campus covering 400 acres over the next decade. These developments provide opportunities for infrastructure design to incorporate the latest in technology as the roadway network develops. Roadway construction is being completed in phases by developers which provide a dynamic testing environment to test against the arterials.

Additionally, the Chula Vista Bayfront in western Chula Vista will soon be home to a convention, conference, and resort center, as well as a large scale mixed-use development that includes 1,500 residential units, two hotels, retail facilities, a marina, and extensive park and active transportation amenities. A shuttle service is proposed to connect the Bayfront developments to Downtown Chula Vista which presents an opportunity for autonomous Electric Vehicle (EV) shuttle service.

The City of Chula Vista is a Smart City Initiative leader with several programs that support AV application and testing. Such initiatives include establishing a network of EV charging stations throughout the city, operating an Advanced Traffic Management System, utilizing in-pavement

wireless arterial detection systems, maintaining a brand new state-of-the-art Traffic Management Center, installing fiber optic infrastructure with traffic signal communication capabilities, and having local ownership of the roadway street lighting system. The city owns approximately 10,000 roadway street lights within an area of 50-square miles.

Additionally, the availability of space at the City's municipal vehicle maintenance garage (Staging Facility - Southwest) could provide a staging and maintenance site. The facility is located in an industrial zone in eastern Chula Vista with easy access to both the South Bay Expressway and Interstate 805. This 18,000 square foot staging area was constructed as an auto and truck repair center with six bays including vehicle lifts and a pit for maintenance and repairs. The facility provides secure garage space, office space, and a large surface parking lot.

Figure 4
Regional Proving Ground 3: City of Chula Vista

Response to Mandatory Criteria

Designated Safety Officer

Caltrans, as the authorized DOT for the state of California, will take responsibility for the Designated Safety Officer locally to oversee the Proving Grounds Program for the I-15 Express Lanes and the South Bay Expressway. For the City of Chula Vista, Mr. Bill Valle, Assistant Director of Engineering/City Engineer would serve as the Designated Safety Officer working in close coordination with Captain Vern Sallee of the City of Chula Vista Police Department. The Designated Safety Officers will prepare and maintain a Safety Management Plan; share safety data, best

practice knowledge, and lessons learned; participate in meetings, conferences, and research; and serve as a single point of contact for the U.S. DOT.

The Caltrans Designated Safety Officer would coordinate with the Caltrans Department of Research, Innovation and System Information as the statewide contact for all innovation pilots – including the San Diego RPG – to ensure that standardized practices are vetted and aligned across multiple proving grounds.

The Safety Officer's "Safety Management Plan" will introduce proving ground participants to the purpose of having a plan, scope of the plan, risk methodology to be used, the target audience, and the authority being invoked to provide management oversight. A focus on the adaption and evolution of the safety planning process will need to be considered when working with highly automated vehicles. The Community of Practice envisioned by the U.S. DOT provides this necessary forum to enable Safety Officers to continually learn and gain practical insights to advance the depth and scope of the Safety Management Plans. The Safety Officers also would work with participants to document how risks would be assessed and managed; what threats would be detected and protected against; and how the entire team would respond to incidents and communicate with stakeholders through awareness training. As with any emerging technology, a governance structure for the proving ground also would be new to most stakeholders, therefore managing expectations will be key to success. This would be facilitated through ensuring both participants and other stakeholders understand clearly how the oversight will occur; how proving ground sponsoring organizations will change to define new roles and responsibilities; and where these new roles will affect oversight to ensure compliance with regulations, internal policies, and external commitments as documented in the Safety Management Plan.

The Designated Safety Officers, responsible for submitting a Safety Assessment, would work with RPG affiliates to address all 15 requirements of the National Highway Traffic Safety Administration's (NHTSA) Safety Plan.

Proposed Contributions

The San Diego RPG team will contribute to the local, state, and national understanding of both near-term and long-range mobility challenges. SANDAG maintains a strong working relationship with the U.S. DOT through its air quality work, freight coordination, long-range planning, environmental analysis, transit data collection, project coordination and oversight, transportation safety and security, congestion management, financial controls, and interagency consultation and coordination.

The San Diego RPG Team is committed to supporting the U.S. DOT ITS Program's technology transfer initiative, particularly as it relates to participation in the Community of Practice as described in the solicitation. The San Diego RPG Team is familiar with U.S. DOT objectives to provide accelerated implementation of a 'best-practice' approach for the adoption of market-ready technologies that are commercially viable within the transportation community. The San Diego RPG Team would host a dedicated website that captures all relevant materials to facility operations, including a meeting calendar, posted agendas, and meeting minutes to provide visibility to facility usage. In addition, staff would support U.S. DOT required pre- and post-designation suitability evaluations for the operational design domain's ability to fully address the needs of a specific safety test area from within the 15-point safety check self-assessment. SANDAG would work closely with

academic resources to ensure these evaluations are fully documented and replicable, with a view to publishing 'practice-ready' papers on the Joint Program Office or National Operations Center of Excellence websites. The evaluations also would be presented at annual Transportation Research Board (TRB) meetings and the San Diego RPG Team would be pleased to present on proving ground activities at U.S. DOT recommended conferences, such as the Association for Unmanned Vehicle Systems International (AUVSI) Automated Vehicle Symposium, TRB, American Association of State Highway and Transportation Officials, and International Transportation Engineer (ITE) annual conferences as well. Should the U.S. DOT express an interest in entering into an area of joint research, the San Diego RPG Team would facilitate invitations to local academic institutions, private industry supporters, and proving ground participants.

Commitment to Safety

Caltrans established a Strategic Highway Safety Plan, "a statewide data-driven traffic safety plan that coordinates the efforts of a wide range of organizations to reduce traffic accident fatalities and serious injuries on all public roads." The Caltrans Designated Safety Officer will work with the City of Chula Vista Designated Safety Officer to prepare and publish a Safety Management Plan for the San Diego Region Proving Grounds. The integrated Safety Management Plan will include the purpose of the document; intended users; geographic location and roadway types covered; unique features; established collaboration and partnerships; traffic incident management and hazard avoidance strategies; stakeholder identification, roles and responsibilities; funding; training requirements; data collection and analysis; performance monitoring and evaluation; risk management; and safety management communication plans.

Caltrans and the City of Chula Vista have a proven record of addressing safety considerations through adherence to the published Design, Construction, Traffic, Maintenance and other manuals; Injury and Illness Prevention Programs; Contract Standard Specifications; and Special Provisions Safety Programs. Safety is a number one priority for both agencies. When the proving grounds must be isolated from the general traffic, the agencies will implement the approved traffic control plan and employ Highway Patrol or local police for RPG area protection.

Further, the City of Chula Vista Safety Commission, established in 1973, is comprised of seven Chula Vista residents who are appointed by the City Council to address traffic and other safety concerns. The City Engineer, Principal Engineer (City Traffic Engineer), Senior Engineer, and Chula Vista Police officer serve as staff to the commission. RPG safety matters also would be vetted through this established local forum.

Research, Application, and Data Sharing

As the automotive industry works to develop and evolve software to support unmanned vehicles, the opportunity for the industry to conduct testing on San Diego's Regional Proving Ground facilities, alongside the region's cluster of technology companies, is unprecedented. San Diego's entrepreneurial talent and proximity to customers have enabled its cybersecurity companies to become leaders in the industry. Most of the region's innovations are attributed to its close ties to the federal government where key branches of the military, such as the U.S. Navy Space and Naval Warfare Systems Command, employ a large swath of cybersecurity professionals alone. This foundation has enabled local companies to diversify and expand into the consumer market and fulfill the needs of private businesses.

Furthermore, San Diego is a global hub of wireless industry innovation. The automotive industry's need to master three areas to deliver AVs – sensor, cloud, and wireless – puts San Diego's RPG facilities right next door to a global leader in automotive chipset manufacturing, and less than five minutes from a Tier 1 supplier's Research and Development headquarters for wireless communications. Close proximity to groundbreaking research facilities provides a unique opportunity for AV developers to work directly with San Diego-based researchers that currently are conducting relevant and ground-breaking work directly applicable to the AV industry.

The San Diego region also is home to three top-performing higher education universities, one of which, UC San Diego, stands at the forefront of relevant research in robotics, deep learning/machine learning, and human-machine interface. Through its Artificial Intelligence Group, UC San Diego engages in a wide range of theoretical and experimental research relevant to AV systems development and deployment.

Additionally, SANDAG was the first planning agency in the state to include AV assumptions into its long-range transportation models for its 2050 Regional Transportation Plan (RTP), including assumptions for personal autos and transit vehicles. In partnership with metropolitan planning organizations (MPOs) throughout the state, SANDAG continues to research these assumptions to further develop its AV modeling tools for future plans. Furthermore, SANDAG has developed an advanced activity-based model that can provide more detailed analytics than previous four-step travel models that are still used by most other peer agencies today.

Research and Extension Resources: Extension resources may include access to a dedicated Vehicle-to-Infrastructure (V2I), Infrastructure-to-Vehicle (I2V) network of Connected Vehicle (CV) radios deployed at strategic locations on the RPG-1 and RPG-2 proving ground locations. Radios may remain on a separate but accessible backhaul communications network for participant request and usage. Hosted applications would conform to SAE J2945/x recommended practice for standardized applications, or participants could load bespoke applications for specific use case testing.

The SANDAG Service Bureau is a renowned source for customized demographic and economic studies, data and analysis, Geographic Information Systems (GIS) analysis and mapping, and transportation modeling. Through the Service Bureau, RPG Participants will have direct access to SANDAG's capabilities to provide feedback on immediate and long-term mobility research areas of interest. SANDAG's existing multi-resolution modeling engines are all open-source, and as such, participant's may conduct modeling 'in-house' and utilize SANDAG's expertise in an advisory capacity, or outsource entire blocks of work. This unique capability to run high-resolution modeling of participant vehicle capabilities on the specific RPG facilities will uncover unintended consequences not identifiable during proving ground tests.

Dissemination of Results: One of SANDAG's greatest assets is its ability to convene large groups and to coordinate with both intra- and interregional partners. SANDAG's list of stakeholders and peer agencies is vast, and SANDAG works diligently to communicate with an array of individuals and groups to disseminate information and gather feedback on its transportation programs. For example, on its RTP, SANDAG partnered with a region-wide network of community-based organizations to effectively engage low-income, minority, senior, and disabled populations in the planning process. SANDAG also implemented a consultation process in partnership with the Southern California Tribal Chairmen's Association to ensure issues of the region's 18 tribal nations were addressed in the RTP.

In addition, SANDAG collaborated with Mexico, the U.S. military, neighboring counties, the business community, tribal nations, and local organizations in an inclusive planning process to ensure the regional transportation system will connect to the megaregion and national network. This is particularly important since the San Diego region has one of the busiest land border crossings in the world, with an estimated 60 million bidirectional crossings per year, plus the largest military population in the nation. These intraregional and interregional relationships make it an ideal platform for SANDAG to share information on any future results of an AV research program.

SANDAG proposes to utilize public engagement techniques that have proven successful for previous efforts, including specific project web sites for information or data (http://datasurfer.sandag.org), social media, visualizations, and other means of involving the public and receiving input.

Data Sharing: The I-15 ICM is host to the Regional Data Hub (RDH), which unifies and integrates 29 regional transportation management systems into a single, standards-based system. One of the benefits of the RDH is the unprecedented level of access to open validation data for proving ground participant usage for a full range of testing including pre, during, and post test runs. The RDH delivers over a terabyte per day of 'real-time' cloud accessible data for participant testing on all three RPGs or in the multi-resolution modeling environment, in the event any participants request full regional scale evaluation. The operational data available from the RDH conforms to a standard development organization message set format. Non-proprietary participant data will be made accessible through a multi-factor secure application programming interface for pre-test validation, and post evaluations of Level 3 to Level 5 AV runs. Additionally, the Safety Management Plan will require participants to provide formal feedback where on-vehicle sensors or cloud software have difficulty interacting with any of the static infrastructure, field devices, or cloud accessible data. Although the San Diego RPG Team will accept participant reports in any format, access will be provided to the Volpe SafetyHat vehicle sensor reporting system to capture this feedback for inclusion in quarterly reports to the Community of Practice.

As a Smart City initiative leader the City of Chula Vista RPG can offer robust data on its transportation system and operations. The City has seven miles of six lane prime arterial roadways along three corridors with SensysNetworks in-pavement sensors on all through lanes. This allows for data to be collected on travel times, levels of service, volumes by lane and by time period. The City's Acyclica system offers mobile unit capability, measures origin-destination of vehicles, travel time, speeds and delay, and a signal timing analysis tool. In the eastern portion of the city adjacent to the SR 125 corridor, there are 28 permanent count stations that can provide volume counts by lane and by direction. The City has video monitoring capabilities at intersections and an Advanced Traffic Management System for traffic signals. These systems are all supported by the brand new 450SF state-of–the-art Traffic Management Center offering six 45-inch large video screens, conference table and work stations with full access to the City's traffic data. Data sharing reports from the existing local roadway infrastructure system could be provided in any format desired.

SANDAG and the RPG partner's commitment to open data sharing and measuring the success of AV testing and deployment are critical to the proving ground's success. In addition, the RPG team commits to enhancing any performance metrics that are developed and sharing such improvements with the Community of Practice. SANDAG has a history of rigorous performance monitoring and analysis, which is applied to its activities, ranging from its planning work to corridor operations. For example, SANDAG worked with its stakeholders to identify and develop 23 performance monitoring indicators that are used to gauge the region's progress toward implementing its RTP. Working in

partnership with Caltrans, SANDAG also developed and implemented performance objectives and measures of effectiveness that are applied to guide the joint operations of the I-15 Express Lanes facility.

Demonstrated Investments and Readiness

As described previously, the proposed RPG locations are currently open. Caltrans is an RPG Team partner and the California State Transportation Agency has provided a letter of support for the project. The RPG Team will work with these partners and the California Department of Motor Vehicles to take all steps necessary to secure the necessary authorization to use these facilities as proving grounds for AV pilot testing. Additionally the City of Chula Vista is working towards developing a local policy that will enable safe AV testing on their streets and roads.

Each of the proving grounds offers staging facilities, providing participants with access to secure garages, vehicle maintenance, and office space. These staging facilities will be complemented with research labs and testing equipment provided by RPG sponsors and supporters.

In addition to the existing highway and local arterial facilities being offered as part of the RPG, SANDAG is committed to integrating emerging technologies with existing and new transportation infrastructure investments to improve safety, reduce congestion and travel times while providing increased mobility choices. The SANDAG RTP supports a robust network of interconnected Managed Lanes (ML) and ML connectors. Like the I-15 corridor, these MLs would provide an opportunity to test future AV components and applications.

To support the ML network the RTP also proposes a $175 million investment in Active Traffic Demand Management (ATDM). ATDM builds on the on ICM framework to dynamically monitor, control, and influence travel demand, traffic demand and flow of key highway corridors. Additionally, Caltrans is committed to achieving full Transportation System Management and Operations (TSM&O) per Director's Policy DP-08-R1. The TSM&O approach aims to create a performance-based framework for all system management activities and funding prioritizations while cooperatively implementing real-time traffic management to optimize flow and safety. ATDM and TSM&O investments will support CV/AV operations.

Further demonstrating the investment made and readiness of the San Diego region to host the Proving Grounds can be found in SANDAG's Overall Work Program which funds a CV Development Program. The objective of this program is to complete the mid to long-term deployment planning for advanced CV technologies by 2019 for inclusion in the RTP. In addition to identifying the infrastructure needed to support NHTSA's CV safety requirement, the program will identify a deployment timeline, responsible parties for development through maintenance and operations, as well as identifying the funding needed to meet the program requirements. The scope includes the systems engineering documents for the Proving Grounds – and will result in a concept of operations; security operations management plan; system requirements; human use approval plans; and outreach plans. This effort will provide a platform to engage participants on sustainable operations and business models for CV infrastructure.

AV technologies also will transform public transit, increasing efficiency and accessibility while reducing congestion. A key investment of SANDAG's most recent RTP is the Mobility Hub concept. Mobility hubs rely heavily on the integration of shared mobility services and technology to

seamlessly connect people to/from high frequency transit and key employment and commercial destinations throughout the region. Mobility hubs incorporate a wide array of on-demand shared mobility services including shared autonomous services and supporting systems like mobile applications, electric vehicle charging, smart intersections, and a universal payment system to make it easy to access a wide range of travel options. Development of a Regional Mobility Hub Implementation Strategy is underway and the RTP assumes an investment level of $258 million in pilot projects. Mobility Hub pilot locations within the City of Chula Vista could serve as proving grounds for autonomous shared services.

SANDAG also is collaborating with California's MPOs to enhance its CV/AV assumptions in its modeling processes, transportation network decisions, revenue allocations, and policy decisions to explore the variety of CV/AV assumptions that can be made in long-range plans. Given the uncertainty of vehicle and system functionality related to these technologies, an array of CV/AV elements are being evaluated and combined into possible test scenarios. Additional coordination among these MPOs is occurring to analyze the impacts of innovative mobility services (shared and/or autonomous) on travel behavior and preferences.

Community Engagement

SANDAG has a long history of community engagement throughout its work in all affected areas and would continue to do so with regard to any AV proving grounds testing. SANDAG regularly updates its Public Participation Plan (PPP) and this PPP serves as the guiding framework for the agency's Public Involvement Plans.

Specifically, the PPP establishes a process for communicating with and obtaining input from the public concerning agency programs, projects, and program funding. The strategies and tactics outlined in the plan guide the agency's public outreach and involvement efforts for highway projects; transit fare changes and construction; smart growth, environmental, and planning efforts; growth forecasts; the RTP; Regional Transportation Improvement Program; Tribal Consultation; and other initiatives. SANDAG public outreach efforts also are guided by the Public Participation Board Policy No. 25.

SANDAG is committed to ensuring that no person is excluded from participation in, denied the benefits of, or discriminated against under its projects, programs or activities on the basis of race, color, creed, national origin, sex, age, or disability as provided in Title VI of the Civil Rights Act, the Americans with Disabilities Act, and 49 United States Code Section 5332.

Related to the national origin component of Title VI, MPOs must also provide meaningful access to programs, services and activities to individuals with limited English proficiency. The SANDAG Language Assistance Plan outlines accommodations for limited English speakers.

Adherence to Laws, Regulations, and Federal Policy

Senate Bill 1298 (2012, Padilla), which authorizes the operation of DMV-approved AVs on public roads, amended the California Vehicle Code to add Division 16.6 (commencing with Section 38750). More recently, draft regulations for full deployment under California Vehicle Code have been proposed to further align California policy with the Federal Automated Vehicle Policy, especially as it relates to Safety Standards. At this time, under proving ground 'testing' scenarios for light duty vehicle testing, the RPG team perceives no challenges with higher levels of automation provided the vehicle is fitted with a steering wheel. Should such a vehicle be presented for testing, where it has passed a Federal 15-point Safety Check Self-Assessment and the California DMV has not passed the revised language referred to above into law, then SANDAG would advise all parties of the inconsistency and ask NHTSA for Federal preemption so that the participant can move forward with RPG testing. Furthermore, SANDAG remains engaged in the federal rulemaking processes aimed to advance the deployment of V2V and V2I, as well as other applicable vehicle technologies.

As stated previously, the City of Chula Vista is working towards, and has strong political support for, developing a local regulatory framework that will enable safe AV testing on their local streets and roads.

Additional Project Resources:

- Letters of Support
- I-15 Express Integrated Corridor Management
- I-15 Express Lanes Photos
- South Bay Expressway Website
- South Bay Expressway Photos
- SR 11 and Otay Mesa East Project
- City of Chula Vista Traffic Signal Communications Master Plan
- City of Chula Vista Photos
- National Automated Highway System – Demo `97 project information
- National Automated Highway System – Demo `97 (video)
- San Diego Forward: The Regional Plan – Performance Monitoring Indicators
- San Diego Forward: The Regional Plan – San Diego Regional Mobility Hub Implementation Strategy