City of San Antonio

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5/16/2018	1	City Council B Session		

DEPARTMENT: Transportation & Capital Improvements

DEPARTMENT HEAD: Mike Frisbie, P.E.

COUNCIL DISTRICTS IMPACTED: Citywide

SUBJECT: Autonomous Vehicles

SUMMARY:

A briefing on autonomous vehicles, including the current state of technology and levels of automation, as well as a potential Request for Information on testing autonomous vehicles in San Antonio.

BACKGROUND:

State of Technology:
While there is no fully autonomous vehicle commercially available today, various forms of automation have been in practice for many years. The Society of Automotive Engineers (SAE) has defined the following levels of automation:

- Level 0, No Automation - Zero autonomy; the driver performs all driving tasks.
- Level 1, Driver Assistance - Vehicle is controlled by the driver, but some driving assist features may be

included in the vehicle design.

- Level 2, Partial Automation - Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.

- Level 3, Conditional Automation - Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.

- Level 4, High Automation - The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.

- Level 5, Full Automation - The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

To date, the highest level of automation commercially available for personal use is the 2018 Audi A8 which can operate in Level 3. Tesla's Autopilot and Cadillac's Super Cruise can operate in Level 2. Currently, Level 5 operation is anticipated to be available in two to three years. There are several companies testing higher levels of automation in several cities, but that technology is not yet available for personal ownership and use.

SA Tomorrow Alignment:
Annually, nearly 40,000 people are killed in traffic crashes in the United States. According to the National Highway Traffic Safety Administration (NHTSA), 94% of those crashes are caused by driver error. In a fully autonomous transportation system, it is believed the vast majority of these crashes will be prevented. However, the deployment of automated systems still requires more development.

In addition to safety, the SA Tomorrow Multimodal Transportation Plan identified the use of technology as a core pillar of a forward thinking transportation system. Autonomous vehicles have the potential to increase operation efficiency and roadway capacity, as well as reduce emissions. Autonomous vehicles also may improve mobility for those unable to drive themselves such as the elderly or disabled.

Federal Responsibilities:
The Federal Government, through the US Department of Transportation (USDOT) and National Highway Traffic Safety Administration (NHTSA), is responsible for motor vehicles and related equipment. In September 2017, NHTSA released new federal guidance for Automated Driving Systems (ADS), Automated Driving Systems 2.0: A Vision for Safety. This is the latest guidance for ADS to industry and States.

- The document outlines Federal and State responsibilities. NHTSA is responsible for regulating motor vehicles and equipment, and States are responsible for regulating the human driver and most other aspects of motor vehicle operation.

- NHTSA is responsible for setting Federal Motor Vehicle Safety Standards (FMVSSs) for new motor vehicles and motor vehicle equipment (with which manufacturers must certify compliance before they sell their vehicles).

- Currently, there are no FMVSS for automated vehicles. Instead, NHTSA has developed voluntary guidance points regarding safety assessment guidelines for entities involved in the testing and manufacturing of ADS. A vehicle still has to meet current FMVSS (i.e. steering wheel, pedals, etc.), but can also be equipped with self-driving capabilities.

State Responsibilities:
Texas Senate Bill (SB) 2205 became effective September 1, 2017, which governs automated vehicles operating within Texas. The law states that a political subdivision of the state, or a state agency, may not impose a franchise or other regulation related to the operation of an automated motor vehicle or automated driving system. Automated vehicles are allowed to operate, with or without a human operator present in the vehicle, if the vehicle meets the following criteria:

- Capable of operating in compliance with applicable traffic and motor vehicle laws
- Equipped with a recording device installed by the manufacturer of the automated motor vehicle or automated driving system
- Equipped with an automated driving system in compliance with applicable federal law and federal motor vehicle safety standards
- Registered and titled in accordance with state laws
- Covered by motor vehicle liability coverage or self-insurance in an amount equal to the amount of coverage that is required under state laws

Texas Automated Vehicle Proving Grounds:
In December 2016, the first ever Texas Mobility Summit was hosted by the Texas Department of Transportation (TxDOT) in Austin, Texas. The Summit brought together municipal agencies from across Texas, community partners, and transportation industry leaders. It was during the Summit that the Texas Innovation Alliance and the Texas Automated Vehicle Proving Ground Partnership were created.

- The Texas Innovation Alliance (Alliance) includes nine major Texas cities and three major research institutions.
    - Cities - Arlington, Austin, Bryan-College Station, Corpus Christi, Dallas, Fort Worth, El Paso, Houston, and San Antonio
    - Research Institutions - Southwest Research Institution (SwRI), Texas A&M Transportation Institute (TTI), University of Texas Center for Transportation Research.
- The vision of the Alliance is to create a platform for innovation that enables the Partners to leverage resources, co-create solutions, and share results for improving the delivery of government services to Texas communities.

In November 2016, the United States Department of Transportation (USDOT) initiated a notice soliciting proposals for a pilot program to designate automated vehicle proving grounds.

- The solicitation included broad criteria for selections including a demonstration of capable safety planning, willingness and ability to share and disseminate information, and an ability to show that all applicable laws, regulations, and policies are adhered to at all times. The solicitation also requested information on the types of facilities and research capabilities available to applicants to test automated vehicle technologies.

- The partners of the Texas Innovation Alliance formed the Texas Automated Vehicle Proving Ground Partnership to apply for the USDOT designation. In January 2017, the Partnership was selected as one of 10 designees nationally.

- The Texas Automated Vehicle Proving Ground Partnership members are contributing their facilities, expertise, and talents as part of a larger Texas network of proving grounds and test-bed sites. Closed-campus proving grounds at the three research institutions and real-world environment test-bed sites across were designated to explore different challenges related to automated vehicles.

- Team San Antonio designated the urban test-bed site of Fredericksburg Road from downtown to the Medical Center, which includes VIA's Primo Bus Rapid Transit Route. As a test-bed site, the City and other transportation partners will evaluate automated vehicle technology and its ability to reduce pedestrian and vehicle conflicts. In addition, possible technology to optimize VIA bus interval spacing along this high frequency route could improve the consistency and efficiency of rider service.

ISSUE:

TCI will provide a briefing on autonomous vehicles, including the current state of technology and levels of automation, as well on potential Request for Information on testing autonomous vehicles in San Antonio.

The Texas SB 2205 requirement to follow applicable traffic and motor vehicle laws may prove to be a barrier for current automated vehicle technology since there are number conditions that require human judgment such as stopping for a school bus, yielding for an emergency vehicle, or human hand gesture traffic control. There has been no public demonstration of an automated vehicle that can comply with these laws. Some cities are testing the markets for specific driverless vehicle applications. Additionally, some companies from the autonomous vehicle industry have expressed interest in testing in San Antonio. One approach may be to issue a Request for Information from the autonomous vehicle industry to test technology as part of a pilot program. Staff recommends that any testing in San Antonio be targeted towards specific uses cases - in other words, solving for a "transportation gap" that exists today in which autonomous vehicles may play an important role. Potential pilot programs include the following:

- Innovation Zones

- City Employment Shuttle

- City Fleet Integration

- Joint Base San Antonio (JBSA) Shuttle

- USDOT Designated Proving Ground (Fredericksburg Road)

ALTERNATIVES:

City Council could choose not to proceed with a Request for Information (RFI) from the autonomous vehicle industry; however, this may limit the City's ability to understand how technology may solve a "transportation

gap" that exists today.

FISCAL IMPACT:

This briefing is for informational purposes only.

RECOMMENDATION:

This is a presentation for informational purposes; however, staff is recommending the issuance of a Request for Information (RFI) from the autonomous vehicle industry to test technology as part of a pilot program with specific uses cases to solve a "transportation gap" that exists today.