THE FUTURE OF AUTOMOTIVE TRANSPORT AND THE IMPACTS OF TECHNOLOGY ON ROAD INFRASTRUCTURE, DESIGN AND OPERATIONS

J. Horsley
American Association of State Highway and Transportation Officials, USA
jhorsley@aashto.org

ABSTRACT

Two trends in automotive technology will significantly affect highway transportation: First, the change to more fuel-efficient cars in response to higher fuel costs and climate change mandates. Second, the change to smarter cars to improve automotive safety and customer convenience.

Increased Automotive Fuel Efficiency can be achieved. First, through conventionally-fueled cars which are lighter, have less drag, and more efficient drive trains. Second, through hybrid vehicles which use both battery power and gasoline. Third, through plug-in electric hybrid vehicles. And, fourth, through vehicles powered by hydrogen fuel cells, compressed natural gas, and bio fuels.

The percentage of passenger travel in the U.S. carried by car, truck and motorcycle will continue at over 90%. The U.S. population will grow by 120 million. To handle the greater number of cars and trucks on the road, funding will be required for the highway capacity and the traffic management systems needed to move traffic efficiently and reliably.

Smarter Cars. Safety and mobility goals historically out of reach are now becoming reachable with technology becoming available in the vehicle, on the roadway and through smart phones.

Radar and video technologies can reduce collisions through blind spot warnings and distance keeping controls. Connected vehicle technologies can communicate data from one vehicle to another and share it with roadway system managers to avoid intersection crashes. iPhones with real-time traffic information and navigation applications can help drivers find parking spots and make restaurant reservations.

1. INTRODUCTION

There are two future trends in automotive technologies which we believe will significantly affect highway transportation: First, the change to more fuel-efficient cars in response to higher fuel costs and climate change-related mandates to reduce greenhouse gas emissions. Second, the change to smarter cars to improve automotive safety and customer convenience.

1.1 More fuel-efficient vehicles

Over the decades ahead, petroleum prices will increase significantly. To make travel by automobile affordable, consumers will shift to more fuel-efficient vehicles. Simultaneously, to mitigate the effects of climate change from transportation-related greenhouse gas emissions, the U.S. government will require vehicle manufacturers to produce vehicles which achieve higher levels of fleet fuel efficiency, possibly to an average of 50 miles per gallon (mpg) or more in the next twenty years. Manufacturers will achieve this through four types of new technologies.

First, they will produce conventionally-fueled cars and trucks which are lighter, have less aerodynamic drag, have more efficient drive trains, and have tires with less rolling resistance. These vehicles should be able to achieve fuel efficiency rates of 50 mpg by 2050. Second, they will produce hybrid vehicles which use both battery power and gasoline. By 2050, hybrids should be able to achieve fuel efficiency rates of 75 mpg. Third, they will produce plug-in electric hybrid vehicles, which do not consume gasoline or diesel. (Petroleum and/or natural gas may be required, in part however, to produce the electricity needed to recharge their batteries.) Fourth, they will produce (in what is expected to be a much smaller segment of the market) vehicles powered by hydrogen fuel cells, compressed natural gas, and bio fuels.

While transit ridership is hoped to quadruple in the U.S. over the next 40 years to meet community needs and to help meet climate change goals, this will not significantly affect the percentage of passenger travel in the U.S. carried by car, truck and motorcycle.

More fuel-efficient vehicles will enable American consumers to continue to rely on the automobile to meet their mobility needs. The U.S. population is expected to grow from 310 million today to around 420 million or more by 2050. AASHTO believes that the rate of growth in vehicle miles traveled (VMT) in the U.S. can be reduced to 1% annually over the decades ahead. If so, VMT will grow from 3 trillion today to around 4.5 trillion by 2050. The number of motor vehicles on U.S. highways is expected to increase from 240 million today to around 330 million by 2050. While a significant percentage of long-distance freight will shift from trucking to intermodal rail, the percentage of freight carried by truck overall will actually increase by 2050. That means that the number of heavy trucks traveling on U.S. highways is expected to double from 6 million today to 12 million by 2050.

To handle the greater number of cars and trucks on the road, and the population and VMT growth expected, federal, state and local governments will need to work together to fund the increases in highway capacity needed and the improvements in traffic management systems needed to move traffic efficiently and reliably.

1.2 Smarter Vehicles which can improve automotive safety and consumer convenience

In transportation, safety and mobility goals that historically were out of reach are now becoming reachable with technology becoming available in the vehicle, on the roadway and in mobile devices such as smart phones and aftermarket navigation equipment. For example, imagine eliminating 80% of all accidents or making it possible for drivers to access real time information on traffic conditions.

With systems already on the market, the National Highway Traffic Safety Administration estimates that autonomous vehicle technologies could nearly eliminate crashes due to rear-end collisions, lane departures, lane change or merge crashes, curve speed or excessive speeding crashes, and stop sign violations. Nissan, as an example, has an “all around collision free” system which includes blind spot warnings, back up vision, lane departure, and distance control, which use radar and video systems.

In the United States, Europe and Japan large scale developmental efforts are underway with industry partners to create a connected vehicle infrastructure for safety and mobility. These connected vehicle programs are advancing the state of knowledge through field trials, evaluations and pilot deployments. The concept is to take data generated by sensors mounted on one vehicle and share it with other vehicles, or share it with roadway system managers. Avoiding intersection crashes is a priority objective of the initiative. Among the concepts being tested are: A “signalized left turn assist” to help drivers judge when it is safe to make a turn; and “traffic signal violation warnings,” to avoid crashes by warning both the driver who is about to violate a signal, and warn the driver on the conflicting approach” The communication can take place using either dedicated short-range communication radios or cell-phone technologies. These systems are also being tested to see if they can be used for in-vehicle signing, to pay tolls, and pre-clear commercial vehicles with proven safety records so they can avoid waiting in line at inspection stations.

Auto manufacturers, cell phone companies, and other entrepreneurs are offering applications and devices which provide enhanced service to drivers. General Motors’ OnStar concierge and assistance service is being offered as an aftermarket device, AT&T has a travel information and navigation application available on the iPhone for a monthly fee, and Inrix offers a basic travel information iPhone application for free and service for a fee. Ford has developed “Synch,” a Blue Tooth communications connection in some of its vehicles to support a connection to smart phones. Not only does “Synch” provide infotainment, it can also provide travel information and navigation. Examples of services drivers will be offered from navigation systems in the near future will be identification of available nearby parking facilities, and the ability to conduct a search make restaurant reservations in the neighborhood a car is approaching.

2. AASHTO’S ANALYSIS OF TWO KEY ADVANCES IN AUTOMOTIVE TECHNOLOGY

2.1 More Fuel-Efficient Automobiles

Fuel prices in the U.S. in 2011 hit record levels. A year ago gas prices averaged $2.80 per gallon. By May, 2011 the national average exceeded $4.00 per gallon. This has created a financial hardship for 40% of vehicle owners across America. The immediate cause of this spike in fuel prices is turmoil in the Middle East, where popular uprisings in countries such as Egypt, Tunisia, Libya, Syria, Yemen, and Bahrain have created uncertainty. Over the longer term, fuel prices are forecast to increase still further because the demand for motor fuels appears to be increasing faster than the supply of petroleum.

According to the Pew Center on Global Climate Change, 2011 Report on **Greenhouse Gas Emissions from U.S. Transportation, "**Transportation demand and its resulting oil use … seem destined to continue the explosive growth of the past few decades... In China, India, and other developing nations, burgeoning wealth, a rising middle class, rapid urbanization, and massive additions to road infrastructure are creating enormous demands for personal vehicles." World-wide, according to the book by Dan Sperling of the University of California at Davis, the number of cars on the road is expected to double over the next thirty years from one billion to two billion. Driven mostly by transportation sector demand, the U.N. International Energy Agency forecasts that oil consumption will increase from 80 million barrels a day in 2003, to 140 million barrels per day by 2030. Related in large part to that increase in transportation sector demand, the Pew Center report notes that many energy analysts expect oil prices to increase more than 40% by 2030. In light of the recent experience in the U.S. market where gas prices increased 42% in just one year from 2010 to 2011, AASHTO would not be surprised to see oil prices increase 40% or more, by 2020.

The two ways consumers will be able to adjust to higher fuel prices will be to buy more fuel-efficient vehicles, or instead of buying vehicles powered by gasoline or diesel, buy alternatively fueled vehicles powered by electricity, hydrogen fuel cells, and compressed natural gas.

The move toward higher vehicle fuel efficiency is also being driven by federal government mandates which will require fuel efficiency for the light duty automotive fleet (composed of cars, light trucks and sports utility vehicles) in the U.S. to increase from 25 mpg today to 35 mpg by 2016. (In September, 2011, U.S. DOT and EPA intend to announce the CAFE standards to be met by the year 2025.) To meet the requirement to increase average fleet fuel efficiency to 35 mpg by 2016, auto manufacturers are increasing the percentage of compact vehicles in their fleets which can achieve fuel efficiency levels of 36 mpg. They are also producing more hybrid vehicles such as the Toyota Prius which use both battery power and gasoline, and today can get between 35 and 50 mpg.

The Pew Center 2011 Report states that by 2035, through greater utilization of existing technology, the fuel efficiency of the U.S. light duty fleet can achieve 50 mpg for conventional gasoline vehicles and 75 mpg for hybrid vehicles. A technology introduced in 2010, through the Nissan "Leaf" and the Chevy "Volt," is the plug-in hybrid electric vehicle (PHEV). The Pew Report expects one to three million of such vehicles to be on the road by 2035, increasing to 10 to 20 million by 2050. These vehicles burn zero gasoline. Another technology with potential is the hydrogen fuel cell powered vehicle. While these vehicles remain a strong prospect, for the moment market enthusiasm has waned.

Will a massive shift to transit result from Climate Change Policy? And will this dramatically reduce the number of vehicles on the road? The answer to both of these questions is "no".

In policy discussions regarding how transportation greenhouse gas emissions (GHG) must be reduced to mitigate the effects of Global Climate Change, some believe that transit will be a major part of the solution, and that reducing highway vehicle miles traveled by automobiles will be an imperative.

Public transportation, including buses, light rail, subways, commuter rail and van service, plays a vital role in moving commuters to work and providing mobility for those dependent on transit. It also helps reduce congestion, conserve fuel, improve the efficiency of highway transportation, and reduce air pollution. The rapid growth in the ranks of citizens over the age of 65, expected in the years ahead, will increase the need for transit to get them to medical and other services. AASHTO has established policy objectives to double transit ridership by 2030, and double it again by 2050, to meet the needs of citizens in both urban and rural areas. Current reductions in transit funding at the state and local levels and threatened reductions in federal transit assistance may slow down the realization of those goals. Over the last decade transit ridership increased from nine to ten billions of riders annually. For the moment ridership is down approximately 5% from its peak of 10.6 billion in 2008.

The 2011 Pew Center Report does not expect transit to play a significant role in reducing greenhouse gas emissions. It states that, "Currently, public transit supplies only about 1 percent of total passenger-miles in the United States and, on average, is only modestly more energy- efficient than personal vehicles… Doubling transit's travel share would yield less than a 1 percent reduction in GHG emissions." Another set of strategies the Pew Center analyzed was what reductions in the growth of Vehicle Miles Traveled (VMT) or shifts from driving to transit could be achieved if counties and cities could be persuaded to change land use plans and move toward more compact development patterns. They reviewed studies done recently by the Urban Land Institute and by the National Research Council on this subject. What Pew determined based on a review of these studies was that the primary GHG benefit of more compact development "comes from VMT rather than actual mode shifts." They produced a table which showed low, mid and high scenarios for achieving GHG reduction. For compact land use they showed the following reductions in the rate of growth in VMT by 2050: low – 1.5%; mid – 3%; and high – 5%.

In the period from 1980 to 2007, VMT in the U.S. was growing at rates of around 2% annually. In 2007, AASHTO set a policy objective to help reduce the rate of growth in VMT to 1% annually, to help achieve climate change goals of reducing transportation-related GHG emissions 80% by 2050. Because of the spike in oil prices in early 2008 and the collapse of the economy later that year, VMT peaked at 3.04 trillion in February 2008, dropped to a low of 2.92 trillion in June, 2009 and stands at around 3.0 trillion in early 2011. Once the economy emerges from the recession, AASHTO expects VMT to resume an annual growth rate of 1% to 1.4%. Our analysis of the truck freight to be moved on U.S. highways is again, that once the economy emerges from the recession, truck freight will resume growth rates of approximately 1.7% per year.

Those seeking perspective in this area of policy would also benefit from recent U.S. Bureau of Transportation Statistics (BTS) data which shows how overwhelmingly dependent Americans are on highway travel to meet their needs. According to BTS, in 2008 Surface Passenger Miles Traveled totaled 4.93 trillion. Of that number, 6 billion miles were traveled on Amtrak, 54 billion traveled on transit, 150 billion by over the road bus service, and 4.72 trillion by car, truck and motorcycle. AASHTO analyzed a scenario in which by 2050, transit ridership quadrupled, Intercity Passenger Rail ridership increased by 12 times, and travel by cars, trucks, motorcycles and over the road bus increased by 1% per year. The scenario showed that transit's market share would increase to 2%, intercity passenger rail to 1 %, over the road bus would remain at 3%, and passenger trips carried by car, truck and motorcycle would drop from 95% to 93%.

2.2 Shifting freight from trucks to rail to reduce GHG

Another option analyzed in the Pew Center Report was the potential to shift a percentage of freight from trucks to rail to reduce GHG emissions. They concluded that obtaining large reductions in GHG emissions by shifting truck and air freight traffic to rail would be difficult. Obstacles included the growing demand for just-in-time delivery, which favors faster modes, the high cost of transferring cargo between modes, the scheduling flexibility of trucking and its ability to handle small shipments and short shipment distances. The one area where intermodal rail is expected to gain market share is in long-haul shipments of over 1,000 miles. In its analysis of scenarios for achieving reduction GHG emissions by shifting freight from truck to rail, Pew showed the following potential reductions in truck VMT by 2050: low – 0%, mid – 2.3%, high – 5%.

Apart from Climate Change considerations, AASHTO has done broader analysis of what to expect in the future as to the number of trucks on our highways. First, by 2050, the U.S. population is expected to grow by between 100 million and 120 million. By 2050, overall freight demand will double from 15 billion tons today to 30 billion tons. Freight carried by trucks will increase 41%, and freight moved by rail will increase 38%. In terms of market share, today trucks carry 93% of freight by value. By 2040, that percentage is expected to increase to 94% because of the shift over time in the freight to moved in this country to greater volumes of high-value, lower weight commodities. As a consequence of the above, the number of trucks on the road compared to today will double, even after considering the expected shift of long-haul shipments to intermodal rail.

2.3 Conclusion

More fuel-efficient vehicles will enable American consumers to continue to rely on the automobile to meet their mobility needs. The Pew Center for Climate Change just published a report on how to achieve national climate change-related goals for the reduction of transportation-related greenhouse gas emissions. It concluded that advances in automotive vehicle technologies and increased fuel efficiency could achieve emissions reductions of approximately 50%. Another 15% in reductions could be achieved through a combination of other strategies including pricing, ridesharing, efficient driving behavior, transit, land use, improving highway system efficiency, and freight logistics. Transit was not expected to achieve a significant amount of the overall reduction. Nor were reductions in vehicle miles traveled by cars and trucks.

The U.S. population is expected to grow by approximately 120 million by 2050. AASHTO believes that VMT will grow from 3 trillion today to around 4.5 trillion by 2050. The number of motor vehicles on U.S. highways is expected to increase from 240 million today to around 330 million by 2050. To handle future freight demands the number of heavy trucks traveling on U.S. highways is expected to double from 6 million today to 12 million by 2050.

To handle the greater number of cars and trucks on the road, and the population and VMT growth expected, federal, state and local governments will need to work together to fund the increases in highway capacity needed and the improvements in traffic management systems needed to move traffic efficiently and reliably.

3. SMARTER CARS WHICH INCREASE SAFETY AND CUSTOMER CONVENIENCE

Transportation as most activities in today's society is being impacted by technology and the opportunities and challenges it presents. In transportation safety and mobility goals that historically were out of reach are now becoming reachable with technology becoming available in the vehicle, on the roadway and in mobile devices such as smart phones and aftermarket navigation equipment. For example, imagine eliminating 70% to 80% of all accidents, or accessing real time information on road and traffic conditions. Every year we come closer to achieving these goals through technology.

Governments, industry and academics are all focusing attention on the ways we can fully utilize technology. In the United States, Europe and Japan large scale developmental efforts are underway with industry partners to create a connected vehicle infrastructure for safety and mobility. These connected vehicle or cooperative vehicle programs as they are called are advancing the state of knowledge through field trials, evaluations and pilot deployments. At the same time governments are doing developmental work the vehicle manufacturers are proceeding with an autonomous approach where the vehicle has all around awareness producing a collision free zone around the vehicle using radar systems and video systems.

In the United States Local transport agencies are beginning to introduce active traffic management systems that have been operating in some parts of Europe for over 20 years. In addition some State Transportation Departments are testing in-vehicle signing, user payment systems with smart personal devices and commercial vehicle regulation using high speed cellular and Dedicated Short Range Communications (DSRC). A group of states have created a Pooled Fund activity to research the potential of using vehicle probes for traffic signal control and for the purpose of estimating pavement conditions.

Certainly all of these actions are leading us into a Future of Automotive Transport that will have long range benefits and produce changes in the way transportation agencies conduct their business.

3.1 The Vehicle to Vehicle Systems

Based on Insurance Company and DLR a German aerospace firm analyses Mercedes Benz states that 2/3 of all commercial vehicle accidents could be eliminated using just two technologies: 1) video cameras for lane keeping and 2) radar for intelligent distance control.

The national Highway Traffic safety Administration estimates that autonomous vehicle (AV) technology could reduce or eliminate crashes due to rear-end collisions, lane departures, lane change or merge crashes, curve speed or excessive speeding crashes, and stop sign violations. It is also assumed that AV systems could potentially address pedestrian, cyclist, and animal crashes as well as loss of control, road departure, and maneuver crashes in which speeding is a contributing factor.[1]

Most if not all vehicle manufactures are working on Autonomous Vehicle technology. Nissan has a total system that they label as “all around collision free”, which includes blind spot warnings, back up vision, lane departure and distance control.

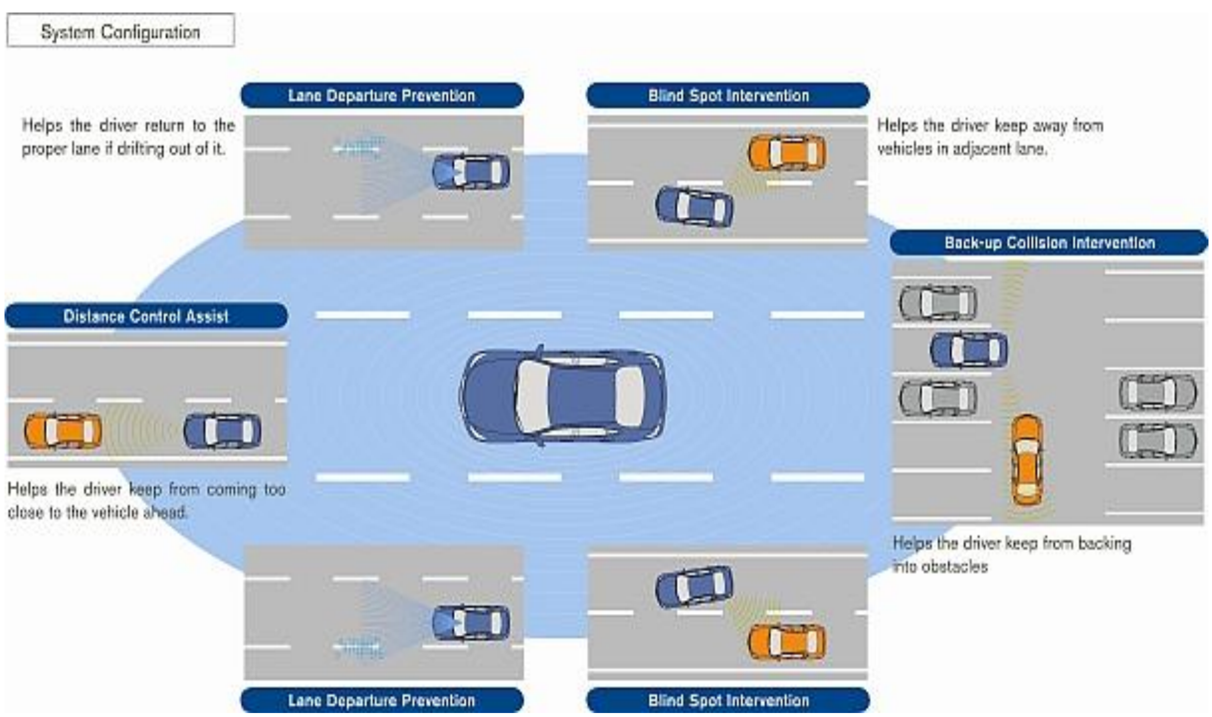

Figure 1 - Nissan’s All around Collision Free System[2]

3.2 Cooperative Vehicle Infrastructure Systems

The United States has had a connected vehicle infrastructure program underway since 2004. The program has had an evolution in titles and concepts. For example, the program names have included the Vehicle Infrastructure Integration (VII) program, the IntelliDrive^{sm} program and now the Connected Vehicle program. The original concept was to deploy roadside communication beacons using DSRC and a companion radio inside the vehicle. The current program continues the DSRC concept for safety applications and relies more on cellular communications for the mobility applications.

The USDOT has been leading the efforts with collaboration and support coming from the automobile industry and the states through AASHTO.

The USDOT 's focus is to demonstrate the system feasibility and the safety benefits to enable the National Highway Traffic Safety Administration (NHTSA) to make some type of decision supporting implementation in 2013. A big piece of the USDOT program is the national safety pilot demonstration in 2011. The safety Pilot will have a large number of vehicles broadcasting “here I am” messages to other vehicle and to infrastructure. Following the Safety pilot USDOT is planning several regional pilot deployments in 2014.

AASHTO has taken a strong leadership role with completion of an IntelliDrive^{sm} Strategic Plan in 2009. The plan defined a set of themes and actions to advance the program towards deployment readiness. One of the first actions was to develop an AASHTO Infrastructure Deployment Analysis, which among other things identified applications that would provide agency benefits in safety and mobility.

Both the USDOT and AASHTO have chosen Intersection safety as a key emphasis area and one that offers a good likelihood of achieving benefits. The intersection safety work is called the Cooperative Intersection Collision Avoidance System (CICAS) and is defined below.

The CICAS applications developed in parallel with the VII program covered three specific cases.

CICAS–Signalized Left Turn Assist (CICAS-SLTA) application area is intended to assist vehicles waiting to turn left at signalized intersections with permitted left turns. The application area assists the driver with gap acceptance. The relevant crash type is a multi-vehicle crash involving a left turning vehicle and a through vehicle.

CICAS–Traffic Signal Violation (CICAS-TSV) application area is intended to address crashes that result from signal violations. This application area provides a warning to both the driver who is in danger of violating the signal and the driver on the conflicting approach.

CICAS–Traffic Signal Adaptation (CICAS-TSA) application area is similar to the CICAS-TSV system in that it is intended to address crashes that result from signal violations. However, this application is intended to address crashes that occur at the onset of the red interval at signalized intersections from signal violations. Upon sensing that a vehicle is about to violate the signal at the onset of the red interval, the application would adapt the traffic signal timings so the conflicting approach would be held at a red signal instead of being released with a green signal.

CICAS–Stop Sign Assist (CICAS-SSA) application is intended to address crashes that result from poor gap acceptance at two-way stop-controlled intersections. This includes stop-controlled vehicles that are going straight or turning at the intersection.

CICAS–Stop Sign Violation (CICAS-SSV) application is intended to address crashes that result from stop sign violations at stop-controlled intersections. This includes two-way, four-way, and other stop-controlled intersections.

A recent Federal Highway Administration analysis documents the potential impacts of current intersection safety applications (including extensions thereto to address conflicts with pedestrians and cyclists). The potential impacts assume 100 percent effectiveness of the application and 100 percent deployment. The results are presented below.

Table 1 – Potential Impacts of Current Intersection Safety Applications

Application	**Estimated Annual Crashes (Weighted)**	**Annual Cost ($)**
CICAS-SLTA	200,212	$9,759,131,692
CICAS-SLTA Extensions	5,013	$579,571,248
CICAS-TSA	229,333	$12,261,025,825
CICAS-TSV	234,013	$12,511,250,841
CICAS-SSA	250,997	$15,880,166,220
CICAS-SSV	74,693	$3,807,849,579
CICAS-SSV Extensions	3,843	$444,938,193

Additional safety applications include advanced warnings of stopped vehicles ahead, slippery roads ahead, and accident ahead. These applications have been demonstrated at ITS World Congress events and are being worked on within the automobile industry

The intention of the crash avoidance systems is to assist drivers in preventing imminent crashes. Such impending crashes usually arise within a relatively short period of time (e.g. under 10 seconds) from the drivers' encounter with hazardous driving conditions. These crash avoidance systems increase the situational awareness or warn the driver of crash-imminent situations, and may apply partial automatic vehicle control in support of the driver. Examples of such systems include rear-end crash warning, lane departure warning, red light violation warning, and head-on crash warning systems.

3.3 Mobility Applications being offered by Industry

With the introduction of the smart phones came numerous consumer applications offered from Google, Navteq, AT&T, Inrix and others. The applications available include directions, travel information, and reservation systems.

These offerings continue to expand. General Motors OnStar concierge and assistance service is being offered on an aftermarket device to be made available through OnStar, AT&T has a travel information and navigation application available on the iPhone for a monthly fee, Inrix also offers a basic travel information iPhone application for free and one for a fee. Ford has developed “Synch” a Blue Tooth communications connection in some of their vehicles to support a connection to smart phones enabling smart phones to be integrated into the vehicle experience. Not only does “Synch” provide infotainment, it can also provide travel information, navigation and health monitoring.

This market seems to provide a much more rapid way to bring mobility applications to the market than through the automobile due to the quick turn over of personal devices relative to vehicle turn over.

A group of State Departments of Transportation have pooled some of their research funds to enable them to develop applications that agencies can use to take advantages of the probe information being made available through consumer devices and ultimately the vehicle. The applications being developed include using probe information for traffic signal control, for pavement conditions and of course probe for travel information.

AASHTO believes the industry driven approach will be a leader in getting technology and applications to market quickly.

3.4 Communication Systems

There are two leading communications opportunities enabling connected transportation systems. The first communication opportunity is the Dedicated Short Range Communications System (DSRC) provided for transportation safety by the Federal Communications Commission. The DSRC spectrum at 5.9GhZ has special characteristics such as speed and latency that make it the most desired if not the only one for safety systems.

With DSRC radios in vehicles and aftermarket devices a network of road side beacons could provide a vehicle to infrastructure (V2I) safety system at localized locations, such as intersections. Road side beacons could also provide in-vehicle signing information, localized traffic information such as delays and incidents and user payments.

The other communications opportunity is cellular, which has characteristics of being readily available and increasing transmission speeds as we move into 4G and Long Term Evolution (LTE). Cellular seems best positioned to offer all of the communication characteristics needed for mobility applications.

Our enabling communications future now appears to be a combination of DSRC and cellular. The major unknown at this time is who will be providing and operating the DSRC infrastructure. To help answer this question AASHTO has initiated a NCHRP 20-07 study that will describe the issues and make recommendations on what opportunities, roles and obligations states have in deploying and operating a DSRC network.

3.5 Impacts on Design, Operations and Business Practices within Transportation Agencies

There are still many unknowns in the connected transportation systems in our future. These unknowns include what contribution the autonomous vehicles will provide in safety, what contributions V2V systems will provide in safety, what contributions V2I systems will provide in safety and mobility and what mobility contributions will be provided by the market place through industry.

In any event the future does seem to be clear that there will be connected transportation systems that will have an impact on how agencies conduct business. The impacts could be direct such as State Transportation Departments deploying and operating a DSRC network or modifying road ways to enhance the effectiveness of autonomous vehicle technology such as lane departure systems. Or the agencies could be more indirectly impacted by using information purchased from the private sector for traffic control and performance management.

AASHTO is conducting studies in deployment analysis, definition of a national footprint of DSRC devices, benefit assessment of connected systems and if necessary formal Design Guides for connected transportation infrastructure.

REFERENCES

1. Frequency of Target Crashes for IntelliDrive[sm] Systems, US Department of Transportation National Highway Traffic Safety Administration, October 2010
2. http://www.nissan-global.com/EN/TECHNOLOGY/OVERVIEW/ssc.html