Transportation and Telecommunications Committee December 17, 2018

SALLY SCHULTZ: [00:00:03] I've got the lights turned on and I'm starting the tape.

FRIESEN: [00:00:07] Good afternoon, everybody, and welcome to the Transportation and Telecommunications Committee Interim Hearing today. We're kind of experimenting in a new room, so they're gonna take a little feedback from everybody. But I think it's quite a change with the lighting system, it's almost a different room, so I feel like a little kid at the table here, but we're going to have to elevate that chair some more. So welcome to the Warner Chamber and the hearing on LR424. It's an interim study resolution examining issues with autonomous vehicles. I'm Curt Friesen, District 34, Chairman of Transportation and Telecommunications Committee. And I would ask you to please turn off your cell phones or mute them. We will not be using a light system today, but I would like to ask you to keep it around five minutes, and it's not-- I don't think we're gonna have a whole lot of testimony, maybe, but let's hold it to five minutes and then we, we won't need the light system. We have no particular order for testifiers, but you can just come up as you want. First, I'll, I'll introduce the committee staff. We've got, Sally Schultz, is the committee clerk, and Tip O'Neill, here's to my right, is the committee legal counsel, and then I'll let the committee members introduce themselves starting with Senator Hughes.

HUGHES: [00:01:29] Dan Hughes, District 44, 10 counties in southwest Nebraska.

GEIST: [00:01:33] Suzanne Geist, District 25, which is the east side of Lancaster County.

BOSTELMAN: [00:01:38] Bruce Bostelman, District 23, Saunders, Butler, and majority of Colfax Counties.

FRIESEN: [00:01:43] There may be other senators joining us as we go on, but I'm not sure who is all gonna attend. I do ask that when you come up to testify, that you say and spell your name for the record. And with that, we will open up the hearing on autonomous vehicles. Welcome.

MIKI ESPOSITO: [00:02:16] Thank you. Good afternoon, Senator Friesen and members of the Transportation and Telecommunications Committee. My name is, Miki Esposito, M-i-k-i E-s-p-o-s-i-t-o. I'm director of Transportation and Utilities for the city of Lincoln, and I love that we're here in this Chamber as an experiment because we kind of like experiments don't we in Lincoln. Thank you for the opportunity to testify today. As you know, Lincoln is taking special interest in AV technology in the form of transit shuttles. Last session, we testified in support of LB989 to authorize the testing of this technology on public roadways by a city of the primary class, and we want to thank this committee for its unanimous support of that original bill as well as Senator Anna Wishart's willingness to introduce and prioritize it. We appreciate the support of the Legislature as well as Governor Ricketts in its ultimate passing. One of the city's primary responsibilities is to provide safe and reliable transportation services to citizens who need access to jobs, health care, education, and other important destinations. The landscape of transportation infrastructure and technology is changing rapidly and autonomous and connected vehicle technology will radically change the travel patterns, vehicle behavior, and the infrastructure needed for safe and efficient movement of people and goods across the world. Public agencies must develop a plan and a framework that will both support and manage this new technology. As a hub for entrepreneurship and tech startups, we believe Lincoln is uniquely positioned for the next generation of transportation technology and the arrival of this emerging industry. However exciting new technology and innovation is, AV/CV advancements have a bigger purpose in mind. One of the greatest challenges facing the country today is traffic safety, which remains our top priority in the deployment of this technology. In a time where vehicular and fatal crashes are on the rise, AV technology shows great potential in preventing injury, saving lives, and reducing the cost of traffic

crashes. An estimated 94 percent of traffic accidents are caused by human error. In the United States, almost 40,000 deaths per year are caused by fatal traffic crashes. That is approximately 100 deaths per day. On average, nearly 1.3 million people die in road crashes per year on a global scale and by 2030, road crashes are predicted to be the 5th leading cause of death. AV and connected vehicle technology shows great promise in reducing the number of fatalities and injury traffic crashes. Automation and connectivity will also reduce fuel reliance and consumption, traffic congestion, and greenhouse gas emissions through their efficient operation as well as their potential for vehicle sharing. In 2016, Americans consumed 143 billion gallons of gasoline even though the average owned vehicle sits idle 95 percent of the time depreciating in value. For people who cannot drive, transportation tech can increase their mobility options providing access to good jobs, quality health care, and education as well as make local public transit systems even more flexible for patrons. Therefore, Lincoln took a logical first step to proactively research this groundbreaking and leading edge technology this past summer to develop a public prototype allowing the technology to inform our judgments for the future. We successfully tested an autonomous shuttle at Nebraska Innovation Campus where more than 75 volunteers collected input from 90 stakeholder groups and 3,300 people. The outreach process involves surveys, autonomous shuttle rides, a ride-hailing app, and kiosk demonstration, focus groups, and one-on-one interviews. Partners included HDR, Allo, Nelnet, the University of Nebraska, Nebraska Innovation Campus, the Downtown Lincoln Association, and the Mill. Coffee was important during this time. We also worked closely with and had the support of ATU, our public transit union. We learned that the technology is viable in Lincoln and citizens were excited about and ready for AV. We also learned that we have the transportation and telecommunications infrastructure to support these vehicles. With respect to specialized pavement markings, we don't need them. The shuttle utilizes near-survey grade GPS points to navigate its program-- programmed routes while traffic signals lets the shuttle know when the signal will change to green. Cameras and LIDAR detect obstructions, such as pedestrians and animals as well as stationary objects. Traveling at speeds of 15 to 20 mile per hour, the shuttle does

a great job of stopping and honking when there is an obstruction. Survey data demonstrated that convenience was a bigger concern in the minds of our residents rather than safety. Elderly patrons found the shuttle to be an attractive and useful mobility option. Demand- responsive and ride-hailing applications were preferred over stationary kiosks for summoning the vehicle. And finally, the downtown and Haymarket area was an ideal location for these shuttles. This prototype was a great start in our exploration of transportation innovation and technology and it provided us with an opportunity to carefully investigate, identify, and understand the impacts, issues, barriers, benefits, and challenges associated with it. We sought knowledge about general performance, operations and maintenance, shuttle characteristics, citizen acceptance, ridership data, appropriate fares, transit routes based upon geographic and operational limitations, needed changes to integrate with existing infrastructure such as traffic signals and fiber communication systems, procurement and business models, security, liability and compliance with licensing, titling, rules of the road, and insurance. This effort successfully built bipartisan support to pass new legislation to allow AV technology testing and helped build a stronger case for the further funding of grant applications. As a result, the city of Lincoln welcomes continued exploration testing and operation of this technology. And with the help of additional grant funding, Lincoln hopes to launch service in its downtown area. We continue to look for opportunities to fully fund up to ten micro shuttles in downtown Lincoln. We are accustomed to finding ways to fund important transportation projects and will pursue opportunities and partnerships that support innovative technologies like AV. In the meantime, Lincoln is advancing safe, affordable, and comfortable public transit like the downtown trolleys, electric buses, and buses fueled with compressed natural gas. However, we strongly believe that autonomous and contec-- connected vehicle technology is the pathway toward a safer and more reliable transportation system. I am happy to answer any questions you'd like to ask about the pilot, and Lonnie Burklund, Assistant Director of Transportation, is also here to provide you with any engineering questions that you may have.

FRIESEN: [00:10:13] Thank you, Ms. Esposito. Are there any questions from the committee? Just a couple, I guess. So I was, I was hoping that with the testing, are there-- did you run across anything that you foresee down the road where there has to be changes made or do you feel comfortable that everything is in place? I noticed you didn't operate on a street or a roadway.

MIKI ESPOSITO: [00:10:38] Right.

FRIESEN: [00:10:38] So is, is everything going to be in place or what, what is the-- some of the--

MIKI ESPOSITO: [00:10:44] Impediments.

FRIESEN: [00:10:45] -- obstructions yet that are, are in the way of actually getting that route run? Because I, I thought, too, it was a, it was a nice route that you had planned out and I was looking forward to seeing it running this fall during the football games, but.

MIKI ESPOSITO: [00:10:56] Right. Well, let me talk about some, some impediments that we see. First, and foremost, is, is funding, we really need to lockdown some federal or state dollars for helping us with the seed money at the city level that we have for a 10-shuttle deployment on a public roadway. I think the second impediment we have, is that we have to be very proactive about seeking a waiver from NHTSA for operation on a public roadway. With respect to the prototype, we were authorized to operate in a public parking lot so we'll need additional time with them to get a waiver for a public roadway operation.

FRIESEN: [00:11:37] Is that from the federal highway transportation?

MIKI ESPOSITO: [00:11:37] That's from the-- yes, the federal level. And then the third, as we

were actually in operations, things like-- you know, these are electrically charged vehicles and we were operating it on a very-- during very hard-- or hot weather and so air conditioning units were kind of falling short on us. We learned that we really, as far as procurement of shuttles, we really need to get things that can accommodate both cold and hot weather. We learned that the sensor-- sensors and the cameras can only pick up animals, you know, sort of 12 inches or greater. So squirrels, I mean we're really-- it's going to be hard for squirrels [LAUGHTER], I suppose. So we learned a few things that when we go out to seek these, these next generation of shuttles, that we have to be very specific about those specifications and make sure they accommodate Lincoln because we have a ton of squirrels in Lincoln. But that's, that's neither--

FRIESEN: [00:12:42] So it is a matter of tailoring those units to the--

MIKI ESPOSITO: [00:12:45] Yes.

FRIESEN: [00:12:46] -- to the city.

MIKI ESPOSITO: [00:12:46] To the existing system. Exactly. So it's, it's a, it's a learning process but, you know, that shuttle was kind of first generation and we think as, as more testing occurs the more we learn and, and can keep up, keep-- kind of improve the technology.

FRIESEN: [00:13:05] So when it came to operation, the city was assuming the liability, I take it of the operation?

MIKI ESPOSITO: [00:13:09] Yes, we were. Yes, we were. We had- we're self-insured and we had a, a $5 million risk package associated with covering those liabilities.

FRIESEN: [00:13:22] OK. Any-- Senator Geist.

GEIST: [00:13:23] Yes, thank you, Miki.

MIKI ESPOSITO: [00:13:24] Sure.

GEIST: [00:13:26] Funding-- you talked about that. What are you looking at for [INAUDIBLE]?

MIKI ESPOSITO: [00:13:30] We have, we have about $2 million set aside as far as city funding and that includes both actual capital money and also staff time. But we really need a match of about $5-$6 million.

GEIST: [00:13:45] Total or additional?

MIKI ESPOSITO: [00:13:47] Additional--

GEIST: [00:13:48] OK.

MIKI ESPOSITO: [00:13:48] --to, to deploy that program over a period of about three years.

GEIST: [00:13:52] OK.

MIKI ESPOSITO: [00:13:53] Yes, thank you very much for the question.

FRIESEN: [00:13:55] Thank you, Senator Geist. Senator Bostelman.

BOSTELMAN: [00:13:56] Thank you for being here. Since you brought up squirrels [LAUGHTER], I'll ask a question. What about pedestrians? What about bicyclists? I've heard-- I've read that some of these systems and, I guess, falling into that would be-- obviously is during good weather, what happens in the wintertime when snow and ice buildup on these sensors and that could use-- did you test any of that type of thing with those or not? And what did you find?

MIKI ESPOSITO: [00:14:22] Great questions. We did not test for inclement weather. As I stated, pavement markings are not necessary for this kind of technology to operate. So we believe because of GPS technology, we can operate during inclement weather because it's reading other systems. As far as pedestrians and bicyclists, the system was tested for obstructions. In fact, a pedestrian was sort of acting out walking with-- on a cell phone, and walking in front of the shuttle. The good news is these shuttles only operate at 15 to 20 miles per hour already. They're very slow moving. In a downtown area that would be ideal, but it gave the shuttle enough time to stop and observe the actual obstruction which was a person on their cell phone in this case and then honk, honk at the person to move out of the way to get their attention. That's what was tested, but we would be very mindful about the specifications for the next type of shuttle that we would choose that they have those kinds of safe equipment and capability. The other thing with the Lincoln deployment that's unique is that we do plan to have ambassadors on the shuttle as both helping patrons get in and on and off of the vehicle to ask-- answer questions about the vehicle. And then, thirdly, to take over operational control as a fallback measure if needed. So we, we-- safety again is our number one priority and we don't want any kind of testing environment to result in something, you know, an injury or some fatalities. So we're taking every precaution we can.

BOSTELMAN: [00:16:19] Did you do anything with either bicycle or motorcycle?

MIKI ESPOSITO: [00:16:23] We did not, no, and it was a, it was a route that was kind of coned

off, but certainly we, we could try that in our next prototype.

BOSTELMAN: [00:16:34] Thank you.

MIKI ESPOSITO: [00:16:34] Thank you.

FRIESEN: [00:16:35] Thank you, Senator Bostelman. Any other questions? Seeing none,--

MIKI ESPOSITO: [00:16:38] All right.

FRIESEN: [00:16:39] -- thank you for your testimony.

MIKI ESPOSITO: [00:16:39] Thank you for your time today.

FRIESEN: [00:16:47] Others wishing to testify? There's some seats up front if you guys want to kind of work the front.

RHONDA LAHM: [00:17:04] Good afternoon.

_____: [00:17:06] Do you just need copies or is that just for her?

FRIESEN: [00:17:09] Director Lahm. Yes, we have a page. Grady is our page today.

RHONDA LAHM: [00:17:13] OK.

FRIESEN: [00:17:23] Welcome.

RHONDA LAHM: [00:17:24] Thank you. Good afternoon, Chairman Friesen and members of the Transportation and Telecommunications Committee. I am Rhonda Lahm, R-h-o-n-d-a L-a-h-m, director of the Department of Motor Vehicles. I'm appearing before you today to offer information in relation to LR424. I'd like to thank you for the opportunity to address the committee today. LR424 seeks to examine an extensive list of issues in the rapidly evolving autonomous driving system market. Jurisdictions throughout the country are grappling with how to oversee and manage the diverse technologies and environments in which ADS equipped vehicles are being tested. Within this context, the DMV, the Nebraska Department of Transportation, the Department of Insurance, and the Nebraska State Patrol have been meeting regularly to examine how Nebraska's environment for ADS equipped vehicles compares to other jurisdictions. The challenge is to develop a balanced approach to the ADS industry and to ensure Nebraska is not a regulatory island either in terms of over-regulating or under-regulating. With this in mind, I thought it may be useful to set the context of the state of enacted ADS legislation in other jurisdictions. Beginning on the federal level, the U.S. Department of Transportation recently published, Autonomous Vehicles 3.0, a guidance document on ADS equipped vehicles. The federal guidance provides a high level overview, but does not impose requirements for what legislation a jurisdiction should adopt. Rather, a number of automation principles are adopted in order to shape the narrative around ADS equipped vehicles, namely the following: prioritization of safety; a technology neutral approach; the need to modernize regulations; a consistent regulatory environment; a proactive approach to automation; and the need to protect the individual choice of consumers to operate a variety of vehicles on the road. The publication contains a number of recommendations which if adopted by states would create a consistent regulatory framework for the ADS industry. The recommendations are widespread and include, among others, adopting standard terminology, assessing state roadway readiness, developing procedures for the testing of vehicles, and a number of law enforcement considerations. Before delving into the details of approaches in other jurisdictions, I'd like to point

out some feedback from a recent USDOT policy summit on ADS equipped vehicles. While the topics considered were extremely broad, a key takeaway was the need to consider the limitations of automation and how these may change over time. Much like the automobile did not replace the horse as a primary means of transportation overnight, ADS equipped vehicles will not replace conventional vehicles overnight either. With any new technology, the route-- reality is there are a number of unknowns and hypotheticals which cannot be addressed until some semblance of standardization develops in the marketplace. Because of this, we believe there is a need to retain balance in the approach to overseeing ADS equipped vehicles. Nebraska needs to remain a welcoming place for the ADS industry while being cognizant of our responsibility to keep our residents safe. Turning to the approach taken in other jurisdictions, legislation and executive orders tend to focus on a number of similar areas, notably the issues of testing, standardized definitions, liability, and licensing requirements. While the range of topics considered in LR424 is much more extensive, the ever-changing ADS market means the regulatory environment does not always move at the same pace as the technology. Beginning with testing, the majority of states take a graduated approach. In this sense, Nebraska appears to be the exception as there is no testing protocol in place at this time. The nature and requirements of testing protocol vary widely among states with one, with one state, until recently, requiring ADS equipped vehicles undergoing testing to be supervised directly by the State Patrol. I just might note that I'd probably get removed from the Colonel's Christmas card list if we did that in Nebraska. [LAUGHTER] A more common approach is for a state agency to oversee, but not be directly involved in the testing of a vehicle. The requirements vary somewhat from state to state but typically permission to test is required in addition to other stipulations such as detailed vehicle and tester information, operational requirements, and locations of test. The National Highway Traffic Safety Administration has recommended a self-assessment model covering 12 safety elements as one mechanism for manufacturers to report to states on testing. The 12 safety elements include areas such as system safety, the operational design domains, cybersecurity, post-crash behavior, and data recording. Should Nebraska take a similarly flexible

approach, guidance documents could be developed based on this model to support and provide oversight of ADS equipped vehicles. Given the rapidly changing, rapidly changing nature of the ADS industry, USDOT strongly recommends the adoption of standardized definitions. A review of enacted legislation from state to state indicates a variety of terms being used in relation to ADS equipped vehicles. While the current legislation in Nebraska is much more aligned to the standardized definitions than in other states there are some which will likely require amending in any future-- further legislative iterations in order to comply. Liability and insurance is another area in which regulatory vary-- variation between states could cause confusion for both consumers and industry. Nebraska appears to be somewhat out of step with other jurisdictions by requiring only the motorist to maintain an insurance policy. A review of enacted legislation in other jurisdictions shows a clear trend to requiring manufacturers of the ADS equipped vehicles to retain insurance, surety bonds, or proof of self-insurance. Typically, this requirement is in the range of $5 million with one state requiring insurance of $10 million. In the event of a road traffic incident, some of the states determine whether the manufacturer or motorist's insurance is liable based on whether the ADS was engaged at the time of the incident. The last area, which tends to garner attention with legislators around the country, is the area of operator licensing and the need for a conventional human driver. This is an area which has significant variations among states, with some requiring a driver present at all times, others allowing the use of remote operators, or not requiring a driver at all under certain circumstances. The level of ADS classification plays a significant role in determining the need for a driver and subsequently a driver license. Nebraska law currently permits an ADS equipped vehicle to operate on the roads without a driver under specific conditions: proof of adequate insurance has been provided to the Nebraska DMV; the vehicle is capable of achieving a minimal risk condition, and-- if necessary; and the vehicle is able to comply with all applicable traffic and motor vehicle safety laws. While licensing of drivers operating an ADS equipped vehicle is not specifically noted in Nebraska statute, it is an area which may be considered in the future as the abilities of ADS equipped vehicles develop. Licensing requirements for drivers could also be

considered should a guidance document be developed to facilitate the oversight of testing ADS equipped vehicles. Chairman Friesen, at this time I'd be happy to answer any questions the committee may have. Thank you for the opportunity to discuss some of the items covered in LR424.

FRIESEN: [00:24:26] Thank you, Director Lahm. Are there any questions from the committee?

GEIST: [00:24:32] I have one.

FRIESEN: [00:24:32] Senator Geist.

GEIST: [00:24:33] Director Lahm, what is your primary hesitation, if any, about moving forward with this type-- with what we're looking at today?

RHONDA LAHM: [00:24:50] So I'm not sure I understand your question. I don't necessarily have any hesitation. I mean, I think-- the only thing that I'm aware of that's happening in Nebraska is the project that is the city of Lincoln is working on and certainly their plan is very sound. I mean, they have a plan for testing and insuring it. Safety is their priority. I mean, that's what you want to have looked at. I think there's a couple places, where I mentioned, where a law seems not consistent with other states, is the insurance piece at, at the current time. It's not clear.

GEIST: [00:25:22] I guess what I'm getting at is that moving forward, my hesitation is, is getting legislation before we understand technology and not, not hurting the technology.

RHONDA LAHM: [00:25:38] Yeah.

GEIST: [00:25:38] And, and then understanding where the guardrails are that enable technology to

move forward in a safe manner. And so I, I guess is that a valid hesitation?

RHONDA LAHM: [00:25:53] So, so one of the things that some states have done, and a thing that we're exploring here is the use of guidance documents, because guidance documents can be changed much quicker than a legislative process, they're a nonbinding document. But those are things that have been used in other kinds-- other states fairly successfully in an effort to maybe guide-- just set out some guidelines, for the lack of a better term, surrounding different aspects. There's a lot of pieces that there isn't even recommendations out on yet, the cybersecurity piece. And it's a-- not any group really has issued guidance on that particular piece of it yet, which is a significant piece. I think there are some things when it comes to these vehicles, for example, in places where they have significant pilots with many vehicles. One of the things that, that I would foresee could potentially be a topic for a guidance document that isn't-- is not addressed at all right now is the safety of first, first responders. There are some very specific things that need to be done at a crash scene on these vehicles to keep the people responding safe. And so in the states where those are, they're required to meet with the first responders and provide that information to them so that they can have that should the need arise. So I think there's some things like that that need to be addressed for the safety of not only the people on the streets and in the vehicles but also of our first responders responding to them. I mean, there are just-- there's a ton of issues listed in LR424. There's probably a ton more dealing with this topic. And it's not, it's not going to-- it's gonna be ever evolving for years way longer than I'm in this position for sure, probably longer than I'll be alive literally.

GEIST: [00:27:47] I do think it will change our world, but a--

RHONDA LAHM: [00:27:50] Um-hum, I agree. And there's a ton of potential for the technology.

GEIST: [00:27:54] Um-hum.

RHONDA LAHM: [00:27:54] There is-- I think there's some misconception of what's out there right now. Right now as far as I know, and I was just at a meeting a month ago, the only place that has a shuttle operating without a driver in it is in California. It doesn't have any people in it either. So it's, it's a empty shuttle. But, you know, their intention is to put people in it, so that would be the first one. But as far as the traditional levels of automation, I think there's a lot of confusion about what those are. And I had an opportunity to hear two manufacturers speak this summer-- well, actually late, late summer, early fall, and I had an employee that actually went to a manufacturing plant. So when you're talking about the levels of automation, the manufacturers have said, we're not really going to bother with Level 3 technology. We're going from Level 2 to Level 4, because there's no cost rate of return on Level 3 technology. It still requires the driver to be able to take control at, at a moment's notice. Level 3 technology is where the driver gets distracted doing other things when they should be paying attention. And so there's a lot of risk there. And so Level 2 are on the road right now. Some of those things are on the road right now in limited amounts. And, and so there's a lot of risk for 3 with not much return. So I don't know if that's helpful.

GEIST: [00:29:24] And-- do you mind if I ask one more?

FRIESEN: [00:29:26] No, go ahead.

GEIST: [00:29:27] I-- would you outline what Level 2, 3 and 4--

RHONDA LAHM: [00:29:30] OK.

GEIST: [00:29:31] I don't know if everyone else knows that much--

RHONDA LAHM: [00:29:33] I'm gambling there's a cheat sheet.

GEIST: [00:29:34] --I mean,--

RHONDA LAHM: [00:29:34] So-- because it's-- I think it-- I mean, I think it's really confusing, but here's traditionally Level 1-- or 0-- I mean Level 0, no automation.

GEIST: [00:29:43] OK.

RHONDA LAHM: [00:29:43] That's like what I drive, Level 0. Level 1, driver assistance; vehicles are controlled by the driver. Some driving assist features may be included in the vehicle design. It includes features such as: adaptive cruise control, lane keeping technology, and automatic emergency braking. So we see cars with that out on today. Level 2, partial automation; and the vehicle has combined automated functions like acceleration and steering that the driver must remain engaged while the driving task and monitor the environment at all times. Level 2 vehicles may include all of the above, meaning what's in Level 1. But in order to be considered Level 2, the technology has to work in coordination with each other. And Level 3, and this is where you hear a lot of people say they have a Level 3 vehicle, they most likely do not. Level 3 is conditional automaton-- automation; the driver's a necessity, but is not required to monitor the environment. So this is where we get in trouble, because people think that they can just knit or do whatever they want to do, text, anything else when they're driving and they can't. The driver must be ready to take control of the vehicle at all times with notice. Level 3 vehicles are capable of performing the driving task under very specific conditions. Level 4, high automation; the vehicle is capable of performing all driving functions under a certain condition. So that's what the city of Lincoln is working on.

GEIST: [00:31:19] Um-hum.

RHONDA LAHM: [00:31:19] The driver may have the option to control the vehicle. The technology on Level 4 vehicles may vary, but the common theme is the ability to perform the entire driving task without human intervention in certain environments. Then, Level 5 is full automation. It means the vehicle can drive by itself anywhere in any environment under any conditions.

GEIST: [00:31:38] OK.

RHONDA LAHM: [00:31:40] We're a long, long ways from Level 5. Level 4 is gonna be out there. Level 5, we're a long ways from.

GEIST: [00:31:48] Thank you, that's helpful. Thank you.

FRIESEN: [00:31:50] Thank you, Senator Geist. Senator Hughes.

HUGHES: [00:31:52] Thank you, Mr. Chairman. Thank you, Director Lahm, for coming. Are you required to be notified if there's any ADS testing within the state at all?

RHONDA LAHM: [00:32:04] No.

HUGHES: [00:32:05] So out west and the more sparse there could be trucks--

RHONDA LAHM: [00:32:11] Um-hum.

HUGHES: [00:32:11] --out there today as long as they meet the requirements?

RHONDA LAHM: [00:32:15] As long as they've shown those requirements, they can conform to the rules of the road and they've shown proof of insurance, which if it's registered in Nebraska they've shown proof of insurance.

HUGHES: [00:32:24] So OK, but you don't-- there's no notification--

RHONDA LAHM: [00:32:28] Correct.

HUGHES: [00:32:28] --to you at all. So just a speculation on your part, do you-- and I'm assuming-- but do you see, see the push more toward hauling people-- passengers or delivery freight-- the autonomous or is it kind of a race?

RHONDA LAHM: [00:32:47] I, I think it depends on who you talk to, and probably depends on the manufacturer. There are some manufacturers that are very focused on the freight piece and there's other manufacturers that are more focused on the people piece. I think you're gonna definitely see the technology used in a commercial fashion sooner than you'll see it used for personal use. And, and honestly probably a way that it has to reap more benefits for communities, first in a commercial realm versus a personal private realm. But, I think it just depends on the manufacturer. There's a, there's a manufacturer that was involved in both arenas and now has gotten out of the passenger arena and is now only in the commercial vehicle arena. And then there's other ones that are focused on projects like what Lincoln is trying to do. And then there's others that are kind of a mixture of the shuttle piece and the passenger vehicle piece.

HUGHES: [00:33:38] OK, thank you.

FRIESEN: [00:33:38] Thank you, Senator Hughes. Senator Bostelman.

BOSTELMAN: [00:33:46] Thank you, Mr. Chairman, and thank you, Director, for being here today.

RHONDA LAHM: [00:33:48] Certainly.

HUGHES: [00:33:49] [INAUDIBLE] again. It's interesting this morning, I read about the AV START Act. It's on the Hill right now, it's bipartisan--

RHONDA LAHM: [00:33:59] Yeah.

BOSTELMAN: [00:33:59] --things going through the federal government trying to address some of the issues, I think, that you brought up. And reading down through the article and, and kind of what caught my attention, something you mentioned before, and I'm kind of curious if there are some things you can speak to immediately on the safety side. Are there some things that we currently have as far as an operated vehicle as we drive now that an autonomous vehicle would not necessarily have as far as specific safety areas? In other words, I don't know what it might be-- it may be a, it may be stopping distances, speed, vehicle-- I don't know what those might be and I'm kind of curious if there's things an autonomous vehicle right now that coming in the state would be operated as where if I was a drive-- if I was in an operated vehicle that I would not be able to do that? Does that makes sense?

RHONDA LAHM: [00:34:59] Yeah. Well, I'm, I'm not exactly sure what you're asking, but as far as the technology, and I've seen-- I've been in autonomous vehicles and I've seen several demonstrations of them and you know the technology is getting very good at, you know, when it

recognizes something and stopping. I mean, that technology is-- and probably reliability-wise more reliable than a human in most cases. So I'm not-- I think we're-- I know recently there was an article that came out about autonomous vehicles in California are involved in a lot higher per crashes per vehicle than regular cars. But I also know from talking to, Bernard Soriano, who is the head of the California Highway Patrol that's working with autonomous vehicles and he will tell you that a significant percent of those way over a majority are not the fault of the autonomous vehicle. It's normally the other vehicle that hits it or, you know, doesn't realize what it's going to do which is another one of the issues the technology is trying to address is mixing it in with the other drivers on the road. Because I don't know about any of you, but when I'm driving in Lincoln when the light turns yellow my first thing is to look in the rearview mirror, because I have to decide am I going to stop and get rear-ended or am I going to have to run through the light. And that's just a fact. And, and so what happens is an autonomous vehicle, when it sees a yellow light, it's gonna stop. And then what happens is it gets hit.

BOSTELMAN: [00:36:27] Sure, I guess, I guess-- and I don't know if I can explain it any more or not. In other words, when I leave here today, I'm gonna go out and get my car-- truck, start it up and drive it down the road. If I had an autonomous vehicle-- if I go sit in that autonomous vehicle, does that autonomous vehicle op-- have-- I have certain safety requirements I have to do in that operated vehicle, and that vehicle has a function certain way.

RHONDA LAHM: [00:36:47] Um-hum.

BOSTELMAN: [00:36:47] I'm just curious if there's-- if you knew if there's anything different-- I think more of what the act and what they're talking on the Hill is just states have different laws,--

RHONDA LAHM: [00:36:55] Right.

BOSTELMAN: [00:36:56] --and they're just trying to look-- trying to, trying to, trying to equalize that process. I'm just trying to make sure-- my, my question is, is, is that if that autonomous vehicle driving down the roads gonna have the same--

RHONDA LAHM: [00:37:05] Right.

BOSTELMAN: [00:37:07] --meets the same requirements or exceeds that I do driving that vehicle right now?

RHONDA LAHM: [00:37:13] Right. I, I think-- I, I'm not aware of any. Because most of the-- you know, there's uniform standards for traffic signals, markings, and everything across the United States so I'm not-- I'm really not aware that that would be-- that there would be something different with them than what you would do with your own car.

BOSTELMAN: [00:37:32] Because, the other question is, just in your experience dealing in this, you know, working in this area, how does an autonomous vehicle driving across Nebraska function, because my curiosity is, is it going on GPS, is it going by as, I think it's called a FLIR, or it was called a FLIR Systems at one time.

RHONDA LAHM: [00:37:56] [INAUDIBLE].

BOSTELMAN: [00:37:56] How does that function? Does it have to have connectivity? If I'm driving through town-- if I'm connected to a satellite, I drop that satellite connection from time to time if I'm going home on my phone, as a passenger in the vehicle, not driving the vehicle, you know, you're on a call, it'll drop that call because we don't have connectivity. Just kind of curious,

could you-- do you know, can you explain that a little bit more to me?

RHONDA LAHM: [00:38:19] So it's my, you know, it's my, it's my understanding, from the vehicles that I've seen, it's not just one technology, they use multiple different technologies. So some use cameras, some use GPS, some use LIDAR, so there's multiple technologies that they use. So it probably depends on the manufacturer to some degree and on their technology, so it's a multiple-- it's a combination. So is it possible that you could lose a connection or a signal and that could impact the operation? It's possible, but-- it would depend on the kind of technology the particular vehicle was using.

BOSTELMAN: [00:38:54] Yeah, thank you.

RHONDA LAHM: [00:38:54] Um-hum.

FRIESEN: [00:38:55] Thank you, Senator Bostelman. Any other questions from the committee? So if, if I understand it right, currently trucks could be platooning on I-80, would they have to maintain the distance requirements that are required now of drivers?

RHONDA LAHM: [00:39:11] So there's nothing in Nebraska in the autonomous vehicle bill that was passed that prohibits the platooning, but the current following too close statute in Nebraska, I think, would prohibit the platooning and still be in compliance with the following too close statute.

FRIESEN: [00:39:26] [INAUDIBLE] follow the Rules of the Road.

RHONDA LAHM: [00:39:27] Right.

FRIESEN: [00:39:30] OK. Seeing no other questions, thank you, for your testimony.

RHONDA LAHM: [00:39:32] Thank you.

FRIESEN: [00:39:54] Welcome.

LEIGHTON YATES: [00:39:55] Good Morning. Good Morning, Mr. Chairman, members of the committee. My name is Leighton Yates. I'm the senior manager of State Government Affairs for the Alliance of Automobile Manufacturers. For those of you that--

FRIESEN: [00:40:06] Spell your name.

LEIGHTON YATES: [00:40:07] L-e-i-g-h-t-o-n, Yates, Y-a-t-e-s. For those of you that are not familiar with the Alliance, we are a trade association that represents 12 of the world's leading car and light-duty truck manufacturers. Together annually, it typically ends up around 70 percent of the new-car market each year. First off, on behalf of the Alliance, I want to thank you for the opportunity to speak before you today on autonomous vehicles. This will be my, my second time this year speaking on the topic to you all, and it's a technology that we believe has potential to save lives and really put Nebraska at the forefront of this emerging technology. We are at a time in society where the auto industry is changing and evolving on a daily basis. Some have said that the industry will change more in the 10 years-- more-- change more in the next 10 years than it has in the last 50 to 100 years. As you see now vehicles on the road, they're adept or equipped with more advanced and more technically sound pieces of technology. And the goal of all those is to keep you safe. There's an abundance of sensors. Five years ago your car would have a handful of sensors, and now it's fairly common for a new car to have 100-plus sensors on a car keeping eyes and ears on the road, keeping you safe, keeping you in line. There's also rearview cameras. Not everyone has the

convenience of that now. But as of 2018, every new car that'll be a standard feature, so everyone will be able to have the new feature added on. And as mentioned earlier, lane keeping technology. And that's quite the upgrade from your conventional cruise control. Now we can not only maintain your speed but also maintain your position in the lane. These features are just a fraction of what's available currently. And they're also just a fraction of the vehicle's entire safety system. But all of these features as I mentioned early have one goal in mind, and that's your safety and to save lives. Speaking of saving lives, in 2017 there were roughly 37,000 roadway fatalities in the United States. Of those 37,000, 94 percent were due to human error. This emphasizes the importance of getting these lifesaving technologies on the road. AVs have much more potential than just saving lives, they also can expand mobility options for the elderly, for the disabled. It also has environmental benefits. They can maximize time. Think of your commute to and from the capitol, if traffic is much more calm you're getting to, to and from home in a much quicker fashion. More time with your kids, more time on-- catch your TV show, make it to the kids' baseball game. There's also space maximization, when you think of all of the parking lots that are placed around the United States whether it's urban or rural or suburban, there's too many parking lots. I think we can all agree. Studies have shown that AVs, when we get to the point that they are parking themselves they would only need three to four inches of parking space on each side due to us not getting it and now with the doors. So you can imagine how much better that lane could be used, whether that's mixed use or, you know, putting it to other, other, other items. But the list of potential benefits for the state adds up rather quickly, but in our opinion, luckily, Nebraska is in a position to reap the benefits. I want to kind of step back and give you an overarching perspective on AVs from the federal's perspective. Director Lahm gave you a good recap, but I wanted to show some of the points that we think are, are important to the discussion. But since AVs have taken a front seat in transportation-- the transportation world, states have looked to the Feds for more guidance. Federal legislation has moved, but is yet to manifest in its final form. You mentioned the SELF DRIVE Act that has come out of the House that was passed by the House and is sitting in the Senate and the Senate has

worked on the AV START Act. Unfortunately, due to time it probably is unlikely for federal legislation to make it across the goal line for the year's end. As Director Lahm mentioned, there's also been guidance issued by NHTSA, the National Highway Traffic Safety Administration. The Alliance has supported all three versions of their guidance and I wanted to share some of the points that we thought was very important to any state regulating AVs, but any state looking to further regulate AVs which we acknowledge is sometimes necessary. One point that has been really reiterated with these guidance's is that they are just a guidance and not to be too prescriptive, but they do reiterate delineation of state and federal roles. When we think of the state role, we like to think of how it regulates the driver, typical state responsibilities and we're talking licensing, registration, insurance, law enforcement, infrastructure, those type of policy areas. And on the federal side, we like to think it is everything that regulates the actual vehicle, so we're talking about the safety standards the FMVSS, the Federal Ve-- the Federal Motor Vehicle Safety Standards. There's also design and performance standards, which essentially is how your car's built and how it's built to function. The cars that we're driving now go under the same type of microscope and AVs do as well. We believe the, the marketing and labeling of AVs is also under the federal realm as well for uniformity. I would also address the basic levels of automation in highly automated vehicles which are considered Levels 3-5 vehicles. Director Lahm did a great job of explaining the levels to you, and I won't clarify that further, but it also shows planning and integration considerations for different modes of transportation similar to how the city of Lincoln is applying AVs here in Nebraska. A lot of states have waited for this federal guidance before moving on AVs and as the years have gone on and you've seen more articles and seen more pictures of AVs on the roads, more states have started to act. Some of those early adopters were the Florida's, California's of the world, Texas, the big states where the testing tends to go first and then many others followed. Others did not want to be left behind, which is understandable, and some passed laws but also felt unprepared or wanted to continue to explore the topic. This is where advisory groups or interim study committees typically come to light. Others have resources in their state that can help with the

development of autonomous vehicle technology. I'd like to think that the University of Nebraska's Innovation Center- Innovation Campus that is here in Lincoln is something that, I believe, the state will and should use to expand and proliferate, you know, the AV technology and educate the folks in the city and the students and help have a piece in this innovation that's, that's happening across the country. The autonomous shuttle is obviously the most recent example of how they've used that asset to, to, to leverage partnerships and bring technology and opportunities here in Nebraska. Well, while we're on the shuttle, that takes us back to session from this past year. I mentioned earlier I was here, and I was actually cautioning this exact committee before passing any side or type of AV and legislation. We were cautioning you to not be-- to be, be too prescriptive. Allow the full-spectrum of technology to mature and not put up barriers to inhibit innovation. We-- we've cautioned you to avoid a local-level patchwork. You can imagine a 50-state patchwork being a headache, just imagine a micro-level municipality type patchwork. That would require quite a bit of Ibuprofen at the end of the day. We also encourage you to examine all levels of automation, specifically Levels 3-5, and I would like to clarify that some of our manufacturers are-- will manufacture Level 3 vehicles. So to say all OEMs are skipping over Level 3 would be in accurate. There are some members of ours that are focusing on Level 4 and higher, but some are starting with 3 and above. But Level 3 vehicles will be sold for private use sooner rather than later and Level 4 vehicles are already being deployed and tested across the country as we speak, specifically, most recent here with the autonomous shuttle. We also ask to keep the terminology close to industry terms and standards and this helps tie that patchwork together because as I mentioned without the federal guidance the patchwork will, will continue to grow. I mean, those are just to name a few. But what started with really just a pilot program bill from Senator Wishart and morphed into LB989, I'd like to believe throughout that process there was quite broad stakeholder engagement of state and local government, myself with the automotive manufacturing sector, transportation network companies, so think of your Ubers and Lifts of the world, the railroad industry, which was a surprise, and technology companies. But the bill provides a basic framework for highly automated

vehicles to operate in the state. It sets a-- has a set of definitions [INAUDIBLE] industry terms which we were happy to see and it's similar to many states as well as NHTSA NSAE. It allows for automated driving system operation on Nebraska roads as long as those systems comply, can apply, and do apply with Nebraska Rules of the Road. It preempts local government. This is something that is important to us because it helps avoid that micro-level patchwork and it makes the state the clearinghouse for everything AVs whether it's the Legislature or the administration or both. It allows for the transportation network companies to operate their networks once they are developed and deployed. It also requires any person or entity to have insurance and it has accident reporting requirements, in the instance of a crash or accident. But LB989 is not the end all be all. We recognize that this basic framework is in place, but as the technology matures and evolves and expands we fully expect the laws in this state and in any other state that's passed a law to grow and adapt with the technology because we know a lot, but the amount we know is, in the grand scheme of things, is actually quite small once you realize how early we are in the technology and how far and the potential it has to grow. But in the closing, as the industry and its partners continue the efforts to make roadways and vehicles on them a safer place and experience. We hope the Legislature and the administration continues to put safety first by welcoming technology that will help Nebraska and the U.S. get as close to zero road fatalities as possible. The Alliance sees Nebraska as a champion on the issue, not only in the U.S., but specifically in the region. From my job, I have all of the region between the Mississippi and the Rockies, and we are actually working with some of your neighbors currently on developing AV technology policy, and we point to Nebraska as a good example. Lastly, I definitely want to thank, Governor Ricketts and his administration, Senator Wishart, the Legislature, and this committee for bringing AVs to the forefront. Your collective leadership will ultimately save countless lives. It also lets industry know that the state is open for business and fosters innovation. The advancement of automated driving technology is an evolution and not a revolution. The Alliance and its member companies look forward to evolving with you in making your on-road experience much safer and much more

enjoyable. We appreciate the opportunity to speak to you today and I'd be happy to answer any questions.

FRIESEN: [00:51:25] Thank you, Mr. Yates. Senator Hughes, question.

HUGHES: [00:51:29] Thank you, Mr. Chairman. Thank you, Mr. Yates for coming. You said you handled the-- from the Mississippi to the Rocky Mountains?

LEIGHTON YATES: [00:51:36] Yes, sir.

HUGHES: [00:51:36] So are, are there autonomous-- are there tests-- is there testing being done on the Front Range of Colorado with deliveries?

LEIGHTON YATES: [00:51:42] There's testing happening in Colorado. There has been some recent shuttle testing around the Super Bowl in Minneapolis, Minnesota this past year. There's a lot happening in Texas. I'm just going to the states in my territory that I'm familiar with, but there's, there's a decent amount in my territory happening at the moment.

HUGHES: [00:52:01] So what kind of, of freight testing-- what type of-- are they semi, 18 wheelers, or delivery vans or?

LEIGHTON YATES: [00:52:09] So I, I can only speak to the light-duty side, that's passenger cars and light-duty trucks. So I can say, yes, for those types of vehicles. They are being, being tested but as far as the, the freight, I, I honestly wouldn't want to speak for that industry.

HUGHES: [00:52:24] OK. So are, are-- what's-- I-- you know, working through the, through the

process, they're driverless now or they have someone there but just to, to monitor?

LEIGHTON YATES: [00:52:37] It depends, there's, there's different methods of testing. Some have a safety driver in them. Some-- it was I think, believe, Director Lahm, mentioned earlier, but remote operation which is essentially someone remotely controlling the vehicle from a, well you know, a base site or an office somewhere.

HUGHES: [00:52:58] So how, how does-- if, if a law enforcement officer should decide to pull-- see something wrong with an autonomous vehicle, are they programmed if they see flashing red lights to pull over and stop, or?

LEIGHTON YATES: [00:53:13] So they're are expected to perform what we call a minimal, minimal risk condition and that's essentially slowing down and move out of the way. And it would pull over and, you know whatever, depending on your state the law enforcement officer wouldn't proceed as how they typically would.

HUGHES: [00:53:27] OK. Well, just listening to your testimony and thinking here, and, and this is a long ways down the road, but we do, we do get a lot of freight from Colorado passing through Nebraska and a lot of those stops are because of the drivers are doing something wrong. You know, they're, they're smoking weed or they're weaving or they're following too close. If you have an autonomous vehicle, you know, with a load of illegal marijuana, how's, how's Patrol gonna stop that? I mean, there's no-- they're not gonna be breaking any laws in order to-- and, and I don't mean to put you on the spot, but just thinking down the road on the freight if there's no infraction how are we going to curtail the transport of, of anything illegal whether it's, you know, illegal aliens or drugs or whatever? You know, just, just thinking outside the box.

LEIGHTON YATES: [00:54:24] So, Senator, if you don't mind, when you say freight are you-- do you-- are you, are you speaking of platooning or a fully autonomous type freight truck?

HUGHES: [00:54:32] No, just if-- there every, every week--

LEIGHTON YATES: [00:54:35] Um-hum.

HUGHES: [00:54:36] --in Nebraska we read of a significant pot bust going down the-- caught going down the interstate.

LEIGHTON YATES: [00:54:44] Right.

HUGHES: [00:54:44] And it's generally the State Patrol or our county law enforcement pulls someone over for a driving infraction.

LEIGHTON YATES: [00:54:53] Right.

HUGHES: [00:54:53] But if there's no driver and they're not breaking any laws, how are we going to-- I mean, do we just let that traffic go through or-- and make their deliveries? Just, just outside the box a little bit.

LEIGHTON YATES: [00:55:07] I, I refer to my, my previous answer about the minimal risk condition, but one of the benefits of having a law that's flexible like Nebraska you're able to, to, to develop that bit of your policy to be more prescriptive to your state. We wouldn't want to come to, to Nebraska and, and have, you know, model legislation on, on freight trucks or law enforcement. We believe that's something that we would work with law enforcement on to help develop because

the problem you're describing now may not be the same problem in Florida or in New York State or California. So it's, it's definitely a case by case basis and I don't have a direct answer for you, but I would assume that the law enforcement officer would proceed as he normally would once the vehicle's pulled over, but.

HUGHES: [00:55:58] Yeah. I-- I'm, you know, I, I have autonomous vehicles, but they only go five to seven mile an hour, so I'm fully engaged and I love driverless,--

LEIGHTON YATES: [00:56:07] Um-hum.

HUGHES: [00:56:07] --being, being a farmer. But, you know, there are-- we are human and we will figure out ways to take advantage of whatever comes along. Thank you.

LEIGHTON YATES: [00:56:18] Thank you.

FRIESEN: [00:56:19] Thank you, Senator Hughes. Senator Bostelman.

BOSTELMAN: [00:56:21] Thank you, Mr. Chairman. Thank you, Mr. Yates for being here. I wanna-- one point of clarification for me for my-- so I make sure I under-- heard, heard you right. The pushback, I think, on the Hill right now on the federal legislation is basically saying they don't want the federal government to overrule states' ability to set law-- safety laws specifically for each-- for their own state. So could you go back over-- you mentioned-- and I can, you know, the quote is from Dianne Feinstein, senator there, that a-- who wrote the March letter that they were concerned the bill would overrule state safety laws without ensuring new federal regs would take their place. So could you just in my own mind so understand what you are saying about caution us about what law, safety laws we put in place. Could you kind of further expand upon that for me, please?

LEIGHTON YATES: [00:57:15] Sure, Senator. I'm speaking of preemption. What you're describing is that the federal bill would preempt all state laws so we would have one blanket AV law--

BOSTELMAN: [00:57:24] Right.

LEIGHTON YATES: [00:57:25] --for manufacturers of cars or trucks or whatever other form it may take on the road. What we've asked for here in Nebraska and really any state is that the state preempts the local governments at least until the federal government is able to pass some sort of law.

BOSTELMAN: [00:57:41] That's right.

LEIGHTON YATES: [00:57:41] So we would want the state-- if we're gonna have a patchwork we rather a state patchwork on the municipal levels.

BOSTELMAN: [00:57:46] Yeah, state law versus--

LEIGHTON YATES: [00:57:47] Correct.

BOSTELMAN: [00:57:47] --county law, city law.

LEIGHTON YATES: [00:57:47] Because you can imagine your-- to your example you're a trucker coming from Colorado driving through Nebraska to get to the next state you would want some uniformity along those lines. But if he's going from county and it's prohibited in the next

county and there's no road to get around that county it can--

BOSTELMAN: [00:58:03] Right.

LEIGHTON YATES: [00:58:03] --it can cause some real, real problems.

BOSTELMAN: [00:58:03] Got you-- I, I appreciate that and that helps me a lot and I don't disagree with you there. Could you explain-- one thing that I need a little bit help understanding autonomous vehicles-- could you-- so I have a vehicle, you have a vehicle, whoever, company X has an autonomous vehicle that they're developing, OK, right. How does that-- what's the testing process of that vehicle from once it's ready to roll, they have that-- their initial test vehicle or a, or a conceptual vehicle there, what happens with that vehicle-- is there an industry standard on how-- what testing process that vehicle goes through from there to where it moves through to where, I don't know, does it go right on the road or what happens?

LEIGHTON YATES: [00:58:52] Well--

BOSTELMAN: [00:58:52] Do you know?

LEIGHTON YATES: [00:58:53] Each, each company develops the cars differently. The technology is in the same realm but they-- some do things differently from conceptualization to, to the road. They have their own avenues for testing. Some will test in foreign roads and here some will only test in certain types of climates--

BOSTELMAN: [00:59:12] Sure.

LEIGHTON YATES: [00:59:13] --just to make sure they're well-rounded.

BOSTELMAN: [00:59:16] Sure.

LEIGHTON YATES: [00:59:16] But in order for a car to be on the road they have to be able to comply with all federal motor vehicle safety standards and our-- my members, they are developing cars to be compliant with FMVSS that are required.

BOSTELMAN: [00:59:28] May I-- where I'm kind of going with this question-- I appreciate that completely-- is that now say X company develops a new car. My understanding, and I may be wrong, is there's a test track, they take it out and they test it, they develop it, they work it. It's pretty well proven before it hits the, the highway-- hits the streets. Is that similar to what autonomous vehicles are going through or are they developing them-- putting them out and testing them on the street to see if they work?

LEIGHTON YATES: [00:59:53] There's, there's both happening. There's real-world testing because that's going to help the technology learn in certain scenarios. You're gonna get in that oddball intersection scenario where you're at a red light but the police officer's governing traffic and there's a construction zone right behind that police officer and the car's gonna have to learn from that instance and there's also closed-track testing, there's an area in Michigan called Mcity and it's basically a fake city for manufacturers to test their vehicles on. So there, there are both scenarios happening at, at the same time.

BOSTELMAN: [01:00:25] I appreciate it, and that my last question for you, I think for right now, and I'm sure that it'll be similar to what Director, Director Lahm said. My question is really the connectivity of these vehicles, how they function and, and I know there's-- and she said it was L--

whatever the, the-- there's a system that sits on the car--

LEIGHTON YATES: [01:00:45] LIDAR.

BOSTELMAN: [01:00:45] LIDAR-- it sees-- that sees real time split second and it's very expensive to put on we're not there technology wise to move it onto a--I guess it could-- you know, unavailable to the public per say unless you have a lot of money. What are the different types? To me it's connectivity. So I live on a country road, you know, I drive eight miles on gravel before I get to my pl-- my, my home. I'm on a, on a state highway. I'm on a county highway. I'm in the city of Lincoln. So my connectivity as I go through that really changes all the way through. So could you help me understand that-- kind of where we're at and maybe where we're going because that would help me out a lot?

LEIGHTON YATES: [01:01:24] So, so she was spot on with, with her answer. There are-- the systems rely on more than one type of sensor or technology. There's a GPS, there's the LIDAR, which is the eyes, the eyes of the car and keeps you in the lanes. Some will be GPS mapped, maps loaded into the vehicles already. So it really depends and also depends on the level of the vehicle because, for instance, a Level 3 vehicle may not be able to take those different three types of terrain, a Level 5 would be able to. In a Level 3 instance if it's not able to, it would alert the driver and the driver would do the driving for as long as it needed to and it could be handed off next to the, to the ADS, the system, but the connectivity shouldn't be an issue. All we need is lane striping in the beginning.

BOSTELMAN: [01:02:17] OK, thank you.

FRIESEN: [01:02:17] Thank you, Senator Bostelman. Any other questions from the committee? I

have one question. You, you mentioned-- when we were talking about the different levels of vehicles, so are there any Level 3 vehicles registered in Nebraska? Have you tested any Level 3 vehicles in Nebraska?

LEIGHTON YATES: [01:02:36] I can't speak to what, what companies have tested in Nebraska because they don't disclose that information as widely as you-- as we would like. But to my knowledge there's no Level 3 vehicles registered anywhere in the country right now,--

FRIESEN: [01:02:49] OK.

LEIGHTON YATES: [01:02:49] --because they're not on the market yet.

FRIESEN: [01:02:51] So there's, there's also no Level 4 vehicles?

LEIGHTON YATES: [01:02:55] So there are Level 4 vehicles being tested at the moment.--

FRIESEN: [01:02:56] Being tested on the road?

LEIGHTON YATES: [01:02:56] For example, there's a-- Waymo has a, a driverless ride-sharing pilot happening in Arizona right now,--

FRIESEN: [01:03:06] OK.

LEIGHTON YATES: [01:03:06] --and those are Level 4. But Level 4 vehicles, as Director Lahm mentioned earlier, they will have parameters, whether that's geofencing, GPS kind of perimeters to tell them what they can do. Some will have certain tasks that they're meant to be and maybe it's a

shuttle and it just goes back and forth and the sensors will all do the same whether you're driving your own car or on a shuttle or some other mode detecting hazards in visuals, animals, obstructions, weather. So hope that answers your question.

FRIESEN: [01:03:40] OK. You, you mentioned at one point when you're discussing with Senator Hughes, that there could be vehicles out there with a remote operator?

LEIGHTON YATES: [01:03:47] Yes.

FRIESEN: [01:03:48] And so you're saying that the driver would either not be there or could be there not paying attention, and if something goes wrong a remote operator would take over?

LEIGHTON YATES: [01:04:00] Speaking more in the terms of, of, of testing or even in operation, if the vehicle was unable to get through that tricky intersection, I just mentioned, it would be able to, to, to summon the remote operator. The motor op-- remote operator would navigate that stretch of road and then it would go back the system.

FRIESEN: [01:04:20] So could something like that today be operating in Nebraska?

LEIGHTON YATES: [01:04:22] Could it? Yes. Is it-- I can't-- I'm not sure.

FRIESEN: [01:04:27] So my question is, if, if I, as a motor vehicle operator, make an error in judgment and hit a pedestrian and kill someone,--

LEIGHTON YATES: [01:04:37] Right.

FRIESEN: [01:04:37] --motor vehicle manslaughter. If a remote operator takes over that vehicle and makes a mistake, is that remote operator subject to motor vehicle homicide laws, just like I am as an operator?

LEIGHTON YATES: [01:04:51] Yes, so the Alliance strongly believes that liability should be [INAUDIBLE] by the manufacturer as long as the ADS is being used as it should be. But if the technology is being used in an inappropriate manner or if it was not-- was retrofitted to the vehicle after manufacturer, we believe that should be on the liability of the, the, the folks who either altered the vehicle or, you know, was in the [INAUDIBLE].

FRIESEN: [01:05:20] So there was, there was a vehicle, I think it was in Nevada, that struck a bicyclist and killed the bicyclist.

LEIGHTON YATES: [01:05:27] Right.

FRIESEN: [01:05:29] Is that just a sacrifice of testing so we get the sensors right or-- I mean, they-- I think the final report was that there was a sensor either misadjusted or malfunctioned.

LEIGHTON YATES: [01:05:41] Um-hum.

FRIESEN: [01:05:41] It didn't determine that it was a large enough object that it should stop for. So as we test these vehicles on our roadways, do we just need to sacrifice a few people once a while or are we gonna get this right?

LEIGHTON YATES: [01:05:55] So there was a lengthy NTSB report following that accident and I don't have all the details for it, but there was error on the human that was the fatality as well as the

operator of the vehicle.

FRIESEN: [01:06:10] Because they were supposed to be paying attention, correct?

LEIGHTON YATES: [01:06:11] No, I don't know specifically, but I-- I believe the human walked out of a median last minute on a dark night, so I don't know the specificity of the actual instance, but no that that's-- we're not comfortable saying there's a human sacrifice for the betterment of autonomous vehicle technology.

FRIESEN: [01:06:31] Are there any, any other states out there that do not require just simple notification of testing?

LEIGHTON YATES: [01:06:40] There are a handful-- I don't have them all off the top of my head. The Alliance is not opposed to notifying the state of any testing have this happening in the state. So to answer your question, yes, there are, there are some.

FRIESEN: [01:06:57] OK. Senator Bostelman.

BOSTELMAN: [01:07:00] Thank you. [INAUDIBLE], Mr. Yates. Point of clarification for myself-- see if I understood-- heard you right. Senator Friesen just asked if there is a vehicle operating and say it's totally autonomous and strikes him, is an accident and there's fatality. The fatality is at the fault we'll say of the autonomous vehicle-- I'm not-- we'll just say it is.

LEIGHTON YATES: [01:07:22] Um-hum.

BOSTELMAN: [01:07:22] Did I hear you say correctly that then the industry, in other words say

it's X motor company, has this vehicle, this vehicle strikes or is it an accident, what-- however it happens, there's a fatality. It's found that the vehicle was at fault so X company would be then the-- did I hear you right that they then would be the responsible party in that incidence where there would be a death? And, and if so, who's held responsible? Because right now if I drive that vehicle and I strike someone and there's-- I'm responsible and I go to jail, who does in that-- is there-- has been talked about? I guess that's kind of where I'm at. I'm just kind of, just kind of trying to understand.

LEIGHTON YATES: [01:08:05] It has-- so to answer your first question, if a Yates's vehicle that was a Level 5 operating as it should be cause an accident, cause a fatality, Yates corporation would be responsible for that. They would take the liability for that. If the vehicle has been altered with or the crash was not due to the Yates's vehicle, it would fall on the other driver or person, persons. As far as what the liability looks like, I think an industry just in the discussions that we've had in the beginning, we assume it would be some sort of monetary fine, but there isn't a, a designated person in the company here.

BOSTELMAN: [01:08:48] I, I hear what you're saying and I, I get what you're saying-- that little-- that bothers me a little bit-- it concerns me a little bit just because we've lost that personal responsibility for that action because large corporations got a lot of money. And yeah, so, so, you know, whatever it is-- just-- is just kind of curious, you said that.

LEIGHTON YATES: [01:09:06] Right.

BOSTELMAN: [01:09:06] Yeah, I would want to make sure I understood that and--

LEIGHTON YATES: [01:09:08] Right.

BOSTELMAN: [01:09:08] --that concerns me just a little bit and if that needs to be looked at or not-- I'm not saying-- I'm just saying that that concerns me and because recently we just had a-- this weekend we had fatalities, two fatalities that I could see potentially, you know, happening. Hope, you know, never happened with an autonomous vehicle where people were helping someone change a tire on the side of the road, if they both had dark clothes and they're right on the side of the road, you know, that reaction times like that,--

LEIGHTON YATES: [01:09:36] Right.

BOSTELMAN: [01:09:37] --there could be something that could happen. Not saying that it would, just saying it could. Then if it comes back to the company and there's no one personally responsible for that, where's the accountability type thing? And that's, that's kind of where I'm at. So thank you for your, for your thoughts. If you have anything else I'm-- you know, you're welcome to share. I'm just--

LEIGHTON YATES: [01:09:57] Senator, I would just say that we-- we've sort of aligned it with just general product liability law. Whether it's, you know, same sort of issue-- if you have a kid's toy and there's a choking hazard and the child chokes and there's no warning, it would be on company X, some--

BOSTELMAN: [01:10:12] Sure. OK.

LEIGHTON YATES: [01:10:12] --one of those similar type scenarios.

BOSTELMAN: [01:10:14] Fair enough, thanks.

FRIESEN: [01:10:15] Thank you, Senator Bostelman. Any other questions? Seeing none, thank you for your testimony, Mr. Yates.

LEIGHTON YATES: [01:10:37] Thank you, Mr. Chairman.

FRIESEN: [01:10:47] Welcome.

KEN OSTRONIC: [01:10:47] Good afternoon. Just a second here. Chairman Friesen, members of the Transportation Telement-- Telecommunications Committee. My name is Ken Ostronic, O-- Ken, K-e-n O-s-t-r-o-n-i-c, and I'm vice president and business agent for Teamsters Local 554 based in Omaha. I'd like to thank the members of this body for allowing me to take the time to testify at today's hearing. My background consists of 26 and a half years of employment with United Parcel Service as a driver as well as 12 years current as a business representative for Local 554. I'm currently-- represent UPS employees throughout Nebraska, both parcel delivery and freight, student transportation of America bus drivers, and for student school bus drivers in Omaha, Douglas County Roads employees, along with other duties. Many of these and other Teamster members are engaged, engaged in various types of skilled-driving duties and responsibilities, and are generally considered to be some of the safest and most reliable drivers in the industry. Teamster members know all too well what it is-- what is at stake and advances it-- as advances in technology creep steadily further into the surface transportation sector and automation threatens our core industries. I'm here today on behalf of these and the more than 3,300 members of Local 554 to ask that this committee drop correct-- adopt corrective legislation to address concerns with LB989. LB989 was originally introduced to allow the city of Lincoln to test automobile-- autonomous vehicles as a pilot project on designated area roads within the city limits of Lincoln. Quite simply, it has turned into a law that allows testing of unmanned vehicles with virtually unlimited or

unrestricted access to our roads using technology that has not been fully developed or, let alone, perfected. The Nebraska Rules of the Road were developed with the public safety as a primary-- as a priority, excuse me, for motor vehicles operated by humans, not computer code. An amendment to Section 1, subsection (5), and Section 2 requiring a properly licensed and proper-- and properly certified professional human driver be present in these vehicles at all time would be a good start. Requiring a human driver as a backstop to recognize and to take over in real-time situations in which a computer could never be programmed to recognize what would be-- would be the responsible thing to do. Many of my members and myself, as well, can testify to the experiences gained by recognizing and detecting a multitude of hazardous potential threats like undetected road damage, distracted and or impaired drivers, and being able to react accordingly. Exhibit 1 in a package, in a packet and I've given-- have some-- several periodical pieces here for you for your perusal, but I have-- I labeled this one as Exhibit 1 in your packet. It's a copy of a November 15th article which speaks of the several aspects of that point and I'll, I'll have it for your perusal.

FRIESEN: [01:14:01] Do you have something to hand out?

KEN OSTRONIC: [01:14:03] Yeah. [INAUDIBLE] just let you know that up-front. There should be enough for each-- if you need more I have a few more. Back to the brief: Of equal importance, LB989 diminishes the rights of Nebraska citizens and also limits the rights of cities, counties, political subdivisions, and public safety officials in addressing issues that may be unique or necessary to its locality. It strips away the ability in Nebraska's communities to determine some say so in public safety issues with roads and highways and the terms of how they are used. I noticed that in Sections 2 and 3, the statute makes mention of consulting railroad companies about how autonomous vehicles cross rail lines. The law does not include law enforcement in those consultations, and a very little mention of law enforcement throughout the statute. Looking further, LB989 lacks any mention of school crossings and how they are safely negotiated or protected by the

statute. I don't think we should forget about school district involvement in that minor detail, let alone the 12- to 14- year-old kid that's helping our kids across the street at those crossings. Amending Sections 2 and 3, to include those entities interest would be an obvious choice. Interested out-of-state corporate operatives who believe our residents interests are for sale, I've tried very hard to convince this state that the law is critical to put up-- to put our silicon prairie brand on the market. They are willing to treat Nebraska's as guinea pigs and treat our state as a Petri dish as they conduct their experiments all cloaked under the guise of innovation. Our highways and roads, infrastructure, and public assets are paid for by hardworking Nebraskans-- taxpayers, and they are not for sale. Deleting Section 6-11 will be another common sense amendment to restore Nebraskans' rights hijacked by this portion of LB989. Another responsible amendment should require that employees of transportation service networks operating in locations to test and utilize driver vehicles must be in compliance with Sections 48-604 and 48-2901 through 48-2912, as they relate to properly classified employees under Nebraska's statutes. Frequently, we hear on the news or read an article pertaining to some forms of cyber attack or hacking activity attempting to compromise or take control of a network or systems big and small. The goal is to manipulate the data or information for whatever nefarious acts these criminals or terrorist organizations can concoct. These technologies used to connect these systems could be vulnerable to the type of cyber attacks that are becoming more and more common. Imagine a compromised network, semi or entire platoon of semis used as some sort of weapon to create the type of mayhem that can create-- that threaten the safety of many, many innocent people. During debates of LB989, and a Q and A-- question and answer exchange between Senators Chambers and Kuehn, it was acknowledged that these complex computer systems run on written code and codes can in fact be hacked. I do not see the potential cybersecurity issues addressed in the statute at all. A suggestion to those who want to promote our silicon prairie brand, that we try redirecting the vast amount of talent resources in this state to promote solving those type of, those types of issues like cybersecurity first. For the people from-- who are here from out of town, the State of Nebraska, we have very nice people who are

very smart and we have a lot of land to develop. For your personal-- for your perusal, I've enclosed a New York Times article which is labeled as Exhibit number 2 in that packet as an example of a New York City venture to create an innovative cybersecurity hub. I believe our state-- most of our state's residents are unaware of the fact that LB989's forward looking at attempt to create a cutting edge and innovative local commuting solution with the best of intentions has morphed into a carte blanche usage of vehicles operating virtually unrestricted within our state-- unmanned vehicles, excuse me. The future of AV use is an important issue which will generally affect all residents in the state in Nebraska, and in some manner or another, and should not be subject to the cart before the horse approach. We ask that this body ensure our residents safety and well-being with a more responsible approach to this issue. We ask that these corrective legislate-- legis-- excuse me, legislative amendments mentioned above be made in LB989 to ensure the goal that we stand with you and in, in any attempt to protect the safety and well-being of our members and their family-- families, as well as all Nebraskans. Thank you for your time and consideration, and I am open to any questions you may have.

FRIESEN: [01:19:26] Thank you, Mr. Ostrata [SIC]. Any questions from the committee? Seeing none, thank you for your testimony.

PAT PFEIFER: [01:19:43] I'm bringing you homework.

FRIESEN: [01:19:45] Welcome.

PAT PFEIFER: [01:19:45] How are you doing, Senators. My name is Pat Pfeifer, P-a-t P-f-e-i-f-e-r. I represent the Brotherhood of Locomotive Engineers and Trainmen. I really don't have no skin in the game of this autonomous vehicle accept I will answer the question, Level 4 vehicles, yeah. We're running trains that are Level 4, push a button and it goes. When you get to these bills and

these laws, I caution you not to be less restrictive, but be more restrictive, technology fails. We used to have cabooses on trains. Remember those? Now we have a little button that controls the EOT on a train. That's what it's called. That if I need to get rid of my error, stop the train, hit a button. Well, we're making trains longer and longer and when you lose communications because of that-- I have two brothers that are dead out in Wyoming. Technology is great thing, I fought hard for positive train control and we're overlaying it with a automated system-- it will take jobs away, but technology fails. I run those every day. My members on the BNSF, CSX, Norfolk Southern, they run them every day, and every day their technology fails. They all run off of GPS. I had the opportunity to be out Washington, D.C., and I had a chat with Representative Darrell Issa, explaining what was going on with the automated trains and stuff. He told me that GPS grid was number one most vulnerable asset of this country. If the terrorists wanted to attack, they're gonna take it out. I haul some of the most nasty stuff in a world that would wipe out whole towns. I'm sure these truckers that are gonna be platooned, they do the same thing. We have that plootin-- platoon technology right now, it's called distributed power. I lose communication with that every day, technology fails. I think it's great to move forward. I think it's great to have that as a safety overlay. But if you put everything into technology, allow carte blanche, do whatever you want, you open up Pandora's box, and you can't ever close that box again. You can't ever take back something so when you write this bill-- you write this law, I'd caution you to be more restrictive. This is about big business. It's about replacing jobs with artificial intelligence, about machines, whatever. And this ain't financial for us, this is about the safety of our employees. This is safety of my brothers and sisters that go to work every day wondering if that technology is gonna work. It didn't for two people out in Wyoming, and they could of had radio repeater boxes which would have saved their lives. But instead you open up the technology, start running automated trains, and then pretty soon you start running double the automated trains as far as length. You lose part of other technology. This is a scary part, so I would caution you, and I would ask when you write this bill, write the bill for the people in Nebraska and not for these corporations, not for the companies that want to utilize

this. It's about the safety. I have nothing wrote down for you, so.

FRIESEN: [01:23:30] Thank you, Mr. Pfeifer. You a, you did pretty well just winging it, so.

PAT PFEIFER: [01:23:34] Well, I usually bring you homework.

FRIESEN: [01:23:36] Any questions from the committee? Seeing none, thank you for your testimony.

PAT PFEIFER: [01:23:40] Thank you.

FRIESEN: [01:23:51] Welcome.

RANDALL GEER: [01:23:52] Good morning, Senator Friesen. My name is Randal Geer, R-a-n-d-a-l-l G-e-e-r. I'm here with ABATE of Nebraska. As we would understand it, the AV technology has a great potential to save motorcyclist's lives. I'm here to resep-- represent motorcyclists. In the last year or so, several of the incidents that have been made to public view on, on the AV vehicles have been issues with motorcycles. At, at one congressional hearing this spring, they said that the technology fails to see a parked motorcycle almost 40 percent of the time. Now that, that technology will get better. All, all we're asking from ABATE Nebraska is that, that we be notified it publicly where these are going to be run on the roads so we can make a choice whether we want to flip a coin and go that way or not. We believe it should be posted on these routes that there's an autonomous vehicle running that route, so we can make a choice on whether to be there or not. And that's, basically, all I have to say.

FRIESEN: [01:25:07] OK, thank you, Mr. Geer. Questions from the committee? Seeing none,

thank you for your testimony. Anyone else wish to testify? Seeing none, I think we'll thank everyone for attending and I'll close the hearing. Thank you.