Noblis "Autonomy at Scale" Event

Remarks by Deputy Assistant Secretary Finch Fulton

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Good morning, everybody. Like he said, my name is Finch Fulton. I'm the Deputy Assistant Secretary for Transportation Policy. I've been at the Department for about two and a half years and, somehow, I landed the innovation portfolio, which is autonomous vehicles drones, some of the big data initiatives, all the fun, shiny things you can possibly get your hands on. Somehow, I got lucky enough to work on all of these things, so today I'm going to give sort of a high-level overview of all the initiatives the Department has going on.

I know that this is a very sophisticated audience, so I don't have to explain to you the importance of automated vehicles—the impact that could have for safety, removing some of the human error that goes into the over roughly 37,000 deaths that happen a year on American roadways and the greater number worldwide. You all understand this but, hopefully, I know that this is sponsored by Noblis. Thank you very much for having me, by the way; I know we have a great partnership with Nobilis, all the work that you're doing with the ITS Joint Program Office. Ken Leonard's here; he's the head of the office, he'll be talking more about all those initiatives right after me. But I know it's a wonderful partnership and we're able to do amazing things with technology so I'm going to talk through. You all also understand how we got where we are today, but I'll briefly touch on what that is.

Back in 2016, recent history, the previous administration put out a fascinating, wonderful document: it was the *Federal Automated Vehicle Policy Guidance* document that explored some of the big-picture questions around automated vehicles (how are we going to certify this, what regime will work, what are the impacts, what authorities do we need to bear, what are the big-picture questions that we have). It was wonderful and thought provoking. At the beginning of this administration, we put out a document trying to build forward on how we would shape the path forward. It was *AV 2.0* and this focused on safety first—how will we prove safety for automated vehicle systems.

Now, this did put a focus on voluntary self-safety assessments, which, you know, there's been some skepticism about whether or not a voluntary regime works, especially in the beginning of these new and emerging technologies. Today, we do have 17 of these that we've gotten in. We just got two more this week; we see more coming in the near future. And it's wonderful to be able to take all these directions for how to ensure safety of these technologies, compare them, learn from them, and build from them.

We see different companies and different approaches learning from each other by participating in these voluntary self-assessments. These are the areas that we ask them to focus on, but this document focusing on safety first serves as the cornerstone for our entire approach for the entire Department to how we address automated vehicles. So, from this cornerstone we've built out *AV 3.0*. This is the document that we put out at the end of last year; this is multimodal, so this is not the 2.0, focused on the vehicle safety itself building out from there. This sort of lays the foundation for all of our work going forward. This is multimodal, so it's more than just the vehicles that NHTSA ensures the safety of the vehicle equipment itself. This includes Federal Motor Carrier Safety Administration operations of trucks; the Transit Administration, which does a lot of funding of transit vehicles so they can shape what the future of transit vehicles looks like; as well as a lot of our other partners that include automation, such as the Maritime Administration with ports and shipping. The Federal Aviation Administration provided a lot of expertise with their experience of automation. Obviously, they have decades of experience with planes being automated hitting greater levels of safety and improving aviation operations.

We brought together the entire Department to make sure we had a holistic approach that would be consistent for years to come by including everyone in the Department in this initiative. As you can see, we laid out a number of key principles for how we address these things. We'll touch on that in a second in strategies for how we're going to be engaging with you and how we'd like you to engage with us so that we can make sure we build this together for something that works for all of our partners.

This document did provide new safety guidance building upon what we already knew. We hope it has done a good job reducing some of the policy uncertainty as we approach these questions, these big, hairy questions, and move forward and then, again, outlining the process for working with the Department of Transportation.

So first and foremost, and everything we do, we will always prioritize safety. This is important and, without safety coming first, the people will lose trust in this technology. That faith in it, it will go nowhere, and all of the potential that it has will go away, so this is has to be our North Star guiding everything we do.

We've heard a lot about our technology-neutral approach and this means for connected, automated, electric, shared, you name it, we want to be tech neutral. We're not going to mandate, we're not going to force these things. We have to let these technologies develop. We do want to, for example, protect the 5.9 gigahertz spectrum that is needed for vehicle communications so that they can coordinate so they can help improve safety there. But we don't want to say it must be DSRC, it must be CV 2x, must be some future 5g technology

that's being developed. We need to give the innovators and all of you the opportunity to come together to find the best technology that works in the long run.

But we do not want to be the chooser of technology, because the government doesn't have a terrific track record in that. We are going to modernize our regulations. We have to do that. You cannot put an automated vehicle without a steering wheel on the road today. We have to update the regulations to show how to do that safely. And so, we have a lot of work to do there.

We're going to be consistent in everything we do. That's why it's important to come together as a department to ensure that we all are on the same page so that, when you ask ITS JPO a question, you'll get the same answer as you would with NHTSA as you would with OST. We have to be consistent; we have to drive that one DOT approach.

We're going to prepare proactively for automation, and you'll hear us talking more about this, but this includes not only the critical path of updating the regulations to allow these technologies on the road but also thinking through the workforce impacts, the privacy security impacts, all of the other impacts that people are worried about. We don't [want] to play a role in addressing this; we will not have the opportunity. Things will not move as quickly as possible.

And, then, the sixth one is just ensuring that people understand we're not going to take away their ability to travel and to choose options on their own. We want to protect the freedoms that people know. They get very scared of these technologies, mostly because they're not on the road. We have some levels of technology on the road today, but we don't have truly autonomous vehicles on the road. People get scared, and so you have to make sure they understand that they can drive. I could drive my 2004 as long as I want. It's not going to be automated ever. We know that this is a future that we think makes sense, so I do want to focus on the cross-cutting issues.

One of the main things that we took a lot of effort ensuring that we had clarity— amongst ourselves, even—was shaping the federal role in these technologies. We are not the innovators ourselves, we are not the ones creating these technologies. We're the ones working with industry on these technologies. So that means we shouldn't develop the technologies, we shouldn't replace private-sector businesses, but the federal government does have a role in a number of cases where there are market failures or where the problems are so big that we have to have a full approach—and the key area that I like to point out is with accessibility and ensuring that these vehicles can work for people with all sorts of disabilities, so one of the things we made sure to get out before we put out *AV 3.0* and then we included it is the travel patterns of American adults with disabilities, we published this study but the point of this is the majority of Americans will have a disability at some point in their lifetime, whether it's from…well, you name it, or through becoming older and then losing mobility options, these

technologies can help address these issues, and so we need to keep them on the forefront. They can open up new labor opportunities that can help people connect with their family—people with disabilities suffer higher levels of loneliness, even, because they tend to be stuck at home, so we have to make sure that, as we work on these vehicles and as we work on these initiatives, we're thinking through all types of disabilities and working towards the North Star of universal accessibility and universal design.

So, this is a great opportunity to take all the research, the billions of dollars in research going towards automated vehicles to ensure we're shaping that and working proactively to make sure these technologies can work for people with cognitive, visual, auditory, mobility disabilities, you name it. We do have a wonderful opportunity—this is not a silver bullet, but if we can use this and build on the research, maybe we can even make some of today's systems and today's vehicles and today's challenges—we can address them by using the research, by using this momentum to leverage greater accessibility designs for vehicles in the near future, not waiting for the silver bullet of an automated, truly universally designed automated vehicle.

We have a number of wonderful initiatives and you're going to hear a lot from the Department in the future focusing on these issues. I think we have some great research projects going on, whether or not it's ITS for the underserved community or through the millions of dollars of spending through a tree through some of our vehicle design initiatives through NHTSA and just through the Department as a whole. This is a focus, so you're going to hear and see more from us because this is the federal role. We belong in this space, helping these technologies develop in these ways. One of the places that we focus this on is in the sixty million dollars we put out for the automated driving systems demonstration grants. So we received 73 applications—the application window closed in March—and I keep learning that "soon" in government doesn't mean the same thing as it meant in my previous job, but—soon, I think we'll be able to make some awards, but one of the key focuses there was when, I should say, first and foremost, it's the ability to demonstrate these technologies safely so people can see them, touch them, understand them, learn from them, develop a community for all that will be involved in these technologies to work together to allow the type of operations they feel comfortable with to happen in their communities.

This was a key part of the applications: they had to show everyone was on board and this is something we learned from the drone integration pilot program that the FAA has been conducting for a year and a half, two years now, where the key factor there was having to bring in the community. The FAA could probably preempt communities on everything in the air that they want; that doesn't mean people will accept it and, then, if you don't get the acceptance of the actual public, they will revolt against it, they'll work

with Congress, the technology will fail, and all the potential will go away. It is critical to let these technologies be introduced to the communities that are eager for them in ways that they want, that are collaborative, so that it is not rejected. So that's important and that is something that you'll see across all of these new technologies.

Also, the data that we need it is critical: the reason we do this is so that we can update our regulations, so we can update our standards. If we're not getting data that helps economists or that helps the lawyers making the rules prove the cost-benefit of these technologies, there's no reason to spend this money—if we cannot get data we can accelerate the path forward and one of the things that I'm hot to trot on about. We got 73 applications, they all offer different types of data that they would be willing to provide, so as we talk about data sharing and as we talk about having a safety goal that we're working towards, knowing what data is feasible that people are willing to offer now, granted, for millions of dollars, but it's a starting point: what is the data that is feasible for them to offer today? They can help us make these [rules]…so this is something I want to make sure we can get it out in people's hands to understand: here's what's offered now, here's what is feasible today. That's at least a good starting point so we can all have a common menu to start from, getting to this: these are the three focuses but, also, we have to ensure that one of the key requirements that we saw was vehicles that can prove accessibility concerns that can be used to improve accessibility.

So I understand truly, highly autonomous vehicles don't exist today in the way many people think about them, but how can we use today's technologies to improve? Paratransit is a good example that we've seen around the country, or some of the accessible vehicles that you see even driving around nearby: how can we use those and learn from those? So we see that and we call specifically for people that need wheelchair restraints, because that is a novel one that, if you don't call it specifically, people often don't quite think through the entirety of what that means, so you see that in this notice of funding. I hope that we will get everything we want, but we'll see. This is a tough program, these are high-profile dollars…these are American taxpayer dollars that need to support American innovation. The data requirements are tough…everyone has known that this has been a big problem, but it is tough to make sure that what people promise can actually be delivered. And that's something that Ken and his team have been working closely on for the entire Department on, this initiative. That's tough and it is not easy, so it's very interesting—again, it's coming out 'government-soon,' but we have a lot to learn from this program.

One of the other areas that Congress has been keen on, that the community has been keen on, that our union partners have been keen on is ensuring that we're preparing for the impacts to the workforce of these technologies. So, we're conducting a study alongside the

Department of Labor, Health and Human Services, and the Department of Commerce, which will come out government-soon, but we're close, I think, so this is focusing first on the impacts to truckers and then, second, impacts the truckers and transit operators. We will address things like package deliveries that aren't true, long-haul trucking; things like ride-sharing, taxi services, and a second part of the study that will come after we get the first one out and receive feedback on it.

But what we've seen—it's been interesting, and I'd say just highlight that there's six things in general that I think impact the nature of the turnover with what people need to be considering as they look at workforce impacts of automated vehicles, specifically to truckers. One is the technology has to be there. We can't predict when that will be; depending on who you ask, they may think it's very soon or they may be like it's going to take some time, but the technology is not there today. So, if you're looking at workforce impacts, is not today the starting point? Is not today the technology has to develop?

Secondly, the shape of what the trucking industry looks like: only 10% of the trucking industry are these major companies that do—I don't want to name-drop major companies that have more money to invest in fleets of trucks, so—only 10% are these major companies that will probably be the first to invest based on what we have here in these technologies, so that makes up a small part of the trucking fleet. 90% are those 10-trucks-or-less, mom-and-pop shops: they buy their trucks typically from the major industry partners after 7 years, 10 years, 13 years after they've been used significantly. That's when the fleet turns over to the secondary market, the 90% of the market, so go ahead and add a decade to what you may have already been thinking and expecting about when that might happen.

By the way, I say things like "a decade," [but] we're not trying to predict when this is going to happen. We know we don't know, so…think through that time period and then look at who managed those trucks or look at who the truck drivers are themselves. They tend to be people that are choosing this as a second job, they tend to be in their 50s and 60s, so we're not talking about a trucker today being impacted. We're talking about somebody that's choosing this as a second profession that has options or can get training or can be ready for this. The Department of Labor has tons of programs that they're making sure are included in this to ensure people can get the training they need, either for a different complexity of trucking or different types of jobs. One of the things that we've seen is new technologies; ATMs are an easy one, they certainly changed the way banks operate, but there have been more people employed by local banks because of ATMs that have been displaced, so jobs grew. These people choosing this industry, these opportunities will be able to choose different types of jobs or the same type of job. We don't know when that turnover will be, but the point is we have an opportunity to engage people making choices, not worrying as much about somebody having something pulled out from under them, and it's also worth noting that truckers are today

averaging 50 or 60 years old. They might decide to retire before these technologies come on board anyway, so that's something that the Teamsters and AFL-CIO and our partners that we've brought into the room have been telling us and thinking through these problems with us.

It's also worth noting that we have a shortage of truckers: this scope of it is differing depending on who you ask, but the American Trucking Association says it's a 50,000-trucker shortage today. That number is projected to go up…if it's 110 or 130 thousand by 2030, but the point is there's more demand at the demand for freights increasing, the demand for package delivery was increasing, federal hyoe [sic] has put out their household goods survey and we just see that the number is increasing dramatically to the point where people are taking fewer trips from their home to go get goods because Amazon does it for them. [I] have to remind myself not to name-drop companies but, [the] point is, people travel less to go pick up goods because it comes to them. This impacts the amount of need we need for freight, for trucking, for logistics—that demand is only going up from what we see. Don't know if that'll continue, but these are things you have to keep in mind as people who are concerned as we talk to our partners about what this technology could mean.

So, this is interesting to me, I think it'll—hopefully, we'll get this out this summer, in the near future, but one of the things that we included in *AV 3.0* and one of the things that's important is this is not the first time the Department has faced concerns over people losing their job because of automation. The FAA has dealt with this going back to the 70s, 80s, 90s as these technologies have developed. And what do we see today? Pilots are still very high, they're very highly respected, there's still a shortage of pilots, they're well-paid; this automation improved their lives in many ways. It improved safety and improved the quality of their jobs and they still exist. So, we don't know exactly what will happen, but we have seen this before, we've seen echoes of this. I did already talk about the spectrum, but I cannot emphasize enough how much focus that we've put on this because it is very important that all of our industry partners speak up about the potential for safety, the potential for connectivity, the potential for efficiency that this bit of spectrum can play and the technologies that are being developed and are in place today to take advantage of it. We do need to see greater, widespread use of this of this band, but it's not to say that the 700 million dollars the DOT has put in place to support this, the massive amount that our state and local partners have put in, all the projects that our industry partners have put in that utilize this band—we're at the point where…these are going to pick up more and more as time goes on. We need to make sure that this band is preserved for traffic safety purposes. So, if you're also interested in this you, might not want to pay attention and pay attention to opportunities to make sure that your voices are heard on this subject as well.

This is the map that is included in *AV 3.0* but sort of points out where around the country what deployments are played or are planned but, again, it's the message that it's not

like this isn't being used. It's like people who are developing the technologies to get it and, at some point, you're hit that tipping point where all vehicles are included in there potentially. Our industry partners are interested in including these technologies so, as we look at everything the government's doing, we have a number of initiatives. One is we have our comprehensive plan that Congress has been urging us to put forth. We addressed it in a few ways as part of that comprehensive plan: you have to look at all of the actions that the Department needs to take, all the actions that our industry partners need to take, all of the actions our state and local partners need to take, but in all of that you have a critical path because we can do everything we want. But if we do not update the regulations we will not get there, so we have actions but we have critical paths, so we're developing a comprehensive and that puts all this together. It will include your input. We have to have the best minds in these technologies give us their best guess as to what the step-by-step progress looks like but these are the building blocks that [we] are working from.

First one is the FMCSA one: this is a big, complex document, because instead of doing lots of little ones it made most the most sense for them to put it all together. So, this is a document that is really important for the future of commercial motor vehicles with how we're going to address automated vehicle technologies and what that means for those that do the inspections, what that means for operations and so on.

The other one that I wanted to point out is NIST's efforts to remove some of the regulatory barriers around the Federal Motor Vehicle Safety Standards. So, I love NIST's approach, they're doing it two ways at the same time: one, you have the step-by-step approach that goes into each and every single FMVSS; this is something we've been working with Virginia Tech on for a number of years and a number of probably you in the room for a number of years. But this is going piece by piece and looking at every single comment, every single period, every single word and figuring about what needs to be changed and what do we need to prove so we can make these updates.

This will take time and we see how fun this is with our drone initiatives to go into every single reg and update them piece by piece, this is important. And we're going to continue our focus on this but one of the things that I also love is—we call it "Heidi's principles," this is Heidi King, our Deputy Administrator of NHTSA. And she's trying to say, if we know we're going to have to make performance-based rules, we know we're going to have to do variable testing to figure out how to do it. We know we're going to have to do research to figure out how to do that, and we know the technology has to develop with us along the way so that we can get there. Well, what are the things…what are the performance-based rules we need to follow? The vehicle has to get from point A to point B, it has to protect the passenger, has to not hit people [or] things on the outside of the vehicle, and it has to follow all laws. Well, that sounds a lot simpler, obviously. It's complex in the way you have to actually prove that a vehicle can

perform to these levels, but we're also trying to get comments and build pathways there so we can figure out how we incorporate something that's simple, that my parents can understand the rules—that how these things operate, how can we take that so we're not just taking the step-by-step, comma-by-period approach, but all saying, "let's look at a new way to do this, maybe there's a better way, maybe it's all for naught, we need to do it this other way anyway." But we're exploring both pathways because we want to make sure that we have a system so that these vehicles can continue to evolve over time and not be stuck with prescriptive requirements that you have to go back again and again to update part of the critical path.

And part of the way this will develop—we have two opportunities in front of us that we've received comment on. One is the neuro petition [sic], and this is around package delivery vehicles. So, if you have the big, complex, hairy operations of moving people, what are the rules and what are the requirements that can change if there's no person in the vehicle? You don't need rearview mirrors, you don't need a lot of things to protect passengers, you don't need to put a seatbelt in there if no one's ever going to be in there. But, right now, the rules don't allow for it because they're not performance based and they never considered vehicles without people, so this is a great opportunity to take comment on to provide exemptions. When you provide an exemption, you put a number of requirements on things and include data sharing them and the like, allowing these if this should be approved, it would allow these vehicles to operate on the road. So we can learn from them and be able to create new categories for types of vehicles or types of operations that it doesn't make sense to put every requirement on. This is also something we learned from our drone world, where they're looking at all the requirements that don't make sense for aviation. When you have a small drone instead of a plane that's landing in front of us here, you don't need all those rules, so how can we do that?

The other one is General Motors. This is more of a…I guess it's not right to call it a "classical" vehicle, but this was with the first petition for exemption for an automated vehicle that we got in. And the reason that's been helpful is because it helped us figure out, all right, as we go through this process, what doesn't make sense anymore? We took action to fix the process or make it better last year by changing the rule of completeness. What this rule essentially meant was that any time the Department receives a petition for an exemption, they get to decide when it's complete and the clock doesn't start till then. Well, if you have clocks and you have these deadlines and you're supposed to put the emphasis on it, you just don't ever declare it 'complete.' And so, we've had petitions that sat in the Department for seven years, ten years; they just never declared them completes, they didn't want to work on it, and that's not the way government's supposed to work, so we removed this requirement.

When we get these in now, [the] clock starts and we got to start working on it. We put for public comment, so it better be game ready because we're not going to fix it, we're not going to do teen [sic] whether or not you're complete. When people come to us for an

exemption petition now, it's going public right away, so they better be ready, that it. You go straight to final exam. And I think this is good, this is a way you can improve government: by removing unnecessary burdens and streamlining the system, it makes sense when people see real ways we're improving the process. So that petition has been super helpful, it's been on our dockets for too long but it's because we changed the system itself to make sure we can handle these in the future.

So, I've talked through our approach—taking that cornerstone of safety, laying a foundation so we have a one DOT approach—this looking at both the critical path and all the other things that are vitally important to gain public trust and to ensure that we're proactively thinking about these technologies.

One other thing that I want to bring up is it's fascinating how much we don't know about what the federal government's already doing to support these technologies, because I can talk pretty knowledgeably about what DOT's doing and talk even more knowledgeably, I'm sure, about what DOT is doing but I couldn't really tell you what DoD is doing now. I have a hard time telling you how DOJ addresses these issues. We've been working with Labor and Health and Human Services and Commerce, but what we've done is we're starting to work in an interagency fashion through the White House to start simple. We have to take an inventory of all the actions the federal government is doing around rules, around research, around initiatives, pilot programs so we can put it all in one place so everyone understands the entire ecosystem of the federal government for what's going on. We can align these things, we can ensure we're all on the same page, we can accelerate things.

The Department of Energy has hundreds of millions of dollars that they're spending on technologies that can enable automated vehicles in the way industry is thinking about doing it. Wouldn't it be great if we're all better aligned so that their hundred million dollars—we could put two million dollars on top of it and suddenly get something that's fascinatingly useful for our rule makers and for our industry?

So we're doing this right now, we already have people over the White House, it's a big effort. It's an interesting effort but, as we talk about the comprehensive plan, the critical path and the other things—it's important for everyone to have all the pieces to know what needs to go in that and to know what makes sense to do in what order you got to do this. And this is something that we don't have today, and this is a great effort that, hopefully, we'll get out government-soon. I still don't know what that means, but it's something we're working on in real time and it really, I think, will help shape the path forward, so the Department is doing so many tremendously interesting, exciting things, and that I'm just excited to work with you all on.

So I have like a minute left to take questions, but if you have hard questions, Ken's coming on a minute after me, so you can ask him those. But thank you all very much.

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