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March 21, 2017

To: The Honorable Members of the Senate and House Transportation
Committees

From: Samuel R. Marshall

**Re: Senate Bill 427 – PennDOT's role in authorizing and regulating the
testing of self-driving cars on Pennsylvania's roadways**

Thank you for the chance to bat clean-up for this impressive group. When insurers raise questions about regulating the testing of self-driving cars, we sometimes get portrayed as the Flintstones opining on the Jetsons – we're labeled as part of an outdated economy resisting change, with some suggesting we don't want self-driving cars because they'll be so safe that insurance will be obsolete.

Nothing could be further from the truth. We have a long record of promoting safety: We've pushed for lower speed limits, mandatory helmets for motorcyclists, primary enforcement of seat belt laws, strong anti-texting laws, and high automotive safety measures. We haven't always succeeded in those and similar initiatives, but I don't think anyone can seriously say our industry doesn't want greater safety on our roads.

That's why we're conflicted on self-driving cars. We approach this purely from a safety perspective. So we see considerable potential in their ability to reduce auto accidents and injuries, and we're eager to see their technological advancements translate into safer cars and better driving.

At the same time, we have safety concerns when we're talking about allowing unproven technology and experimental cars to be tested on public roads. Granted, that has to be done, but it should be done with a clear regulatory framework in place from the outset to ensure adequate safety measures and meaningful ongoing oversight and regulation. The promise of tomorrow can't be pursued at the expense of the safety of today.

Page two

That's our concern with this draft of Senate Bill 427: We don't think it establishes a regulatory structure with adequate standards for and ongoing supervision of the testing of these experimental cars on our roadways.

We're not going to be able to cover that in depth in our allotted fifteen minutes, and it's already been a long hearing. So we've attached a section-by-section review of the bill with specific questions and suggestions, and we welcome the chance for further meeting with you, other stakeholders and PennDOT.

But here are a few key considerations that should be expressly spelled out in any bill authorizing the experimental testing of self-driving cars on our roads:

- **The bill should spell out the insurance requirements of HAV testers and operators and their liability in the event of an accident.**

We'll start with an insurance-specific concern: What are the insurance requirements of HAV testers and operators, and how are they to respond to claimants in the event of an accident? The bill doesn't say much, and it is confusing as to who is "driving" the car at various levels for liability purposes.

Further, the HAV tester may or may not be the entity responsible for the computer system, which is likely the one responsible in an accident, so it is unclear how or against whom a claimant would proceed.

We're all unwittingly going to be taking part in the testing of these experimental cars. The bill should at least make sure any accidents are fully and readily compensated, and it should provide clarity as to who is liable among those involved with testing these cars – the HAV tester, the test operator, or some other party involved with the test car.

- **The bill should clearly set forth what an applicant has to submit to PennDOT and the standards PennDOT is to apply in reviewing the application.**

Section 3611 says PennDOT "shall collect information" from an applicant "in a manner consistent with applicable Federal laws, regulations and guidelines to determine the safe testing and management" of these experimental cars.

Page three

That doesn't mean much. Why not list the information an applicant has to submit to PennDOT and how PennDOT is to review it? If all that is still being determined, at least require that PennDOT publish what it requires and how it evaluates what is submitted. The language may suggest that – but that isn't what it says.

- **The bill should clarify the level for which an applicant is applying, and how PennDOT will evaluate any change in those levels.**

There are different test levels for these experimental cars. The bill should clarify what level an applicant is applying for, and it should clarify that an applicant seeking to move from one level to another should submit a separate application and go through a separate review.

- **The bill should require that an applicant detail its cybersecurity procedures, and PennDOT should have standards for measuring the adequacy of those procedures.**

These are computer-driven cars, so they are only as safe as their computers are secure – and yet the bill barely touches this. We're talking about experimental computer-driven cars, so the oversight of their cybersecurity systems should be of paramount concern to PennDOT and should be expressly made part of any enabling legislation.

- **The bill should require that an HAV tester immediately and regularly report to PennDOT any cybersecurity breach, computer malfunction, or instances of human intervention or override.**

PennDOT should not be just evaluating an applicant; it should also be regulating an approved applicant on the key safety functions. The bill should require that HAV testers report to PennDOT any cybersecurity breaches, computer malfunctions and needed human intervention in the testing process. That's the only way PennDOT will know of safety problems so it can step in to protect the safety of others on our roadways.

Page four

- **The bill should clarify and coordinate the roles of PennDOT and those of NHTSA and the Society of Automotive Engineers, and any other states also allowing testing.**

The standards for HAVs, and for the testing of them, are going to be a mix of federal and state regulation. Let's make sure that's a coordinated mix.

The bill should expressly require that PennDOT work in conjunction with NHTSA – and with the SAE, since it is also a key player. Everyone talks about NHTSA having oversight of some functions, and state agencies having oversight of others. Let's make sure the bill expressly denotes those responsibilities and that PennDOT is coordinating its oversight with whatever NHTSA is doing.

As impressive as today's panels have been, they haven't included NHTSA or the SAE – but you need to hear from them, too, to evaluate if there is coordinated supervision of the testing of these experimental cars to assure adequate public safety. Yes, NHTSA came out with guidelines last September – but those don't give much insight on how to set up a coordinated federal and state regulatory structure that ensures high safety standards for those looking to test these cars. And those guidelines are being re-evaluated by U.S. Department of Transportation Secretary Chao anyway.

We don't think these recommendations are onerous or will stifle the efforts of those developing and testing self-driving cars in Pennsylvania. They are similar to the regulatory structure you've established for our own industry to protect the public. And they are far more welcoming than what, for instance, the FDA requires to bring an experimental drug to market.

As much as we want Pennsylvania to attract these innovators, this bill shouldn't be rushed to the Governor's desk at the expense of public safety or with a blind eye instead of ongoing supervision.

Let's be candid: We all look forward to driverless cars – but you might not want an experimental one driving next to you, at least unless you know it is subject to the oversight of a coordinated regulatory structure. We hope you make the improvements to this bill that will establish that structure, and we welcome that chance to be part of that effort.

Page five

We realize this comes across as a wet blanket. So we'll close with some observations from last Thursday's Bosch Connected World Conference:

- Bosch CEO Volkmar Denner noted truly self-driving cars are a long ways off, saying, "Of course, we still have to prove that an autonomous car does better in driving and has less accidents than a human being."
- Nvidia CEO Jen-Hsun Huang noted the challenge of getting computers to write their own code for this – a decade-long effort and counting – saying, "No human could write enough code to capture the vast diversity and complexity that we do so easily, called driving."

The recommendations we've offered today are consistent with that: This is a long, arduous and risky process. The regulation of it should be flexible and encouraging – but also thorough and accountable, because this really is as risky as it is exciting.

We'll close with a parallel to the recent law establishing regulatory oversight of the TNC industry. That process started with wariness from all sides, but it ended with everyone learning from each other and arriving at a law that hasn't stifled innovation – but has made sure that innovation is being safely provided to consumers. We welcome the same result here.

Senate Bill 427 – The Insurance Federation’s section-by-section comments

Subchapter A – Definitions

“Automated vehicle tester”: This is a key definition, as this is who is applying to PennDOT and who, along with the driver, is liable – the bill essentially applies only to it. Given that, it is an unduly limited definition – just the entity testing the HAV on a trafficway. That may be different than entities who make key components of HAVs, as with the software, and who might be the ones who should be liable in an accident and should be reporting to PennDOT. We’re seeing considerable synergy between technological companies and car manufacturers, with the development of HAVs a shared endeavor among many entities. That’s to be expected, but all entities involved with the HAV’s key features – certainly those involved with “the hardware and software that performs the dynamic-driving task” - should be identified and made part of the regulatory oversight structure.

“Dynamic-driving task”: This lists a number of functions that “may” be included. It should be “shall” include – otherwise the bill nonsensically could be read to not include these terms.

“Highly automated vehicle system”: This says the computer system “performing the dynamic-driving task” (i.e., driving the car) “falls under the Society of Automotive Engineers’ Level 3, 4 or 5 as specified under Standard J3016 and accepted by the National Highway Traffic Safety Administration.” What does that mean, and does any of it also “fall under” PennDOT’s auspices? What is meant by “falling under” those three levels anyway? What happens if the SAE changes those levels, or NHTSA no longer accepts those levels – or if “Standard J3016” changes or ceases to exist? Can the state defer to the SAE, and what does that mean?

Given the importance of Levels 3, 4 and 5, the SAE and NHTSA, they should also be defined – and with some forethought about any successor levels or designations that may emerge. That’s especially true with the SAE, as it is a private entity, not a fellow agency with at least some governmental accountability.

“Manufacturer”: This is a broad definition, meaning a particular HAV may have more than one manufacturer. That makes sense, but the bill regulates a manufacturer only if it is the one doing the actual testing of the HAV – so a manufacturer might avoid regulatory oversight under the bill, and thereby avoid the bill’s liability and insurance requirements, even though it makes the experimental car. This again shows the problem of the bill’s focus on the “automated vehicle tester,” without any oversight of the others involved with the development of the car – and with these experimental cars, developing is as important as testing.

“Test operator”: What does it mean to be “not be primarily responsible for the dynamic-driving task” – can the operator still be partially responsible for that? What standards will PennDOT apply in licensing these people, beyond their having standard licenses and beyond what their employers (the HAV testers) might do in their own (unregulated) training? If the operator “is responsible for certain aspects of the highly automated vehicle system,” PennDOT should know that – that potentially makes the operator more important than the tester. And what is meant by an operator “being capable of being liable” for testing? One isn’t capable of being liable – one is or is not liable; is this meant to go to insurance requirements for operators?

Is this definition meant to say that an “operator” is a person who, whether in the car or remotely, who performs one or more of the “dynamic-driving task” if the computer hardware and software malfunction? If so, it should be clearly state that, with the recognition that the operator is only the back-up: The primary test operator, at every level, is the computer; the human operator only comes in after the computer operator has had a problem driving the test car. That’s a big distinction generally, and certainly for liability purposes.

Subchapter B – Testing authorization

Section 3611 – Application for testing authorization

Subsection (a): This suggests an automated vehicle tester needs only one approval, even if it starts at Level 3 and hopes to advance to Levels 4 and 5. Each level merits a separate application and review. The \$200 application fee for an HAV tester is ludicrously low in relation to the cost of reviewing the application – at least if PennDOT is doing much in the way of review.

Subsection (b): Subsection (1) should state that the applicant has to submit information required by PennDOT, and it should list the areas of information PennDOT should require, or at least require that PennDOT publish such information – and it should apply for a particular level. If the intent is that PennDOT shall require the information NHTSA has set forth in in September, 2016 guideline, then say it – but that guideline is more a list of areas than items for PennDOT to review, and it is in flux. This subsection is vague as to what, if any, insurance coverage an applicant should have – and it goes only to the automated vehicle tester, not the test operator or the other entities involved in developing the car. That makes for a weak assurance of coverage in the event of an accident.

Subsection (2) contemplates PennDOT identifying and approving this information even after an application has been approved. What does that mean? If it means ongoing review of certain areas, as with quarterly reports, great; and it could mean PennDOT will ask approved applicants to keep their applications updated in the event of NHTSA changes – also great. But that should be clarified – and if NHTSA (or the SAE) makes changes, applicants should have a fixed period of time to update their information with PennDOT and be approved.

Subsection (3) is hard to understand. Is public comment invited only about the general application process, or about specific applications? If the latter, how will PennDOT give public notice of an application? With the bill giving PennDOT only 15 business days to decide on an application, how much writing to either the applicant or the public will there be? And this subsection envisions PennDOT “identifying and approving” the information it collects – can it also disapprove?

Subsection (c): These are applications to operate experimental, computer-driven cars on public roads – no small feat - and PennDOT has only 15 business days to decide? It takes longer on far less significant applications. This should not be a cursory review or rubber stamp.

Subsection (3) presumes any denial is based on a need for additional information as opposed to failing to satisfy whatever the standards are. It should allow PennDOT to disapprove an applicant because it fails to satisfy its standards, not just that it didn't finish the application.

Subsection (5) says PennDOT can limit the number of applicants it will approve in the first two years. Why? How is that limit to be determined? This raise the possibility of a “first come/first serve” process rather than an application system that invites all qualified entities. Applications should be approved judiciously, not arbitrarily.

Subsection (d): We think subsection (2) is meant to say “if”, not “unless”, with respect to NHTSA approving a different form of identification.

Subsection (e): Why is this subsection necessary? Are there any potential automated vehicle testers operating on public roads at levels 3 through 5? If there are, they should be immediately required to file their applications, not given another year of no regulatory oversight or accountability. And what is a “potential” automated vehicle tester anyway?

This section should also provide for the coordination of PennDOT’s review with that of NHTSA (and maybe the SAE). PennDOT’s approval should be conditioned on an applicant also having approval to test a car at a particular level from NHTSA, and the applicant should be required to include that information as part of its application. We understand why the regulation of these experimental cars includes both federal and state agencies – that’s why any enabling legislation should require coordination of those agencies and of any outside entity involved here, as with the SAE.

This Chapter provides only for applications of automated vehicle testers, not test operators. Maybe the goal is to fully defer the supervision of test operators to the automated vehicle tester with whom the operator “is authorized by, employed by or affiliated with”. But given the broad scope of these operators as they are defined in this draft, and their potential financial responsibility in covering any damages, PennDOT should have more direct oversight – these are the people who are supposed to jump in if a computer being tested has a problem, so they are integral to the safety of the testing process.

Subchapter C – Testing

Section 3621 – HAV and platooning testing

Subsection (a): An automated vehicle tester doesn’t “possess” a statement of policy, so we’re not sure what this means.

Subsection (b): So PennDOT, the state police and the commission can provide “recommendations” to automated vehicle testers, but the testers don’t have to do anything with them? If PennDOT were to “recommend” that a tester hold off testing until any computer glitches were remedied, could the tester ignore it?

Subsection (c): This needs to be cleaned up. It says in level 3, a test car “shall be occupied or controlled remotely”. It should clarify that the car shall be occupied by a test operator capable of taking over if the computer misfunctions. At levels 4 and 5, this says a test operator “may” be involved – either in the car or remotely. Does that mean that at these levels, a test operator isn’t required – that the test car can be operator exclusively by computer? If so, that should be clearly stated.

This goes to the need for an automated vehicle tester to make separate applications for each level. Those are dramatically different types of experimental cars and they will be operating on public roads in dramatically different ways.

Subsection (d): Subsection (1) should be merged with subsection (a)(2). What does subsection (2) mean – PennDOT “may” notify an automated vehicle tester of changes to state and local traffic laws? What happens if it doesn’t? The bill should clearly state that an automated vehicle tester should show, as part of the application review, that it has a hardware and software program in place that can keep up with these changes.

Subsection (e) and (f): These sections don’t require reporting by automated vehicle testers to PennDOT in the way of not just accident reports, but any computer malfunctions, or cyber intrusions or needed human interventions or overrides. These are experimental cars being tested on public roads. How can PennDOT oversee this to protect the public’s safety without this information? These sections should require that reporting, and on a real-time basis so PennDOT can take real-time action.

Section 3622 – Audit of permit compliance

PennDOT should be monitoring how automated vehicle testers are doing on an ongoing basis, not just biennial audits. With the technology and testing rapidly evolving, two years is too long. Also, the bill should require that an automated

tester pays PennDOT's expenses for these audits (that's how financial and market conduct exams of insurers are paid). PennDOT's monitoring should not be limited by budget constraints.

Subchapter D – Inspections

Section 3631 – Safety and emissions inspections

Granted, these test cars should be subject to standard safety and emission inspections. But that highlights the need to also have their self-driving technology inspected.

Subchapter F – Liability

Section 3651 – Liability for violations

This provides that the “driver” in level 3 is the test operator, whereas the “driver” in levels 4 and 5 is the automated vehicle tester – but only for violations of this chapter, not generally. We’re not sure what violations of this chapter apply to “drivers” anyway, so we’re not sure what impact or meaning this section has: The rest of the chapter doesn’t talk about “drivers.”

If this is meant to apply to general liability – namely, liability for accidents and damages arising out of the testing of these experimental vehicles – the section should expressly state that. To that end, we recommend the bill clearly make the automated vehicle tester liable for claims arising out of the testing of these vehicles on public roads. That is the only entity regulated by PennDOT and the only one required to have insurance. Besides, the test operator is an employee or affiliate of the automated vehicle tester, and the operator’s role is limited to intervening if the principal driver – the computer – malfunctions. We’re not sure what special rules apply to “drivers” of these test cars at any level – but clearly the automated vehicle tester should be the one primarily responsible at each of them.

The bill should also clarify that the automated vehicle tester is liable for damages even if an accident involving a test car is caused not by the automated vehicle tester or the test operator, but by another entity involved in the development of the test car. As noted in the definitions section, the tester might not be the one who developed the computer system or other parts of the test car; in fact, that

entity (or entities) isn't covered by any of this bill despite being integral to the development of the test car. Consumers injured by an experimental car shouldn't have to search for the entity who might be liable; that entity should clearly be the only one PennDOT is allowing to test the car on public roads – in the parlance of the bill, the automated vehicle tester.

Section 3652 – Construction of chapter

What causes of action are referenced, specifically or otherwise, in this chapter?
We don't see any, so we're not sure what this section means

Subchapter G – Platooning

Section 3661 – Platooning on trafficways

Subsection (a): This again refers to an automated vehicle tester “possessing a statement of policy”. We're not sure what this means.

Subsection (d): This says each car in platooning “shall be occupied by at least one test operator”, and presumably at every level. We agree. Why isn't the same standard applied when an automated vehicle is being tested outside of a platoon? Does the bill envision a different safety risk in platooning than in testing of individual automated vehicles in levels 4 and 5?

Subchapter H – Statement of Policy

Section 3671 – Issuance of a statement of policy

Subsection (a): This allows PennDOT to issue statements of policy “relating to this chapter.” We think it means implementing this chapter – as with setting the standards for approving applications from automated vehicle tester. “Relating” and “implementing” are very different terms: “Relating” allows for waiving or amending these statutory requisites – “implementing” means interpreting, applying and enforcing them.

And “statement of policy” should be defined: Generally, it is an agency's statement of how it reads or applies a statute or regulation, with the caveat that it

doesn't have the force and effect of a statute or regulation. We're not sure what it means here, especially given the preceding sections' reference to testers "possessing" these statements.

We understand the purpose of this section is to allow PennDOT to supply detail to the bills' elements without having to go through the IRRC process. We think doing that by statute is a bad precedent. If the General Assembly does so here, it should have certain limits:

- This should be limited to Subchapters B and maybe C and J. The other subchapters don't justify this lesser standard of regulatory accountability.
- Why PennDOT should be able to publish these statements of policy through means other than (instead of in addition to?) the **PA Bulletin**.

Subsection (c): This allows public comment on a statement of policy. That opportunity should come before, not just after, a statement of policy is issued.

This section needs to be reconciled with Section 3685, which says PennDOT "shall" – not may – promulgate regulations to suspend or cancel a permit issued to an automated vehicle tester. Accepting the rationale for giving PennDOT the expediency of statements of policy, why wouldn't that apply to enforcement matters?

Subsection I – Penalties

Sections 3681 and 3682 – Permit and registration suspension and cancellation

These are weak penalties, certainly compared to regulatory penalties on insurers. And they arguably only take effect if and after PennDOT promulgates regulations under Section 3685. They raise questions on both penalties and enforcement:

- Can PennDOT suspend or cancel a permit issued to an HAV tester before, or only after, a hearing? Can it issue a temporary injunction on testing if it uncovers a safety concern, or must it first have a formal administrative hearing?

- What actions allow for suspension or cancellation? What happens if PennDOT learns an automated vehicle is experiencing computer problems? How can it take quick regulatory action to get the car off the road?
- How will PennDOT know of actions that might merit a suspension or cancellation – as with accidents, computer glitches, cyber intrusions and the need for human intervention in testing? If automated vehicle testers don't have to report any of this to PennDOT, and if PennDOT is only auditing these testers once every two years, the penalties are more in theory than in practice.

Section 3685 – Regulations

This says PennDOT shall first promulgate regulations before it can pursue the major penalty sections. If the IRRRC process is too slow elsewhere, why is it good here?

We appreciate the goal of welcoming automated vehicle testers to Pennsylvania. But that shouldn't short-change PennDOT's ability to learn how these testers are doing and to take prompt action if they are not doing well.

Subchapter J – Confidentiality

Section 3691 – Confidential information

This prevents the reports of automated vehicle testers from being publicly available, at least if it would mean disclosing proprietary information (we're not sure what is meant by "personally identifiable information"). Our concern is the lack of reports going to PennDOT – not just with accidents, but malfunctions, overrides, cyber intrusions and the like. An automated vehicle tester may not want its competitors to know of problems, but PennDOT should.

We are also concerned with whether this section impacts investigating an accident and litigation arising out of an accident. This section shields pertinent information from being available to third parties involved in accidents with automated test vehicles, and to a greater degree than those parties currently have against "regular" car manufacturers in claims involving manufacturing or design defect.

Subchapter M – Reporting

Section 3691.31 – Reports on HAVs and platooning

This call for a January 1, 2020 report from PennDOT, with the singular focus on changes needed to get self-driving cars on public roads – the “overcoming barriers report” in subsection (b).

This should be broadened to require that PennDOT report on results of automated vehicle testing: How are the approved applicants doing, and at what levels, with how much testing and where, and with what results? That’s the best way for PennDOT to assure public safety in its regulation the testing of these experimental cars.

Also missing is a requirement for ongoing reporting from automated vehicle testers to PennDOT. Again, if PennDOT is to properly oversee the testing of these cars, it needs to get ongoing reports from them, not just rely on its own audit in a couple of years.

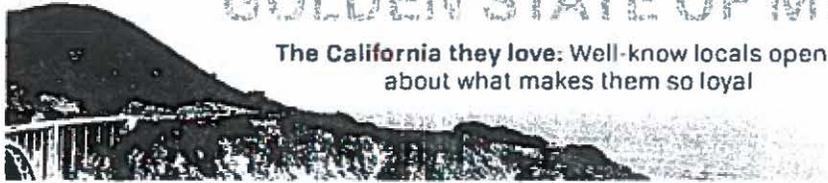
Subchapter N – Reciprocity

Any reciprocal agreement should be limited to states and others with standards substantially similar to those of PennDOT.

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12:04 AM PST

Uber's self-driving cars ran through 6 stoplights in California, NY Times says

Documents cast doubt on Uber's claims that a red light video was due to "human error."

By [Michael Grunwald](#) and [David Streitfeld](#)



AP Photo/Chris Wedel

1/32

According to internal documents, Uber's self-driving cars ran six red lights in the short span of time that the company was shuttling customers around in autonomous vehicles in San Francisco, California.

The autonomous vehicle pilot program was launched in 2015 and quickly drew controversy as the media noted that Uber wasn't registered on the California DMV's list of companies approved to test self-driving cars.

The documents, obtained by [The Wall Street Journal](#) through a public records request also showed that the California DMV had warned Uber for months prior to the launch of its pilot program that it would need an autonomous testing permit to drive on California's roads.

Uber maintained that it didn't register in California because its cars are not truly autonomous cars but simply cars with Advanced Driver Assist Systems (ADAS), which do not require a permit to drive in California. The California DMV countered that the

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California

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vehicles were, in fact, autonomous under DMV standards, and the company had not been notified of the DMV's decision to suspend its license for Uber's autonomous cars. Uber announced that it would stop its pilot program in San Francisco and take the program to Arizona.

If Uber had obtained an autonomous testing license under California's guidelines, the company would have had to provide a safety plan, as well as how often engineers testing the system had to disengage.

During the squabble between Uber and the California DMV, a video was released in which an Uber self-driving car was seen driving through a red light at an intersection in San Francisco in front of the Museum of Modern Art. At the time, Uber spokesperson Chelsea Kohler stated that the incident was due to human error: "This is why we believe so much in making the roads safer by building self-driving Ubers."

But the unnamed sources provided *The New York Times* with company documents noting that, "In this case, the car went through a red light," and it did so on five other occasions.

"All told, the mapping programs used by Uber's cars failed to recognize six traffic lights in the San Francisco area," the *Times* wrote.

According to *NYT*, Kohler clarified on Friday: "Our self-driving technology required human intervention. The vehicle operator had time to intervene, but failed to take over before crossing the stop line and manually proceeded through the protected crosswalk."

Ars contacted Uber for additional information, but the company has not responded.

Ars also contacted the Arizona DMV on the status of Uber's pilot program within the state. The public information office responded with the statement: "ADOT works with Uber and other companies testing self-driving technology to create the most supportive environment possible while also promoting public safety."

The revelations are more bad news for a company that just last week was [clipped](#) with a lawsuit from Waymo, (Google's self-driving car division) that alleges Anthony Levandowski, a former Google autonomous car engineer and a current Uber engineer, stole company trade secrets and infringed a patent.

Megan H. Long

Megan is a staff editor at Ars Technica. She writes breaking news and has a background in fact-checking and research.

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