

Testimony before  
**Senate Transportation Committee**

Michael DeKort – Dactle LLC

February 8<sup>nd</sup> 2022

**Oppose SB 379**

Mr. Chairman and members of the committee,

My name is Michael DeKort. I am a former system engineer, engineering, and program manager for Lockheed Martin. For the past four years I have been heavily involved in the air and ground autonomous vehicle industries including on several SAE (Society of Automotive Engineers) committees including those for driverless vehicle testing, Artificial Intelligence, and simulation. I am also a member of the system integration and test group for USDOT VOICES (Virtual Open Innovation Collaborative Environment for Safety). While at Lockheed I worked in aircraft simulation, was the software engineering manager for all of NORAD, a software project manager on an Aegis Weapon System program, and a Command, Control, Communications, Computers Intelligence, Surveillance and Reconnaissance systems engineer on the U.S. Coast Guard Deepwater Program. That ongoing effort is a \$24 billion program to upgrade the Coast Guard after 9/11. It was on that effort that I became a whistleblower in 2006. I reported significant safety and security issues to the DHS IG and eventually the DoJ. I also made a YouTube video exposing the issues. That led to my being a lead witness at a congressional hearing, being on 60 Minutes, in a documentary movie, several books on ethics and receiving the IEEE Barus Ethics Award presented to me by the late Rep. Elijah Cummings. I mentioned that resume because I want to establish some verifiable credibility before I tell you exactly while I am here. (I would like to note the editor of SAE's Autonomous Vehicle magazine recently wrote an article stating I was "prescient" regarding my opinions on how the driverless vehicle industry is developing and testing their systems, especially Tesla. And should have been listened to four years ago.)

The reason I am here in opposition to the bill is not because I am against the creation and use of autonomous vehicles. I am largely in support of that technology both for commercial and military use. What I am in opposition to is the approach the industry is using to develop and test that technology. That approach is untenable from a time, cost, and safety point of view. The approach relies on several untenable parts to reach a driverless state of SAE Level 4. Those being the extremely immature state of general and deep learning, the use of the real-world for most of the development and testing and gaming-based simulation. Combined, these will never create an autonomous systems and save the lives the industry wants to save. Rand estimated the miles it would take to stumble and restumble on enough scenarios to learn them, without even considering the extreme immaturity and lack of inference capability of general and deep learning, would be 500 billion miles. Toyota said it was a trillion miles. My extremely conservative cost estimate for that trillion miles is \$300 billion. But the most concerning part is the literal sacrifice of human beings inside and outside the vehicles to train the machine learning. Machine learning require scenarios be experienced to be learned. That requires massive repetition until the neural networks are adjusted and retested enough times to drive

the error rate to an acceptable point. While some inference will occur, many crash and edge case scenarios will have to be experienced hundreds or thousands of times each. That means those “safety drivers” cannot disengage in many cases. This so the scenarios can be experienced, and the data gathered. Or the human test subject will not be able to safely disengage at the last moment between when the data is gathered, and the crash occurs. Largely due to not being able to obtain enough situational awareness in time critical scenarios to do the right thing the right way. It is at this point someone might suggest simulation is used. While that is the solution, the problem here is the industry relies on gaming simulation technology, instead of simulation technology from aerospace and DoD. This brings us to the entire solution. The industry should adopt that simulation technology, which would be informed and validated by the real-world and augment it with a progressive engineering and safety due diligence approach to prove the technology is ready for the real-world. As well as to justify when real-world “safety driving” is necessary. And when it, is those events should be run like a movie set. Not the haphazard events being run now involving needless public guinea pigs inside and outside the vehicles for the purpose of hype and building false confidence. (I should note here that this is exactly the process USDOT VOICES recommends. The problem here is they are being ignored by NHTSA and the industry echo chamber.) Beyond this is the establishment of an autonomous systems driver’s test. That test would include information on what scenarios were tested successfully, proof of the fidelity of the models used in the simulation and disengagement data to include when the human disengaged to avoid a crash. Not only is none of that being done, Waymo just sued the California DMV to avoid providing far less than this information. I ask you. If Waymo or anyone else were actually building the driverless systems they say they are, wouldn’t they rush to provide proof to build trust and even differentiate themselves from others? I submit to you that none of this is happening because we are in an echo chamber of largely IT developers who have little actual domain or systems engineering experience. A group of people who got in way over their heads and now cannot find the courage or ethical fortitude admit the king has no clothes. If you look at human history, including the aerospace industry in the 50s, you will see an unfortunate pattern. Human beings, especially when they are in for-profit companies, do not make significant grassroots changes, especially regarding safety, without an outside forcing factor. That forcing factor is usually progressive tragedies, press coverage, hearings, and laws. To date at least eleven people have been killed needlessly in this process. One in an Uber and ten in a Tesla. The majority have been in Tesla’s for a variety of reasons including their sensor system is incompetent, they use non-trained customer Guinea pigs, their driver monitor system encourages crashes through 20 second or longer alarms and they name their products “Autopilot” and Full Self Driving” which are clearly misleading. Make no mistake about it though, while Tesla is the most egregious, the others will harm and kill people needlessly as well. They cannot keep disengaging, avoiding complex and dangerous scenarios forever. And that includes trucking. While the highway operational design domain is less complex that for urban environments, it will not escape the time, cost, and safety issues I raised here. In closing I wish to state that I am well aware that my point of view here is outside the “conventional wisdom”. However, I suggest that if you apply common sense independent of the masses you will see all of this makes sense. Beyond that, please question the industry about what I have said here. But please be extremely specific and ask for responses in writing. This to avoid their dodging, misdirecting, or avoiding your inquiry.

I would like to note here that the section that follows is not part of my submitted testimony. It was added as a result of my being able to watch the first hearing. As this is involves critical safety issues I wanted to ensure this was entered into the record.

Gatik significantly misled this committee. To a point of gross negligence. They will injure or fatally injure your constituents. I have filed a complaint with the DOT IG on this matter.

- Gatik stated they reported all crashes. This is misleading. I would suggest asking them for all disengagement data including crashes that would have occurred if the safety driver did not intervene. As these are hidden and awaiting crashes. I also suggest asking them if they have learned all relevant crash scenarios, how they did that and to prove it.
- The fixed, repeatable routes approach does make the development easier and safer. However, in the big scheme of things, especially regarding handling what is still a massive number of scenarios, objects, and degraded objects, as well as the use of machine and deep learning, this is still far too much work, too expensive and too dangerous to complete relying on the real-world. The deterministic part mentioned is also misleading because any single location still must deal with every variation of object, scenario and crash scenario that could occur at those location. And that list is massive.
- Gatik stated they have a “100% safety record across each of their operational sites”. This is only true because they have made notable strides and they use “safety drivers” to disengage away from crashes. Thus, not learning them. This means they are not actually able to drive better than a human but are good enough, with that “safety driver” and their actual accomplishments to disengage often enough to date to play the odds and hope for a miracle or cash out in a SPAC. That will not last.
- Their “safety driving” is not safe nor necessary and will result in many people being harmed or fatally injured, as well as people around them. And even if they do what everyone else is doing and disengage away from actually learning many crash scenarios, they will still have injuries and fatalities because humans cannot gather enough situational awareness in most time critical scenarios to do the right thing the right way.
- Gatik said they “ensure strong transparent data sharing and strict and structured reporting process and sharing information in every aspect of our deployments”. Do they provide the data I suggested earlier? Has Gatik supplied data on all scenarios completed, all disengagement data with all potential crashes identified, and proof of fidelity of all simulation models and real-time operations?

I would like to thank the committee for giving me the time to speak and would be glad to answer your questions.