BEFORE THE PUBLIC UTILITIES COMMISSION OF THE

STATE OF CALIFORNIA

Order Instituting Rulemaking on Regulations Relating to Passenger Carriers, Ridesharing, And New Online Enabled Transportation Services	R.12-12-011

RESPONSE OF SAN FRANCISCO INTERNATIONAL AIRPORT AND THE SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY TO PETITIONS OF GENERAL MOTORS/GM CRUISE, LYFT AND RASIER-CA ADDRESSING THE USE OF AUTONOMOUS VEHICLES FOR PASSENGER TRANSPORTATION

Phase III

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I. Introduction and Summary of Response

General Motors (GM), Lyft and Raiser-CA all filed petitions on September 11, 2017, asking the Commission to modify its decisions in these proceedings to address the advent of autonomous vehicles (AVs). But because there is currently no law or regulation that permits the deployment of AVs in California, and because pending regulations regarding testing prohibit the use of AVs for commercial transportation of passengers, the petitions are premature. We concur with GM that the Commission presently lacks authority to regulate AVs.

The California Department of Motor Vehicles (DMV) is the body with the authority to regulate AVs in the state.[1] Current DMV regulations only permit AV use in a testing capacity by AV manufacturers. When the DMV concludes that AVs have been tested sufficiently to allow deployment, then the Commission will be in a position to consider whether AVs are appropriate for charter-party carrier service.

Generally, we support the concept of AVs for the reasons many others do – they have the potential for delivering safer transportation services than conventional vehicles, they will potentially reduce reliance on private vehicles and, with proper regulation, reduce congestion in urban areas and reduce greenhouse gas emissions if deployed as shared ride vehicles. But the streets in our city are already choking with TNCs. We are looking to the Commission to act on our previous request to direct TNCs to make data available that will provide the tools needed to control congestion, and to apply these concepts to AVs.

II. Current State of the Law

In California, Vehicle Code § 38750 controls the operation of autonomous vehicles. It provides that: (1) AVs may be operated on public roads for testing purposes only if they are operated by licensed drivers who are employees, contractors or other authorized persons designated by the manufacturer (§ 38750(b)(1)); (2) AV manufacturers are prohibited from

[1] *See* Cal. Veh. Code § 38750.

operating AVs on public roads unless they first submit an application to the Department of Motor Vehicles (DMV), which must demonstrate that the applicant's AVs meet certain requirements (§ 38750(c)); (3) the DMV will adopt regulations setting forth insurance requirements and compliance with safety requirements (§ 38750(d)); and (4) even if the DMV approves a manufacturer's application and the manufacturer completes the testing necessary to satisfy the DMV that AVs are safe to operate on public roads, the DMV may nevertheless "impose additional requirements it deems necessary to ensure safe operation of those vehicles …" ((§ 38750(e)).

Consistent with Vehicle Code § 38750, the DMV adopted a series of regulations that set out the requirements for a manufacturer's testing permit.[2] Nothing in the regulations adopted by the DMV allows manufacturers with a testing permit to deploy AVs for private or commercial use.

III. Pending Law

The U.S. Senate is currently considering the "American Vision for Safer Transportation through Advancement of Revolutionary Technologies Act," or the "AV START Act." The Act is broad in scope, and could arguably result in all or parts of current and pending California regulations being preempted. And in March 2017, the DMV sought and received public comment on proposed amendments to AV regulations, which include the mechanism for transitioning from the current test mode to deployment. On October 11, 2017, the DMV published revised regulations that cover driverless testing and deployment of AVs. The public comment period for these proposed regulations ends on October 25, 2017.[3] As a result, the DMV has not yet issued regulations on AV deployment.

[2] *See* 13 CCR § 227.00, *et seq*.
[3] https://www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/auto.

IV. Regulation of AVs by the CPUC

GM is correct that jurisdiction over the testing and deployment of AVs in California rests with the DMV, and that vehicle safety requirements fall under the jurisdiction of the National Highway Traffic Safety Administration (NHTSA). The Commission's authority will not be triggered until the DMV issues deployment permits.

When deployment permits are issued, the Commission should promulgate regulations that contemplate two passenger delivery models: (1) traditional charter-party carrier service performed by a human driver in a personal vehicle that has not been designed to eventually operate completely without human interactions (i.e., the existing TNC framework); and (2) a separate permit for AVs, which at the time of deployment, or at some future point, have been designed to operate completely without human interaction.

A. Autonomous Vehicles that Transport Passengers for Hire are TCPs, not TNCs

The Commission's initial decision in this proceeding made the following declaration: [4]

The primary distinction between a TNC and other TCPs is that a TNC connects riders to drivers who drive their personal vehicle, not a vehicle such as a limousine purchased primarily for a commercial purpose. To that end, a TNC is not permitted to itself own vehicles used in its operation or own fleets of vehicles. But AVs are not likely to be used as "personal vehicles" for TNC purposes in the foreseeable future, as Lyft concedes[5]:

> AVs will initially be relatively costly to own and maintain. As a result, individual ownership of autonomous vehicles is likely to be limited for the foreseeable future. AVs will instead be owned by manufacturers or other entities managing fleets of autonomous vehicles so that their complex technological systems can be regularly monitored, tested, maintained and updated. As a result, although initial testing and deployment of AVs for passenger transportation will require the presence of a human driver in the

[4] D. 13-09-045 at 24.
[5] *See* Lyft Petition, at 9.

> vehicle, that driver is likely to be an employee or contractor of the manufacturer or owner, or of the platform conducting the testing or deployment, rather than an individual vehicle owner.

Although it may be years before state or federal law allows the use of completely driverless vehicles, i.e., with no human operator in the vehicle to take over in the event of an emergency, the fact that a human operator will sit in an AV "driver" seat and that passengers are Lyft or Rasier-CA customers does not transform an AV into a TNC – a term that was expressly developed to define non-professional human drivers using their personal vehicles from time to time to provide transportation in exchange for compensation. In California, the DMV requires the AV test driver to be an employee, contractor, or designee of the manufacturer, who has been certified by the manufacturer as competent to operate the vehicle.[6] This requirement precludes individual drivers who are *not* manufacturer employees, contractors, or designees from operating such an AV vehicle. In addition, the DMV has proposed regulations that would explicitly *prohibit* drivers or manufacturers of AVs issued a testing permit from charging a fee, or otherwise receiving compensation, to members of the public to ride in such a vehicle.[7] Finally, as Lyft concedes, if an AV vehicle is issued a *deployment* permit from the DMV sometime in the future, it is highly unlikely that individual drivers will be using a personal vehicle for TNC purposes since the costs for purchasing and maintaining such an AV vehicle will be very high.

As a result, we concur with GM's proposal to adopt a TCP subcategory for AVs, called "Autonomous Vehicle Carrier," but unlike GM, we believe the designation should apply beginning with SAE Level 3, sometimes called "conditional automation," defined as the "driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task with the exception that a human driver will respond appropriately to a request to intervene."[8] The Commission will thus have jurisdiction over existing TNC regulations in which a conventional, non-autonomous vehicle, driven by a human who is the owner or lawful driver;

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[6] *See* 13 CCR § 227.04.
[7] *See* https://www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/auto; 13 CCR § 227.26(f).
[8] The 5 levels of automation, developed by the Society of Automotive Engineers was adopted by the NHTSA. A summary of SAE levels of driving automation is attached as Exhibit A to the Declaration of Angus Davol.

and a TCP category called AVC, a category specifically developed for AVs from Level 3 through Level 5 (complete autonomy) regardless of whether the AV was issued a testing or deployment permit from the DMV.

B. Ensuring Accountability

Lyft and Rasier-CA suggest that no new regulations are necessary except for minor tweaks to the definition for TNCs. We disagree. Commissioners will recall that when these proceedings commenced in 2013, Lyft and Rasier-CA touted their services as the solution to a multitude of problems – congestion would decrease as people opt to take a TNC ride instead of purchasing a car, the environment would improve because some TNC drivers operate hybrid vehicles, unemployed or under employed people could take on a driving "gig" in their own vehicles on their own schedules and earn extra income, frustrated consumers would no longer have to wait for a taxi, the "last mile" problem would be solved, and the cost of a ride would be cheaper than a taxi or a limousine because the vehicles are privately owned.

Some of this vision has been realized. For example, the volume of TNC business has increased year over year suggesting that consumers have embraced the TNC model.[9] But aside from consumer satisfaction, few of the other TNC promises have materialized. TNCs have contributed to a significant *increase* in congestion, carbon emissions, and vehicle miles traveled in San Francisco and other U.S. cities, not less.[10] A recent report by the San Francisco County Transportation Agency, *TNCs Today, A Profile of San Francisco Transportation Network Company Activity,* indicates that, "On a typical weekday, over 5,700 TNC vehicles operate on San Francisco streets at peak times…….On Fridays, over 6,500 TNC vehicles are on the street during the peak of 7:30pm to 8:00pm. This is over 15 times the number of taxis on the street at these times of day." Both Lyft and Uber drivers find it hard to make more than minimum wage

[9] *See* Declaration of Angus Davol.
[10] *See* UC Davis Institute of Transportation Studies Research Report (UCD-ITS-RR-17-07) "Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride-Hailing in the United States," October 2017.

when expenses are taken into account[11] and, without data, it is impossible to verify whether the onslaught of TNC vehicles are hybrid or electric-powered, or if most are conventional gasoline-powered automobiles.

In considering appropriate regulation for AVs as charter-party carriers, we urge the Commission to rebalance regulation by requiring TNCs to share data that urban transportation planners desperately need. According to a 2015 study of transportation modes conducted by the Transportation Sustainability Research Center at the University of California, Berkeley, 43% of the 380 individuals surveyed who used TNC services during the surveyed period said that if not for TNC service, they would have walked, ridden a bike or taken public transportation instead.[12] And another report, issued by the University Transportation Research Center at City University of New York, in collaboration with New York University School of Law and Cornell University School of Industrial and Labor Relations ("the New York Study") found that TNCs consistently fail to provide adequate access to members of the disabled community, cause greater congestion and that surge pricing has the effect of red-lining communities with limited or no TNC access.

Regarding congestion problems, the New York study indicates[13]:

> The lack of sufficient data to correctly measure the impact of the expansion rate of Uber and other TNCs in many cities has exacerbated the problem. These companies do not provide data to substantiate the claims they make about their success in reducing the number of vehicles on the roads, despite the public representations that their core business is developed based on TNC claims of being "everyone's private driver."

The New York study also finds fault with the "sharing" economy label and the suggestion that embracing that term for TNC operations is misleading[14]:

> These companies, while initially operating as platforms to encourage social interaction and create economic efficiency by reducing waste, have

[11] *See*, for example, https://rideassociation.wordpress.com/2016/07/20/the-tncs-have-the-money/, http://america.aljazeera.com/articles/2015/9/15/taxi-wars-full-time-with-uber-but-running-on-fumes.html.
[12] Mobility and the Sharing Economy: Impacts Synopsis, http://tsrc.berkeley.edu/sites/default/files/Innovative-Mobility-Industry-Outlook_SM-Spring-2015_0.pdf.
[13] The Expanding Transportation Network Company "Equity Gap," at 49 http://www.utrc2.org/sites/default/files/Equity-Report-FINAL-11232642.pdf.
[14] *Id* at 64.

> now morphed into businesses that profit from facilitation of the exchange of goods and services, with less, or no, emphasis on sharing surplus. In short, there is nothing these companies share in a "shared economy" model, and the transpiring of exchanges of goods and services are equivalent to the normal market economy setting where these goods and services are geared toward profit-generating customers that happen to be technology-savvy.

Finally, the New York study describes how the financial success of TNCs is simply the result of shifting risk and cost onto drivers, with only the TNCs reaping the rewards.

C. Autonomous Vehicle Carriers (AVCs) must have 24/7 Insurance

In early 2014, after Decision 13-09-045 was issued establishing TNCs as a new class of charter-party carriers, Rasier-CA submitted a brief regarding insurance in which it argued as follows[15]:

> TNC drivers differ from taxicab drivers and TCP drivers in one material respect – they operate their private vehicles. Taxicab drivers and TCP drivers operate commercial vehicles that are essentially always in operation as a public or livery conveyance. By contrast, TNC drivers necessarily engage in personal activities, as well as TNC transportation activities, with the same vehicle. In recognition of this hybrid use of the same vehicle, it is appropriate to establish different insurance requirements that account for the differential personal and commercial uses of the same vehicle.

With the deployment of AVs as charter-party carriers, this distinction – and the rationale for having different coverage depending on how the vehicle is being used – is eliminated. Instead, AVCs should have full coverage either in the TNC amount of $1 million, or the limousine amount to $750,000. The coverage should be held by the entity holding the AVC permit, and the coverage should be in effect 24 hours per day, 365 days of the year, just as policies are for taxis and limousines.

[15] *See* Comments of Uber Technologies to Assigned Commissioner's Ruling, 4/7/14, at 4.

D. A Portion of Every Autonomous Vehicle Carrier Fleet should be Accessible to Passengers with Manual and Motorized Wheelchairs

In D.13-09-045, the Commission made the following determination[16]:

> The Commission will convene a workshop one year after the issuance of this decision to hear from all stakeholders on the impacts of this new mode of transportation and accompanying regulations. Workshop topics will include, but not necessarily be limited to, a consideration of safety, competition, innovation, accessibility, congestion, the California Environmental Quality Act, and other pollution related issues.

Although the Commission did convene a workshop on criminal background checks in February 2013 and had a second workshop on October 10th on the issue of data sharing, it has not convened a workshop on accessibility, pollution-related issues, or competition[17]. It is our hope that the Commission will soon undertake these remaining issues. In the short-term, it has an opportunity with AVCs to require that a portion of each permittee's fleet have wheelchair accessible features. Because AVs are the cutting edge of transportation innovation, when such vehicles are introduced for the commercial transportation of passengers, they must include wheelchair accessible models.

We urge the Commission to adopt a regulation that requires each AVC permittee to provide vehicles with universal accessibility including wheelchair accessibility.

E. The CPUC Should Direct both AVCs and TNCs to Share Anonymized Data

As we previously asserted in the Phase III, Track 3 comments on data sharing, there are numerous good government policies that should be supported and advanced by public access to TNC data including: Safety/Vision Zero and Congestion; Transit First; Equity; Accessibility; and Clean Air/Sustainability. We also advised the Commission regarding the successful data access program developed by the New York City Taxi and Limousine Commission, which uses a secure

[16] D. 13-09-045 at 74.
[17] Although there has also been no workshop on safety, the parties have further briefed the issue of vehicle inspections and the Commission made revisions, provided a measure of inspection verification.

file transfer procedure to obtain trip data from TNCs. The New York City model was designed to provide anonymous data and omit personal information.

And the National Association of City Transportation Officials (NACTO), has developed data sharing principles, asserting that "[a]nonymized data including vehicle speed, volume, travel time, pick-up and drop-off information, among other crucial data points, will enable cities to make better data-driven planning and policy decisions, and redesign streets to meet modern needs." [18] We agree.

It is unlikely that every jurisdiction in California needs or desires this data, but in dense urban areas, the data can provide a roadmap for improving safety and the overall quality of life of its residents. We propose a regulation requiring both TNCs and AVCs to provide the following data to local jurisdictions that request it:

- Pick-up location and time
- Drop-off location and time
- Vehicle occupancy (exclusive of operator)
- Non-revenue vehicle miles traveled
- Vehicle dwell times
- Number, date and time of unfulfilled rides requested by disabled passengers
- Number, date and time of declined rides requested by disabled passengers, and
- Number, date and time of canceled rides

F. AVCs to be Programmed to Comply with Local Traffic Laws

Before being deployed as AVCs, all vehicles must be programmed to obey local laws regarding stopping, standing, double parking, and speed limits. In addition, local public entities must have a mechanism for enforcing local traffic laws that are violated by AVCs.

[18] *See* http://nacto.org/wp-content/uploads/2017/01/NACTO-Policy-Data-Sharing-Principles.pdf.

G. Operation at Airports

Consistent with D. 13-09-045, regulations regarding AVCs should expressly state that "AVCs shall not conduct any operations on the property of or into any airport unless such operations are authorized by the airport authority involved."

H. AVCs and Congestion Management

AVs have the potential to increase urban congestion if used for individual – and not shared - trips. A goal of autonomous vehicles is to improve the in-vehicle experience by allowing users to not focus on the task of driving, which will increase the attractiveness of driving and encourage more trips to be made by automobile particularly for seniors, youths, and persons who do not have driver's licenses. Without relevant, objective data, it cannot be assumed that autonomous vehicles will have higher vehicle occupancy rates. Furthermore, autonomous vehicles will produce driverless, deadhead miles, traveling with no passengers in the vehicle. We encourage the Commission to consider these impacts and how they should be monitored, regulated and mitigated. The TNC model presumes that because the driver is using their personal vehicle, they are free to choose when they will accept rides; furthermore, when service demand is low, they are able to perform personal trips. AVs, on the other hand, might be fleets, but also might be privately owned vehicles. To that end, when these driverless vehicles are not providing trips, it remains unclear where these vehicles will travel to; how they will operate; and under what circumstances will the vehicles be removed from the pool of available vehicles.

The Commission collects 0.33% of TNC revenue (the majority of which is generated from service miles); however, the Commissions currently has no mechanism for discouraging numerous AVs from traveling around already congested streets as they await passengers. It cannot be assumed that the business model of an AVC or TNC would lead them to minimize deadheading. For example, a company may deploy its fleet to pickup in areas where fares (and trip lengths) are known to be higher, but with more distributed, less centralized destinations,

leading to long deadheads back to the high demand area. We urge the Commission to look into the potential ramifications of and promulgate appropriate regulations to address these concerns.

V. Conclusion

Because there is currently no law or regulation that permits the deployment of AVs in California, and because pending regulations regarding testing prohibit the use of AVs for commercial transportation of passengers, the petitions asking the Commission to modify its decisions are premature. We concur with GM that the Commission presently lacks authority to regulate AVs. Further, although we support the concept of AVs, we are looking to the Commission to act on our previous request to direct TNCs to make data available that will provide the necessary tools to control congestion and apply these requirements to AVs. Finally, we concur with GM's proposal to adopt a TCP subcategory for AVs called "Autonomous Vehicle Carrier" with the requirements set forth above but believe that the designation should apply with SAE Level 3.

Dated: October 25, 2017

Respectfully submitted,

By: /s/
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Airport Director
San Francisco International Airport

By: /s/
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Director of Transportation
San Francisco Municipal Transportation Agency

APPENDIX 1

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE

STATE OF CALIFORNIA

Order Instituting Rulemaking on Regulations Relating to Passenger Carriers, Ridesharing, And New Online Enabled Transportation Services	R.12-12-011 Declaration of Angus Davol in Support of San Francisco International Airport and San Francisco Metropolitan Transportation Agency Response to Petitions to Modify Previous Decisions – Autonomous Vehicles

I, Angus Davol, declare as follows:

1. I am employed by the City and County of San Francisco at the San Francisco International Airport as a Senior Transportation Planner assigned to the Landside Operations Division. I have personal knowledge of the facts set forth herein.
2. Among my duties is oversight of TNC operations at the Airport. Historically, this work included meeting with TNCs on multiple occasions regarding the terms of the Airport's operating permit, working with the Airport's ITT team and the TNCs in developing a real-time TNC tracking system that monitors TNC activity on Airport property, working directly with the TNCs to address TNC operational issues and ensure compliance with the Airport's permit terms, and reviewing and assessing metrics regarding TNCs and all other commercial passenger ground transportation modes with Airport operating permits.
3. Attached hereto as Exhibit A is a table showing the number to TNC trips to and from the Airport from October 2014 through August 2017. These data are derived from the Airport's database on ground transportation operations.
4. Attached hereto as Exhibit B is a true and correct copy of a summary of five levels of vehicle automation, developed by the Society of Automotive Engineers.

I declare under penalty of perjury that the foregoing is true and correct and that this declaration was executed on October 23, 2017 in San Francisco, California.

Angus Davol

ANGUS DAVOL DECLARATION – EXHIBIT A

Transportation Network Companies
Historical Data

2014	
Oct	101,066
Nov	132,022
Dec	148,714
Total	381,802
2015	
Jan	148,398
Feb	157,836
Mar	214,028
Apr	222,335
May	272,099
Jun	269,543
Jul	280,112
Aug	302,018
Sep	319,736
Oct	353,459
Nov	351,471
Dec	347,438
Total	3,238,473
2016	
Jan	348,246
Feb	347,474
Mar	394,606
Apr	407,209
May	472,193
Jun	465,124
Jul	484,549
Aug	521,850
Sep	554,425
Oct	583,320
Nov	578,831
Dec	551,509
Total	5,709,336
2017	
Jan	549,159
Feb	524,139
Mar	630,604
Apr	618,129
May	692,081
Jun	686,594
Jul	673,540
Aug	718,864
Total	5,093,110

EXHIBIT B

AUTOMATED DRIVING

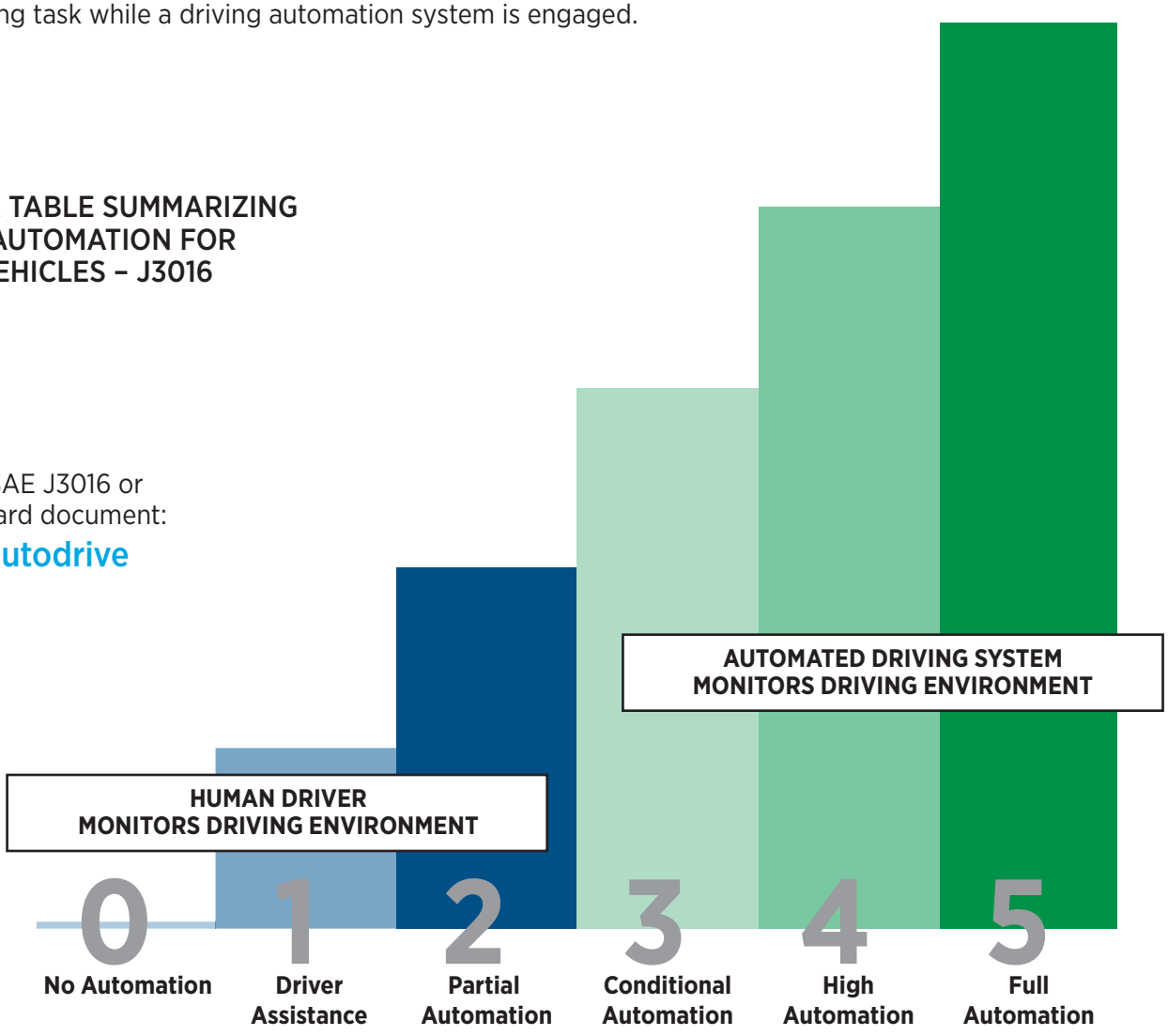
LEVELS OF DRIVING AUTOMATION ARE DEFINED IN NEW SAE INTERNATIONAL STANDARD J3016

With the goal of providing common terminology for automated driving, SAE International's new standard J3016: **Taxonomy and Definitions for Terms Related to On-Road Motor Vehicle Automated Driving Systems**, delivers a harmonized classification system and supporting definitions that:

- Identify six levels of driving automation from "no automation" to "full automation".
- Base definitions and levels on functional aspects of technology.
- Describe categorical distinctions for a step-wise progression through the levels.
- Are consistent with current industry practice.
- Eliminate confusion and are useful across numerous disciplines (engineering, legal, media, and public discourse).
- Educate a wider community by clarifying for each level what role (if any) drivers have in performing the dynamic driving task while a driving automation system is engaged.

OVER FOR A TABLE SUMMARIZING LEVELS OF AUTOMATION FOR ON-ROAD VEHICLES – J3016

Learn more about SAE J3016 or purchase the standard document:
www.sae.org/autodrive



SUMMARY OF SAE INTERNATIONAL'S LEVELS OF DRIVING AUTOMATION FOR ON-ROAD VEHICLES

Issued January 2014, **SAE international's J3016** provides a common taxonomy and definitions for automated driving in order to simplify communication and facilitate collaboration within technical and policy domains. It defines more than a **dozen key terms**, including those italicized below, and provides **full descriptions and examples** for each level.

The report's **six levels of driving automation** span from *no automation* to *full automation*. A **key distinction** is between level 2, where the *human driver* performs part of the *dynamic driving task*, and level 3, where the *automated driving system* performs the entire *dynamic driving task*.

These levels are **descriptive** rather than normative and **technical** rather than legal. They imply **no particular order** of market introduction. Elements indicate **minimum** rather than maximum system capabilities for each level. A particular vehicle may have multiple driving automation features such that it could operate at **different levels** depending upon the feature(s) that are engaged.

System refers to the driver assistance system, combination of driver assistance systems, or *automated driving system*. **Excluded** are **warning and momentary intervention systems**, which do not automate any part of the *dynamic driving task* on a sustained basis and therefore do not change the *human driver's* role in performing the *dynamic driving* task.

SAE level	Name	Narrative Definition	Execution of Steering and Acceleration/ Deceleration	*Monitoring* of Driving Environment	Fallback Performance of *Dynamic Driving Task*	System Capability *(Driving Modes)*
***Human driver* monitors the driving environment**						
0	**No Automation**	the full-time performance by the *human driver* of all aspects of the *dynamic driving task*, even when enhanced by warning or intervention systems	Human driver	Human driver	Human driver	n/a
1	**Driver Assistance**	the *driving mode*-specific execution by a driver assistance system of either steering or acceleration/deceleration using information about the driving environment and with the expectation that the *human driver* perform all remaining aspects of the *dynamic driving task*	Human driver and system	Human driver	Human driver	Some driving modes
2	**Partial Automation**	the *driving mode*-specific execution by one or more driver assistance systems of both steering and acceleration/ deceleration using information about the driving environment and with the expectation that the *human driver* perform all remaining aspects of the *dynamic driving task*	**System**	Human driver	Human driver	Some driving modes
***Automated driving system* ("system") monitors the driving environment**						
3	**Conditional Automation**	the *driving mode*-specific performance by an *automated driving system* of all aspects of the dynamic driving task with the expectation that the *human driver* will respond appropriately to a *request to intervene*	System	**System**	Human driver	Some driving modes
4	**High Automation**	the *driving mode*-specific performance by an automated driving system of all aspects of the *dynamic driving task*, even if a *human driver* does not respond appropriately to a *request to intervene*	System	System	**System**	Some driving modes
5	**Full Automation**	the full-time performance by an *automated driving system* of all aspects of the *dynamic driving task* under all roadway and environmental conditions that can be managed by a *human driver*	System	System	System	**All driving modes**

Key definitions in J3016 include (among others):

Dynamic driving task includes the operational (steering, braking, accelerating, monitoring the vehicle and roadway) and tactical (responding to events, determining when to change lanes, turn, use signals, etc.) aspects of the driving task, but not the strategic (determining destinations and waypoints) aspect of the driving task.

Driving mode is a type of driving scenario with characteristic *dynamic driving task* requirements (e.g., expressway merging, high speed cruising, low speed traffic jam, closed-campus operations, etc.).

Request to intervene is notification by the *automated driving system* to a *human driver* that s/he should promptly begin or resume performance of the *dynamic driving task*.

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