

DRAFT
FOR DISCUSSION ONLY

HIGHLY AUTOMATED VEHICLES ACT

NATIONAL CONFERENCE OF COMMISSIONERS
ON UNIFORM STATE LAWS

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January 19, 2018

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HIGHLY AUTOMATED VEHICLES ACT

REPORTER'S VERSION RELEASE NOTE

Introduction

This February 2018 version of the Highly Automated Vehicles Act updates the version discussed at the drafting committee's December 2017 meeting. Please refer to those December 2017 materials for a predicate introduction to these drafts and to the many issues they address.

This supplemental note elaborates on five issues of particular interest to the committee at its December 2017 meeting: remote facilitation of the driving task, level 3 automated driving, following distance requirements, the automated driving provider, and (briefly) insurance.

Each of these issues implicates competing visions for automated driving. These visions are in turn motivated both by safety philosophies and by business interests. People of good faith disagree, for example, about the propriety of remote driving and of level 3 automation. And they disagree about the roles that various actors—developers, manufacturers, dealers, owners, users, and many others—should play in a world of automated driving.

These convictions often overlap with established or anticipated commercial structures and strategies. This is understandable: Specific companies may pursue the technological applications they believe to be responsible, and specific industries may have unique insight into the contributions they make to public policy goals such as road safety. Such perspectives will necessarily—though not always explicitly—inform discussion of these key issues.

These considerations help explain why (as explained in the December 2017 note) a key challenge for the drafting process is the diversity of automated driving. This term properly encompasses a wide and still expanding range of technologies, applications of those technologies, and business models for those applications.¹ A vehicle may or may not have conventional input mechanisms for accelerating, decelerating, and steering; those mechanisms may or may not be used during part or all of a trip; a human user may or may not be seated behind those mechanisms; another human situated close to or far from the vehicle may or may not provide another form of real-time (or near-real-time) input. It is at least conceivable that vehicles manufactured without automated driving systems may later be retrofitted with those systems, and it is probable that automated driving systems installed on vehicles may eventually be disabled or abandoned by developers no longer willing or able to support those systems.

This diversity may also extend to the actors with some relationship to the development or deployment of these systems. In a tightly closed model, one company may perform or at least direct the development and manufacture of both the vehicle and its automated driving systems,

¹ See How Governments Can Promote Automated Driving at newlypossible.org.

maintain the vehicle and those systems, generate the maps and other data used by those systems, and engage the end users of that vehicle. In a more open model, each of these functions may be performed by one or more entities that might not even have a legal relationship with each other. Accordingly, the manufacturer, owner, user, or insurer of a vehicle may or may not have a sophisticated understanding of the vehicle's current automated driving systems. A one-size-fits-all approach based on these actors' conventional roles is therefore unlikely to fit a diverse future.

Remote facilitation of the driving task

The December 2017 draft defined "automated operation" in relevant part as "the performance of the complete dynamic driving task by an automated driving system, a *remote driver*, or a combination of automated driving system and remote driver..." (emphasis added). This definition included remote driving because:

- (1) Many visions for automated driving actually rely in part on some kind of facilitation of the driving task by a human or humans located far from the vehicle.²
- (2) These visions are generally not candid, clear, or consistent in their description of that remote human role.
- (3) The technical community (including experts within SAE and ISO) has not yet resolved the issue of what remote actions actually constitute performance of the dynamic driving task.
- (4) The draft sidesteps this contentious issue by requiring a single "automated driving provider" to vouch for the entirety of automated operation (including remote facilitation).
- (5) Users of automated vehicles may likewise care more about the service provided by automated vehicles than about the precise delineation of the human and machine roles on which that service depends (although these users will care whether they are considered remote drivers).
- (6) Separately defining automated operation and remote operation would introduce unnecessary linguistic complexity throughout the act.

At the December 2017 meeting, several participants nonetheless expressed discomfort with including remote driving within automated driving. This discomfort took at least three forms:

- (1) **Semantics:** The definition of a term should correspond to the denotation of that term, and automated driving is the opposite of human driving in any form.
- (2) **Substance:** Automated driving and remote driving raise different safety concerns.
- (3) **Scope:** Remote driving is outside this committee's charge.

The February 2018 draft attempts to address these concerns by removing "a remote driver" from

² Examples may include identifying an unknown roadway object, specifying a path through a construction zone, authorizing a deviation from a traffic rule, orally communicating with another road user, and deciding whether to continue travel.

the definition of “automated operation” while retaining “or a combination of automated driving system and remote driver.” In other words, “automated operation” now means, in relevant part, “the performance of the complete dynamic driving task by an automated driving system *or a combination of automated driving system and remote driver...*” (emphasis added).

There are several advantages to this approach:

- (1) The act now excludes from its scope “pure” remote driving—that is, remote operation without any reliance on an automated driving system that could independently perform the dynamic driving task on a sustained basis (even if it could not do so in a given moment).
- (2) The act still encompasses automated driving scenarios involving a wide range of remote human facilitation that may be necessary for the practical deployment of automated vehicles.
- (3) The act recognizes that automated driving can involve some human role just as human driving can involve some automated systems (such as advanced driver assistance systems and automated emergency intervention systems).
- (4) The act still defines remote driving but does not need to define other forms of remote facilitation—and, as a practical matter, does not need to define with absolute precision the line between remote driving and other forms of remote facilitation.³
- (5) The act is spared the added linguistic complexity of repeatedly referencing “automated or remote operation” as a single term or “automated operation” and “remote operation” as separate terms throughout the text.

If the committee would prefer even more semantic precision, the term “automated operation” could instead be changed to “automated or remote operation.” However, the introduction of a substantively unnecessary conjunction could make the entire text less clear and therefore less accessible.

Finally, the committee could wander into the rabbit hole of separately defining automated operation, remote operation, and remote facilitation as distinct concepts. This, however, would be a contentious definitional exercise largely in search of an application, as the act as currently drafted does not require an independent definition of “pure” automated operation.

Level 3 automated driving

Level 3 and 4 automated driving are distinguished from each other by who or what is expected to reasonably continue or terminate a trip when the automated driving system cannot complete it. At level 4, an automated driving system that encounters a failure or condition for which it was not designed can consistently achieve a “minimal risk condition” by bringing the vehicle to a reasonably safe stopping point such as a highway shoulder. At level 3, in contrast, a particular vehicle user is expected to intervene under these circumstances (after appropriate warning by the

³ This assumes, hopefully with good reason, that employees and contractors who remotely facilitate automated driving will hold valid driving licenses, even if they are arguably not remote drivers under this act’s definition.

automated driving system or the vehicle) to either drive the vehicle to its destination or, if this is no longer practical, to achieve a “minimal risk condition.”

SAE J3016, which has been embraced by NHTSA and referenced in many recent state bills, probably devotes more space to level 3 automation than to any other level. It defines level 3 as “the *sustained* and *ODD*⁴-specific performance by an *ADS*⁵ of the entire *DDT*⁶ with the expectation that the *DDT fallback-ready user* is *receptive* to *ADS-issued requests to intervene*, as well as to *DDT performance-relevant system failures* in other *vehicle* systems, and will respond appropriately.” The document separately explains these italicized terms as well as other terms—such as “fallback” and “minimal risk condition”—that further elucidate this difficult definition.⁷

The December 2017 draft, while deliberately avoiding reference to the levels of automation, implicitly included level 3 automated driving through its definitions of “automated driving system,” “automated vehicle,” and “automated operation.” The draft included level 3 because:

- (1) Excluding level 3 from the act would leave a peculiar gap in state vehicle codes.
- (2) Level 3 presents and confronts many of the same state legal issues as higher levels.
- (3) At least one automaker has already announced its intention to release a level 3 feature.
- (4) Proponents of level 3 automation were not represented at the committee’s first meeting (in which level 3 automated driving was provisionally excluded from the scope).

At the same time, the draft did not make specific provision for this level, because:

- (1) The principle that an automated driving provider vouches for the automated operation of its automated vehicles can reasonably apply to level 3 automated driving.
- (2) The technical community has not yet resolved contentious issues of particular salience to level 3, including what constitutes appropriate warning to the vehicle user, what constitutes a sufficient minimal risk condition, and what role a remote driver can play in achieving this condition.
- (3) Achieving consensus on a set of specific rules unique to level 3 could exhaust the drafting committee’s time and energy.
- (4) Congress may preempt states from setting some of these rules.

This position is clear in the draft’s full definition of “automated operation,” which “means the performance of the complete dynamic driving task by an automated driving system or by a combination of automated driving system and remote driver. Automated operation begins upon

⁴ Operational design domain

⁵ Automated driving system

⁶ Dynamic driving task

⁷ Drafting committee participants were encouraged to read J3016 in preparation for the committee’s first meeting. A third version of J3016 is forthcoming, and nascent collaboration between SAE and ISO will likely lead to a fourth version in the coming years.

this performance and continues until an in-vehicle driver or operator intentionally terminates this performance for a reason other than a reasonable perception of imminent harm.”

The consequence of this definition is that automated operation—and hence the obligation of an automated driving provider—ends only when an in-vehicle driver resumes actively driving. It does not end when an automated driving system warns a user to resume driving—or within some specified period after that warning. To make this even more concrete: If an automated driving provider relies on an in-vehicle user to achieve a minimal risk condition, then that provider needs to make sure that the user does not fall asleep—or wake them up if they do.

At the December 2017 meeting, a few participants made points that contemplate level 3:

- (1) Language: The act should define terms such as fallback and minimal risk condition.
- (2) Scope: The act should—or should not—address level 3.
- (3) Substance: In addressing level 3, the act should be more—or less—accommodating.

In the February 2018 draft, level 3 remains in the scope and subject to the same principles as higher levels of automated driving—but some alternatives have been provided for the convenience of the committee. Two of the options under the definition of “automated driving system” would exclude level 3 from that definition and hence from the act’s scope.⁸ The draft also includes optional definitions of fallback, minimal risk condition, and operational design domain that have been adapted from SAE J3016.⁹ However, if the original definition of “automated driving system” is retained, then these definitions are not used anywhere in the draft.

Following distance requirements

Automated driving has a complex relationship with requirements in state vehicle codes that a driver maintain some distance between her vehicle and the vehicle ahead. These requirements fall into two types: “reasonable and prudent distance,” which is not relevant to this discussion, and minimum numeric distance (typically expressed in feet), which is.

Several points are relevant to the committee’s work:

- (1) As with other traffic laws, many human drivers already violate these following distance requirements—and in many cases unreasonably so. It may or may not be desirable for automated vehicles to actually adhere to these requirements.
- (2) Because of their increased responsiveness, automated vehicles may also be capable of safely following other vehicles at closer distances in the course of ordinary driving, particularly in

⁸ If the committee does exclude level 3 from the scope, it may wish to retain “Highly Automated Vehicles Act” as the act’s title or to recommend changing this title to the “Highly Automated Driving Act” rather than to just the “Automated Driving Act.”

⁹ As with other definitions adapted from J3016, the specific language has been changed in both trivial and substantial ways.

combination with vehicle-to-vehicle communications. For capacity reasons, states may want to allow or even encourage these shorter headways.

- (3) In the context of vehicle automation, the term “platoon” typically refers to a more formalized convoy of compatible vehicles that may be even more closely spaced and tightly coordinated. Much of the commercial interest in these platoons has involved trucking, but other vehicles could also be platooned.
- (4) Although this kind of platooning relies heavily on vehicle-to-vehicle communications and at least some automation, many of the early concepts do not involve automated driving systems. Rather, only the speed of the non-leading vehicles is automated, and human drivers in each vehicle continue to steer. However, higher automation is certainly conceivable on a time frame similar to automated driving more generally.
- (5) Many states have exempted vehicle platoons from numerical following distance requirements—sometimes as part of an automated driving bill and sometimes separately.

The December 2017 draft sought to accommodate these platoons, even when their constituent vehicles are not under “automated operation” as defined therein. Accordingly, the draft provided that “[a] requirement under this Title that imposes a minimum following distance other than a reasonable and prudent distance does not apply to the operation of a non-leading vehicle traveling in a procession of vehicles if the speed of each vehicle is automatically coordinated.”

At the December 2017 meeting, participants had a range of views on this treatment of platoons. Some wanted this language retained, while others wanted it refocused exclusively on automated vehicles under automated operation. Of those in the latter group, some wanted the exemption to apply only to automated vehicles under automated operation in a platoon, while others wanted all automated vehicles under automated operation to be exempt, regardless of whether their speeds are automatically coordinated. The options in the draft reflect these possibilities.

Automated driving provider

The core of the December 2017 and February 2018 drafts is the automated driving provider. This provider is essentially—and under this draft legally—the “driver” of an automated vehicle under automated operation. But even more fundamentally, the provider is the legal entity that vouches for this automated operation—and that thereby makes a promise to the state and to the public. And only if there is such an entity that is willing to vouch for a particular automated vehicle may that vehicle be registered.

This approach is necessarily flexible and subtle. As emphasized above, automated driving encompasses a wide and still expanding range of technologies, applications of those technologies, and business models for those applications. Automated driving systems may be installed on vehicles by the system developer, the vehicle manufacturer, or another entity altogether. Some of these vehicles may be sold to individuals, and some may be managed in vast fleets that span many states. This diversity precludes categorical assertions.

Fortunately, an automated driving provider is defined by what it does rather than by what it is. Because the provider self-identifies, it could be a vehicle manufacturer, an automated driving system developer, a fleet owner, an insurer, or any other legal person that is willing and able to make the representations required of it. The concept is therefore independent of inconsistent definitions of and anachronistic assumptions about the companies that make and the people who buy vehicles.

In addition, vehicle registration is a clearly established state function with an existing administrative structure. Congress may preempt states from regulating many aspects of automated driving, and even state legislatures may be wary of new licensing regimes and regulatory structures. And because corporations are not subject to the same physical constraints as an individual driver or vehicle owner, a new licensing regime for them would also present difficult interstate issues. But vehicles do have a physical presence, and states are likely to retain broad authority over their registration.

At the December 2017 meeting, discussion about automated driving providers focused on two principal issues:

- (1) Substantively, what representations should an automated driving provider make?
- (2) Procedurally, how should it make those representations?

In terms of substance, the December 2017 draft required that an automated driving provider identify each vehicle by vehicle identification number, describe the capabilities and limitations of the automated driving system, provide proof of any required insurance, represent that it believes that automated operation of the vehicle is reasonably safe, represent that clear and convincing evidence supports that belief, warrant to the public that automated operation of the vehicle is reasonably safe, and appoint each department of motor vehicles as a lawful agent.

These representations include both a subjective and an objective prong. The provider must declare its subjective belief that automated operation is reasonably safe; this is an important declaration intended to instill confidence in the public and circumspection in the provider. But the provider must also represent that this belief has a compelling evidentiary foundation; a mere belief, however genuine, does not suffice. Importantly, these representations pertain not to the automated vehicle but, rather, to the automated operation of that vehicle.

The “reasonably safe” standard was selected to provide flexibility both to automated driving providers and to regulators. However, the alternatives presented in the draft below respond to concerns expressed by some participants; the automated driving provider might instead represent that automated operation complies (or reasonably complies) with rules of the road or with all applicable federal, state, and local laws.

Similarly, the “clear and convincing evidence” standard was selected because of its strong basis in law and its robust evidentiary requirements. “Substantial evidence” has been provided as an

alternative but is generally regarded as lax and is therefore not recommended.

In terms of procedure, the December 2017 draft required that the automated driving provider make this information available “by means of a current electronic record” that can be “automatically retriev[ed]” by the particular state’s department of motor vehicles as well as by the equivalent department in any other state that has enacted the uniform law. This mechanism was intended to:

- (1) Relieve state agencies from any obligation to create or maintain databases.
- (2) Accommodate a public or private database should state agencies, the US Department of Transportation, or industry organizations choose to create one.
- (3) Allow automated driving providers to keep their records current.
- (4) Relieve automated driving providers from the burden of sharing the same information across motor vehicle departments in multiple states.
- (5) Facilitate verification through only the vehicle identification number and a link to the putative automated driving provider.

In response to a desire for even more flexibility and ease, the February 2018 draft provides an alternative that merely requires the automated driving provider to provide this information for the duration of the registration without specifying any mechanism for doing so.

Insurance

The December 2017 draft includes two insurance requirements specific to automated vehicles. The committee began to discuss whether the act should address insurance, whether these requirements are substantively desirable, and whether they are legally clear.

In anticipation of further discussion, the February 2018 draft:

- (1) Limits the automation continuation guarantee to three years.
- (2) Indicates the language to be deleted if this automation continuation guarantee is omitted.
- (3) Provides that an “automated driving provider shall be considered a permissive driver under an insurance policy applicable to an associated automated vehicle.”
- (4) Provides that the insurance section “does not modify or limit the liability of an automated driving provider under statutory or common law.”
- (5) Provides (in revised language) that the act “does not displace other insurance requirements, and the insurance required under this act does not satisfy other insurance requirements.”

In addition, a separate document—*Options for Automated Operation Insurance in the Highly Automated Vehicles Act*—offers three drafting options for provisions related to the automated

operation insurance that the current draft act requires automated driving providers to maintain. (These options are presented separately to facilitate reading and discussion.)

For extended analysis of all of these insurance provisions—as well as useful background on insurance law—please read Hilary Rowen’s thoughtful *Note to Committee Members and Observers on Insurance Provisions*.

Both *Options for Automated Operation Insurance in the Highly Automated Vehicles Act* and *Note to Committee Members and Observers on Insurance Provisions* are to accompany this draft.

1 **HIGHLY AUTOMATED VEHICLES ACT**

2 **SECTION 1. SHORT TITLE.** This [act] may be cited as the Highly Automated
3 Vehicles Act.¹⁰

4 **SECTION 2. DEFINITION.** In this [act]:

5 (1) “Associated automated vehicle” means an automated vehicle associated with an
6 automated driving provider through the registration of that vehicle.

7 (2) “Automated driving provider” means the person that expressly warrants that
8 automated operation of an associated automated vehicle

9 **OPTION 1:** is reasonably safe;

10 **OPTION 2:** complies with this Title’s rules of the road;

11 **OPTION 3:** complies with applicable federal, state, and local law;

12 **OPTION 4:** reasonably complies with this Title’s rules of the road;

13 **OPTION 5:** reasonably complies with applicable federal, state, and local law;

14 **OPTION 6:** is reasonably safe and in reasonable compliance with applicable law;

15 (3) “Automated driving system” means

16 **OPTION 1:** the combination of hardware and software represented as capable of
17 performing the entire dynamic driving task on a sustained basis.¹¹

18 **OPTION 2:** the combination of hardware and software collectively capable of performing

¹⁰ The committee may wish to recommend changing this title to the “Automated Driving Act” in light of both the terms used within it and potential federal language on preemption.

¹¹ The automated driving provider would make this representation. SAE J3016 defines this term as “[t]he hardware and software that are *collectively capable* of performing the entire DDT on a sustained basis, regardless of whether it is limited to a specific operational design domain (ODD); this term is used specifically to describe a level 3, 4, or 5 driving automation system” (emphasis added). Recent state and federal bills reference or adopt this definition. I have modified this language to clarify that the term covers systems that fail to perform as represented. Although neither definition satisfactorily addresses the opposite situation in which a system capable of performing the entire dynamic driving task on a sustained basis is nonetheless represented to be less capable, such a situation is more likely to arise in testing rather than in deployment. See, e.g., Uber vs. the Law.

1 the entire dynamic driving task on a sustained basis.

2 **OPTION 3:** the combination of hardware and software represented as capable of
3 performing the entire dynamic driving task on a sustained basis and of achieving a
4 minimal risk condition when needed.

5 **OPTION 4:** the combination of hardware and software collectively capable of performing
6 the entire dynamic driving task on a sustained basis and of achieving a minimal risk
7 condition when needed.

8 (4) “Automated operation” means the performance of the complete dynamic driving task
9 by an automated driving system or by a combination of automated driving system and remote
10 driver.¹² Automated operation begins upon this performance and continues until an in-vehicle
11 driver or operator intentionally terminates this performance for a reason other than a reasonable
12 perception of imminent harm.¹³

13 (5) “Automated operation insurance” means an insurance policy that covers damages to
14 the person or property of another arising from the automated operation of an automated vehicle
15 without regard to fault.¹⁴

16 (6) “Automated vehicle” means a motor vehicle¹⁵ with an automated driving system,

¹² This definition has been revised to exclude the complete performance of the dynamic driving task by a remote driver.

¹³ This second sentence addresses the conceptually ambiguous transition between automated and conventional operation in a vehicle capable of both. It has several important if subtle implications. First, a user of an automated driving system—even the fallback-ready user of a level 3 automated driving system—could not become the driver involuntarily. Second, an individual would generally not become a driver merely by trying to prevent a crash. Third, automated operation continues even if the vehicle parks itself.

¹⁴ Automated operation insurance is intended to provide modest compensation in the event of an injury related to automated driving. (As provided below, the amount required would be the same as the minimum amount of third-party liability coverage required in the state.) The provision is intended to address gaps in current insurance policies, facilitate limited recovery by injured individuals instead of or in addition to a product liability suit, enlist insurers in supervising the safety of automated driving systems, and help assuage public unease about automated driving. However, the committee might decide to exclude insurance from its scope of work.

¹⁵ State vehicle codes generally define “motor vehicle” or an equivalent term. Registration requirements in turn are generally applied to motor vehicles. This act is intended to apply to only those vehicles currently covered by

1 regardless of whether the vehicle is under automated operation.¹⁶

2 ~~(7) “Automated vehicle owner” means the owner of the automated vehicle, as the term~~
3 ~~owner is defined in this Title.¹⁷~~

4 (8)

5 **OPTION 1:** “Automation continuation guarantee” means a surety bond or cash deposit
6 that, for three years from the date of the first registration of an automated vehicle, specifically
7 covers diminution in the value of the vehicle arising from revocation of the registration of the
8 vehicle by the [Department of Motor Vehicles] because of concern about the safety of automated
9 operation of the vehicle, including the failure of an automated driving provider to make a
10 representation or warranty required by this [act].¹⁸

11 **OPTION 2:** [omit this provision]

12 (9) “Dedicated automated vehicle” means an automated vehicle designed for exclusively
13 automated operation while on public [highways].^{19 20}

14 (10) “Disability” means as provided in the Americans with Disabilities Act, 42 U.S.C. §
15 12102.²¹

registration requirements.

¹⁶ NHTSA and Congress use the term “automated vehicle” even though SAE J3016 cautions against its use. (Many state bills also refer to automated vehicles or autonomous vehicles.) This definition clarifies that a motor vehicle with an automated driving system is an automated vehicle regardless of whether the automated driving system is engaged.

¹⁷ I have removed the definition of “automated vehicle owner” and rephrased subsequent references to address committee concerns about consistency among states.

¹⁸ This automation continuation guarantee anticipates that some automated driving systems may become obsolete or unsupported, particularly if an automated driving provider becomes insolvent. The guarantee is accordingly intended to reduce the financial costs to vehicle owners as well as the political costs to a department of motor vehicles. As with the automation operation insurance, this guarantee would be a small step into the domain of insurance.

¹⁹ States use a variety of words to refer to roads and other publicly accessible vehicle facilities. This draft uses “[highway]” in the broadest sense to encompass streets, roads, highways, and parking facilities that are open to the public. A state should use whatever term corresponds to this meaning in its vehicle code.

²⁰ A dedicated automated vehicle is called an “automated driving system dedicated vehicle (ADS-DV)” in J3016 and a “dedicated highly automated vehicle” in the Senate bill.

²¹ 42 U.S.C. § 12102 provides that “[t]he term ‘disability’ means, with respect to an individual—(A) a physical or

1 (11) “Drive” means as provided in the vehicle code, except that an automated driving
2 provider²² exclusively drives an associated automated vehicle under automated operation.²³

3 (12) “Driver” means as provided in the vehicle code, except that an automated driving
4 provider is the exclusive driver of an associated automated vehicle under automated operation.

5 (13) “Dynamic driving task” means the real-time operational and tactical functions
6 collectively required to operate a vehicle in on-road traffic, including controlling lateral vehicle
7 motion, controlling longitudinal vehicle motion, monitoring the driving environment, executing
8 responses to objects and events, planning vehicle maneuvers, and enhancing vehicle
9 conspicuity.²⁴

10 (14)

11 **OPTION 1:** “Fallback” means the response by a vehicle user to either perform the
12 dynamic driving task or achieve a minimal risk condition after occurrence of a system failure
13 relevant to the performance of the dynamic driving task or upon an exit from the operational
14 design domain exit, or the response by an automated driving system to achieve a minimal risk
15 condition given the same circumstances.²⁵

16 **OPTION 2:** [omit this definition]

mental impairment that substantially limits one or more major life activities of such individual; (B) a record of such an impairment; or (C) being regarded as having such an impairment (as described in paragraph (3))....”

²² I have changed “automated driving system” to “automated driving provider” in the definitions of drive, driver, operate, and operator.

²³ This language is intended to avoid disrupting the various statutory and judicial interpretations of drive, driver, operate, and operator outside of the automated driving context. This drafting effort could not ameliorate the tremendous variation among and even within states on these terms. See Automated Vehicles Are Probably Legal.

²⁴ This definition is adapted from the much lengthier definition provided in SAE J3016. Alternately, the committee could (1) use J3016’s full definition (including additional terms defined therein), (2) adopt the likely federal definition (“[t]he term ‘dynamic driving task’ has the meaning given the term by SAE International standard J3016, published on 8 September 30, 2016.”), or (3) reference this eventual federal definition (in which case the reader would need to first consult the federal law and then consult J3016).

²⁵ The committee may wish to consider whether this term is actually useful in this act. Its inclusion was requested at the December 2017 committee meeting, and its definition is adapted from SAE J3016.

1 (15)

2 **OPTION 1:** “Minimal risk condition” means a condition to which a vehicle user or an
3 automated driving system may bring a vehicle [after performing the fallback] to reduce the risk
4 of a crash when a trip cannot or should not be completed.²⁶

5 **OPTION 2:** [omit this definition]

6 (16) “Operate” means as provided in the vehicle code, except that an automated driving
7 provider exclusively operates an associated automated vehicle under automated operation.

8 (17)

9 **OPTION 1:** “Operational design domain” means the environmental, geographic, time-of-
10 day, traffic, infrastructure, and other conditions under which a driving automation system is
11 specifically designed to function.²⁷

12 **OPTION 2:** [omit this definition]

13 (18) “Operator” means as provided in the vehicle code, except that an automated driving
14 provider is the exclusive operator of an associated automated vehicle under automated operation.

15 (19) “Participating agency” means the [Department of Motor Vehicles], an administrative
16 agency of another state that shares automated vehicle registration information with this State, or
17 an administrative agency of the United States that shares automated vehicle registration
18 information with this State.²⁸

19 (20) “Person” means as defined in this Title [or, if not defined, an individual, estate,

²⁶ The committee may wish to consider whether this term is actually useful in this act. Its inclusion was requested at the December 2017 committee meeting, and its definition is adapted from SAE J3016.

²⁷ The committee may wish to consider whether this term is actually useful in this act. Its inclusion was requested at the December 2017 committee meeting, and its definition is adapted from SAE J3016.

²⁸ As detailed below, this draft would accommodate a basic interstate database of automated driving systems to avoid duplicative efforts by automated driving providers, automated vehicle owners, and departments of motor vehicles.

1 business or nonprofit entity, public corporation, government or governmental subdivision,
2 agency, or instrumentality, or other legal entity].²⁹

3 (21) “Remote driver” means an individual who performs part of or the complete dynamic
4 driving task while not seated in a position to manually exercise in-vehicle braking, accelerating,
5 steering, and transmission gear selection input devices.³⁰

6 **SECTION 3. APPLICATION; GOVERNING LAW.**

7 (a) This [act] applies to ownership, registration, insurance, and operation of an automated
8 vehicle, even if the ownership, registration, insurance, and operation of the automated vehicle
9 was compliant with laws before the effective date of this [act].

10 (b) The [Department of Motor Vehicles and the Department of Insurance] may make
11 rules, issue interpretations, and take other lawful actions to administer and enforce this [act].³¹

12 **SECTION 4. DRIVING LICENSING.**

13 (a) A person is not required to hold a [driving license]³² solely because that person uses
14 an automated vehicle without driving or operating the vehicle, turns on an automated vehicle to
15 engage the automated operation of the vehicle for an entire trip, or engages the automated

²⁹ This standard ULC definition has been modified to reflect that many but not all state vehicle codes already define person.

³⁰ This definition is adapted from SAE J3016. Remote involvement in driving could take many different forms. For example, a user might be standing next to and supervising a vehicle as the vehicle pulls into a tight parking space, specifying a vehicle’s speed on a laptop while seated in the back of that vehicle, manually steering the lead vehicle as the only driver in a truck platoon, or slowly directing a vehicle through a construction zone from a monitoring center located hundreds of miles away—among many other possibilities. This diversity raises difficult issues of both substance and wording, particularly for roles that may not cross into driving. Consider, for example, a passenger who is merely watching the road when this is not technically or legally required or an individual at a monitoring facility who instructs an automated driving system to briefly cross a double yellow line but who does not remotely steer that vehicle.

³¹ Although California and Nevada expressly directed their state motor vehicle agencies to develop regulations for automated driving, other states generally did not. This provision would give motor vehicle and insurance agencies explicit authority to implement this law without requiring rulemaking.

³² States use a variety of terms for a driving license, including driver’s license, operator’s license, and chauffeur’s license. Each state should use the appropriate term in this law.

1 operation of an automated vehicle for an entire trip.

2 (b) An automated driving provider that is not an individual is not required to hold a
3 [driving license].

4 (c) An automated driving provider who is an individual must hold a [driving license] that
5 is valid in this State for the type or class of the associated automated vehicle.

6 (d) A remote driver must hold a [driving license] that is valid in this State for the type or
7 class of vehicle for which the remote driver is performing part of or the complete dynamic
8 driving task.

9 (e)

10 **OPTION 1:** A person who would be entitled to a driving license but for a disability is
11 instead entitled to a driving license that carries an appropriate restriction.³³

12 **OPTION 2:** A person who would be entitled to a [driving license] but for a disability is
13 entitled to a [driving license] that is restricted to the type or class of vehicle, if any, capable of
14 compensating for the disability.

15 **SECTION 5. VEHICLE REGISTRATION.**

16 (a)

17 **OPTION 1:** Registration of an automated vehicle may be granted, maintained, and
18 renewed only if, by means of a current electronic record automatically retrievable by every
19 participating agency, an automated driving provider:³⁴

³³ Driving automation—as well as related technological advances—may open forms of driving to individuals who are currently unable to drive. This provision is intended to serve these individuals, to comply with federal law, and to account for considerable variation among states in specifying license criteria.

³⁴ As introduced above, an automated vehicle could be registered only if one legal or natural person has self-identified as the automated driving provider and made all of the enumerated representations and warranties. The vehicle owner would apply to register the vehicle. The department of motor vehicles could then use the vehicle identification number (VIN) to check whether the vehicle had been associated with an automated driving provider in

1 **OPTION 2:** Registration of an automated vehicle may be granted, maintained, and
2 renewed only if, for the duration of the registration, an automated driving provider:

3 **BOTH OPTIONS:**

4 (1) identifies the vehicle by vehicle identification number;³⁵

5 (2) describes the capabilities and limitations of the automated driving system of
6 the vehicle;³⁶

7 (3) provides proof of automated operation insurance for the vehicle;³⁷

8 (4) provides proof of any required automation continuation guarantee for the
9 vehicle;³⁸

10 (5) represents to every participating agency that the provider believes that
11 automated operation of the vehicle³⁹

12 **OPTION 1:** is reasonably safe;

13 **OPTION 2:** complies with this Title’s rules of the road;

14 **OPTION 3:** complies with applicable federal, state, and local law;

15 **OPTION 4:** reasonably complies with this Title’s rules of the road;

16 **OPTION 5:** reasonably complies with applicable federal, state, and local law;

17 **OPTION 6:** is reasonably safe and in reasonable compliance with applicable law;

an interstate registry. That registry could in turn link to additional vehicle information that would be maintained by the automated driving provider and may even be contained in a database controlled by that provider.

³⁵ Although a VIN contains a variety of information about a vehicle, the number itself currently provides no information about the vehicle’s automation features. However, the VIN could be used as the key to a separate record that does contain this information.

³⁶ This information would likely be included in the safety assessment letters that the National Highway Traffic Safety Administration has encouraged and the safety evaluation reports that Congress may require.

³⁷ As specified above, this insurance would be maintained by the automated driving provider rather than by the vehicle owner.

³⁸ This provision will be deleted if the automation continuation guarantee is omitted from the act.

³⁹ This is a subjective requirement: The provider would need to declare its confidence in the automated vehicle and the automated driving system.

1 (6) represents to every participating agency that⁴⁰

2 **OPTION 1:** clear and convincing evidence supports this belief;

3 **OPTION 2:** substantial evidence supports this belief;⁴¹

4 (7) warrants to the public that automated operation of the vehicle⁴²

5 **OPTION 1:** is reasonably safe; and

6 **OPTION 2:** complies with this Title's rules of the road; and

7 **OPTION 3:** complies with applicable federal, state, and local law; and

8 **OPTION 4:** reasonably complies with this Title's rules of the road; and

9 **OPTION 5:** reasonably complies with applicable federal, state, and local law; and

10 **OPTION 6:** is reasonably safe and in reasonable compliance with applicable law;

11 and

12 (8) irrevocably appoints each participating agency as a lawful agent upon which
13 process may be served in an action arising from the automated operation of the vehicle.⁴³

14 (b) The [Department of Motor Vehicles] may decline, suspend, revoke, or decline to
15 renew the registration of an automated vehicle it determines to be in a condition that is not
16 reasonably safe, improperly equipped, not insured in accordance with applicable law,
17 noncompliant with a vehicle registration requirement, or otherwise unfit to be operated on a
18 [highway].⁴⁴

19 (c) If the [Department of Motor Vehicles] declines, suspends, revokes, or declines to

⁴⁰ This is an objective requirement: Although the provider would not need to provide this evidence, it would need to vouch for the existence of that evidence.

⁴¹ Please note that the substantial evidence standard is generally regarded as lax.

⁴² This is a warranty to the public at large and independent of the two prior representations.

⁴³ This is a basic jurisdictional provision.

⁴⁴ Some vehicle codes already make these powers explicit, and some go further by making deregistration mandatory in certain situations. These powers are included here to ensure they are available to the appropriate state agency. They would apply equally for automated vehicles and conventional vehicles—but they may be particularly useful for automated vehicles.

1 renew the registration of an automated vehicle, it may grant a temporary registration that applies
2 to the automated vehicle only when the vehicle is not under automated operation.

3 (d) Registration of a motor vehicle that is no longer an automated vehicle may be granted,
4 maintained, and renewed only if the registrant represents to the [Department of Motor Vehicles]
5 that the vehicle cannot and will not be used under automated operation on a [highway].

6 (e) Registration of an automated vehicle in another state is not valid in this State if the
7 automated vehicle travels more than 80 percent of its miles inside this State as measured on a
8 calendar year basis.⁴⁵

9 (f) Registration of an automated vehicle creates no presumption as to the safety of that
10 vehicle or its equipment.⁴⁶

11 **SECTION 6. EQUIPMENT.**

12 (a) This Title's equipment provisions shall be interpreted to facilitate the development
13 and deployment of automated vehicles in a way that improves traffic safety.⁴⁷

14 (b) An automated vehicle must be

15 **OPTION 1:** reasonably safe.

16 **OPTION 2:** in a reasonably safe condition.

⁴⁵ I have changed the position and wording of this provision to address concerns about clarity. These changes do not address possible concerns about substance. This provision is intended to prevent large fleet owners from evading the requirements of this uniform act by registering their automated vehicles in a state that has not adopted the act while principally using those vehicles in states that have adopted the act. The high threshold of 80 percent, which is intended to capture the most obvious instances of evasion, is likely underinclusive, especially in the case of automated vehicles primarily used for long-distance trips.

⁴⁶ This provision is intended to address potential agency concerns about the legal implications of registration decisions. Per committee discussion it has been revised to apply only to automated vehicles.

⁴⁷ As with the parallel provision for rules of the road (below), this provision recognizes that states may have anomalous equipment provisions that could be interpreted to be inconsistent with automated driving and that there may even be unanticipated issues related to more common provisions. It provides further evidence and direction to courts that any remaining inconsistencies are implicitly addressed by this act.

1 (c) An automated driving system must be

2 **OPTION 1:** reasonably safe.

3 **OPTION 2:** in a reasonably safe condition.

4 (d) A provision of this Title requiring equipment that is necessary only for performance
5 of the dynamic driving task by a human driver does not apply with respect to a dedicated
6 automated vehicle.⁴⁸

7 (e) A restriction under this Title on an electronic device as vehicle equipment, other than
8 a device used to evade law enforcement, does not apply with respect to a dedicated automated
9 vehicle.

10 (f) A restriction under this Title on an electronic device as vehicle equipment, other than
11 a device used to evade law enforcement, may not be enforced with respect to an automated
12 vehicle under automated operation.

13 **SECTION 7. RULES OF THE ROAD.**

14 (a) This Title’s rules of the road shall be interpreted to facilitate the development and
15 deployment of automated vehicles in a way that improves traffic safety.⁴⁹

16 (b) Automated operation of an automated vehicle in accordance with applicable federal,
17 state, and local law and in a reasonably safe manner is lawful.⁵⁰

18 (c) An automated driving provider must

⁴⁸ This provision categorically addresses various and varying state requirements about steering wheels, brake pedals, mirrors, and other accoutrements for conventional drivers. These requirements would continue to apply to automated vehicles that are capable of conventional operation. (The federal motor vehicle safety standards (FMVSS) may already preempt some of these requirements.)

⁴⁹ As with the parallel provision for equipment (above), this provision recognizes that states may have anomalous equipment provisions that could be interpreted to be inconsistent with automated driving and that there may even be unanticipated issues related to more common provisions. It provides further evidence and direction to courts that any remaining inconsistencies are implicitly addressed by this act.

⁵⁰ This provision expressly authorizes automated driving.

1 **OPTION 1:** ensure reasonable compliance with this Title’s rules of the road during
2 automated operation of an associated automated vehicle.⁵¹

3 **OPTION 2:** take reasonable steps to ensure reasonable compliance with this Title’s rules
4 of the road during automated operation of an associated automated vehicle.

5 (d) An automated driving provider is liable under this Title as would a human driver or
6 operator for a failure to comply with this Title’s rules of the road.⁵²

7 (e) An automated vehicle may not be operated on a [highway] if the vehicle is in a
8 condition that is not reasonably safe, improperly equipped, not insured in accordance with
9 applicable law, noncompliant with a vehicle registration requirement, or otherwise unfit to be
10 operated on a [highway].

11 (f) An automated vehicle under automated operation shall not be considered unattended
12 or abandoned solely because an individual is not in or near the vehicle, unless the vehicle is not
13 lawfully registered, poses a risk to public safety, or unreasonably obstructs other [highway]
14 users.⁵³

15 (g) A child or pet in an automated vehicle shall not be considered attended solely because
16 the automated vehicle is under automated operation.⁵⁴

17 (h) A restriction under this Title on the use of an electronic device, other than a device

⁵¹ This provision would prospectively impose an obligation of compliance with the rules of the road on the automated driving provider—with two important qualifications. First, this provision does not demand perfect compliance; this means, for example, that an automated vehicle might lawfully cross a double yellow line to give more space to a cyclist or to get around a stalled vehicle. Second, the automated driving provider need only take reasonable steps; this recognizes that an automated driving provider may not be able to prove that its automated vehicle will never perform unreasonably. This provision should be read in conjunction with the following provision.

⁵² This retrospective provision is intended to treat an automated driving provider like a human driver in the retrospective case of noncompliance. In other words, notwithstanding the qualifications of the prior provision, if a human would be ticketed or charged for a violation, the automated driving provider would be too. However, this reference to a human driver is also intended to reflect that human drivers are not subject to perfect enforcement.

⁵³ This provision would address existing prohibitions on leaving vehicles unattended or abandoned.

⁵⁴ Some states additionally prohibit leaving young children or pets alone in vehicles. See <https://www.kidsandcars.org/resources/state-laws>. This provision maintains these prohibitions.

1 used to evade law enforcement, does not apply during the automated operation of an automated
2 vehicle.⁵⁵

3 (i) A requirement under this Title that imposes a minimum following distance other than
4 a reasonable and prudent distance does not apply to the:

5 **OPTION 1:** operation of a non-leading vehicle traveling in a procession of vehicles if the
6 speed of each vehicle is automatically coordinated.⁵⁶

7 **OPTION 2:** automated operation of a non-leading automated vehicle traveling in a
8 procession of vehicles if the speed of each vehicle is automatically coordinated.

9 **OPTION 3:** automated operation of an automated vehicle.

10 **OPTION 4:** operation of a non-leading vehicle traveling in a procession of vehicles if the
11 speed of each vehicle is automatically coordinated or to the automated operation of an automated
12 vehicle.

13 (j)

14 **OPTION 1:** A person that in willful or wanton disregard for the safety of persons
15 initiates, continues, or impairs the automated operation of an automated vehicle commits reckless
16 driving.⁵⁷

⁵⁵ This provision would address a wide variety of existing prohibitions and restrictions on the use of electronic devices, including phones and televisions. It has two distinct purposes: To clarify that an occupant of an automated vehicle under automated operation can use these devices (even though, because this occupant would not be the driver, they would not be subject to these restrictions) and to establish that the automated driving provider (which would be the driver) can make use of these devices.

⁵⁶ Many vehicle codes specify minimum following distances that are inconsistent with vehicle platooning. This provision would exempt these platoons from these requirements. It would apply even to platoons that feature only level 1 or level 2 driving automation.

⁵⁷ This provision is intended to bring a wide range of particularly egregious behavior related to automated driving into the existing crime of reckless driving. Relevant behaviors might include maliciously hacking a vehicle, deploying an automated vehicle that is manifestly unsafe, deliberately declining to prevent an obvious crash when it would be easy to do so, and testing or challenging an automated vehicle by, for example, deliberately jumping in front of it. Because of wide variation in the relationship between vehicle codes and criminal codes, adoption of this provision may require particular care.

1 **OPTION 2:** [omit this provision]

2 **SECTION 8. INSURANCE.**

3 (a)

4 **OPTION 1:** An automated driving provider must maintain automated operation insurance
5 for each associated automated vehicle in an amount not less than the amount of third-party
6 liability insurance specified in the financial responsibility law of this State.⁵⁸

7 **OPTIONS 2 AND 3: SEE SUPPLEMENTAL INSURANCE MEMO**

8 (b)

9 **OPTION 1:** An automated driving provider must maintain an automation continuation
10 guarantee for each associated automated vehicle in an amount not less than \$10,000 for three
11 years from the date of the first registration of the vehicle, except that this requirement does not
12 apply if the automated driving provider is also the registrant of the automated vehicle.⁵⁹

13 **OPTION 2:** [omit this provision]

14 (c) An automated driving provider shall be considered a permissive driver under an
15 insurance policy applicable to an associated automated vehicle.

16 (d) This [section] does not modify or limit the liability of an automated driving provider
17 under statutory or common law.

18 (e) This [act] does not displace other insurance requirements, and the insurance required
19 under this act does not satisfy other insurance requirements.⁶⁰

⁵⁸ Automated operation insurance is discussed above. Most states require third-party liability coverage in the low to mid five figures. Although these minimums are appalling low for any driver and any vehicle, they provide a concrete basis for this basic automated operation insurance. Tying the two together could conceivably encourage some states to raise their minimums.

⁵⁹ The automation continuation guarantee is discussed above. The \$10,000 figure is arbitrary. The concerns motivating this guarantee are not present where the automated driving provider is also the vehicle owner.

⁶⁰ This provision clarifies that existing insurance requirements would be unaffected, including coverage

1 **SECTION 9. PENALTIES.** A person that fails to comply with a provision of this [act]
2 is liable for a civil infraction and may be fined not more than \$1,000 for each day of each
3 violation by the [Department of Motor Vehicles or other appropriate authority].⁶¹ This provision
4 does not preclude liability under other laws.

5 **SECTION 10. UNIFORMITY OF APPLICATION AND CONSTRUCTION.** In
6 applying and construing this uniform act, consideration shall be given to the need to promote
7 uniformity of the law with respect to its subject matter among states that enact it.⁶²

8 **[SECTION 11. SEVERABILITY.** If a provision of this [act] or its application to a
9 person or circumstance is held invalid, the invalidity does not affect other provisions or
10 applications of this [act] which can be given effect without the invalid provision or application,
11 and to this end the provisions of this [act] are severable.]⁶³

12 **SECTION 12. EFFECTIVE DATE.** This [act] takes effect [30] days after its
13 enactment.⁶⁴

requirements for personal vehicles and for commercial operations. Many commercial operations—including trucking, taxi service, and transportation network companies—may be subject to far higher insurance requirements as well as a variety of additional requirements. At its first meeting, the committee decided by consensus not to address the application of these various regimes to automated driving.

⁶¹ States take a wide variety of approaches to enforcing their vehicle codes, including some of the provisions referenced or expanded by this draft. Accordingly, this provision would merely establish a default rule that a violation of this act would constitute a civil infraction. Tension between California’s Department of Motor Vehicles and an automated driving developer in that state highlighted the lack of a standalone penalty provision in that state’s automated driving law. See *Uber vs. the Law*.

⁶² This is a standard ULC provision.

⁶³ This is a standard ULC provision and is to be accompanied by a legislative note.

⁶⁴ This is a standard ULC provision.