Attn: Mr. Yaakov Shemtov, Senior Area Director, Technology and Innovation, Ministry of Transport

**Re: Adapting Road-Transport Laws to Self-Driving Vehicles**

Ref: Your communication of August 6, 2019

a. Preface

1. Mobileye congratulates the Ministry of Transport for taking the initiative to solicit views on the formulation of regulation in respect of autonomous driving and is grateful to have the opportunity to express its position on the desired regulation of this area of activity.

2. Israel may gain meaningful social and economic utility from extensive use of autonomous vehicles, foremost by reducing traffic accidents. In addition, under the right conditions, Israel may become a leader in the field of smart transport and may attract additional projects and new technologies beyond the autonomous vehicle industry, thus strengthening the country’s industrial and business community.

3. A sine qua non for the successful integration of autonomous vehicles is the pre-existence of regulation that will allow companies to have certainty—innovative regulation based on the trailblazing technological capabilities that have been developed in recent years. This regulation should enshrine basic regulatory principles, particularly the need to strike a balance between strict protection of road users’ safety and the need to assure the efficiency of travel and the regular flow of traffic.

4. Mobileye, in conjunction with Volkswagen—the world’s largest carmaker—and Champion Motors, has chosen to launch in Israel a first-ever commercial autonomous-vehicle project by 2022, after understanding that the government is committed to creating appropriate regulation for the launching of the project. Therefore, we are pleased to cooperate and ask the government to make a concerted effort to complete said regulation in a timely manner.

5. Before we relate to each of the questions in your communication, we believe it correct to specify briefly the principles that, in our view, should guide the regulation of autonomous vehicles. The principles and some of the responses in this document are based on a detailed Mobileye position paper on the question of autonomous-vehicle regulation, attached as an appendix to this document.

6. The attention given in this Preface may create redundancy in answering the questions, but we believe it important that the main messages be presented at once, at the forefront of our remarks.

7. We will focus our attention on highly autonomous or fully autonomous motor vehicles, in which the driver is not in the vehicle and is not needed for the performance of driving during all or much of the trip. We will also relate to the commercial operation of these projects.

8. In respect of the pilot regime and the period preceding full commercial rollout, we see no need for specific regulation; one may rely on existing procedures for the approval of pilots relating to autonomous vehicles and may, to the extent necessary, broaden these procedures to cover driverless pilots as well.

b. Basic regulatory principles

1. Safety first, without losing sight of the balance of safety and efficiency

1.1 The field of transport abounds with hazards to body and property. Existing regulation attempts to cope with these risks by means of licensing, traffic regulations, and strict enforcement. Alongside the maintenance of safety, regulation also deals with assuring the efficiency and flow of traffic. In effect, regulation is based on a balance between maximum safety and efficiency.

1.2 For example, setting a speed limit reflects a regulatory balance between the need to facilitate efficient driving and the need to maintain safety. Marking a broken line that allows drivers to overtake reflects a similar balance. Namely, the legislator and the regulator allow drivers to take somewhat risky driving actions in order to assure an efficient flow of traffic, it being assumed that if they do so judiciously the risk will be calculated and reasonable. Unless efficiency considerations are given weight, the ability to move about on the roads and to use motor vehicles will be impaired. Sometimes, too, driving in the absence of efficiency and traffic-flow considerations menaces other users of the road and forces them to behave unsafely.

1.3 Therefore, thorough attention to the question of traffic efficiency indicates that traffic efficiency may sometimes be considered part of the set of safety elements.

1.4 Existing regulation is based on the presence of a human driver. It is predicated on human limitations, the advantages of human discretion, and a matrix of incentives geared to a human driver. The expected change in the world of transport, including removing the driver from the vehicle, makes it necessary to reexamine existing regulation and adjust it to the changing reality, so that it can attain its central goal—safeguarding the safety of road users without making motor-vehicle use inefficient.

 **The significant challenge that new regulation faces is how to set a clear standard of safety that the autonomous driving system (hereinafter: ADS) will have to satisfy, while bearing traffic efficiency in mind.**

1.5 The standard to be set should give expression to the complexity of the driving task. Safe driving, as stated, cannot be reduced to driving cautiously or knowing and obeying the traffic laws. Safe driving also requires, among other things, using discretion before invoking the right of way; sometimes, too, it entails taking calculated risks.

1.6 In the case of a human driver, the way discretion is applied, including the balance between efficiency and safety, is examined after the fact, sometimes after an accident or a traffic violation occurs. The road-transport laws are based on broad and open-ended rules both because the legislator prefers to rely on human discretion and because in many cases discretion cannot be structured individually. The challenge, then, is to “educate” the ADS, in advance, to perform the act of driving while applying discretion that will allow safe and efficient driving to take place.

1.7 This challenge has an important advantage. Autonomous driving systems will be able, for the first time, to structure, on an ab initio and individual basis, how to drive correctly. This education, however, must be composed of internal balances that will reflect the existing balance in the road-transport laws.

1.8 For example, an ADS that is programmed to drive at a speed far below the speed limit would be safer, ostensibly, because it would stop the car more safely. However, it would do this at the cost of impairing the flow of traffic. In addition, it might cause other drivers to overtake dangerously. Furthermore, it may be that no one will want to travel in a car that moves slowly and hesitantly and takes longer to reach its destination than more efficient alternatives.

1.9 Therefore, an ADS that takes no calculated risk would make trips longer and disturb other users of the road. It might even make itself into a safety hazard and become economically unattractive.

1.10 The absence of a calculated balance may cancel out the major advantages of the ADS. Here the state steps into the picture. Establishing the desired safety standard and the balance between safety and efficiency is not a decision for ADS manufacturers to make. To a large extent, it is a value question that the state needs to answer.

1.11 Thus, the state should require ADS manufacturers to disclose the “discretion” of the system before it allows the system to take to the road. This would make it possible to determine whether the ADS meets the desired safety standard and balances safety and efficiency appropriately.

1.12 Transparent and clear regulation will make autonomous driving systems more trustworthy and attractive to the public. It will even give manufacturers certainty as they develop products and will abet faster integration of autonomous vehicles and attainment of the utilities that come with them.

1.13 An ADS that is also based on efficiency would be even safer from a broad perspective by allowing extensive use of much safer driving systems than human drivers.

1.14 In this context, we should note that Mobileye has developed the RSS (Responsibility Sensitive Safety) model, which includes a transparent and easily explicable array of principles on the basis of which the ADS will operate. The model addresses itself to several fundamental tenets, such as: What distance should an autonomous vehicle maintain from other vehicles for safe merging into a lane or for overtaking purposes, and under what scenarios should the vehicle not exercise its right of way? In effect, the model is a mathematical formulation of a human driver’s discretion that includes an internal balance between safety, to which the company assigns top priority, and the efficiency of travel.

 **We are willing to present the model to the state and, on the basis of the regulator’s decision, to adjust the system of balances that underlies the driving task when performed by an automated driving system.**

2. Preparatory, flexible, and gradually evolving regulation

2.1 **Preparatory regulation:** Existing transport regulation, including statutes, standards, and international treaties, is based on the existence of a human driver. An autonomous vehicle revises this underlying assumption. This fundamental change requires the state to adjust its regulation to the specific characteristics of the autonomous-vehicle. Such regulation cannot be reactive; it must precede and even be a condition for integration of autonomous vehicles. The reasons for this include the following:

\* The sensitivity of this field and the risks to body and property have resulted in strict regulation based on prior licensing of motor vehicles and drivers in accordance with standards set on the basis of the assumption of a human driver. Therefore, to breach this convention, preparatory regulation is needed that will do away with, or adjust, provisions of law that may prevent or impede the integration of autonomous vehicles.

\* The transfer of control over driving to an autonomous vehicle evokes concern among the public about accidents involving these vehicles. The public will probably find it difficult to accept accidents involving autonomous vehicles even if they are much rarer than those involving “ordinary” vehicles and even if the autonomous vehicle is not at fault. Thus, preparatory regulations are also needed to bolster the public’s confidence in autonomous vehicles as instruments that have been certified up front. In the absence of confidence, the public will not rush to consume services or products based on autonomous-vehicle technology, meaning that the utilities inherent to this technology will not be gained. In addition, Israel may lose its attractiveness to industry because its domestic firms will find it difficult to develop this area of activity.

\* The motor-vehicle industry is a conservative one based on long-term planning and calculated risk management. Absent preparatory regulation, it may refuse to take risks, slowing the penetration of autonomous vehicles against the overall public interest. In addition, in the absence of appropriate preparatory regulation, there is concern that those inclined to take risks will be less responsible firms that will turn out inadequately safe products. Preparatory regulation may winnow out elements that are unwilling and unfit to sell this sensitive product, to the benefit of the manufacturers and the public at large.

2.2 **Flexible regulation:** When an innovative field in which little experience has been amassed is regulated, much flexibility should be maintained so that the arrangements may be updated in rapid and simple ways and in accordance with lessons learned. Rigid regulation that leaves no room for flexibility may bind the state and the industry to ineffective regulation that will not allow the advantages of integrating autonomous vehicles to be fulfilled. Regulation that is inflexible and not technology-neutral may keep new and effective technologies out of the market.

2.3 What this recommendation means in practice is that a large number of relevant arrangements should be made by means of administrative directives, at least provisionally, until sufficient experience in the field accumulates.

 **Obviously, however, the underlying principles of this regulation, such as the preliminary licensing procedure and the balance between safety and efficiency, should be enshrined in main legislation in order to establish the borders of the front for industry, the public, and the various government players. This should be done as promptly as possible.**

3. Regulating the gradual integration of autonomous vehicles:
 Mobility as a service

3.1 We propose that regulation focus in its first stage on mobility as a service only. Such regulation would also create an infrastructure for the private use of autonomous vehicles several years onward. This is recommended for several reasons:

\* As long as the systems that facilitate autonomous driving are expensive and complicated to operate, and as long as international standards have not evolved, it is believed that, in the next few years, mass manufacture of autonomous vehicles for private ownership will not take place. Therefore, most current projects in this field belong to the category of mobility as a service and will probably be so in Israel as well.[[1]](#footnote-1) Therefore, it is preferable to focus on regulating the services that will be offered in the next few years instead of producing broad and complex regulation in an area that still lacks supply and demand.

\* By licensing mobility as a service that uses automated vehicles, it will be possible to base the activity on a small number of license holders who will operate fleets of vehicles and to focus regulation on them. These license holders may be subjected to a higher level of requirements than that applying to private vehicle owners in terms of maintenance, operation, inspection, information security, and reportage. It would also be easier to maintain an ongoing discourse with such license holders and to engage them in bidirectional learning. In addition, Israel already places transport services under ramified regulation; therefore, existing law can be used as a basis for the regulation of mobility as a service, adjusted by the addition of an extra licensing suite for automated-vehicle transport services.

c. Reference to the Ministry of Transport’s questions

Vehicle licensing

a. How should prior licensing of ADS/vehicles be carried out?

1. Licensing of autonomous driving systems

1.1 It is Mobileye’s stance that autonomous driving systems and vehicles should be licensed separately. Insofar as international standards for ADS evolve in the future, it will be possible to put out a unified license for both the vehicle and the ADS installed in it. In today’s initial stage, however, it is proposed that the Ministry of Transport give each ADS prior certification. Certification of a given model would be valid for every ADS that uses the same model.

1.2 In the absence of an international standard, we propose that an ADS be seen as a substitute for a human driver and that a licensing array resembling the licensing of a human driver should be constructed, as we explain presently.

2. Terms of licensing

2.1 We propose that an applicant for an ADS license submit to the Ministry of Transport, together with the license application, the operating scheme of the vehicle.

2.2 The operating scheme should constitute the applicant’s statement of intentions, so to speak, about the way the ADS will perform the act of driving. The scheme should include details such as the proposed operating plan, the sensor systems and redundancy mechanisms of the system, the resources on which the ADS may draw in the event of a mishap or a failure, the way in which the system will respond; the rules that will guide the ADS in performing the driving act under various travel conditions; the event upon which the system will be asked to switch to driving in “a minimal-risk condition”; and the way decisions will be made under these conditions. The approved scheme should be incorporated into the ADS license.

2.3 In other words, if the applicant’s proposed operating scheme limits itself to certain terrain or weather conditions, then the driving license shall be valid only where these conditions are present.

2.4 It is also proposed that each company should describe the way it intends to assure safety and how it determined the balance between safety and efficiency.

2.5 **Driving tests:**

2.5.1 To determine the terms of the license, the Ministry of Transport should subject the ADS to testing in accordance with the operating scheme presented, focusing on the following:

2.5.2 **Sensor system:** Technical tests should be developed that will determine the autonomous system’s ability to detect objects under various lighting and weather conditions; identify road users, signage and other indicators; and identify security and rescue forces and understand the nature of instructions that they give.

 The test should be given in accordance with the operating plan included in the scheme. In accordance with the results of the tests and the assessment of the abilities of the sensor system, the ADS operating plan may be determined (as part of the terms of the license).

 Notably, for the purposes of this Section, the abilities of the sensor system may also be subjected to statistical analysis. In other words, an attempt may be made to estimate the probability that the sensor system will fail to discern objects in its environment or to classify them correctly.

 **A** **sensor system, like any technology-based system, is not immune to errors. Here, too, we propose the establishment of a reasonable standard of error that will take account of technological limitations.**

 In this respect, the licensing of the sensor system may be likened to the vision test that a human driver’s license applicant takes.

2.5.3 **Decision-making system:** In this section, we propose that the ADS be put to a test similar to that of the human driver. First, a **theory test** should be given, including elements similar to those set forth in Regulation 205 of the Regulations—familiarity with the road-transport laws, identification of road signs and markers and their meaning, behavior on the road, and so on. In this section, the system’s discretion should also be examined, i.e., the way the system is instructed to perform the driving task under different driving conditions and situations.

 In other words, in the theory section, the ADS should be tested for the existence of a set of driving rules that will allow it to drive lawfully and safely, maintaining the safety/travel efficiency balance and complying with the proposal submitted.

2.5.4 Afterwards, there should be a **road test,** in which the ADS’s ability to perform the act of driving in accordance with all the parameters tested above is examined. Such a test should be undertaken on the basis of the operating plan that the license applicant includes in the scheme. This test should take place on a proving ground but also under real-life conditions in accordance with the operating plan.

2.6 **Legal person:** It is proposed that licensing an ADS be conditioned on the existence of a legal person that assumes responsibility for all requisite obligations for the operation of the ADS. This legal person should be responsible for the functioning of the ADS in accordance with the terms of the license and additional requirements related to the system’s periphery (updating of software, reportage of malfunctions, etc.). The extent of this legal person’s obligations may vary in accordance with the autonomous-vehicle operating model chosen.

b. How should the safety of the system for driving be ascertained?

3. Although autonomous-vehicle safety is central in professional and regulatory discussions around the world, no clear consensus as to how safe an ADS must be and how the level of safety should be estimated has taken shape.[[2]](#footnote-2) In our estimation, progress in this matter will take place at the individual-state level until the relevant international organizations work out an agreed-upon standard. Our stance is that the State of Israel has an interest in the situation as a leading player in formulating “safety policy” for autonomous vehicles and should not wait for an international standard to come about. This, of course, does not preclude the adoption of such a standard once it is formulated.

4. The decision on whether an ADS is “safe for driving” is not only a technical one; it also ties into social values. It entails a decision on questions of whether the ADS should be safer than a “reasonable” human driver, or the proper balance between safety and efficiency—because, as we specified in the Preface, the safety of an ADS should also be determined in view of its efficiency.

 Therefore, the state should review the driving policy of the ADS and decide whether, according to its position, it is safe for driving. From our standpoint, it is inappropriate to rely on a license applicant’s own attestations in this matter. Applicants’ assertions usually rest on statistics relating to accidents or malfunctions per Vehicle Miles Driven and are not transparent enough in regard to the driving policy that guides the ADS.[[3]](#footnote-3)

5. As for the issue proper, Mobileye proposes the following testing procedure for ADS safety:

5.1 The operating scheme that we specified in Section 2.1 should be attached to the driving license application. The state should determine whether the overall proposal in the scheme suffices in terms of level of safety and whether the system’s checks and balances reflect an accepted level of safety and efficiency or whether the proposed scheme needs revisions or updates.

5.2 Such a testing procedure would commit the license applicant to transparency in presenting the set of rules, principles, and balances that guide the ADS.[[4]](#footnote-4) In the absence of transparency as to the system’s driving policy, the regulator effectively has no knowledge of how the ADS “plans” to carry out the driving act and leaves these matter to the license applicant to resolve.

5.3 As stated in our response to Section A, it is our position that the ADS should be put to driving tests that may be carried out in a variety of ways: taking the autonomous vehicle on a road test with a Ministry of Transport examiner aboard (who can take control of the ADS in mid-trip), using a simulator, or using a route designed for training and testing purposes.[[5]](#footnote-5)

c. Should the state make its own policy on ADS decision-making (i.e., its driving policy) or should it certify an existing driving policy and, if so, how?

6. We consider both alternatives possible. In the first alternative, the state should set a standard or issue administrative directives as to the guiding rules for decision-making by an ADS. The license applicant should then have to demonstrate compliance with the standard or the rules. In the second alternative, the applicant is asked to present the licensing authority with the scheme by which its ADS will operate, which includes the system’s driving policy, and must subject the ADS to testing. Only if the licensing authority is convinced that the ADS will allow safe and efficient driving may the ADS be licensed.

7. In the long term, having the state establish guiding rules or some other standard seems to be the right way to go. In the near term, however, and in the first stages of the integration of autonomous vehicles and until the state acquires expertise and identifies global trends in this field, the alternative of state testing and certification of driving policy is preferable.

d. How should the state make sure that the vehicle is both safe and conducive to efficient driving amid other road users?

8. As we explained at length in the Preface, the balance between safety and efficiency is a critical element in the driving policy of an autonomous vehicle. A correct balance entails driving that is both safe and compliant with the traffic laws, but also in a way that does not disturb other road users and does not impair traffic flow. This is correct in the medium term, in which autonomous and people-driven vehicles share the road.

9. This balance is already embedded in road-transport law. Driving lessons and tests for human drivers construct and test human drivers’ discretion in applying this balance. From this standpoint, autonomous driving systems give regulators an opportunity by allowing them to structure the desired discretion ab initio. In practice, the “brain” of an ADS may be programmed with a clear-cut set of rules based on human experience and also, farther along, on experience that the system itself will amass, all in a way that will attain a clear balance between safety and efficiency.

10. As for the issue itself, Mobileye proposes the following principles for the efficiency–safety balance:

10.1 We believe that the license applicant should be obliged to transparency in regard to the specified set of balances for the ADS so that the regulator may certify it. In the case of Mobileye, for example, this entails the presentation of the RSS (Responsibility Sensitive Safety) model, which reflects Mobileye’s thinking about how the balance should be achieved. The regulator should test the model and either approve it or demand that the balance be adjusted. The limits to be set and the rules to be determined should oblige the ADS and enforcement proceedings against the ADS would be justified only if the limits and rules are breached.

10.2 An ADS should be given some “discretion” to violate road-transport laws under appropriate circumstances. This would resemble the way Israel’s laws and enforcement policies acknowledge circumstances under which a human driver would be justified in breaking the law in the service of another interest, e.g., avoiding an accident or circumventing an obstacle on the road and refraining from blocking traffic. For example, one may determine that the ADS would be able to break the law if no reasonable alternative exists and only if said violation would not compromise the safety of other road users.

10.3 The question of driving policy demonstrates the importance of adopting flexible regulation. Once experience in operating autonomous vehicles accumulates, it will certainly be possible to shape the limits and the balance in this important measure more effectively. If a rigid standard is imposed from the outset, it will be harder to revise the rules while “on the move.”

e. How should the licensing procedure be carried out and what tests should be given before the ADS is approved, and what is the right way of administering the tests?

11. As stated in our response to Section A, we propose a procedure for ADS licensing. The procedure should begin with the submission of a license application that includes the vehicle’s operating scheme. The licensing authority should have to determine whether the totality of information in the scheme reflects an adequate level of safety and a proper balance between safety and efficiency. Afterwards, the ADS should have to pass driving tests including the abilities of the sensor and decision-making systems. The test should comprise a theory section and a road-test section, both testing the system’s ability to cope with performing the driving task.

Insurance (addressed mainly to the Capital Markets Authority)

F. From pilot operators—what is happening abroad?

G. How should the vehicles be insured and should regulation in this field be revised to make commercial operation possible?

H. Is there a need for change in the regime of license holders’ and manufactures’ civil liability in this field?

12. Here we respond to these questions collectively. It is somewhat complicated to try to learn about developments abroad in the field of insurance. The main automated-vehicle pilots are taking place in the United States, where the insurance regime does not resemble Israel’s.[[6]](#footnote-6) In the UK, where the insurance regime is somewhat similar to Israel’s, it was recently determined that bodily damage occasioned by an accident involving a “regular” vehicle should also apply in the context of an autonomous vehicle that is authorized to operate in the UK.[[7]](#footnote-7)

13. We propose that Israel adopt the British method and extend the existing insurance arrangement, which is based on compulsory insurance and no-fault compensation, to autonomous vehicles. As part of the terms of the license, license holders may be required to purchase additional coverage for third-party property damage. The question of comprehensive insurance for the license holder itself may be left to the license holder’s discretion and to negotiations with the insurance companies.

14. To our taste, it is important to make sure, from the public’s standpoint, that there is no room for differentiation between types of vehicles in terms of compulsory compensation and the manner of its application. Therefore, it would be wrong to create a specific insurance arrangement for autonomous vehicles.[[8]](#footnote-8)

15. For these reasons, we see no need to revise the regime of civil liability in respect of autonomous vehicles.

Enforcement (in conjunction with the Police and the Ministry of Justice)

I. To the best of your knowledge, does the existing legislation (not only that of the Ministry of Transport) have enforcement barriers that prevent the use of the vehicle?

16. The Road Transport Ordinance and the Road Transport Regulations have many complicated provisions concerning the legal requirements associated with carrying out the driving task. They are essentially ill-suited to driverless driving.

17. It is important to distinguish between two types of barriers.

 The first is created by directives that prevent or prohibit the performance of the driving task without licensing. Today, there is no licensing for an autonomous, driverless vehicle.

 The second is produced by directives that are unsuited to a driverless vehicle, e.g., the requirement that a driver keep both hands on the steering wheel.

18. In respect of the licensing barrier, the scheme presented for ADS licensing is in effect a proposal for separate ADS licensing, much as in the chapter that concerns the licensing of a human driver. In other words, we propose that a separate chapter in the Road Transport Ordinance be established for autonomous vehicles. It would regulate ADS licensing in a way that would allow today’s licensing requirements in the Ordinance to be “surmounted,” thereby eliminating the first barrier.

19. In addition, we propose that, in the special chapter for autonomous vehicles, the Minister of Transport be authorized to exempt an autonomous vehicle and an ADS from the provisions of the Ordinance and the Regulations and to issue an interpretive directive to the effect that the directives in the Road Transport Ordinance and the Regulations should be applied to autonomous vehicles *mutatis mutandis.* In this manner, arrangements that are irrelevant to autonomous vehicles may be dealt with, clearing away the second barrier.

20. In any matter related to barriers in criminal law, see our proposal in Section J below.

J. Should an administrative enforcement model in lieu of criminal enforcement be proposed?

21. Existing criminal law concerning road transport is antiquated and unsuited to enforcement for autonomous vehicles; it presents various enforcement difficulties vis-à-vis human beings as well.

22. A conceptual change has to be made in order to accommodate the removal of the driver from the vehicle and the depositing of decision-making and other driving actions in the “hands” of an autonomous driving system. Even if the system breaks the law and causes damage on this account, subjecting it to criminal law serves none of the goals of the penal laws. After all, the system is a robot for which considerations of punishment, deterrence, and reward are irrelevant.

23. Mobileye’s stance is that an administrative enforcement model vis-à-vis license holders is more suitable and effective for coping with violations pertaining to a driving act performed by an ADS.

24. In addition, it is our stance that the regulator should certify the driving policy of an ADS ab initio (see Section A above) so that if the ADS operates as certified within the appropriate range of the balance between safety and efficiency, and if an accident or a traffic violation occurs within the risk limits that the state has approved, there will be no reason to use criminal tools.

25. There will be cases in which deviation from the law would justify the use of criminal tools. **First,** the criminal enforcement model should continue to apply to most obligations unrelated to the ADS (= duties not specific to the driver), such as those pertaining to the vehicle owner or the license holder. **Second** are cases in which the human player associated with the ADS has knowingly broken the law, e.g., programming the system to violate the terms of the license or making false representation about the capabilities of the ADS. In these cases, criminal enforcement usually should take place on the basis of violations of general criminal law (fraud, etc.) and not necessarily in the context of road-transport law.

26. We propose an expanded administrative enforcement model guided by the following principles:

26.1 **Exceptioning from criminal law**—It is proposed to exception the ADS from most penal provisions of the Ordinance and to establish special provisions for autonomous vehicles.

26.2 **Administrative inquiry**—In cases where a **driving-related** violation has taken place, an administrative inquiry proceeding vis-à-vis the player that drove the vehicle should take place: Was this player a human driver (who is subject to ordinary law)? and why did the infraction occur: Was it a malfunction involving the ADS or the violation of an obligation of the license holder under the Ordinance? An example would be a failure by the holder of an ADS operator’s license to update the ADS per manufacturer’s instructions.

26.3 Depending on the outcome of the inquiry, the regulator may take one of the following steps:

\* **License:** The regulator may order the relevant term of the license to be revised until the malfunction is corrected. If continue driving poses a real menace to the public’s safety, the license may be **suspended.** In extreme cases, e.g., if the defect is not corrected, the license may be **revoked**.

\* **Financial sanctions:** It is proposed that the Ministry of Transport be empowered to impose a financial sanction on a license holder who violates h/her “technical” obligations under the Ordinance. The sanction should be applied whether the breach results in a road-transport infraction or not. The sanction is not criminal and is meant to deter the recurrence of a violation that may affect the safety of user of the ADS. Said sanction should replace the existing criminal proceeding of an optional fine.

\* **Suspicion of criminal conduct:** Even if criminal proceedings are not launched on account of the infraction itself, the possibility of turning to the criminal track should be available if the inquiry results in suspicion of criminal violations of the Road Transport Ordinance or of general law.

 **Our stance is that criminal enforcement should be reserved for severe cases such as malice.**

26.4 **Offenses unrelated to driving**—Apart from offenses directly associated with the ADS, there are some that are not directly related to driving, e.g., a holder of an ADS operator’s license who transports passengers for revenue without a license or allows the vehicle to travel even though it has been damaged in an accident. In these cases, the specified administrative measures or the criminal track may be invoked, depending on the type of infraction, its severity, and so on.

26.5 **In any event, it is our stance that criminal proceedings should not be launched in cases where the ADS performed in accordance with the previously certified driving policy.**

J. How should accidents be investigated and what information should be retained after investigation?

27. The state and the industry have a strong interest in investigating traffic violations and mishaps not only in order to find a human culprit but also, and mainly, to understand the origin of the mishap, to correct it, and to prevent its recurrence.

28. Therefore, we propose that a statutory mechanism similar to that enshrined in Chapter 7 of the Aviation Law, 5711-2011, be created. This mechanism should include: (a) an interpretive provision concerning the purpose of the investigation—collecting and processing information in order to enhance the safety of autonomous vehicles; (b) requiring relevant players to report accidents or malfunctions (for investigative purposes); (c) drawing conclusions from the investigation, including the authority to undertake criminal proceedings where suspicion of criminality exists.

29. To facilitate the investigations and enhance their efficiency in view of the innovative nature of the technology, we propose compulsory reportage by license holders and compulsory retention of documentation and recordings of the sensor and decision-making systems in order to investigate accidents and learn from them for the purpose of updating the regulations.

30. In this context, it is important to note that the ability to document the actions of an autonomous system is one of the epitomic advantages of autonomous-vehicle technology. In the future, it will be possible to know quickly and clearly what happened in any accident involving an autonomous vehicle and what processes brought it on. Apart from improving regulation and safety, this ability may have a major effect on legal proceedings following a road accident if the documentation is given evidentiary value similar to that given today to the outcomes of technographic investigations or traffic cameras.[[9]](#footnote-9)

31. However, in view of the scope of information gathered and the cost of retaining it over time, we propose that the Ministry of Transport specify the information that must be retained and the method to be used in retaining it. We suggest that the focus be placed on several minutes preceding the accident or other safety event.

General question

32. We did not find it correct to present additional proposals beyond the broad references in this document. We realize that there are additional issues unrelated to the act of driving that should be discussed, such as ADS security, privacy, and so on. Therefore, we emphasize again the need to move ahead rapidly on regulating this sphere of activity. Beyond its utility for the project in which we are partners, rapid regulatory progress would be significantly advantageous for the Israeli economy and public at large.

1. Recently, for example, the city of Toronto declared its intent to pilot transport services between regular stops by autonomous vehicles in 2020. [↑](#footnote-ref-1)
2. Mobileye (Intel?) has been leading a discourse with other stakeholders in the industry in an attempt to promote discussion of the topic: <https://newsroom.intel.com/wp-content/uploads/sites/11/2019/07/Intel-Safety-First-for-Automated-Driving.pdf> [↑](#footnote-ref-2)
3. Beyond the value aspect of certifying a system without knowing how it carries out the driving task and what balances it invokes, there are also real difficulties in assessing the level of safety on the basis of statistics that the applicant furnishes. How should a decision be made on how many test trips are needed to determine statistically that an ADS is safe? How many of these trips were performed under conditions relevant to trips in Israel, and so on? [↑](#footnote-ref-3)
4. In a consultation proceeding in Britain, practical questions were asked about proper way of striking the balance between safety and efficiency. Also asked, however, was a general question about whether the state should require system manufacturers to disclose the ethical “policy” of the ADS. Here, 61 percent of respondents believed that this should be required (with certain reservations, however). [↑](#footnote-ref-4)
5. See, for example, the Rand Corporation’s proposal on these matters: <https://www.rand.org/pubs/research_reports/RR2662.html> [↑](#footnote-ref-5)
6. Notably, in some American states that have not made insurance arrangements, compulsory insurance is imposed as part of the terms of the autonomous vehicle operation license. [↑](#footnote-ref-6)
7. See the Automated and Electric Vehicles Act 2018. [↑](#footnote-ref-7)
8. This, for example, is one of the principles adopted by the Australian National Transport Commission, which was appointed to draft autonomous-vehicle regulation: [https://www.ntc.gov.au/Media/Reports/(70E5881A-1E58-DC34-6C15-73AAFADC29A0).pdf](https://www.ntc.gov.au/Media/Reports/%2870E5881A-1E58-DC34-6C15-73AAFADC29A0%29.pdf) [↑](#footnote-ref-8)
9. Namely, to issue provisions similar to those in Sections 27c–27d of the Road Transport Ordinance concerning documentation of the driving system. [↑](#footnote-ref-9)