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Procedure Instruction No. H-02-2017	Approval of Trial Vehicles for the Purpose of Research and Development of New Technology Systems	Rev. 1 Jun. 1, 2019

1. Background

1.1. The Ministry of Transport and Road Safety recognizes the great importance of promoting new vehicle technologies as part of the strategy to strengthen the Israeli industry and making it a universal development center and an attraction for entrepreneurs from all over the world.

1.2. The Ministry of Transport and Road Safety recognizes as well the importance of developing technologies and systems designated for autonomous vehicles in light of their great potential to enhance road safety and reduce casualties.

1.3. Most of the development stages of modern technological systems take place in labs and in closed delineated areas, but these are not sufficient to ensure their performance, safety and credibility. The key is to examine the systems in real operational conditions.

1.4. The Ministry of Transport and Road Safety is keen to allow the trial of vehicles with new technological systems on public roads as an important and necessary stage of the systems substantiation.

1.5. Therefore, the Ministry of Transport and Road Safety is required to determine the standards, procedures, rules and conditions required for the approval of trials vehicles on Israeli public roads while maintaining maximum safety for all road users.

1.6. This procedure relates to the approval of trials vehicles and the permission to travel on public roads. The requirements arising from this procedure instruction depend on the nature of the experiments and the systems being tested. The approval of the experiments does not approve or authorize a serial installation or the overall use or commercial marketing of the systems being tested.

1.7. The approval given by the Ministry of Transport does not remove the responsibility from the applicant for the changes made to the vehicle and for all the actions that will be taken by his company during the trials.

2. Legal Basis

2.1. Section 31(a)(8) of the Licensing of Services and Professions in the Vehicle Industry Law, 5776, 2016.

2.2. Regulation 380, Regulation 382, Regulation 282 (dl) of the Transportation Regulations, 5721, 1961.

2.3. Section 115 of the Licensing of Services and Professions in the Vehicle Industry Law, 5776, 2016 and its regulations.

3. Purpose of the Procedure

The purpose of this procedure is to present a set of rules, terms and milestones required to be implemented in order to get the Israeli Ministry of Transport approval for driving trial vehicles with new technological systems on public roads for examination and experiments.

4. Definitions

For this Procedure:

4.1. **New Technology** – means an advanced system or feature installed in a trials vehicle that may intervene or may have a negative effect on the vehicle safety systems performance.

4.2. **Professional Committee —** means a committee authorized by the vehicle division director to examine the integration of new technology systems in trials vehicle and recommend to the director regarding the approval of trials vehicles to go on public road.

4.3. **Vehicle manufacturer/ Development company -** means a person or body who is responsible to the approval authority for all aspects of the approval or authorization process. It is not essential that the person or body be directly involved in all stages of the construction of the vehicle, system, component or separate technical unit which is the subject of the approval process;

4.4. **Trials vehicle –** means a vehicle equipped with new technology systems that are responsible for steering, brake or accelerating systems when the equipment is activated. A test driver should seat alert behind the steering wheel and continuously monitor the vehicle performance.

4.5. **Test operator/driver –** means a human operator/driver how holds a valid and suitable driving license for the trials vehicle category being tested. The operator/driver has to be trained to take a full control over the vehicle and must be able to override the vehicle's systems at any time. The operator/driver must obey all traffic laws of the state of Israel and must ensure safe operating of the trials vehicle on public roads.

4.6. **Self-driving mode –** Vehicle operational mode which conduct the entirety of the driving task without the need for human intervention or not being controlled, and does not need to be monitored, by an individual.

5. Method

5.1. Vehicle Manufacturer/Development Company, who are interested in examining vehicles with new technologies on public roads, should submit an application for approval as required in Appendix C of this procedure and a full trial portfolio to the Engineering and Standardization Department at the Vehicle Division.

5.2. The trial portfolio should include a large scale of system details and data as required in Appendix B of this procedure including a certificate issued by a technical service confirming that the driver is able to take a full control over the vehicle and is able to override the vehicle's systems at any time.

5.3. The application and the trial portfolio will be examined by a professional committee, chaired by the head of Engineering and Standardization Department, which will be formed for this very purpose by the head of the Vehicle Division.

5.4. The committee will include representatives from the vehicle division and other official offices (for example: Infrastructures division, Traffic Controller, National Road Safety Authority, Ministry of Defense etc.)

5.5. The Ministry of Transportation and the Committee members shall undertake to maintain the confidentiality of the information to be transmitted within the committee framework.

5.6. The committee's work will emphasis on the following subjects:

a. The manner in which the new technologies are connected to the vehicle systems
b. Safety perception and systems risks.
c. Analysis of the system's failure situations, their severity and criticalness.
d. Qualification and maturity of the new technology to travel on public roads.
e. The exemptions/exceptions required by the law, by the Israeli Road Traffic Ordinance and Regulations, according to the Ministry of Transport procedures and/or other governmental ministries.
f. The training methods of the test drivers.
g. The ability to investigate safety events (a video and audio recording system to detect the vehicle movement and driver's operation should be used)
h. Insurance coverage of the trials vehicle.

5.7. Documents submitted by the original vehicle manufacturer or by his representative in Israel (manufacturer's R&D center), which certify the correctness of the technological systems and their ability to travel in public roads, may be accepted by the professional committee as alternative documents to those required by the provisions of this procedure.

5.8. After examining the application and the trial portfolio and according to its discretion, the head of Engineering and Standardization Department will forward his recommendation to the Vehicle Division Director to approve the implementation of the experiment without the need to convene the professional committee or alternatively to convene a professional committee to examine the test file.

5.9. The Engineering and Standardization Department will publish a response to the request (a request for additional data or an invitation to a professional committee) within 14 business days at the most from submitting the application and the trial portfolio.

5.10. The representatives of the applicant shall appear before the professional committee for the presentation of the technological system and the experiment. In presenting the system, emphasis should be placed on all actions taken to ensure the reliability and safety of the system components.

5.11. The Committee may request additional information and documents before concluding its recommendation and approving the vehicle and the experiments.

5.12. After examining the application and the trial portfolio, the committee will present its recommendations to the Director of the Vehicle Division to approve or reject the application for the experiment.

5.13. Recommendation to approve the vehicle and the experiment shall include, among other things, all the restrictions and conditions for use of the vehicle and the systems installed therein, the permitted driving zones, the marking and identification of the vehicles, the time period allowed for implementing the experiments and the exceptions given by the Traffic Controller officer based on the authority granted to him by regulation 16A of the Traffic Regulations.

5.14. The approval to perform the vehicle experiment on public roads will be granted by the Vehicle Division Director within the scope of his authority, according to his discretion, based on the committee's recommendation and after receiving the confirmations of relevant parties to the experiment.

5.15. It should be emphasized that changes planed by the Vehicle Manufacturer /Development Company on the tested technology or in the trial portfolio or in the development that might affect the safety of the road users and the ability to identify failures should be presented to the committee for re-approving.

5.16. The Manufacturer/Development Company would be required to demonstrate that the vehicle and the driver carries an adequate insurance for the operation of the vehicle as a trial vehicle.

5.17. The Manufacturer/Development Company must immediately report of any unusual events or any involvement in accident occurred while the vehicle is operated under a self-driving mode. The report must include details required for the investigation of the incident.

5.18. The Ministry of Transport and Road Safety is authorized to cease the experiments at any time.

5.19. The Manufacturer/Development Company will provide to the Vehicle Division a progress reports according to the time schedule requested by committee.

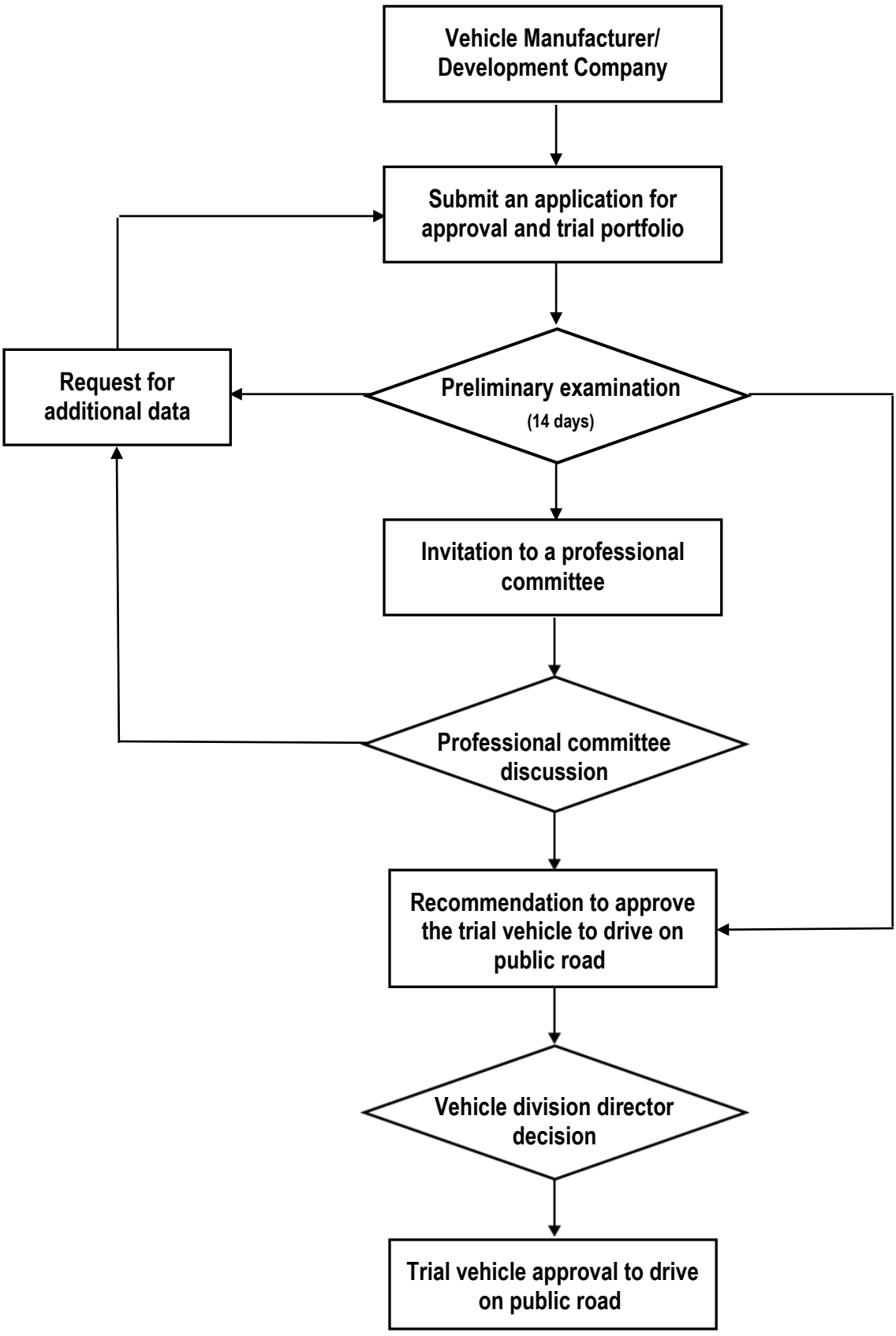
5.20. At the end of the experiments, the Manufacturer/Development Company is required to submit an application for the removal of the technology systems from the vehicle.

6. Commercial and Serial Installation of a New Technology System

A Ministry of Transport approval for the serial installation of new technology systems will be given after a separate examination and will be subject to submission of a new application to the Vehicle Division.

Engineer Doron Kugmen
Head of Engineering and
Standardization Department

Appendix A – Vehicle Approval Flowchart



Appendix B - Development and Trial Vehicle Portfolio

New systems that are installed in vehicles might intervene or affect the control, the monitoring, the vehicle safety, the communication between the components and the performance of the existing vehicle systems.
Therefore the portfolio and the information presented to the committee members should contain a full details of the new technological systems installed, the changes made on the trials vehicle for the purpose of Research and Development (R&D), the tests and all the safety aspects regarding the systems.

For the convenience of the vehicle manufacturer/development company, here is a list of details to include in the portfolio:

1. General

(a) Details of the company, a review of its engagement with the experiment's field, and the professionals engaged in the system development.

(b) Experiment plan including manner of conducting, location and duration, the examinations which will occur, manner of monitoring and collecting data.

(c) Safety concept description - means and properties meant to assure the system's performance and that when a failure occurs, the vehicle keeps functioning safely.

(d) Confirmations/responses of relevant licensing authorities regarding the use of infrastructures, such as: Electricity Authority, Ministry of Communications, Fuel Administration, Ministry of Environmental Protection.

(e) Details regarding the extent of the manufacturer's or its representative's participation and support provision in the experiment, such as: systems installation, connection to the communication interfaces in the vehicle, collection and analysis of data, consulting and provision of technical and maintenance services during the experiment.

2. The Vehicle

(a) Details of the vehicle(s) used in the experiment.

(b) Regulations and standards that the vehicle doesn't meet in its requested configuration.

(c) Proper insurance for experiments in vehicles.

(d) Consideration of the vehicle's future after the experiment.

3. The System

(a) Description of the examined system. The manners, methods and logic by which the system has been developed. The functionality of the system.

(b) The manner of connection/use of the examined system by the vehicle's systems.

(c) List of units associated with carrying out/achieving the goal, explanation of all system units, scheme of connections between units and unit's hierarchy.

(d) Analysis of the units and system's failure situations, their severity and criticality, manner of detecting failures and real-time response by the test operator/driver - including documentation of experiments performed in closed areas.

(e) List of all input data used by the system and their operational range.

(f) List of outputs controlled by the system. Denote if the system performs direct control or if the control is done by other systems or by a human driver qualified as a safety driver, control range, and the physical limitations under which the system is designed to operate.

(g) A full description of the date collection system.

The vehicle should be equipped with a data collection system capable to capture data from sensors and control systems, as well as other information regarding the vehicle movement. Among other things, it should record the following data:

- Whether the system is in action or neutralized.
- Vehicle's velocity.
- Steering command and its activation.
- Braking command and its activation

These data must be sufficient in order to determine who or what controlled the vehicle during the event. The data must be well stored and provided to the relevant authorities upon request.

(h) A description of all monitoring cameras installed in the vehicle. A video and audio recording system to detect driver's operation should be included.

(i) A description of a Real-time failure detection ability by the system or a human driver backing it up (safety driver).

(j) Description of resistance to electromagnetic interruptions.

4. Test Operator/Driver

(a) A proof that the test operators/drivers hold a valid and suitable licenses for the vehicle category being tested.

(b) A training certificate proving that the operator/driver had been trained to operate the trial vehicle and to take a full control on the vehicle if necessary.

5. System Performance in the Automated Mode

(a) Automated System Type Definition.

(b) Automated Driving Functions.

(c) Operational Domain:

(1) Speed, road type;

(2) Environment;

(3) Road Conditions.

(d) Basic Performance (e.g. max. lateral acceleration).

(e) Tasks other than driving enabled by the system.

A. Environment Perception

(a) With respect to operation domain.

(b) Lanes/Objects.

(c) Redundancy (with respect to system performance).

(d) Sensor monitoring:

(1) Plausibility check with respect to misuse;

(2) Implemented monitoring system or degradation considered.

(e) Connectivity.

(f) Maps.

B. Dynamic Driving Task and Interaction with Other Road Users

(a) Have a predictable and careful behavior:

(1) Driving in accordance to the speed limits (explicit and implicit);

(2) Obeying passing restrictions;

(3) Adapting the speed of the vehicle to environmental conditions (e.g. rain, fog, curves, hilltops, sun glaring) affecting:

- Adhesion of the road
- Viewing distance of the system

(4) Keeping the required minimum distance to other road users.

(5) Rules regarding the preferred lane of travel ("Drive on the rightmost lane").

(6) Compliance with relevant country specific traffic rules (respecting road markings and road signs).

(b) React to:

(1) Other vehicles within the lane or in the neighboring lanes (e.g. other vehicle cutting into the lane, neighboring vehicle driving too close or across the lane marking);

(2) Vulnerable road users (if applicable in the operation domain);

(3) Police and Emergency Vehicles.

(4) Law enforcement injunctions (police control, compliance with officers' regulations)

6. Driver Interaction

(a) Activation/Deactivation/Modes (on/off/standby).

(b) Overriding/Human driver priority.

(c) Human Machine Interface (HMI):

(1) Driver Information (Operation Status, Failure);

(2) Optical Warning Signal (type and operation mode);

(3) Acoustic/Haptic Warning Signals (type and operation mode).

(d) Driver Presence and Responsiveness Recognition System.

(e) Extract of the relevant part of the owner's manual.

(f) Means to prevent misuse and manipulation.

7. Transition of the Driving Task

(a) Planned:

(1) Boundary conditions;

(2) System behavior;

(3) System performance.

(b) Unplanned (including major system failure):

(1) Boundary conditions;

(2) System behavior;

(3) System degradation;

(4) System performance.

(c) Emergency (only in case of imminent danger of a collision):

(1) Boundary conditions;

(2) System behavior;

(3) System performance.

8. Minimum Risk Maneuvers

Description of the different risk maneuvers for the different scenarios (e.g. planned and unplanned events).

9. Data Storage System

(a) Type of Data stored.

(b) Storage location.

(c) Storage duration.

(d) Means to ensure data security and data protection.

(e) Access to the data.

10. Cyber Security

(a) Description of the different risks and measures put in place to mitigate these risks.

(b) Description of the update procedure.

11. Safety Assessment and Testing

(a) Design and validation process to be validated by the technical service and confirmed by the approval authority:

– Assessment of the functional and operational safety for the automated system design;

– Test of the functionality;

– Tests in case of system failure.

(b) Measurement equipment used.

(c) Test conducted by the technical service/type-approval authority.

(d) Description of in-use tests.

(e) Description of the internal review & approval process carried out by the company when, hardware and/or software changes are applied.

12. Information Provisions to Users

Model of the information provided to users.

Note:

The Ministry of Transport and Road Safety may update, amend and append subjects with regard to the request and experiment kind.

For the convenience of the vehicle manufacturer/development company, here are some questions that may be presented by the Committee members during the process:

	Requirement	Description
1	Company details	• Collaborations with other commercial bodies. • The scope of the Company's activity in the automotive and transportation sector, with an emphasis on international operations, if any. • The volume of personnel employed by the company engaged in the development of the technology required to conduct the experiment. • Duration of the Company's activity in the field of technology development.
2	Trails vehicle	• Details of vehicles to participate in the experiment, license numbers, chassis numbers. • Project Background, development process and experiments. • Exceptions to the composition of the existing standard, if any. • Vehicle images. • What would be done with the vehicle at the end of the experiment?
3	The tests	• What is the scope of the automated driving mode? • What is the purpose of the tests? • The requested trial period. • Tracks / areas where tests are to be carried out. • Dates, hours duration • Environmental conditions in which the tests will be performed. (Day, night, weather) • Speed range • What Issues are to be considered during the tests • What are the scenarios to be checked? (the scenarios should be carried out in a graduated difficulty)
4	The test driver	• Driver's names. • Details of training of experimental drivers, including training certificates. • Driving hours accumulated by drivers in closed areas.

	Requirement	Description
5	The technology	• Technology components. • Installation of the technology components to the vehicle systems - attach photos. • The technology version number being tested on public roads. • Details of all the preliminary tests carried out with and without the technical services in closed areas to ensure the safety functioning of the technology. • Present a copy of a test report issued by technical services. • Details of tests made to ensure the safety functioning of the technology in different environmental conditions. (Day/night, rain, sun glare, vibration) • Standards used to develop technology. • Description of the technology safety concept and the features have been used to ensure system performance and integrity, as well as standards used for reliability testing (for example: ISO 26262) • Protection of the technology against unintentional use of both hardware and software (cyber security)
6	Driver warning system in case of technology failure	• What are the visual indicator displays inside the driver compartment to indicate when the technology is turned on? • Is there a Real-time failure detection indicator. • What types of alerts are given to the test operator in the event of a technology failure? • Attach photos of the visual alert.
7	The driver ability to take full control of the vehicle	• What are the means and actions that should be done by the driver to take a full control over the vehicle and override the autonomous systems? • Is there a "panic button" to override the autonomous systems? Attach a photo. • Which systems will be disabled as a result of using override means? • What tests were performed to ensure the reliability of the technology? • What tests were performed to ensure the reliability of the override means?
8	The ability to detect and filter out wrong commands	• What are the means and the abilities of the system to detect and filter out wrong commands?
9	Pre-tests for each experiment	• Is it necessary to perform car preliminary tests before starting the experiment? • Is it necessary to revalidate the mapping of the roads prior conducting the experiments?

מדינת ישראל

Appendix C

Application for approval to carry out vehicle trials on public roads

Owner's Particulars	
Owner/Applicant Name	*Name of Company*
Nationality Number	*Company Registration Certificate Number*
Vehicle Details	
Make & Model	*Type of Vehicle*
Vehicle Registration Number	*Propellant (Petrol, Diesel, Electric, Hybrid, etc.)*
Registration year	*Period of Use (Duration)*

By signing on this Form, I, _____ in my personal capacity, as well as on
name
behalf of my company _____ confirm that
Company name
the information provided in this Form is true and complete to the best of our knowledge and belief and;

(a) Undertake to comply with all terms and conditions imposed by the Ministry of Transport, including any changes or additions to such terms or conditions that the Ministry of Transport may from time to time notify me in writing.
(b) Undertake to have in hand for the all period of the trial a policy of insurance (at least third party liability against death of or bodily injury to any person, including property damage) in force for each approved vehicle.
(c) Undertake to promptly update Ministry of Transport should there be any material change in circumstances or new developments affecting the accuracy of the information provided in this Form.
(d) Undertake to notify the operator/test drivers regarding their responsibilities for all the driving tasks and that they will be accountable for any deviation of the trials vehicle from the traffic regulations.
(e) Undertake to report of any unusual events or any involvement in accident occurred while the vehicle is operated under a trial mode.
(f) Undertake to notify the Ministry of Transport immediately after the completion of the trials.

Name & Designation	*Date*	*Signature & Company Stamp*