



**Economic and Social  
Council**

Distr.  
GENERAL

TRANS/WP.1/2001/15  
25 January 2001

ENGLISH  
Original: FRENCH

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**ECONOMIC COMMISSION FOR EUROPE**

**INLAND TRANSPORT COMMITTEE**

Working Party on Road Traffic Safety  
(Thirty-sixth session, 3-6 April 2001,  
agenda item 8)

**APPLICATION OF INFORMATION TECHNOLOGY TO ROAD SAFETY**

**External intervention in speed and the Vienna Convention on Road Traffic  
of 8 November 1968**

**Transmitted by Germany**

**1. PRELIMINARY COMMENT**

Progress in technology has led to the invention of various devices that can be used by a driver to manoeuvre his vehicle. They can be evaluated from the standpoint of improved comfort in driving, traffic efficiency and road safety; these goals are not mutually exclusive but often overlap. The devices, originally mechanically based, have become increasingly complicated with time. Now that actual vehicle manoeuvres require less force and skill, systems to assist drivers have been increasingly used for optimum vehicle movement in traffic. The safety aspect of traffic has thus gained in importance. With the emergence of electronics and information technology, the process has reached a new dimension, and at the same time traffic itself has become increasingly complex. The advantages and disadvantages of individual road safety devices are more and more difficult to assess. The appreciation is all the more difficult in that a number of devices are rated positively on an individual basis but may have adverse

consequences in interaction with others. In this context the man-machine interface is of key importance. A partial aspect will be selected below from a large number of issues, namely, to what extent such devices are compatible with the provisions of the Vienna Convention on Road Traffic of 8 November 1968 in relation to the responsibility of the driver of the vehicle.

## **2. LEGAL SITUATION**

Where the law on behaviour is concerned, the Convention on Road Traffic stipulates as one of its fundamental provisions the responsibility of the driver of the vehicle for all manoeuvres.

Article 8, paragraph 5 stipulates:

“Every driver shall at all times be able to control his vehicle (and) to guide (it).”

Article 13, paragraph 1 provides:

“Every driver of a vehicle shall in all circumstances have his vehicle under control so as to be able to exercise due and proper care and to be at all times in a position to perform all manoeuvres required of him. He shall, when adjusting the speed of his vehicle, pay constant regard to the circumstances, in particular the lie of the land, the state of the road, the condition and load of his vehicle, the weather conditions and the density of traffic, so as to be able to stop his vehicle within his range of forward vision and short of any foreseeable obstruction.”

## **3. TYPES OF DEVICE AFFECTING DRIVER BEHAVIOUR**

Of the devices which may assist the driver to perform his tasks as a driver, those which improve the stability of the vehicle by their influence on the physics of driving and which ultimately serve to maintain the course prescribed by the driver by optimizing the transmission of force to the road and maintaining the trajectory should be considered separately in this legal appreciation. These systems do not impair the driver's ability to control his vehicle; they rather improve it, with the particularity that they optimize a function which he must perform and which he also initiates.

They include:

ABS: anti-lock braking system, which ensures that the vehicle can still be steered even during fierce braking because it uses only the amount of braking power that the wheels can exert on the road without blocking.

ASR: an anti-skid system which improves traction, especially on starting. If the wheel turns more rapidly than required by the moving speed, a regulatory system is activated and prevents the vehicle from skidding and the driving wheels from slipping by reducing the driving power or by braking.

ESP: an electronic stability programme which by means of the selective braking of individual wheels, detects and prevents involuntary spinning or lurching by the vehicle, thus stabilizing its motion.

This list is not exhaustive.

The present legal analysis is limited to the systems known as ISA (Intelligent Speed Adaptation). The key to this concept is communication between the vehicle and external equipment in respect of locally prescribed maximum speed. This can take place at three levels:

- an information system with optical and/or acoustic recognition when the maximum speed prescribed by the road signs at the location of the vehicle is reached;
- a system which the driver can override, and in which the driver can decide, by activating or deactivating it, whether the maximum speed data memorized by the vehicle can be automatically used when activated externally by markers, GPS or an on-board CD-ROM;
- a mandatory system which cannot be neutralized, in which it is not possible to override the externally-controlled limitation of driving speed (or only in an emergency by breaching a seal or by means of the electronic storage of the override).

### **3.1 Informing/warning the driver (first ISA intervention level)**

Information/warning that maximum speed has been reached would be added to the displays prescribed by the Convention, such as speed of motion, direction of motion, lighting situation, etc. It would be a further contribution to the rest of the data transmitted to the driver, such as the temperature of the water-cooling system, fuel remaining in the tank, or oil pressure which are part of the standard equipment. It would be another addition to data ranging from open doors, attached seat belts, engine speed, oil pressure and temperature, outside temperature, tyre pressure, distance in front and behind the vehicle, intensity of electric current and current fuel consumption to dynamic guidance systems based on digital maps and up-to-date traffic information, GPS navigation systems and even television with the usual entertainment programme.

The driver's responsibility as regards information initially includes the possibility of selecting certain data. This possibility will not be eliminated. It is incumbent on the driver only to take in the quantity of information that he can process without danger for traffic safety. He can and should always be blamed for acquiring more data than he is capable of absorbing on the grounds that, for example, selecting and viewing information takes up his attention to such a degree that he is no longer able to give the necessary attention to what is happening in the traffic situation.

The common feature of these devices is that they may make it more difficult for the driver to control his vehicle by increasing the risk of his being unable to react adequately, but they do not restrict him in the sense of removing control of the vehicle. Generally speaking, the

depth and range of the information should be a temptation. But the driver continues to be in a position fully to determine the vehicle's functions. This also applies at the first level of ISA intervention.

In the circumstances, it is the State's duty in an overall assessment to ensure that this danger is minimized, for example, by authorizing telephone calls only if certain rules are adhered to or only authorizing an onboard dynamic guidance system reduced to the simplest information which diminishes the time the eye spends on it and has no adverse impact on the field of vision. In extreme cases, a device must simply be prohibited. Where the driver is concerned, the deluge of data may aggravate the risks of failing to act adequately, but overall, it does not adversely affect his responsibility.

### **3.2 ISA as a system which the driver can activate and override (second ISA intervention level)**

In this version, ISA is installed at a higher level. It replaces a driving function which it is the driver's responsibility to determine and thus takes over driving tasks. Its main feature is the fact that the driver continues to decide whether and for how long he will use the system. In addition, the configuration of ISA is such that it can be neutralized; it is therefore characterized by the fact that although it functions automatically, the driver can at any time interrupt its functioning and take full control of the vehicle himself. For example, he can react to a particular occurrence that the system has not recognized, such as an obstacle coming from the side. It may therefore be assumed that full responsibility within the meaning of articles 8 and 13 of the Road Traffic Convention continues to be attributed in full to the driver.

### **3.3 ISA as a mandatory system which cannot be overridden (third intervention level)**

ISA as a mandatory device (i.e. prescribed by regulations for installation and use in the vehicle) prevents a locally prescribed speed from being exceeded.

This should make it resemble a speed limiter. It should not, however, be placed on the same footing since speed limiters are regulated on a specific final speed value on a principle comparable with the maximum design speed depending on the type of vehicle. In detail:

Speed limiters, for example, those which are required to be installed and used on heavy vehicles and buses as speed limiters in accordance with EEC Directive 92/6, oblige the driver for safety reasons not to exceed a limit which is immutable; its formal purpose is to act against the driver's wishes. For example, the driver cannot overtake at a higher speed, even if the driving force were theoretically to permit it and if under certain circumstances the situation required it. He is therefore deprived of the possibility of controlling the vehicle beyond the regulated speed, so that the question of discrepancy with articles 8 and 13 of the Convention could possibly be raised. However, any contradiction should be refuted. Despite the regulated speed, the driver can adapt the way he drives in the same form as for other technical data inherent in the vehicle, e.g. deceleration or acceleration, maximum speed or range of illumination.

The case of the version of ISA which cannot be overridden is different. There is no usual fixed limit for the driver; the system reduces the speed to be applied in accordance with the local

requirement independently of whether the driver has noticed the prescribed speed or through negligence has failed to notice it. Additionally, control of the vehicle is handed over to third parties (system operators, authorities, technicians). This is why the question of compatibility with the Convention is a special issue here.

Compatibility must first be considered from the standpoint of a literal interpretation.

Article 8, paragraph 5 requires the driver “at all times” to be able to control his vehicle, while article 13, paragraph 1 provides that he must have his vehicle under control “in all circumstances”.

In the text of the regulations, article 13, concerning vehicle manoeuvres as such and especially speed, is the most relevant. Priority should therefore be given to its interpretation.

Article 13 postulates control of the vehicle. This control should enable the driver to meet the obligations of diligence incumbent on him so that he will be “in all circumstances” in a position to perform all the manoeuvres required of him. The choice of speed must be such that he can pay attention to all circumstances and be able to stop his vehicle within the range of forward vision and short of any foreseeable obstruction. On the other hand, in order for him to be able to do so, he must be given control of the vehicle such that he is able to comply with the obligations of diligence and the performance of the manoeuvres required in the circumstances described, in other words, all of these.

It may be wondered whether the imposition of practically unlimited control of the vehicle and the device referred to are mutually exclusive. In order to answer this question, the central term of the regulations contained in article 13 of the Convention - the word “control” - needs to be considered. “To control” means to be able to decide something or the course of an event by oneself. The opposite is manipulation by a third party, the decision being in the hands of that party, here including the operator of the system. In addition to this, the intervention concerns not only a secondary feature of driving behaviour but the choice of the speed. Speed is a central criterion in the control of a vehicle in traffic. Moreover, the intervention concerns not only a limited segment but all cases governed by road signs and therefore all speed sections without exception.

In the form in which it cannot be overridden, therefore, ISA is not compatible with article 13 of the Convention. The reason is that in the case of ISA when it cannot be overridden, the driver’s decision-making capability is transferred to a third party. This results in a disparity in quality because it is the latter who takes decisions which depend on the situation in the driver’s place, these therefore being decisions for which he and not the driver must be answerable.

This notion is confirmed by the sense and the purpose of the broad formulation of article 13. It is formulated on the basis of the idea that road traffic comprises a very complex system made up of drivers, vehicles, infrastructure, traffic environment and other features. This can most clearly be seen in urban areas where the number of possible manoeuvres is greatest, compared, for example, to the motorway where operations are relatively simple in structure. The more complex the system, the more stringent the demands on the road user. The great variety of

situations with which he is confronted often include unusual and surprising manoeuvres which must themselves be compensated for by adequate behaviour. The degree of responsibility required by this system in which the most varied sensorial perceptions are handled consciously or unconsciously using the lessons of past experience cannot but be total.

This means that article 13 requires that the manoeuvres the vehicle permits given its technical equipment should be attributed to the driver. The competent authorities should not use technical devices to ensure compliance with maximum speeds allowing the decision to be transferred to external third parties.

#### **4. LEGAL LIMITS OF APPROVAL FOR DEVICES WHICH CANNOT BE OVERRIDDEN**

As regards the legal aspects of approval, it should be recalled that the Convention contains a large number of provisions concerning vehicle equipment and fitting-out; particular mention may be made here of annex 5. The Contracting States are free to issue other regulations on their territory and to require additional equipment. Insofar as they make use of this possibility, they may not refuse vehicles at borders which do not have this equipment but which do comply with the requirements of the Convention. Conversely, a Contracting State which has prescribed the additional equipment on its territory may not require another State to include this additional equipment in its legislation. A standard regulation would only be possible if a positive law prescription was issued. However, since the requirements of road safety policy differ among contracting countries and since there are also divergences in the law concerning equipment, an international legal ruling on equipment and behaviour is not anticipated as regards ISA.

A greater divergence in national regulations in this regard, however, would not be a positive development. Where traffic is mixed, with some vehicles equipped and others not, risks could arise from the differing capacity of vehicles to avoid collisions. The automatic control of certain manoeuvres permits a reaction that is more rapid but also to some extent different from that of vehicles controlled manually. Errors of calculation may make accidents more likely. The risk mentioned in the case of mixed traffic would similarly exist during the introductory phase which would be lengthy owing to the gradual penetration of the vehicle fleet.

#### **5. RISKS OF ISA FOR TRAFFIC SAFETY**

The question of whether its introduction is appropriate should be kept separate from that of whether it is legally permissible. Even without following the arguments on the incompatibility of the systems described in paragraph 3.3, the question still arises of whether the devices should be tolerated or even recommended. The aspect of road safety is of paramount importance here.

The following may be noted:

There are always situations in road traffic in which the danger has only been avoided without adverse consequences because the driver accelerated instead of braking. In such exceptional situations, nothing can replace human flexibility. Man has the special ability of

reacting by association. Human comportment is extremely tolerant of errors and is characterized by great reliability in how it functions. Flexible action to compensate for errors, not only on the part of the person causing the danger but also on the part of the other person involved is the main reason why, statistically speaking, an accident is the result of only one in every 50,000 conflictive situations and why an accident is preceded on average by 150,000 km with no accident. Traffic scientists have discovered that a journey of one kilometre requires an average of 125 observations and 12 decisions. Any intervention in this system which functions more or less smoothly could quite easily have disruptive effects. This is so in so far as behaviour models are imposed on the driver precisely in an area where his particular strengths can develop, in the associative assessment of traffic movements. This advantage should be kept.

Above all, the field of vision should not be restricted to a specific determining factor such as speed, for example. Speed is indeed one of the most important components but only one of many that determine the course of events in traffic. The traffic situation, including the distance and speed of other road users, the layout and quality of the road, bad weather and the power of the driver's own vehicle may be quite as important for assessing a situation in traffic.

Other psychological factors also require to be taken properly into account. Thought needs to be given to the known ABS risk compensation phenomenon which has temporarily produced accident-increasing instead of accident-reducing behaviour. In this context, particular thought should go to the question of whether and to what extent the desire to offset the subjective sensation of wasted time incurred in enforced slow progress is expressed, for example, by aggressive driving within the speed limit of a specific area or by driving too fast outside a built-up area.

Lastly, consideration should also go to economic policy components. External intervention requires enormous expenditure. The rapid ageing of electronic systems where penetration of the vehicle fleet is relatively slow should be included. High costs require an advantage to set them off, i.e. a considerable accident-reduction potential for which there is concrete evidence. The figures submitted to date which take this aspect into consideration are high, unrealistic in part, and do not stand up to pressure.

## **6. SUMMING-UP**

From the German point of view, external intervention on vehicles to ensure enforced compliance with imposed maximum speeds is in contradiction with articles 8 and 13 of the Vienna Convention on Road Traffic of 8 November 1968. In the last instance, only one solution can be supported which permits the combining of the functional advantage of the technical equipment with human capacity for action in terms of the situation and associative thinking based on experience, and that is that it must always be possible to override the devices. Unlike the systems described in paragraph 3.3 of this document, the devices to which paragraphs 3.1 and 3.2 refer would therefore appear, in meeting certain general conditions, capable of contributing to improving traffic safety.

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