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Intelligent transport systems — Cooperative ITS —

Part 9: Compliance and enforcement aspects

Systèmes intelligents de transport — Systèmes intelligents de transport coopératifs —
Partie 9: Conformité et aspects relatifs à l'application

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*.

ISO 17427 consists of the following parts, under the general title *Intelligent transport systems — Cooperative ITS*:

— *Part 2: Framework overview* [Technical Report]

— *Part 3: Concept of operations (ConOps) for 'Core' systems* [Technical Report]

— *Part 4: Minimum system requirements and behaviour for core systems* [Technical Report]

— *Part 6: Core systems risk assessment methodology* [Technical Report]

— *Part 7: Privacy aspects* [Technical Report]

— *Part 8: Liability aspects* [Technical Report]

— *Part 9: Compliance and enforcement aspects* [Technical Report]

— *Part 10: Driver distraction and information display* [Technical Report]

The following parts are under preparation:

— *Part 1: Roles and responsibilities in the context of co-operative ITS architechtures(s)*

— *Part 5: Common approaches to security* [Technical Report]

— *Part 11: Compliance and enforcement aspects* [Technical Report]

— *Part 12: Release processes* [Technical Report]

— *Part 13: Use case test cases* [Technical Report]

— *Part 14: Maintenance requirements and processes* [Technical Report]

This Technical Report provides an informative consideration of 'Compliance and Enforcement Aspects' for Cooperative Intelligent Transport Systems (C-ITS). It is intended to be used alongside ISO 17427-1, ISO/TR 17465-1, other parts of the ISO 17465 series and ISO 21217. Detailed specifications for the application context will be provided by other ISO, CEN and SAE deliverables, and communications specifications will be provided by ISO, IEEE and ETSI.

Introduction

Intelligent transport systems (ITS) (2.7) are transport systems in which advanced information, communication, sensor and control technologies, including the internet, are applied to increase safety, sustainability, efficiency, and comfort.

A distinguishing feature of *'ITS'* are their communication with outside entities.

Some *ITS* systems operate autonomously, for example, 'adaptive cruise control' uses radar/lidar/and/or video to characterize the behaviour of the vehicle in front and adjust its vehicle speed accordingly. Some *ITS* systems are informative, for example, 'Variable Message Signs' at the roadside, or transmitted into the vehicle, provide information and advice to the driver. Some *ITS* systems are semi-autonomous, in that they are largely autonomous, but rely on 'static' or 'broadcast' data, for example, *GNSS* (2.6) based 'SatNav' systems operate autonomously within a vehicle but are dependent on receiving data broadcast from satellites in order to calculate the location of the vehicle.

Cooperative Intelligent Transport Systems (C-ITS) are a group of *ITS* technologies where service provision is enabled by, or enhanced by, the use of "live", present situation related, dynamic data/information from other entities of similar functionality [for example from one vehicle to other vehicle(s)], and/or between different elements of the transport network, including vehicles and infrastructure [for example from the vehicle to an infrastructure managed system or from an infrastructure managed system to vehicle(s)]. Effectively, these systems allow vehicles to "talk" to each other and to the infrastructure. These systems have significant potential to improve the transport network.

A distinguishing feature of *'C-ITS'* is that data is used across *application*/service boundaries.

It will be immediately clear to the reader that such systems present possibilities for 'Compliance and Enforcement'. However such issues are highly sensitive, bound closely with issues of personal privacy, and may have a major impact on the whole public acceptance of *cooperative ITS*.

Further Technical Reports in this series are expected to follow. Please also note that these TRs are expected to be updated from time to time as the *C-ITS* evolves.

Intelligent transport systems — Cooperative ITS —

Part 9:
Compliance and enforcement aspects

1 Scope

This Technical Report identifies potential critical compliance and enforcement aspects issues that C-ITS service provision may face or introduce; to consider strategies for how to identify, control, limit or mitigate such issues. The objective of this Technical Report is to raise awareness of and consideration of such issues and to give pointers, where appropriate, to standards deliverables existing that provide specifications for all or some of these aspects. This Technical Report does not provide specifications for solutions of these issues.

2 Terms and definitions

2.1
application
app
software application

2.2
application service
service provided by a service provider accessing data from the in-vehicle system (within the vehicle), in the case of *C-ITS* (2.4), via a wireless communications network, or provided on-board the vehicle as the result of software (and potentially also hardware and firmware) installed by a service provider or to a service provider's instruction

2.3
compliance
assurance that equipment or a service behaves within a set of predetermined, declared and accepted parameters

2.4
cooperative ITS
C-ITS
group of ITS technologies where service provision is enabled, or enhanced by, the use of 'live', present situation related, data/information from other entities of similar functionality (for example, from one vehicle to other vehicle(s)), and/or between different elements of the transport network, including vehicles and infrastructure (for example, from the vehicle to an infrastructure managed system or from an infrastructure managed system to vehicle(s))

2.5
enforcement
regulatory measures to ensure observance with certain requirements

2.6
global navigation satellite system
GNSS
several networks of satellites that transmit radio signals containing time and distance data that can be picked up by a receiver, allowing the user to identify the location of its receiver anywhere around the globe

2.7
intelligent transport systems
ITS
transport systems in which advanced information, communication, sensor and control technologies, including the internet, are applied to increase safety, sustainability, efficiency, and comfort

2.8
jurisdiction
government, road or traffic authority which makes and enforce regulations

EXAMPLE Country, state, city council, road authority, government department (customs, treasury, transport), etc.

2.9
type approval
certificate of conformity granted to a product that meets a minimum set of regulatory, technical and safety requirements, generally, by regulation required before certain products are allowed to be sold

Note 1 to entry: Often called 'Homologation'.

3 Abbreviations and acronyms

ANPR automatic number plate recognition

C-ITS cooperative intelligent transport systems, cooperative ITS

ITS intelligent transport systems (2.7)

TR technical report

TTA Transport Ticketing Authority

4 How to use this Technical Report

4.1 Acknowledgements

Much of the inspiration for this Technical Report and its considerations and content originate from the reports l "Cooperative ITS Regulatory Policy Issues" and "Cooperative Intelligent Transport Systems Policy Paper" National Transport Commission, Australia. And this source is acknowledged and thanked. References [9] and [10].

Contribution from the European Commission project EETS is also acknowledged.

See Bibliography for further details.

4.2 Guidance

This Technical Report is designed to provide guidance and a direction for considering the issues concerning *compliance* (2.3) *and enforcement* (2.5) *aspects* associated with the deployment of *C-ITS* service provision. It does not purport to be a list of all potential *compliance* and *enforcement* aspects factors, which will vary according to the *application service* (2.2) being provided, the regime of the *jurisdiction* (2.8), the location of the instantiation, and to the form of the instantiation; nor does it provide definitive specification for the solution of these issues. Rather, this Technical Report discusses and raises awareness of the major *compliance* and *enforcement* aspects issues to be considered, and provides guidance and direction for considering and managing *compliance* and *enforcement* aspects in the context of future and instantiation specific deployments of *C-ITS*.

4.3 ITS and 'compliance and enforcement aspects'

Whilst they share the common framework of being regulatory measures, '*compliance*' and '*enforcement*' within the context of *C-ITS* are two very different, though in some cases closely linked, paradigms.

4.3.1 Compliance

Compliance is defined by the Oxford English dictionary as 'the state or fact of according with or meeting rules or standards'.

4.3.2 Enforcement

Enforcement is defined by the Oxford English dictionary as 'the act of compelling observance of or *compliance* with a law, rule, or obligation'.

4.3.3 Compliance and enforcement within the context of C-ITS

Within the context of *C-ITS,* the term '*compliance*' may therefore simply be applied to the assurance that equipment or a service behaves within a set of predetermined, declared and accepted parameters.

'*Enforcement*' may be considered to be regulatory measures to ensure observance with certain requirements.

While this at one end of the spectrum may imply that those who provide defective equipment or services (non-compliance) will face unpleasant consequences, so as to encourage them not to so by default, at the other end of the *spectrum enforcement* may also, and in a different paradigm, mean that specific *C-ITS* services, or information from *C-ITS* services, could be developed to penalise drivers that err from driving regulations.

4.4 C-ITS compliance and enforcement aspects issues

That *compliance*, and *enforcement* of *compliance*, for equipment and to defined systems specification is required is probably doubted by few, including drivers. Indeed, *compliance* assurance through certification (see ISO/TR 17427-11) and/or *type approval* (2.9) of equipment and *application* (2.1) systems, will help to provide confidence to drivers. *Type approval* regulations will also provide assurance to drivers. Such measures will normally therefore encourage the take-up of systems so approved.

However, particularly in a situation where the driver will have need or requirement to purchase equipment and/or subscribe to *ITS* service provision, to then find that this equipment will/may subsequently be used in *enforcement* measures to penalise him for violation of driving regulations will be a sure deterrent to dissuade him from buying/subscribing and using *C-ITS application services*. If the equipment is mandated, it will be a sure way to encourage the driver to switch the system off or otherwise disable it.

At some time in the future, if drivers become more used to being automatically controlled, or it becomes socially acceptable as a norm, the use of C-ITS systems for *enforcement* to driving regulations may become acceptable, but it seems highly likely that this is not the case at the time of developing this Technical Report.

Jurisdictions will therefore have to make a decision as to whether to try to enforce such measures to *enforce* regulations, which may well seriously affect their electability, or leave the choice of use to the market place. In this latter case, there is a high probability of drivers not using *C-ITS* systems, and the safety of life improvements, and improvements to the efficiency of the traffic system, achievable through the use of *C-ITS,* being lost as a result.

4.4.1 Private vehicles

The issues and potential effects were summed up in the US Privacy Policy Framework:

"were a National….. (*C-ITS*)……Program to be proposed that would use …(*C-ITS*)….. as a surveillance tool for law *enforcement* purposes, '*concerns with regard to privacy and civil liberties would be raised by the public and its representatives and advocates, which would threaten the implementation of such a Program. The primary purposes of ….(C-ITS)…are to enhance transportation safety and mobility through improving driver situational awareness, to help avoid and/or mitigate crashes and to use technology to optimize anonymous traffic monitoring and control strategies. The program is being developed, and policy-makers are making decisions, with these purposes in mind. To expand the program beyond these purposes to include punitive uses of the….(C-ITS) system for enforcing traffic or other laws would cast doubt regarding the true intent of the initiative. If a National Program were used to facilitate or automate enforcement, many would likely seek ways to disable the ….(C-ITS)… communications system on their vehicles, or to purchase or retain an older, non-equipped vehicle. This would negatively impact not only their safety, but also the safety of other road users, because a ….(C-ITS)….-disabled or non-equipped vehicle and would no longer be sending or receiving safety data.'*" [14]

A further consideration is that there will be a long period during which more technologically advanced cars share the road with those that do not have *C-ITS* devices. Does *compliance* and *enforcement* activity need to take a different approach to these different groups? Would more advanced cars be held to a higher standard (because their breaches could potentially be more easily detected) and will this discourage the take-up of advantageous technology? Some stakeholders already report public concern that they could be fined for speeding based on roadside detection of *C-ITS* signals from the vehicle,[9] and there seems to be widespread fear of misuse.

As an example, police in Washington have set up a 'net' of ANPR detectors, tracking movements around the city, which have apparently moved from initially capturing wanted criminals or unregistered vehicles to a range of other purposes.

"Police also have begun using them as a tool to prevent crime. By positioning them in nightclub parking lots, for example, police can collect information about who is there. If members of rival gangs appear at a club, police can send patrol cars there to squelch any flare-ups before they turn violent. After a crime, police can gather a list of potential witnesses in seconds.

Beyond the technology's ability to track suspects and non-criminals alike, it has expanded beyond police work. Tax collectors in Arlington bought their own units and use the readers to help collect money owed to the county. Chesterfield County, in Virginia, uses a reader it purchased to collect millions of dollars in delinquent car taxes each year, comparing the cars on the road against the tax rolls".[22]

There have also been some examples in the US of private use, for example, by banks searching for delinquent borrowers.[23]

It seems clear that in respect of the private car driver, *enforcement* would likely be a disincentive to take-up of the technology. Do limits need to be placed on the use of data from safety systems in order not to penalise those who take them up? The principle that *ITS* policy should '*be consistent with broader transport network objectives*' needs to be taken into account in considerations of the use of *C-ITS* technology for *enforcement*.

Most concerns centre around keeping of information about members of the public who have not committed an offence. Many existing systems such as point-to-point are explicitly designed not to retain information if there is no suspected offence, in order to avoid this concern. Regimes are in place to limit the use of data from other systems, such as tolling. Surveillance device legislation in various states provides rules around the use of tracking devices, including for *enforcement* purposes.

In addition, there is a question over how *C-ITS* data would be used in the aftermath of a crash. Data could be captured within the vehicle or elsewhere within the system (e.g. by a roadside unit). There may be value in making this data available in order to analyse crash causation, which could be extremely valuable in helping to set appropriate speed limits on particular stretches of road or improve road infrastructure. However, this data could also be used to convict a driver, for example, of negligent driving. If historical data is retained then this could also be used (e.g. to show that a driver had a history of driving in a reckless manner).

There may be potential to counter-weight the increased surveillance made possible by *C-ITS* with incentives and rewards for its use where compliant behaviour is demonstrated (for example, reduced insurance costs).

While the advent of *C-ITS* provides opportunities for *compliance* and *enforcement*, it may be far more beneficial, rather than seek to use these *enforcement* opportunities, to promote opportunities to assist drivers in achieving *compliance* with road laws, for example, through intelligent speed warnings, which can assist and encourage drivers to keep to the speed limit, or by physically speed control at risk or danger zones (such as school crossings, blind spots, etc.) using the justification and incentive that the technology helps prevent violation of regulations and therefore assist avoiding enforcement and its penalties.

4.4.2 Commercial vehicles

It is important here to separate out private road usage from commercial road usage. For, while *enforcement* of private vehicle drivers may prove unpopular, *enforcement* that commercial vehicles respect the road rules is likely to be very popular with the population at large, and regulatory control is far more accepted in the commercial vehicle sector.

Automatic reporting, and in some cases control, by *C-ITS application* systems, can also be very popular with fleet operators, because it may allow better and less bureaucratic access to the road network, especially for large vehicles. For example, many of these opportunities have already been tested and are in growing use in Australia, under its 'Intelligent Access Programme' (IAP).

The IAP is a certified intelligent transport system recognized in law and developed in partnership between all Australian road agencies. The IAP has been operational since 2008. The IAP was developed by Australian Governments in response to current and emerging policy challenges, including the following:

— a growing population, public and private transport and freight task;

— community expectations about the use, availability and safety of the road network;

— road safety through the interaction of people, vehicles and infrastructure;

— sustainability and environmental impact in managing greenhouse emissions;

— security and associated responses in transport.

In common with many countries, Australia faces constrained infrastructure budgets, being impacted by an ever increasing maintenance demand, including in urban areas a declining ability to build new infrastructure. At the same time there are expectations of increased and unrestrained mobility of people, goods and assets including, pressure from the road transport industry to permit operation of larger, heavier vehicles. Increases in freight volumes have been higher than truck travel growth rates because of the trend towards larger trucks and higher payloads. Heavier articulated trucks are replacing small rigid trucks. Along with freight issues, Australia is facing challenges in increasing traffic congestion resulting from the interaction of demand and lack of capacity in the movement of people, goods and assets; road safety issues through the interaction of people, vehicles and infrastructure and a drive to dramatically decrease road casualties; sustainability and environmental impact issues in managing greenhouse emissions; security and associated responses in transport. Whilst traditional reforms have served Australia well, authorities required smart solutions to move forward. The IAP is an effective, efficient, non-intrusive approach that delivers unparalleled assurance and productivity gains.[20]

One of the many benefits of the IAP is its ability to accurately monitor *compliance*. In turn, road authorities and the road transport industry will have new opportunities to optimize vehicle operations safely, efficiently and productively. Another important feature of the IAP is its ability to combine regulatory and commercial fleet management services.

For further information on The Intelligent Access Program, its "Overview Guideline" provides an explanation of the IAP and the role of program participants.[21]