Statens vegvesen

# ITS - standardisering

Statusrapport på engelsk 2013

**STATENS VEGVESENS RAPPORTER**     **Nr. 219**



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## Forord

Denne rapporten om ITS-standardisering er utført av Q-Free i Trondheim på oppdrag fra Statens vegvesen i løpet av høsten 2013. Rapporten er en oppdatert versjon av fjorårets rapport VD rapport nr. 185, med samme navn.

Rapporten er skrevet på engelsk, dels fordi den skal være lesbar for flere og dels fordi den henter tekst og formuleringer fra engelskspråklige dokumenter. Dessuten ville oversetting av titler, formuleringer og status medføre risiko for feil og mye ekstra arbeid som vi ikke fant god nok grunn til å gjøre.

Det er viktig å være klar over at spesifikasjoner fra standardisering oppdateres jevnlig. For siste status i de ulike standardiseringsorganisasjonene henviser vi til web-linkene som følger under hver gruppe. Ved å følge dem vil man kunne finne de siste oppdateringene.

Rapporten gir et innblikk i hva hver av gruppene i ISO, ETSI og CEN jobber med. I tillegg er det beskrevet en del andre fora og organisasjoner som påvirker standardiseringen eller er sterkt knyttet opp mot ITS-standardisering. En del internasjonale prosjekter som bruker ny ITS-teknologi, og som gjennom sitt arbeid indirekte gir input til og påvirker standardisering av ITS-teknologi, er også nevnt. Nye fokusområder innen standardisering er trukket fram, for eksempel Cooperative Systems (samhandlende systemer).

En viktig del av hensikten med rapporten er å belyse sider ved ITS-standardisering som kan påvirke Statens vegvesen sine valg av teknologiske løsninger på kort og lang sikt. Slike aspekter er bakt inn i teksten under grupper man anser som viktige for Statens vegvesen. I tillegg er det påpekt direktiver og mandater som påvirker Statens vegvesen sin oppfølging av ITS-tjenester og som er rådgivende og styrende for implementering av ITS i vegsektoren.

Målet med rapporten er også å gi et overblikk av status og perspektiver framover innen ITS-standardisering, og dermed skape større interesse rundt og kunnskap om standardiseringens hensikt og viktighet. Det er et håp at rapporten kan være med å stimulere til økt medvirkning på feltet. Det er viktig med norsk deltagelse i internasjonal standardisering, både for å sikre næringsinteresser og for å utvikle kompetanse og nettverk.

Rapporten er tenkt å være et levende dokument. Det vil si at dokumentet vil oppdateres jevnlig, slik at det er relativt up-to-date med hensyn til hva som skjer innen ITS-standardisering.

Kontaktpersoner for rapporten og standardisering av ITS er listet under preface-kapittelet.

Oslo/Trondheim november 2013
Vegdirektoratet
Seksjon for trafikkforvaltning (VT)
Seksjon for ITS (TMT)

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## Sammendrag av ITS-standardisering

Intelligente transportsystemer (ITS) innen vegtrafikk er systemer som bruker informasjons- og kommunikasjonsteknologi for sikrere transport og mer effektiv bruk av veginfrastrukturen. Intelligente transportsystemer har et bredt nedslagsfelt fra grunnleggende styringssystemer til avanserte systemer som benytter avanserte modeller til å beregne trafikkutviklingen frem i tid. Om noen år kommuniserer kanskje kjøretøyene med hverandre og øvrig veginfrastruktur, slik at de blir en integrert del av trafikkstyringssystemene.

Standardisering er et viktig element for å utvikle gode ITS-løsninger. Standardisering bidrar til at ITS-systemer virker sammen uavhengig av hvilke leverandører som benyttes. Det åpner et større marked for leverandørene og er bra for vegmyndighetene som får flere tilbydere av samme utstyr. Et velfungerende marked fører til økt innovasjon og lavere priser.

Innen ITS-standardisering er det de tre standardiseringsorganene CEN, ETSI og ISO som er spesielt relevante. Hvert standardiseringsorgan består av en rekke tekniske komiteer som utvikler standarder innen sine spesielle felt. Innen de tre nevnte organisasjonene er det de tekniske komiteene CEN TC 278, ETSI TC ITS og ISO TC 204 som er spesielt relevante for ITS.

CEN og ETSI er europeiske standardiseringsorganisasjoner som er spesielt interessante siden EU har et spesielt fokus på europeisk lovgiving og regulering. En europeisk koordineringsgruppe (ITS Coordination Group, ITS-CG) mellom CEN og ETSI er blitt etablert for å koordinere standardiseringen innen CEN og ETSI.

ISO er den internasjonale standardiseringsorganisasjonen. Den bidrar til global standardisering, slik at produkter og tjenester kan brukes over hele verden. For å få til mest mulig homogene løsninger med USA er det i tillegg blitt etablert en EU-U.S. koordineringsgruppe.

Det som standardiseres dekker så og si hele ITS-feltet. Dette inkluderer arkitekturer for ITS-tjenester, trådløs kommunikasjon, meldingsformater, sikkerhet, personvern, databaser m.m.

Bruksområdene til standardene kan grupperes i områder for reiseinformasjon, kontrollsystemer for transport, kommunikasjon til og fra kjøretøy, godstransport, offentlig transport m.m.

EUs ITS-direktiv, med ITS action plan, legger visse føringer for å sikre en raskere innføring av ITS i Europa. Målet er å fremme sikre, effektive og miljøvennlige mobilitetsløsninger. Direktivet peker på behovet for interoperabilitet og homogene løsninger på tvers av landegrensene. Distribusjon av grensekryssende tjenester for reiseinformasjon og trafikkstyring kan ikke oppnås av medlemsstatene alene.

For å oppnå den ønskede internasjonale interoperabiliteten som ITS-direktivet etterspør, er det viktig at Statens vegvesen holder seg oppdatert på det som skjer innen ITS-standardisering. ITS-tjenester er og vil forbli en stadig viktigere del av eksisterende og ny infrastruktur. Kunnskap om ITS-tjenester og utviklingen innen ITS-standardisering er derfor viktig for flere fagmiljøer, slik at ITS blir en integrert del av fremtidens transportsystemer.

Informasjonen som er gitt i denne rapporten er korrekt pr. november 2013. Mange standarder utvikler seg hurtig. Leseren oppfordres derfor til å bruke lenkene som er oppgitt i denne rapporten for å sjekke de siste oppdateringer innen den enkelte standard.

En oversikt over hovedfokus til standardiseringsorganene CEN, ISO og ETSI innen ITS-standardisering, finnes i Figur 1.

# ITS Standardisation

Overview and Status Report 2013
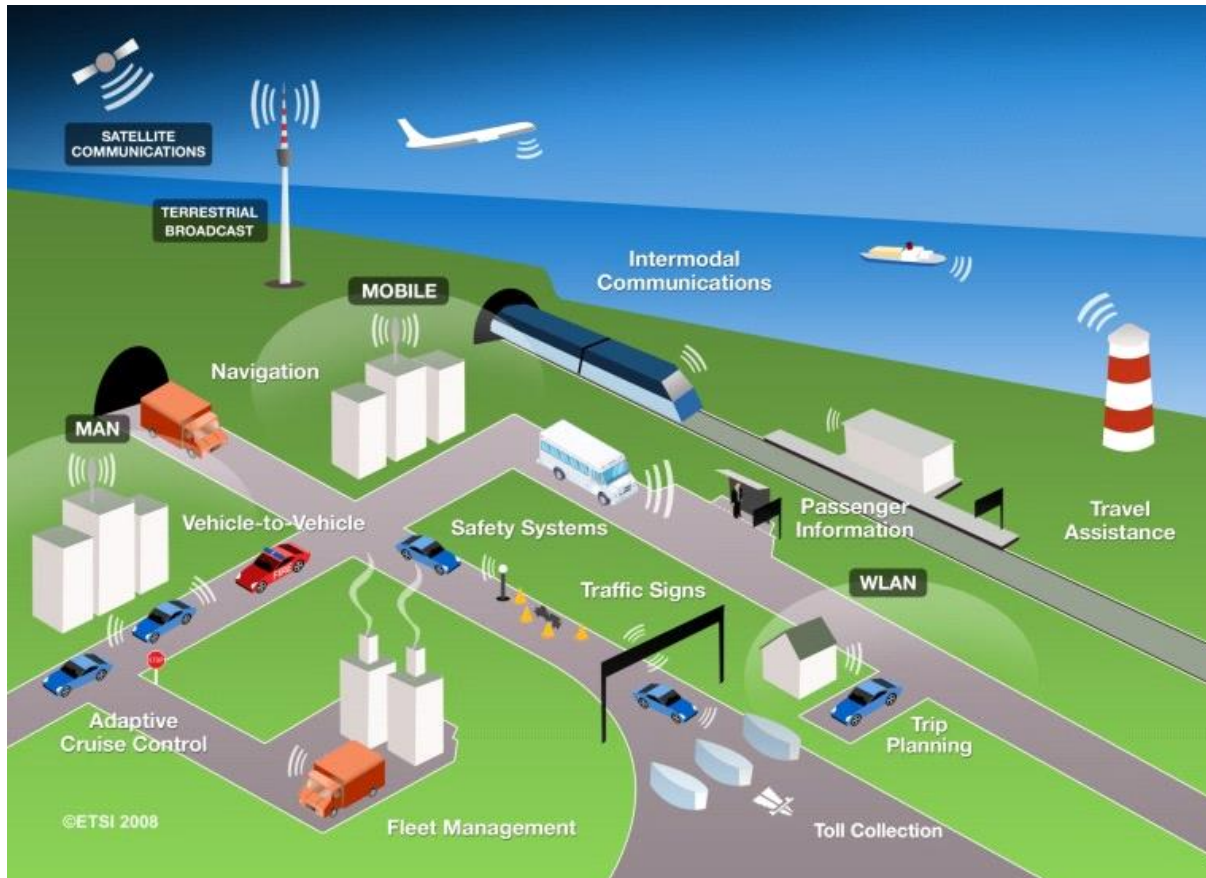


Norwegian Public Roads
Administration
Traffic Management Section
ITS Section
2013

# Executive Summary

Standardisation has been important since the beginning of ITS, and it has become even more essential today. Knowledge about ITS standardisation is therefore important to many participants involved with ITS services. This report has been compiled with a view to providing a broad overview of current standard groups and interest organisations working within the ITS domain. It provides an overall status of the work being conducted in each of the working groups within CEN, ISO and ETSI. In addition, it includes tables of standards, which can be used to access detailed information as there are links to the actual standardisation groups.

Up until recently, most of the ITS standards have been stand-alone standards, such as Electronic Fee Collection and Traffic Information (RDS-TMC). Today, there are standards covering a wide range of ITS related services and technologies. There is no doubt that the standardisation of ITS services and technologies has been essential in bringing ITS technology to the mass market. EFC and RDS-TMC standards are good examples of this. The development of standards has also resulted in reduced product prices and it has allowed various ITS services to become interoperable.

ITS is regarded as a tool to reduce accidents, increase transport efficiency, reduce environmental impact and improve sustainability, in addition to providing improved user experience within the transport area. Policies are being set both at the national level and at the regional level, such as EU directives, and more recently, also between regions, such as between the US and Europe. It is evident that there are some conflicting targets and that local policies will determine the actual mix and balance of the services. From a technical perspective, this means that systems trying to incorporate the service mix will need to be able to handle many parameters and be flexible for the future. There is little doubt that the next stage of ITS will see increased complexity. The task for standardisation professionals and implementers is to hide this complexity from the users.

The good news is that the standardisation domain, together with the R&D projects, has taken on this task. Many organisations are currently at work, and good standards are being produced.
The not-so-good news is that work is being duplicated among these organisations, and the standards being produced are not necessarily interoperable. This problem has been recognised, and both the EC and US DoT, together with national/state transport authorities, are actively trying to bridge the gaps.

The perceived situation at the present time is that the balance between Safety requirements and Efficiency requirements has been tilted in favour of anti-collision vehicle Safety. This is due to the fact that car manufacturers are a strong group both politically and financially, and there is no comparable group from the efficiency/sustainability side to balance the equation.

From a policy perspective, there is significant on-going work to support the policy documents from the EC: the ITS Action Plan and ITS Directive. Areas of special interest that are linked to the ITS action plan include:

- Real time traffic and traveller data sharing to support a safer and more relaxed driving situation
- International road signing and information layout and formats to support common understanding across borders

- International Automatic Vehicle Identification/Electronic Fee Collection systems to support common payment services and a greener transport sector due to various emission fees

- Emergency call and safety warnings to reduce the number of traffic fatalities and accidents

- Safe and equipped truck parking areas with pre-booking possibility for efficient and safe transport of goods

# 1 Contents

**Preface**

This report is an overview of ITS Standardisation as part of a project financed by the Norwegian Public Roads Administration (NPRA). The work has been carried out by Q-Free in Trondheim during September to November 2013.

## 1.1 Disclaimers

All facts and figures are correct as of November 2013, unless otherwise noted. Attention has been made to produce a report that can be maintained in a reasonable manner. Relevance of subjects and contents has been determined together with the NPRA to fit the time and resources allotted. Note that the standardisation scene changes rapidly, and that the information from some of the groups is limited. Some of the information in this report could therefore be outdated by the time it is read. Please refer to the links to check the most recent status.

## 1.2 IPR on Standards

All standards in this document are referenced back to the source, where they can be legally obtained (respecting the intellectual property rights for the different sources and types of standards). Available web links to open sources are provided throughout the document. Please refer to these links for more in-depth information. Resources protected by copyright cannot be accessed without proper authorisation. These resources are usually noted with a reference. Unfortunately, most working documents from the Standardisation Organisations (SDOs) are restricted until they have been finalised. This makes it difficult to provide detailed information and open references to the technical work progress within each WI.

## 1.3 How to acquire standards

There are several possible ways of acquiring copyrighted material, depending on the source, the user and the purpose for which the material will be used. In general, all standards are protected by copyright while in the process of development. Completed standards are often sold on a commercial basis by ISO, CEN and the National Standardisation Organisations (NSOs). In general, the best way to acquire finalised or draft standards is to contact your NSO personally. In Norway, please contact Standards Norway (SN).

## 1.4 Contact persons

The person in charge of ITS standards in Norway is Bjørnhild Sæterøy. She will be able to answer all questions related to ISO and CEN committees, as well as to procure standards from these committees.

The person within the NPRA with the best knowledge of ITS standardisation and ITS policies/directives, currently serving as the leader of our national ITS reference group, is Ivar Christiansen.

For other organisations, such as ETSI and IEEE, and for general questions related to the contents of this document, please contact the author of this report: Knut Evensen

Contact person for this report at the NPRA is Thor Gunnar Eskedal. (TRAFF)

## 2   Introduction

### 2.1   The aim of ITS standardisation

The term Intelligent Transport Systems (ITS) refers to the efforts to collect, store and provide real-time traffic information with a view to maximising utilisation efficiency, providing convenient safe transport and reducing energy by applying advanced electronics, information and telecommunication technologies into roads, automobiles and goods. All transport system that used to be controlled, managed and operated predominantly by human intervention should now make more use of technology to automate various functions and information gathering. The air transport system has made extensive use of ITS to control aircraft and airspace for decades. This has not, to the same extent, been the case for the road transport system. Lights signals, automatic speed control systems, camera surveillance, tunnel safety systems, among others, have been operational for many years. One of the challenges with these currently deployed systems is that they are mainly proprietary and not based on (international) standards. These existing systems represent only a fragment of the traffic control, information and surveillance systems that may be implemented to alleviate the growing traffic problems, especially in urban areas. In particular, the interconnection of systems and sharing of data is still in its infancy in the road transport segment.

ITS can significantly contribute to a cleaner, safer and more efficient transport system. Consequently, ITS has become the focus of a number of policy and legislative initiatives in Europe. The European Commission has laid down the legal framework in order to accelerate the deployment of these innovative transport technologies across Europe. Furthermore, the European Commission has requested the European Standardisation Organisations to develop and adopt European standards in support of this legal framework. Not surprisingly, there is considerable activity within this area by the European standards organisations CEN, CENELEC and ETSI.

Standardisation of technological solutions for road transport is one important aspect to increase development of ITS services. Additionally, ITS standardisation yields the following benefits:

- Enables interoperability of systems/services and between different implementations that will give users seamless plug-and-play functionality

- Encourages innovation, fosters enterprises and opens up new markets to suppliers

- Creates trust and confidence in products and services. This includes quality testing that will ensure that the products/solutions are safe, healthy, secure, flexible and of correct quality.

- Expands the market, reduces costs and increases competition

- Helps prevent duplication of efforts and improves communication

- Assisting Governments, Administrations and Regulators to support
  - legislation,
  - regulations and
  - policy initiatives

- For the industry, manufacturers and suppliers of systems, standardisation brings important benefits, including a solid foundation upon which to develop new technologies, and an opportunity to share and enhance existing practices. Among other things, this:
  - provides technological stability

- enables multi-market access
- creates active markets
- encourages innovation

Knowledge of emerging ITS services through standardisation is important to the NPRA in order to make optimal use of the services throughout the complete lifecycle of the road transport system. Optimal use of international standards is in line with the NPRA's and the national government's overall strategy and requirements regarding the development of the Norwegian road transport system.

## 2.2 ITS standardisation organisations

Within ITS standardisation, there are three standardisation bodies that are of particular interest to the European domain. These are CEN TC 278, ETSI TC ITS and ISO 204.

Of these, the European SDO's CEN TC 278 and ETSI TC ITS are of particular interest since the European community has special focus on European legislation. The ITS Coordination Group (ITS-CG) between CEN and ETSI has been established to ensure on-going coordination of the standardisation activities within these two SDOs.

ISO, IEC and ITU are global SDOs that standardise ITS at the global level. Several of the working groups (WGs) with CEN overlap with ISO. To harmonise and obtain good and fruitful cooperation, CEN 278 and ISO 204 have joint meetings twice a year.

ITS standardisation is very much active in the USA. An EU-US joint Declaration of Intent on Research Cooperation in Cooperative ITS has therefore been established, and it has resulted in significant standards harmonisation, as reported later in this document.

In addition to the mentioned SDOs, there are a number of organisations that work with ITS standardisation. Please refer to chapter 7 onwards for other relevant SDOs.

Note that the number of standards from various SDOs at any stage (published or under active work) changes quite rapidly for a number of reasons:

- New standards that cover aspects of existing standards are initiated. In the case of full overlap, existing standards are usually withdrawn.

- Paradigm shifts like Cooperative ITS will generate a considerable number of new standards in a fairly short period of time.

- Shifting user requirements will lead to new standards being developed.

- Depending on the type of standard, it has a limited lifetime of three to five years after which it will need to be reconsidered and either re-adopted, modified and re-voted, or withdrawn if there is not enough interest.

Cooperation between global ITS standards organisations is important in order to achieve harmonised standards that provide global interoperability. Detailed cooperation between the standards organisations has been initiated in addition to the already existing cross participation by membership in the relevant organisations.

To ensure work progress and cooperation in standards development, the EC has created so-called mandates. These shall ensure that standards are developed within certain high focused areas, cf. section 12. The ITS directive is supported by mandate 453, and even though this mandate has formally ended, there are several standards activities still being supported by M/453.

Achieving a good understanding of what is being standardised, who is working with what and the importance and impact of the standardisation for ITS stakeholders is therefore important.


## 2.3    What is being standardised

The scope of what is being standardised is very broad and covers more or less the complete architectural hierarchy in various ITS domains. This includes, among other things:

- standardisation of architectures for ITS services
- various radio communications systems
- formats and structure of message systems and transport
- security and privacy technologies and system aspects
- interfaces and reference points
- database technologies and data file structures

Areas in which the standards can be applied can be divided into the following categories:

- traveller information systems
- transport control systems
- vehicle-to-driver communication
- vehicle-to-vehicle communication
- vehicle-to-roadside communication
- goods and vehicle information
- public transport aspects including emergency systems

The works of the standards organisations partly follows this pattern of separating technologies from application areas, but please note that this division is not absolute. Instead, there are significant overlaps and combinations of services and technologies within one working group ("silo standards").

## 2.4    The status and outlook of ITS standardisation

This conclusion will necessarily be somewhat subjective. The perceived situation at the present time is that the needed balance between Safety requirements and Efficiency/Sustainability requirements has been tilted in favour of Active Safety. This is a result of the car manufacturers being a strong group both politically and financially, and there is no comparable group from the efficiency/sustainability side to balance this strength. Therefore, several of the standards coming from ETSI are only relevant to anti-collision in a very restricted understanding of Cooperative ITS.

ISO and CEN are struggling to keep up their part, but this work has less funding, less coordination and is per definition more complex to achieve. The work is therefore progressing at a slower pace.
The global trend of ITS means that Cooperative ITS will eventually succeed; however, there is a lot of ground to be covered in order to satisfy the needs of authorities and road operators. Even though some car manufacturing specialists will claim that the goal has been achieved, they are only referring to their part of the equation.

Another challenge the ITS standardisation work is facing is overlapping standards. Even though the EU-US Task Force has issued policies to the contrary, there is an absolute trend that ETSI is finalising a standard that fully overlaps and competes with the already existing CALM set. The same is happening with IEEE and SAE. Consequently, there are at least three competing full sets of standards that need to be taken into account. This represents another challenge when designing for a global market.

To improve this situation, the EC DG CONNECT (INFSO) and US DOT jointly ran a series of Harmonisation Task Groups (HTG1/HTG3) in 2012, and these groups have proposed a number of solutions to bring the diverging elements back together. Please see the last section "Standardisation interests in line with the ITS action plan and ITS directive".

The good news and direct result of the HTG process is that there is active cooperation between the IEEE/SAE and ISO groups to harmonise and, if possible, come up with just one standard with regional options.

## 2.5    Standardisation impact on the NPRA's work with the ITS action plan and ITS directive

The ITS directive, led by mandate 453, puts forward certain requirements and guidelines for the implementation of ITS to ensure a more rapid implementation of ITS services in Europe. The aim of the European Union's land transport policy is to promote a mobility that is efficient, safe, secure and environmentally friendly. The directive points out the need for interoperability and homogeneous solutions across borders. It also promotes a layered architecture to ensure better compatibility between communication solutions and services. Trans-national deployment of continuous cross-border services for travel information and traffic management cannot be achieved by Member States alone.

The work on cooperative systems is one major step in this direction. The new standards stemming from this work will directly impact the way the NPRA should develop its infrastructure and system architecture to cope with the upcoming ITS services, so as to ensure compatibility. Use of Datex2 as a common traveller information system is one such step to harmonise transport information across borders. A common system for Electronic Registration Identification and AVI/AFC are other initiatives.

The global nature of road communication will demand interoperability. It is important to influence and follow up the standardisation groups that work with international systems which will affect the Norwegian transport system. Good cooperation with the countries with common borders with Norway is thus of special interest.

Areas of special interest that are linked to the ITS action plan include:

- Real time traffic and traveller data sharing to support a safer and more relaxed driving situation
- International road signing and information layout and formats to support common understand across borders
- International Automatic vehicle identification/Automatic fee collection systems to support common payment services and a greener transport sector due to various emission fees
- Emergency call and safety warnings to reduce the number of traffic fatalities and accidents

These aspects are also common with the overall road transport development strategy from the Ministry of Transport and Communications. Following up and influencing the SDOs and forums working on these aspects will lead to specifications in line with Norway's special interests.

## 2.6 How do the work groups fit together

The picture below illustrates the main focus area of working groups from several standardisation bodies. Not all groups are included, and some groups may cover more than one focus area.

However, the intent of the illustration is to present a quick overall glance at the different areas of a road management system and where the work groups have their main focus.
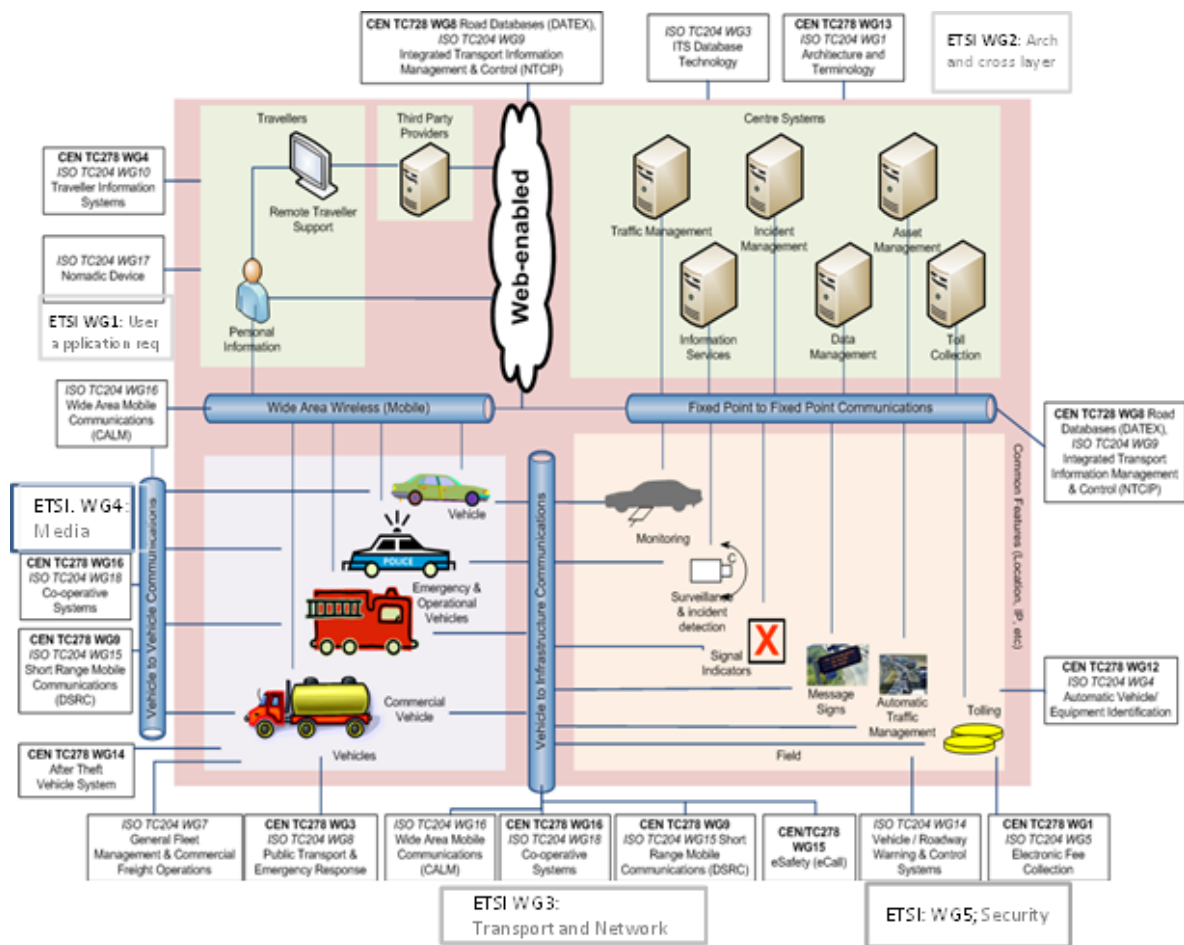
**Figure 1**: **Overview of the focus areas for the various working groups of ISO, CEN and ETSI**.

## 3    Terminology and abbreviations

The Standardisation field has its own "tribal language" with many abbreviations. The following list of terms and abbreviations can be of help to read and understand some of the documents in this field.

| Term | Explanation and link |
|------|----------------------|
|  |  |
| API | Application Programmers Interface, in the case of C-ITS this is the definition for applications residing on top of the Facilities layer |
| C2C-CC | Car-to-car communications consortium, a group started by OEMs |
| CAM | Cooperative Awareness Message defined by ETSI. This is the basic data set that is broadcast from vehicles and roadsides 2-10 times per second |
| CAMP | Crash Avoidance Metrics Partnership is a US project of mainly US car makers supported by the US DoT. GM and Ford were the founders of this cooperation, and there are many similarities to the European C2C-CC. |
| CEN | The European Standardisation Committee, with 27 European Nation States as members. |
| C-ITS | Cooperative Intelligent Transport Systems. the new paradigm of ITS involving communications and sharing of information. See later chapters |
| CS | Cooperative Systems. The previous term now replaced by C-ITS |
| CVIS | Cooperative Vehicle-Infrastructure System. This is the largest European Integrated Project in the field of Cooperative ITS, and has significant involvement with standardisation |
| DENM/DNM | Decentralized Environmental Notification Message. Defined by ETSI. This is a message that is broadcast from a vehicle or a roadside to notify an event, e.g. ice spot, panic braking in my vehicle, crash happened,… |
| DSRC | Dedicated Short Range Communication. *Note that this is an ambiguous term.* CEN DSRC is the 5.8 GHz system developed by CEN TC278/WG9 and used for tolling systems around the world, e.g. the AutoPASS system in Norway. This is the original meaning from 1992  DSRC is now also used in America as a synonym for WAVE (5.9 GHz IEEE 802.11p) systems since 2005. This understanding is sometimes used by European car makers as well. |
| EC DG INFSO | European Commission – Directorate General – Information Society |
| EFC | Electronic Fee Collection, payment systems such as AutoPASS |
| EN | European Norm; the full European standard that has been voted through the CEN, CENELEC or ETSI national members |
| ERI | Electronic Registration Identifier, identification system for vehicles including electronic license plates and electronic registration papers. |
| G5A | ETSI terminology for European 5.9 GHz operation based on IEEE 802.11p protocols. G5A spectrum is 5.875-5.905 GHz, where the Control Channel (CCH) is defined as 5.895-5.905 GHz. |
| IP Project | Integrated Project. This is the larger size EC R&D projects consisting of multiple sub-projects. Typical size is 10-40 million Euro over 3-4 years. Examples are SAFESPOT, CVIS, SmartFreight |
| IPR | Intellectual Property Rights, this covers patents and other ownership claims. |

| Term | Explanation and link |
|------|----------------------|
| | Usually the standards shall be either free of IPR, or where this cannot be avoided, the IPR holder has to sign a declaration of FRAND (Free, Reasonable and Non-Discriminatory) |
| ISO | International Standards Organisation, the global SDO with almost all Nation States as members. |
| ITS Station | defined in ETSI EN 302 665 / ISO 21217, e. g. units installed in vehicles, at the road side, in traffic control/management centres, in service centres, or hand-held units. |
| LDM | Local Dynamic Map. One of the main concepts coming out to the CVIS and SAFESPOT projects, where all information is referenced by time and position, and then stored in a relational database. Accepted to be one of the core blocks of C-ITS. |
| NSO | National Standards Organisation, the body responsible for voting and selling standards in each country. An NSO can also provide national Standards, and will then be a national SDO. |
| OEM | Original Equipment Manufacturers; in the case of ITS this is a synonym for car makers, e.g. Daimler, Ford, GM, Toyota. |
| PT | Project Team, a small group of experts financed by European Commission to draft a standard for CEN in a short time. |
| SA Project | Support Action projects are small, special European Framework R&D projects that will facilitate and support coordination of other projects. Are usually funded 100%. Examples are COMeSafety and iCar Support who have standardisation support as part of their task. |
| SAE | Society of Automotive Engineers |
| SDO | Standards Developing Organisation, the generic term for CEN, ETSI, ISO, IEEE and so on. |
| STF | Specialist Task Force, a small group of experts financed by European Commission to draft a standard for ETSI in a short time. |
| STREP | Specific Targeted Research Projects. A "regular" European Framework R&D project, which can get up to 67% EC funding support. Examples are GeoNet, EVI and RCI |
| US DoT RITA/JPO | United States Department of Transportation - Research and Innovative Technology Administration – Joint Programs Office. See this link for an overview This is the federal administration responsible for ITS research and standardisation |
| VA | Vienna Agreement, the cooperation agreement between CEN and ISO. It basically regulates that CEN shall not start work where ISO is already working on a subject, and vice versa. The end result is no duplication or overlapping standards. |
| WAVE | Wireless Access in the Vehicular Environment. The name of an IEEE project (set of standards) called P1609. |

## 4    CEN TC278

**CEN TC278** is the European ITS committee. It started with the name of Road Transport and Traffic Telematics (RTTT), but changed to ITS in 2013. This was the first ITS standardisation body, and TC278 has laid the groundwork for global ITS standards. The initial ideas came from the European framework programme called DRIVE, where it became clear that standardisation had to be started.

In general, CEN has a good representation and participation from industry, service providers, public bodies and road operators/authorities, but less from car makers.

CEN TC278 has a home page with a good overview of ITS standardisation and search facilities for TC278 items. The site will be kept updated close to the official CEN/ISO database.

The following link directs you to the active WGs and list over reports from the groups:

**http://www.itsstandards.eu/index.php?option=com_content&view=article&id=183&Itemid=28**

### 4.1    WG responsible:
The following working group information is intended to give a rapid overview of the status. Note however that Work Items and published standards change quickly over time, as do the other facts. Therefore please use the web links to get the exact status of any fact below. Note also that CEN work groups does not have formal websites, but the intention is to develop more information on the TC278 website. Please look under the tab "**Application Areas**

The following WG are active (October 2012):
* WG 1 Electronic Fee Collection (Sweden) – Jesper Engdahl
* WG 2 Freight, Logistics and Commercial Vehicle Operations (UK) - Jonathan Harrod Booth
* WG 3 Public Transport (France) – Dominique Descolas
* WG 4 Traffic and Travel Information (UK) – Paul Burton (Dormant, see details below)
* WG 7 Geographic Data Files (re-established under the convenership of  Kees Wevers nominated by NBN delegated by ERTICO under the umbrella of the TB-ITS platform)
* WG 8 Road Traffic Data (Netherlands) – Dick de Winter
* WG 10 Human-Machine Interfacing (Germany) – C. Heinrich
* WG 12 AVI/AEI (Norway) – Knut Evensen
* WG 13 Architecture and Terminology (UK) – Richard Bossom
* WG 14 Recovery of stolen vehicles (UK) – Alan McInnes
* WG 15 e-safety (UK) – Bob Williams
* WG 16 Cooperative ITS (Germany) – H.J. Schade

**4.2    WG1: Electronic fee collection**

Road User Charging (RUC) in transport is used all over Europe for raising revenue, dealing with congestion and internalizing transport costs. Concerns over escalating congestion, pollution and carbon dioxide issues, i.e. the sustainability of road transport, put even more emphasis on fair pricing schemes in European traffic.

Electronic Fee Collection (EFC) is a collective name for IT technologies that allow for electronic charging of road users (as opposed to manual systems, such as paying at a toll booth). EFC systems offer the possibility of charging road vehicles in a flexible way, and allow for targeted infrastructure charging policies. There are three basic technologies in use in EFC today:

- EFC based on dedicated short range communication (DSRC) at a toll station.
- Autonomous EFC systems, which use in-vehicle devices for positioning (e.g. GNSS-based EFC).
- Video-based charging (i.e. registering the number plate automatically by video recognition).

Recently WG1 has been studying how EFC will be affected by Cooperative ITS, and there is a report available outlining the possibilities. The idea is that EFC will become an application residing in an in-vehicle C-ITS platform, and the boundaries between the different EFC types will gradually disappear because of the local flexibility given by downloading Apps to cover local requirements.

There are many EFC systems in Europe today, however, most of them have been developed and expanded on a regional basis creating different variants between different nations. In order to reap the full benefits of EFC systems they need to be interoperable, allowing a vehicle to pay charges in different countries using a single on-board unit (OBU) and a single contract. For this reason the European Commission is setting up a common EFC service for Europe called the EETS (European Electronic Toll Service). Directive 2004/52/EC lays down the conditions for this service and the emergence of cross border interoperability of electronic road toll systems in the European Union.

This demand for interoperability calls for strong measures in standardization. Open and common standards are necessary for creating interoperable systems and services. This will also create better opportunities for market development in Road user charging and Electronic fee collection. EFC-standards provide the building blocks for the EETS as well as other tolling schemes in Europe and strengthen the competitiveness of European industry in the global EFC technology market.

This is one of the most productive WGs in ITS. The work is divided in three sub groups currently, and the WG usually have 4-5 meetings per year with 2-4 days per meeting. Most of the meetings are held in Europe, but some of the meetings are held in conjunction the ISO TC204 meeting week which happens twice per year around the world.

The main field from the start was CEN DSRC based tag-and-reader systems, and this was done in a loose cooperation with WG9 and WG12. The EC supported the original set of standards through a mandate and a number of PTs. The basic standards from WG1 have been incorporated in the EFC Directive, and are also referenced by all national EFC specifications, such as the AutoPASS specification.  The new wave of standards has been designed to support the EFC directive even more, and a new mandate (M/338) has been active for a while. This leads up to GNSS/CN based system specifications (called Autonomous in WG1) with related conformance testing standards developed by SG5, and further work on conformance testing also for DSRC-based systems. Architecture, back-office operations and value-added services are other areas of work recently.

Below is the latest list (October 2013) of the WG1 deliverables.

| Reference | Title | WI Status | Standard Status |
|---|---|---|---|
| EN 15509:2007 | Road transport and traffic telematics - Electronic fee collection - Interoperability application profile for DSRC | Active | Published |
| EN ISO 14906:2011 | Electronic fee collection - Application interface definition for dedicated short-range communication (ISO 14906:2011) | Active | Published |
| CEN ISO/TS 17575-1:2010 | Electronic fee collection - Application interface definition for autonomous systems - Part 1: Charging (ISO/TS 17575-1:2010) | Active | Published |
| CEN ISO/TS 17575-2:2010 | Electronic fee collection - Application interface definition for autonomous systems - Part 2: Communication and connection to the lower layers (ISO/TS 17575-2:2010) | Active | Published |
| CEN ISO/TS 17575-3:2011 | Electronic fee collection - Application interface definition for autonomous systems - Part 3: Context data (ISO/TS 17575-3:2011) | Active | Published |
| CEN ISO/TS 17575-4:2011 | Electronic fee collection - Application interface definition for autonomous systems - Part 4: Roaming (ISO/TS 17575-4:2011) | Active | Published |
| CEN ISO/TS 13141:2010 | Electronic fee collection - Localisation augmentation communication for autonomous systems (ISO/TS 13141:2010) | Active | Published |
| CEN ISO/TS 13143-1:2011 | Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to ISO/TS 12813 - Part 1: Test suite structure and test purposes (ISO/TS 13143-1:2011) | Active | Published |
| CEN ISO/TS 13140-1:2011 | Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to ISO/TS 13141 - Part 1: Test suite structure and test purposes (ISO/TS 13140-1:2011) | Active | Published |
| CEN/TR 16152:2011 | Electronic fee collection - Personalisation and mounting of first mount OBE | Active | Published |
| CEN/TR 16040:2010 | Electronic fee collection - Requirements for urban dedicated short-range communication | Active | Published |
| CEN/TR 16092:2011 | Electronic fee collection - Requirements for pre-payment systems | Active | Published |
| CEN ISO/TS 12813:2009 | Electronic fee collection - Compliance check communication for autonomous systems (ISO/TS 12813:2009) | Active | Published |

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|---|---|---|---|
| CEN ISO/TS 13143-2:2011 | Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to ISO/TS 12813 - Part 2: Abstract test suite (ISO/TS 13143-2:2011) | Active | Published |
| CEN ISO/TS 13140-2:2012 | Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to ISO/TS 13141 - Part 2: Abstract test suite (ISO/TS 13140-2:2012) | Active | Published |
| CEN ISO/TS 16407-1:2011 | Electronic fee collection - Evaluation of equipment for conformity to ISO/TS 17575-1 - Part 1: Test suite structure and test purposes (ISO/TS 16407-1:2011) | Active | Published |
| CEN ISO/TS 16401-1:2012 | Electronic fee collection - Evaluation of equipment for conformity to ISO/TS 17575-2 - Part 1: Test suite structure and test purposes (ISO/TS 16401-1:2012) | Active | Published |
| CEN/TR 16219:2011 | Electronic Fee Collection - Value added services based on EFC on-board equipment | Active | Published |
| CEN/TS 16439:2013 | Electronic fee collection - Security framework | Active | Published |
| CEN/TS 16331:2012 | Electronic fee collection - Interoperable application profiles for autonomous systems | Active | Published |
| CEN ISO/TS 17444-1:2012 | Electronic fee collection - Charging performance - Part 1: Metrics (ISO/TS 17444-1:2012) | Active | Published |
| CEN ISO/TS 16410-1:2011 | Electronic fee collection - Evaluation of equipment for conformity to ISO/TS 17575-3 - Part 1: Test suite structure and test purposes (ISO/TS 16410-1:2011) | Active | Published |
| CEN ISO/TS 16403-1:2012 | Electronic fee collection - Evaluation of equipment for conformity to ISO/TS 17575-4 - Part 1: Test suite structure and test purposes (ISO/TS 16403-1:2012) | Active | Published |
| CEN ISO/TS 16407-2:2012 | Electronic fee collection - Evaluation of equipment for conformity to ISO/TS 17575-1 - Part 2: Abstract test suite (ISO/TS 16407-2:2012) | Active | Published |
| CEN ISO/TS 16401-2:2012 | Electronic fee collection - Evaluation of equipment for conformity to ISO/TS 17575-2 - Part 2: Abstract test suite (ISO/TS 16401-2:2012) | Active | Published |
| CEN ISO/TS 16410-2:2012 | Electronic fee collection - Evaluation of equipment for conformity to ISO/TS 17575-3 - Part 2: Abstract test suite (ISO/TS 16410-2:2012) | Active | Published |
| CEN ISO/TS 16403-2:2012 | Electronic fee collection - Evaluation of equipment for conformity to ISO/TS 17575-4 - Part 2: Abstract test suite (ISO/TS 16403-2:2012) | Active | Published |
| | Electronic fee collection - Secure monitoring for autonomous toll systems - Trusted recorder | Waiting | Not Published |
| FprCEN/TS 16702 | Electronic fee collection - Secure monitoring for autonomous toll systems - Part 1: Compliance checking | Active | Not Published |

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|---|---|---|---|
| CEN ISO/TS 14907-2:2011 | Electronic fee collection - Test procedures for user and fixed equipment - Part 2: Conformance test for the onboard unit application interface (ISO/TS 14907-2:2011) | Active | Published |
| EN 15876-1:2010/FprA1 | Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to EN 15509 - Part 1: Test suite structure and test purposes | Closed | Not Published |
| FprCEN/TR 16690 | Electronic fee collection - Guidelines for EFC applications based on in-vehicle ITS stations | Active | Not Published |
| EN 15876-1:2010+A1:2012 | Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to EN 15509 - Part 1: Test suite structure and test purposes | Active | Published |
| prEN 15509 | Electronic fee collection - Interoperability application profile for DSRC | Active | Not Published |
| FprCEN ISO/TS 17444-2 | Electronic fee collection - Charging performance - Part 2: Examination Framework (ISO/DTS 17444-2:2013) | Active | Not Published |
| | Electronic fee collection - Secure monitoring for autonomous toll systems - Trusted recorder | Active | Not Published |
| CEN ISO/TS 25110:2013 | Electronic fee collection - Interface definition for on-board account using integrated circuit card (ICC) (ISO/TS 25110:2013) | Active | Published |
| | Electronic fee collection - Interoperable application profiles for information exchange between Service Provision and Toll Charging | Active | Not Published |
| prEN ISO 17575-1 | Electronic fee collection - Application interface definition for autonomous systems - Part 1: Charging (ISO/DIS 17575-1:2013) | Active | Not Published |
| EN ISO 14906:2011/prA1 | Electronic fee collection - Application interface definition for dedicated short-range communication (ISO 14906:2011/DAM 1:2013) | Active | Not Published |
| prCEN ISO/TS 19299 | Electronic fee collection - Security framework | Active | Not Published |
| prEN ISO 12813 | Electronic fee collection - Compliance check communication for autonomous systems | Active | Not Published |
| prEN ISO 13141 | Electronic fee collection - Localisation augmentation communication for autonomous systems | Active | Not Published |
| prEN ISO 17575-2 | Electronic fee collection - Application interface definition for autonomous systems - Part 2: Communication and connection to the lower layers | Active | Not Published |
| prEN ISO 17575-3 | Electronic fee collection - Application interface definition for autonomous systems - Part 3: Context data | Active | Not Published |
| prEN ISO 17575-4 | Electronic fee collection - Application interface definition for autonomous systems - Part 4: Roaming | Active | Not Published |

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|---|---|---|---|
| CEN ISO/TS 13141:2010/AC:2013 | Electronic fee collection - Localisation augmentation communication for autonomous systems - Technical Corrigendum 1 (ISO/TS 13141:2010/Cor 1:2013) | Active | Published |
| EN ISO 14906:2011/AC:2013 | Electronic fee collection - Application interface definition for dedicated short-range communication - Technical Corrigendum 1 (ISO 14906:2011/Cor 1:2013) | Active | Published |
| CEN ISO/TS 17575-1:2010/AC:2013 | Electronic fee collection - Application interface definition for autonomous systems - Part 1: Charging - Technical Corrigendum 1 (ISO/TS 17575-1:2010/Cor 1:2013) | Active | Published |
| CEN ISO/TS 17575-3:2011/AC:2013 | Electronic fee collection - Application interface definition for autonomous systems - Part 3: Context data - Technical Corrigendum 1 (ISO/TS 17575-3:2011/Cor 1:2013) | Active | Published |
| CEN/TR 15762:2008 | Road transport and traffic telematics - Electronic fee collection (EFC) - Ensuring the correct function of EFC equipment installed behind metallised windshield | Active | Published |
| EN ISO 12855:2012 | Electronic fee collection - Information exchange between service provision and toll charging (ISO 12855:2012) | Active | Published |
| CEN ISO/TS 17574:2009 | Electronic fee collection - Guidelines for security protection profiles (ISO/TS 17574:2009) | Active | Published |
| CEN ISO/TS 14907-1:2010 | Electronic fee collection - Test procedures for user and fixed equipment - Part 1: Description of test procedures (ISO/TS 14907-1:2010) | Active | Published |
| EN 15876-2:2011 | Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to EN 15509 - Part 2: Abstract test suite | Active | Published |
| prEN ISO 12855 | Electronic fee collection - Information exchange between service provision and toll charging (ISO/DIS 12855:2013) | Active | Not Published |
| CEN ISO/TS 14907-1:2010/AC:2010 | Road transport and traffic telematics - Electronic fee collection - Test procedures for user and fixed equipment - Part 1: Description of test procedures (ISO/TS 14907-1:2010/Cor 1:2010) | Active | Published |
| EN ISO 12855:2012/AC:2013 | Electronic fee collection - Information exchange between service provision and toll charging - Technical Corrigendum 1 (ISO 12855:2012/Cor 1:2013) | Active | Published |

## 4.3   WG2: Freight and Fleet Management Systems

The work in this WG has concentrated on information gathering and information collection about goods and vehicles/trailers/containers. The following aspects have been studied.

- Data on the performance of both drivers and vehicles;
- Vehicle tracking systems;
- Text messaging communication;
- Trailer tracking;
- Paperless manifest and proof of delivery;
- Traffic information and
- On-board navigation systems.
- Parking and resting locations for truck drivers

This work is important for an efficient transport of goods across longer distances by always obtaining information about the whereabouts of goods and trailers and the travel routes being used. Below is the list of active WIs from the group. As seen two of the reports are connected to truck parking. This is linked with safety and the requirements concerning rest hours for truck drivers on long journeys.

Since the re-establishment of WG2 in 2011, many stakeholders have shown interest in the work of WG2. However active participation remains low, and most of the current members are direct representatives from standardization bodies. There is a need to promote the work of WG2 in order to involve the right stakeholders. The convener has requested support from the national standardization bodies and head of delegations in assessing interest in national developments in respect of Intelligent Truck Parking and Data Modelling for dangerous goods transport.

| Reference | Title | WI Status | Standard Status |
|---|---|---|---|
| | ITS Standardisation requirements for Freight, Logistics and Commercial Vehicle Operations | Waiting | Not Published |
| | Framework Architecture, Roles and Responsibilities to support Intelligent Truck Parking Information and Reservations services. | Waiting | Not Published |
| | ITS Standardisation requirements for Intelligent Truck Parking Information and Reservations services | Waiting | Not Published |

### 4.4 WG3: Public Transport

WG3 is producing standards in several areas. The primary ones are:

- Internal data networks in public transport vehicles that will connect sensors, indicators, ticket machines, etc together (FIP, CAN, IP/Ethernet, Messages and Data contents)
- Man-machine interfaces for drivers, platform validators and on-board validators.
- Information systems - real-time and multimodal network and time table exchange as an addition on top of Transmodel
- Ticketing systems including the full business chain from electronic tickets to exchange between back-office systems

As seen from the WI list below the main aspects are concerned with real time status information and ticketing. Most of the members are coming from the Public Transport industry, but with some regulators/authorities sitting in. There is a good cooperation with other WGs such as WG1 (EFC). The cooperation with the ISO equivalent (WG8) has also picked up the last year, with open discussions over joint areas of interest. In ISO TC204 the group is also focused on emergency situations linked to public transport which is an important issue to follow, even though this dimension is less prominent in the European area.

| Reference | Title | WI Status | Standard Status |
|---|---|---|---|
| ENV 12694:1997 | Public transport - Road vehicles - Dimensional requirements for variable electronic external signs | Active | Published |
| ENV 13093:1998 | Public transport - Road vehicles - Driver's console mechanical interface requirements - Minimum display and keypad parameters | Active | Published |
| ENV 12796:1997 | Road transport and traffic telematics - Public transport - Validators | Active | Published |
| ENV 13998:2001 | Road transport and traffic telematics - Public transport - Non-interactive dynamic passenger information on ground | Active | Published |
| CEN/TS 13149-6:2005 | Public transport - Road vehicle scheduling and control systems - Part 6: CAN message content | Active | Published |
| EN 12896:2006 | Road transport and traffic telematics - Public transport - Reference data model | Active | Published |
| EN 13149-1:2004 | Public transport - Road vehicle scheduling and control systems - Part 1: WORLDFIP definition and application rules for onboard data transmission | Active | Published |
| EN 13149-2:2004 | Public transport - Road vehicle scheduling and control systems - Part 2: WORLDFIP cabling specifications | Active | Published |
| EN 13149-4:2004 | Public transport - Road vehicle scheduling and control systems - Part 4: General application rules for CANopen transmission buses | Active | Published |
| EN 13149-5:2004 | Public transport - Road vehicle scheduling and control systems - Part 5: CANopen cabling specifications | Active | Published |

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|---|---|---|---|
| EN ISO 24014-1:2007 | Public transport - Interoperable fare management system - Part 1: Architecture (ISO 24014-1:2007) | Active | Published |
| CEN/TS 15504:2007 | Public transport - Road vehicles - Visible variable passenger information devices inside the vehicle | Active | Published |
| CEN/TS 13149-3:2007 | Public transport - Road vehicle scheduling and control systems - Part 3: WorldFIP message content | Active | Published |
| CEN/TS 15531-1:2007 | Public transport - Service interface for real-time information relating to public transport operations - Part 1: Context and framework | Active | Published |
| CEN/TS 15531-2:2007 | Public transport - Service interface for real-time information relating to public transport operations - Part 2: Communications infrastructure | Active | Published |
| CEN/TS 15531-3:2007 | Public transport - Service interface for real-time information relating to public transport operations - Part 3: Functional service interfaces | Active | Published |
| CEN/TS 15531-4:2011 | Public transport - Service interface for real-time information relating to public transport operations - Part 4: Functional service interfaces: Facility Monitoring | Active | Published |
| CEN/TS 15531-5:2011 | Public transport - Service interface for real-time information relating to public transport operations - Part 5: Functional service interfaces - Situation Exchange | Active | Published |
| CEN ISO/TR 24014-2:2013 | Public transport - Interoperable fare management system - Part 2: Business practices (ISO/TR 24014-2:2013) | Active | Published |
| | Public transport - European ticketless and ticket on departure for rail distribution | Waiting | Not Published |
| FprCEN/TS 16614-1 | Public transport - Network and Timetable Exchange (NeTEx) - Part 1: Public transport network topology exchange format | Active | Not Published |
| FprCEN/TS 16614-2 | Public transport - Network and Timetable Exchange (NeTEx) - Part 2: Public transport scheduled timetables exchange format | Active | Not Published |
| CEN/TR 16427:2013 | Intelligent transport systems - Public transport - Traveller Information for Visually Impaired People (TI-VIP) | Active | Published |
| CEN/TS 16406:2013 | Intelligent transport systems - Public transport - Indirect Fulfilment for Rail | Active | Published |
| | Public transport - Network and Timetable Exchange (NeTEx) - Part 3 Public transport network fare information exchange format | Active | Not Published |
| | Public transport - Road vehicle scheduling and control systems - Part 7: Network and system architecture | Active | Not Published |
| CEN/TS 13149-8:2013 | Public transport - Road vehicle scheduling and control systems - Part 8: Physical layer for IP communication | Active | Published |

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|---|---|---|---|
| CEN ISO/TR 24014-3:2013 | Public transport - Interoperable fare management system - Part 3: Complementary concepts to Part 1 for multi-application media (ISO/TR 24014-3:2013) | Active | Published |
| prEN 15531-1 rev | Public transport - Service interface for real-time information relating to public transport operations - Part 1: Context and framework | Active | Not Published |
| prEN 15531-2 rev | Public transport - Service interface for real-time information relating to public transport operations - Part 2: Communications | Active | Not Published |
| prEN 15531-3 rev | Public transport - Service interface for real-time information relating to public transport operations - Part 3: Functional service interfaces | Active | Not Published |
| | Intelligent transport systems - Public transport - Implementation specifcations for IFM Systems | Waiting | Not Published |
| prEN ISO 24014-1 rev | Intelligent transport systems - Interoperable fare management system - Part 1: Architecture | Active | Not Published |
| prEN 12896-2 | Public Transport - Reference Data Model - Part 2: Public Transport Network | Active | Not Published |
| prEN 12896-3 | Public Transport - Reference Data Model - Part 3: Timing Information and Vehicle Scheduling | Active | Not Published |
| | Public transport - Interoperable fare management system - Communication between contactless readers and fare media | Active | Not Published |
| prEN 12896-4 | Public transport - Public Transport Reference Data Model - Part 4 | Waiting | Not Published |
| prEN 12896-1 | Public Transport - Reference Data Model - Part 1: Common Concepts | Active | Not Published |
| EN 28701:2012 | Intelligent transport systems - Public transport - Identification of Fixed Objects in Public Transport (IFOPT) | Active | Published |

## 4.5 WG4: Traffic and Travel Information



WG4 was recently put in a dormant state in CEN TC278 to avoid the extra work involved in the Vienna agreement application. The technical work is progressing at full speed, so this measure is purely to aid efficiency in the development process.

The following description therefore applies for ISO TC204/WG10, and will be moved there in the next issue of this report.

WG4 has been very active in the past, but the activity is mostly moved to TISA (Traveller Information Services Association) which is a non-profit organisation for TPEG, RDS-TMC (Alert C) and Graphic Data Dictionary. The main work is related to definition of data sets and transport protocols for sending traffic related information, mostly via public broadcast systems, but also via other media.

This is one of the most productive WGs with around 35 developing + published standards, and considered to be one of the most successful global sets of ITS standards, on par with CEN DSRC/EFC.

TPEG is a standard that will allow much larger data volumes to be sent to the on boards travel units. It is based on DAB radio communication and it will arguably take over for RDS-TMC in the future. TPEG is included as a communication and location standard for Datex II. A DATEX II-to-TPEG demonstrator was organized during the ITS European Congress in Lyon for which the technical explanation is available here.

It is recommended to follow this work and uptake of this standard closely in the coming years and evaluate if a transition to TPEG should be carried out in Europe, or if TPEG should be seen upon as a complement to RDS-TMC.

| Reference | Title | WI Status | Standard Status |
|---|---|---|---|
| ISO 14821 | Road Transport and Traffic Telematics - Traffic and traveller information - Messages via cellular networks | Split | Not Published |
| ENV 12315-2:1996 | Traffic and Traveller Information (TTI) - TTI Messages via Dedicated Short-Range Communication - Part 2: Data Specification - Uplink (Vehicle to Roadside) | Active | Published |
| | Road Transport and Traffic Telematics - Traffic and traveller information - Medium-range pre-information | Split | Not Published |
| ENV 12315-1:1996 | Traffic and Traveller Information (TTI) - TTI Messages via Dedicated Short-Range Communication - Part 1: Data Specification - Downlink (Roadside to Vehicle) | Active | Published |
| EN ISO 14819-1:2003 | Traffic and Travel Information (TTI) - TTI Messages via traffic message coding - Part 1: Coding protocol for Radio Data System - Traffic Message Channel (RDS-TMC) using ALERT-C (ISO 14819-1:2003) | Active | Published |

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|---|---|---|---|
| EN ISO 14819-2:2003 | Traffic and Traveller Information (TTI) - TTI Messages via traffic message coding - Part 2: Event and information codes for Radio Data System - Traffic Message Channel (RDS-TMC) (ISO 14819-2:2003) | Active | Published |
| ENV 12313-4:2000 | Traffic and Traveller Information (TTI) - TTI Messages via Traffic Message Coding - Part 4: Coding Protocol for Radio Data System - Traffic Message Channel (RDS-TMC) - RDS-TMC using ALERT Plus with ALERT C | Active | Published |
| | Road Transport and Traffic Telematics - Traffic and Travel Information (TTI) - TTI information over high data-rate broadcast digital bearers | Split | Not Published |
| CEN/TS 14821-1:2003 | Traffic and Travel Information (TTI) - TTI messages via cellular networks - Part 1: General specifications | Active | Published |
| CEN/TS 14821-2:2003 | Traffic and Travel Information (TTI) - TTI messages via cellular networks - Part 2: Numbering and ADP messsage header | Active | Published |
| CEN/TS 14821-3:2003 | Traffic and Travel Information (TTI) - TTI messages via cellular networks - Part 3: Basic information elements | Active | Published |
| CEN/TS 14821-4:2003 | Traffic and Travel information (TTI) - TTI messages via cellular networks - Part 4: Service-independent protocols | Active | Published |
| CEN/TS 14821-5:2003 | Traffic and Travel Information (TTI) - TTI messages via cellular networks - Part 5: Internal services | Active | Published |
| CEN/TS 14821-6:2003 | Traffic and Travel Information (TTI) - TTI messages via cellular networks - Part 6: External services | Active | Published |
| CEN/TS 14821-7:2003 | Traffic and Travel Information (TTI) - TTI messages via cellular networks - Part 7: Performance requirements for onboard positioning | Active | Published |
| CEN/TS 14821-8:2003 | Traffic and Travel Information (TTI) - TTI messages via cellular networks - Part 8: GSM-specific parameters | Active | Published |
| CEN ISO/TS 18234-4:2006 | Traffic and Travel Information (TTI) - TTI via Transport Protocol Expert Group (TPEG) data-streams - Part 4: Road Traffic Message (RTM) application (ISO/TS 18234-4:2006) | Active | Published |
| EN ISO 14819-3:2004 | Traffic and Travel Information (TTI) - TTI messages via traffic message coding - Part 3: Location referencing for ALERT-C (ISO 14819-3:2004) | Active | Published |
| EN ISO 14819-6:2006 | Traffic and Traveller Information (TTI) - TTI messages via traffic message coding - Part 6: Encryption and conditional access for the Radio Data System - Traffic Message Channel ALERT C coding (ISO 14819-6:2006) | Active | Published |
| CEN ISO/TS 18234-5:2006 | Traffic and Travel Information (TTI) - TTI via Transport Protocol Expert Group (TPEG) data-streams - Part 5: Public Transport Information (PTI) application (ISO/TS 18234-5:2006) | Active | Published |

| CEN ISO/TS 18234-6:2006 | Traffic and Travel Information (TTI) - TTI via Transport Protocol Expert Group (TPEG) data-streams - Part 6: Location referencing applications (ISO/TS 18234-6:2006) | Active | Published |
|---|---|---|---|
| CEN ISO/TS 24530-1:2006 | Traffic and Travel Information (TTI) - TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) - Part 1: Introduction, common data types and tpegML (ISO/TS 24530-1:2006) | Active | Published |
| CEN ISO/TS 24530-2:2006 | Traffic and Travel Information (TTI) - TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) - Part 2: tpeg-locML (ISO/TS 24530-2:2006) | Active | Published |
| CEN ISO/TS 24530-3:2006 | Traffic and Travel Information (TTI) - TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) - Part 3: tpeg-rtmML (ISO/TS 24530-3:2006) | Active | Published |
| CEN ISO/TS 24530-4:2006 | Traffic and Travel Information (TTI) - TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) - Part 4: tpeg-ptiML (ISO/TS 24530-4:2006) | Active | Published |
| CEN ISO/TS 14823:2008 | Traffic and travel information - Messages via media independent stationary dissemination systems - Graphic data dictionary for pre-trip and in-trip information dissemination systems (ISO/TS 14823:2008) | Active | Published |
| CEN ISO/TS 18234-3:2013 | Intelligent transport systems - Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format - Part 3: Service and network information (TPEG1-SNI) (ISO/TS 18234-3:2013) | Active | Published |
| CEN ISO/TS 18234-11:2013 | Intelligent transport systems - Traffic and Travel Information (TTI) via transport protocol experts group, generation 1 (TPEG1) binary data format - Part 11: Location Referencing Container (TPEG1-LRC) (ISO/TS 18234-11:2013) | Active | Published |
| CEN ISO/TS 18234-7:2013 | Intelligent transport systems - Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format - Part 7: Parking information (TPEG1-PKI) (ISO/TS 18234-7.2013) | Active | Published |
| CEN ISO/TS 18234-1:2013 | Intelligent transport systems - Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format - Part 1: Introduction, numbering and versions (TPEG1-INV) (ISO/TS 18234-1:2013) | Active | Published |
| CEN ISO/TS 18234-9:2013 | Intelligent transport systems - Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format - Part 9: Traffic event compact (TPEG1-TEC) (ISO/TS 18234-9:2013) | Active | Published |

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|---|---|---|---|
| CEN ISO/TS 18234-10:2013 | Intelligent transport systems - Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format - Part 10: Conditional access information (TPEG1-CAI) (ISO/TS 18234-10:2013) | Active | Published |
| CEN ISO/TS 18234-2:2013 | Intelligent transport systems - Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format - Part 2: Syntax, semantics and framing structure (TPEG1-SSF) (ISO/TS 18234-2:2013) | Active | Published |
| EN ISO 14819-1:2003/AC:2004 | Traffic and Travel Information (TTI) - TTI Messages via traffic message coding - Part 1: Coding protocol for Radio Data System - Traffic Message Channel (RDS-TMC) using ALERT-C (ISO 14819-1:2003) | Active | Published |
| FprEN ISO 14819-2 rev | Traffic and Traveller Information (TTI) - TTI messages via traffic message coding - Part 2: Event and information codes for Radio Data System - Traffic Message Channel (RDS-TMC) (ISO/FDIS 14819-2:2013) | Active | Not Published |
| FprEN ISO 14819-1 rev | Traffic and Traveller Information (TTI) - TTI messages via traffic message coding - Part 1: Coding protocol for Radio Data System - Traffic Message Channel (RDS-TMC) using ALERT-C (ISO/FDIS 14819-1:2013) | Active | Not Published |
| FprEN ISO 14819-3 rev | Intelligent transport systems - Traffic and travel information messages via traffic message coding - Part 3: Location referencing for Radio Data System - Traffic message Channel (RDS-TMC) using ALERT-C | Active | Not Published |
| | Intelligent transport systems â€• Travel and traffic information â€ A multiple/crossâ€domain commonly agreed interface | Waiting | Not Published |

**4.6    WG5: Traffic Control**
Dormant WG with no active standards or work items.
Some of the ideas are taken up by ISO TC204 WG9.

**4.7    WG6: Parking Management**
Dormant WG with no active standards or work items.

**4.8    WG7: Geographic Road Databases**
Re-established WG. There is one active standard in this field called Geographical Data Files (GDF). The current version (GDF 3.0 in Europe) is used in modified versions by map providers, with unfortunately little interoperability as a result. New developments of GDF have been taken over by **ISO TC204 WG3** where there is a lot of activity. GDF has been upgraded to GDF4.0 and recently further to GDF5.0 which is currently under implementation in some regions. More information on the standardisation of GDF5 can be found here.

New scope was proposed for the re-establishment of WG7: Specification of a framework for an efficient and quality-ensured supply chain for information on safety-related static road attributes, from public authorities to commercial map providers and other road data users, with a focus on changes in the concerned attributes rather than full data sets. Preliminary work was carried out in the EU-funded ROSATTE project. The intended framework will consist of the following parts: (1) a conceptual specification of the data content (the information model); (2) a physical exchange format to specify a coding for the various types of data listed under the conceptual model; (3) a service specification to facilitate the actual data flow between the various actors. The specification will be aligned with the INSPIRE project as an extension for ITS spatial data of the theme Transport Networks, while adding elements that are essential for ITS spatial data but not currently offered by INSPIRE, such as maintenance of the data, quality control and location referencing.

The re-established WG is chaired by Kees Wavers from NBN, delegated by ERTICO-ITS Europe under the umbrella of TN-ITS platform. Mr. Wavers is the chair of TN-ITS as well.

| Reference | Title | WI Status | Standard Status |
|---|---|---|---|
| | Transport network ITS spatial data exchange framework | Waiting | Not Published |

### 4.9 WG8: Road Traffic Data

This is the DATEX II working group. EasyWay now provides the user forum for DATEX II. Some attempts have been made at standardising interfaces for roadside infrastructure and controllers, but the current internal situation in WG8 remains unknown.

There have been contact between TISA and DATEX II recently, and also some joint activities with ETSI for Cooperative Awareness Message (CAM) and Decentralised Environmental Notification Message (DENM event messages) broadcast. The main focus is achieving global interoperability with ISO TC204 WG9, which is responsible for "global" DATEX harmonization.

The DATEX II standards are steadily adopting new material as new technologies emerge and as member states apply for new material to be included. One example is a new mechanisms for easier linking of point locations to name lists have been added to identify the location of a traffic situation such as an accident. These are both additions of class A/B.

One challenge is the fact that ISO and CEN are developing DATEX standards diverging on essential points. In ISO TC205/WG9, the name is DATEX-ASN, and the contents and structure is quite different from DATEX II. Efforts should be taken to inform users regarding these differences, furthermore efforts are on-going to align the work of ISO and CEN. It should also be mentioned that there are significant overlaps with a standard from the US, called NTCIP.

| Reference | Title | WI Status | Standard Status |
|---|---|---|---|
| CEN/TS 16157-1:2011 | Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 1: Context and framework | Active | Published |
| CEN/TS 16157-2:2011 | Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 2: Location referencing | Active | Published |
| CEN/TS 16157-3:2011 | Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 3: Situation Publication | Active | Published |
| EN ISO 14825:2011 | Intelligent transport systems - Geographic Data Files (GDF) - GDF5.0 (ISO 14825:2011) | Active | Published |
| FprCEN/TS 16157-4 | Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 4: Variable Message Sign (VMS) Publications | Active | Not Published |
| FprCEN/TS 16157-5 | Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 5: Measured and elaborated data publications | Active | Not Published |
| | 16157-6 Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 6: Parking Publication | Waiting | Not Published |
| | Intelligent transport systems - Data interfaces between centres for transport information and control systems - Platform independent model specifications for data exchange protocols for transport information and control systems | Waiting | Not Published |

### 4.10 WG9: Dedicated Short-Range Communication (DSRC)

Dormant WG. This WG used to be joint with ISO TC204 WG15 which is also dormant.

In the end the WG produced 4 basic standards from 1993-2001, and these four still provide the basics of tolling systems around the world. More than 40 million units are in daily use around the world.
The four standards EN12253(L1), EN12795(L2), EN12834(L7) and EN13372(Profile) are now maintained by CEN TC278 itself.

Conformance validation standards are managed by ETSI TC ITS WG2.

| Reference | Title | WI Status | Standard Status |
|---|---|---|---|
| EN 12253:2004 | Road transport and traffic telematics - Dedicated short-range communication - Physical layer using microwave at 5,8 GHz | Active | Published |
| EN 12795:2003 | Road transport and traffic telematics - Dedicated Short Range Communication (DSRC) - DSRC data link layer: medium access and logical link control | Active | Published |
| EN 12834:2003 | Road transport and traffic telematics - Dedicated Short Range Communication (DSRC) - DSRC application layer | Active | Published |
| EN 13372:2004 | Road Transport and Traffic Telematics (RTTT) - Dedicated short-range communication - Profiles for RTTT applications | Active | Published |

### 4.11 WG10 Human-Machine Interfacing

This WG was transferred to ISO/TC22/SC13/WG8 since it was mainly related to in-vehicle systems which are in the scope of ISO TC22 (Road Vehicles). The WG has produced five ENs which deals with HMI testability and symbols, and has around five more under way as ISO items. There is no direct ISO TC204 parallel group, but some relations with ISO TC204 WG14 and WG17.

Some key words for what is done in this WG are: Dialogue Management, Auditory Information Presentation, Measurement of Driver Visual Behaviour, Visual Information Presentation, Process requirements for driver system integration such as Warning Systems in Vehicles.

Most of the work in this WG is finished with published reports. The only "working" document is about auditory presentation for in-vehicle systems EN ISO15006.

Note that the on-going reorganization of ISO TC22 may affect the future cooperation with CEN TC278.

| Reference | Title | WI Status | Standard Status |
|---|---|---|---|

| | | | |
|---|---|---|---|
| EN ISO 15007-1:2002 | Road vehicles - Measurement of driver visual behaviour with respect to transport information and control systems - Part 1: Definitions and parameters (ISO 15007-1:2002) | Active | Published |
| EN ISO 15005:2002 | Road vehicles - Ergonomic aspects of transport information and control systems - Dialogue management principles and compliance procedures (ISO 15005:2002) | Active | Published |
| EN ISO 17287:2003 | Road vehicles - Ergonomic aspects of transport information and control systems - Procedure for assessing suitability for use while driving (ISO 17287:2003) | Active | Published |
| EN ISO 15006:2011 | Road vehicles - Ergonomic aspects of transport information and control systems - Specifications for in-vehicle auditory presentation (ISO 15006:2011) | Active | Published |
| prEN ISO 15007-1 rev | Road vehicles - Measurement of driver visual behaviour with respect to transport information and control systems - Part 1: Definitions and parameters (ISO/DIS 15007-1:2013) | Active | Not Published |
| EN ISO 15008:2009 | Road vehicles - Ergonomic aspects of transport information and control systems - Specifications and test procedures for in-vehicle visual presentation (ISO 15008:2009) | Active | Published |
| prEN ISO 15008 rev | Road vehicles - Ergonomic aspects of transport information and control systems - Specifications and test procedures for in-vehicle visual presentation | Active | Not Published |

### 4.12 WG12. Automatic Vehicle Identification & Automatic Equipment Identification

This WG deals with AVI/AEI, which is one of the earliest and most basic ITS technologies. This WG runs all meetings jointly in CEN and ISO. Identification in its various forms is essential for many applications, requiring a good cooperation with other WGs. The registration regime defined in ISO14816 that was created by WG12 is for example used directly in the core Electronic Fee Collection standards.

There are three main groupings of AVI/AEI: The basic set of AVI/AEI standards for road vehicles (ISO 14814, 14815 and 14816), the intermodal freight standards (17261, 17262, 17263), and finally the Electronic Registration Identifier (ERI) series (17264, 24534-1/-4, 24535). Finally an Interoperability Application Profile determining how to apply AVI and ERI on top of CEN DSRC protocol published as a European Standard (EN 16312) and is currently being moved to full ISO standard (EN ISO 19061).

The Electronic registration Identification work may be of special interest since this work is directly aimed at public authorities. The idea is to combine electronic license plates and electronic registration papers in a way that respect European privacy laws. Several countries around the world are looking at this; Portugal and Brazil are planning the introduction of this technology. This technology is sensitive for privacy issues, so careful attention has been made for cryptographic solutions that will manage privacy according to European legislation.

Below is the list of reports that are under work in this WG. As noted above the ERI documents should be carefully followed in relation to various ITS services where individual vehicles are registered (for short or longer time duration).

| Reference | Title | WI Status | Standard Status |
|---|---|---|---|
| EN ISO 14814:2006 | Road transport and traffic telematics - Automatic vehicle and equipment identification - Reference architecture and terminology (ISO 14814:2006) | Active | Published |
| prCEN ISO TS 24534 | Road transport and traffic telematics - Automatic vehicle and equipment identification - Electronic Registration Identification (ERI) for vehicles | Split | Not Published |
| EN ISO 14815:2005 | Road transport and traffic telematics - Automatic vehicle and equipment identification - System specifications (ISO 14815:2005) | Active | Published |
| EN ISO 14816:2005 | Road transport and traffic telematics - Automatic vehicle and equipment identification - Numbering and data structure (ISO 14816:2005) | Active | Published |
| EN ISO 17264:2009 | Intelligent transport systems - Automatic vehicle and equipment identification - Interfaces (ISO 17264:2009) | Active | Published |
| EN ISO 24534-1:2010 | Automatic vehicle and equipment identification - Electronic Registration Identification (ERI) for vehicles - Part 1: Architecture (ISO 24534-1:2010) | Active | Published |
| EN ISO 24534-2:2010 | Automatic vehicle and equipment identification - Electronic Registration Identification (ERI) for vehicles - Part 2: Operational requirements (ISO | Active | Published |

| | | | |
|---|---|---|---|
| | 24534-2:2010) | | |
| EN ISO 24534-3:2010 | Automatic vehicle and equipment identification - Electronic Registration Identification (ERI) for vehicles - Part 3: Vehicle data (ISO 24534-3:2010) | Active | Published |
| EN ISO 24534-4:2010 | Automatic vehicle and equipment identification - Electronic Registration Identification (ERI) for vehicles - Part 4: Secure communications using asymmetrical techniques (ISO 24534-4:2010) | Active | Published |
| EN ISO 17261:2012 | Intelligent transport systems - Automatic vehicle and equipment identification - Intermodal goods transport architecture and terminology (ISO 17261:2012) | Active | Published |
| EN ISO 17262:2012 | Intelligent transport systems - Automatic vehicle and equipment identification - Numbering and data structures (ISO 17262:2012) | Active | Published |
| EN ISO 17263:2012 | Intelligent transport systems - Automatic vehicle and equipment identification - System parameters (ISO 17263:2012) | Active | Published |
| EN 16312:2013 | Intelligent transport systems - Automatic Vehicle and Equipment Registration (AVI/AEI) - Interoperable application profile for AVI/AEI and Electronic Register Identification using dedicated short range communication | Active | Published |
| prEN ISO 19061 | prEN ISO 19061 Intelligent transport systems - Automatic Vehicle and Equipment Registration (AVI/AEI) - Interoperable application profile for AVI/AEI and Electronic Register Identification using dedicated short range communication | Active | Not Published |
| prEN ISO 24534-3 rev | Intelligent transport systems - Automatic vehicle and equipment identification - Electronic registration identification (ERI) for vehicles - Part 3: Vehicle data (ISO/DIS 24534-3:2013) | Active | Not Published |

## 4.13 WG13: Architecture

WG13 was not part of the original work programme. Originally TC278 intended to do architecture, terminology and several other such tasks directly at the TC level. After ISO TC204 got started, it set up Architecture as WG1 because of its essential nature. It then became clear that architecture is so central that a European WG had to be created, and the TC level work transferred to WG13

There is an on-going task to set up a registration scheme for data objects /(data dictionary) This task will require funding for the operation, and this has proven to be a challenge..

According to the Vienna Agreement, most of the work is done in ISO, so there is little direct activity in WG13. Please see ISO TC204/WG1 for more information on technical work. One specific European issue is the Privacy regulations, and this one is not under the joint work with ISO.

| Reference | Title | WI Status | Standard Status |
|---|---|---|---|
| | Privacy aspects in ITS standards and systems in Europe | Active | Not Published |

## 4.14   WG14: After Theft Systems for Vehicle Recovery

This group was started as cooperation between police and insurance companies. The idea was originally to use ITS to track and recover stolen vehicles, in particular on border crossings. These standards are mainly finished now, but the need is reduced because of better anti-theft technology in new cars. Only some testing is carried on (ref report list below) that may lead to minor corrections in the specifications.

This working group has developed a suite of Technical Specifications for the location, tracking and recovery of stolen vehicles. The TS are not technology specific as they are designed to allow both short range and long range systems to detect and identify the stolen vehicle. Systems may therefore be GPS, GSM, direct bearing or electronic tagging based, or a combination of these. Therefore this service may reside on a C-ITS platform.

The critical features are the testing of systems, accuracy of identification and location, the confirmation of report of crime and the timely and accurate passing of data between the stolen vehicle, infrastructure, monitoring agencies and law enforcement agencies at national or international level. All of which should lead to the lawful recovery of the vehicle and arrest of offenders.

The next phase of work is investigating the viability of systems to remotely slow down and/or stop the engine of a known stolen vehicle or a vehicle that poses a significant risk to people. If the investigation is successful this will be developed to TS. In the first instance this is only relevant for heavy vehicles/special vehicles that can be used for terrorism and serious crime.

| Reference | Title | WI Status | Standard Status |
|---|---|---|---|
| CEN/TS 15213-6:2011 | Road transport and traffic telematics - After-theft services for the recovery of stolen vehicles - Part 6: Test procedures | Active | Published |
| EN 15213-1:2013 | Intelligent transport systems - After-theft systems for the recovery of stolen vehicles - Part 1: Reference architecture and terminology | Active | Published |
| EN 15213-4:2013 | Intelligent transport systems - After-theft systems for the recovery of stolen vehicles - Part 4: Interface and system requirements in terms of long range communication system | Active | Published |
| EN 15213-2:2013 | Intelligent transport systems - After-theft systems for the recovery of stolen vehicles - Part 2: Common status message elements | Active | Published |
| EN 15213-3:2013 | Intelligent transport systems - After-theft systems for the recovery of stolen vehicles - Part 3: Interface and system requirements in terms of short range communication system | Active | Published |
| EN 15213-5:2013 | Intelligent transport systems - After-theft systems for the recovery of stolen vehicles - Part 5: Messaging interface | Active | Published |

### 4.15 WG15 eSafety

For the benefit of road users and society in general, eSafety is working for a quicker development and increased use of smart road safety (and eco-driving) technologies. They are called 'smart' because they are based on the powers of computers and telecoms.

In 2009, road accidents killed 35.100 people in the EU and injured 1.5 million. Human error is involved in 95% of all traffic accidents!
http://212.68.215.195/esafety/esafety_2010.wmv

'eSafety technologies' help reduce these negative effects of road transport. They bring down the death toll and cut road traffic's energy consumption and $CO_2$ exhausts. This WG was created specifically to produce system level standards for the eCall directive which is the main eSafety system being standardised. Radio standards for eCall have been produced by ETSI 3GPP.

There are two different "types" of eCall:
Pan-European eCall is the "normal" standard way to achieve this task, and is covered by the European Mandate. The intention is to install this in all new vehicles from 2015 onwards.
Third-party eCall is based on already installed equipment in cars (e.g Volvo on-call, BMW Assist Advanced eCall, Renault Odysline, Ford/Opel OnStar, Daimler TeleAid, etc)

The majority of work is in the final stages of development, but there have been some controversy that may delay final approval and deployment of eCall. The challenge is around how to apply the third-party eCall, and make it interoperable with Pan-European eCall, respecting the privacy laws of all involved countries.
The reports under work from the group are listed below. The scope of the WG is wider than only eCall providing a standard for eCall end-to-end testing and heavy goods vehicles related optional data.

| Reference | Title | WI Status | Standard Status |
|-----------|-------|-----------|-----------------|
| EN 16072:2011 | Intelligent transport systems - eSafety - Pan-European eCall operating requirements | Active | Published |
| EN 15722:2011 | Intelligent transport systems - eSafety - eCall minimum set of data (MSD) | Active | Published |
| EN 16062:2011 | Intelligent transport systems - eSafety - eCall high level application requirements (HLAP) | Active | Published |
| EN 16102:2011 | Intelligent transport systems - eCall - Operating requirements for third party support | Active | Published |
| CEN/TR 16405:2013 | Intelligent transport systems - ESafety - ECall additional optional data set for heavy goods vehicles eCall | Active | Published |
| CEN/TS 16454:2013 | Intelligent transport systems - ESafety - ECall end to end conformance testing | Active | Published |
| prEN 16454 | Intelligent transport systems - eSafety - eCall end to end conformance testing | Active | Not Published |

| | CEN/TS 16405 Intelligent transport systems - eCall - Additional data concept specification for heavy goods vehicles | Active | Not Published |
| --- | --- | --- | --- |
| EN ISO 24978:2009 | Intelligent transport systems - ITS Safety and emergency messages using any available wireless media - Data registry procedures (ISO 24978:2009) | Active | Published |

### 4.16 WG16: Co-operative systems

Co-operative systems are ITS systems based on vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I, I2V) and infrastructure-to-infrastructure (I2I) communications for the exchange of information. As the name indicates the goal is to construct systems that can communicate efficiently and in a safe and secure manner. Cooperative ITS (C-ITS) have the potential to increase the benefits of ITS services and applications.

This is the latest addition to CEN TC278, and is an initiative coming out of Europe to answer the European ITS Roadmap and ITS Directive, see chapter on Cooperative ITS. This WG is fully joint with ISO WG18, and has two main roles:  Firstly to develop new standards in the field of C-ITS, and secondly to help coordinate and foster new C-ITS thinking in the existing WGs of CEN TC278 and ISO TC204.

It is safe to say this is the new super-WG in CEN/ISO. There are more than 80 experts registered from 17 countries around the world; more than half of the experts coming from Europe. Since WG16 is still under creation, there are minimal results available. The seven Work Items are likely going to be supported by Project Teams, but as noted later the CEN role in M/453 is lagging a bit. The current proposals inside WG16 is a mix of applications/services related to speed and information display in cars, and more Facilities layer functions related to LDM and APIs.

Documents from the WG are still under development. The overall goal is to achieve interoperability in data formats and transfer capabilities so the systems can "talk together" and exchange understandable and sufficient information. This work is of great importance to achieve the goals of data sharing, not only local within vehicles systems and between the vehicle and the national traffic data bases, but also across borders and international systems.

Several project teams have been launched recently in order to develop the most important work items and move forward the standardization work: PT1602, PT1603, PT1604.
The ITS industry stakeholders are urgently requesting the standards for C-ITS in order to proceed with the planned deployment efforts which should start in 2014.

New objective has been identified to be in the focus of the standardization: Probe Data, also called "Vehicle as Probe" or Floating Car Data in Europe. There are already Probe Data standards available from the ISO CALM group (TC204/WG16), and modifications/extensions to this work in order to harmonize with other ITS data sets, new work will start on CEN WG16.

SAE and ETSI are working in close collaboration with WG16 in order to harmonize the content of their message sets used in SAE J2735 and ETSI CAM&DENM. More details on this on-going international standard's harmonization is described later in this document.

| Reference | Title | WI Status | Standard Status |
|---|---|---|---|
| FprCEN ISO/TS 17419 | Intelligent transport systems - Co-operative systems - Classification and management of ITS applications in a global context (ISO/DTS 17419:2013) | Active | Not Published |

| | | | |
|---|---|---|---|
| FprCEN ISO/TS 17423 | Intelligent transport systems - Co-operative systems - ITS application requirements and objectives for selection of communication profiles (ISO/DTS 17423:2013) | Active | Not Published |
| FprCEN ISO/TR 17424 | Intelligent transport systems - Co-operative systems - State of the art of Local Dynamic Maps concepts | Active | Not Published |
| FprCEN ISO/TS 17427 | Intelligent transport systems - Co-operative systems - Roles and responsibilities in the context of co-operative ITS based on architecture(s) for co-operative systems (ISO/DTS 17427:2013) | Active | Not Published |
| prCEN ISO/TS 17425 | Intelligent transport systems â€¢ Coâ€¢ operative systems - Specification for inâ€¢ vehicle presentation of external road and traffic related data | Active | Not Published |
| prCEN ISO/TS 17429 | Intelligent transport systems - Co-operative systems - Profiles for processing and transfer of information between ITS stations for applications related to transport infrastructure management, control and guidance | Active | Not Published |
| prCEN ISO/TS 17426 | Intelligent transport systems - Co-operative systems - Contextual speeds | Active | Not Published |
| | Intelligent transport systems - Co-operative systems - Definition of a global concept for local dynamic maps | Active | Not Published |
| prCEN ISO/TS 19091 | Intelligent transport systems - Cooperative ITS - Using V2I and I2V communications for applications related to signalized intersections | Active | Not Published |
| prCEN ISO/TS 19321 | Intelligent transport systems - Cooperative ITS - Dictionary of in-vehicle information (IVI) data structures | Active | Not Published |

## 5    ETSI TC ITS

**ETSI** is the European Telecom Standardisation Institute, and is commonly known a major contributor to global telecom standards such as GSM, LTE and DVB. ETSI does also have a formal and legal role in Europe since it produces Harmonised European Norms, which is an operative part of the R&TTE directive that allows sale and operation of radio equipment without type approval. ETSI is different from ISO and CEN since it is a private institution with paying members, and where balloting is done by weighted votes according to membership size.

Since the members pay for the secretariat, the resulting standards and finished documents can be downloaded for free. This main link to ETSI gives a good overview, and there are further links to search for freely downloadable standards.

ETSI TC ITS has a separate home page. This home page is relatively complete with news updates and links to much other work, but unfortunately not very easy to get an overview of.

The formal work is performed under the ETSI Portal. Much of the overview and status information is available, but drafts and internal documents require password access.
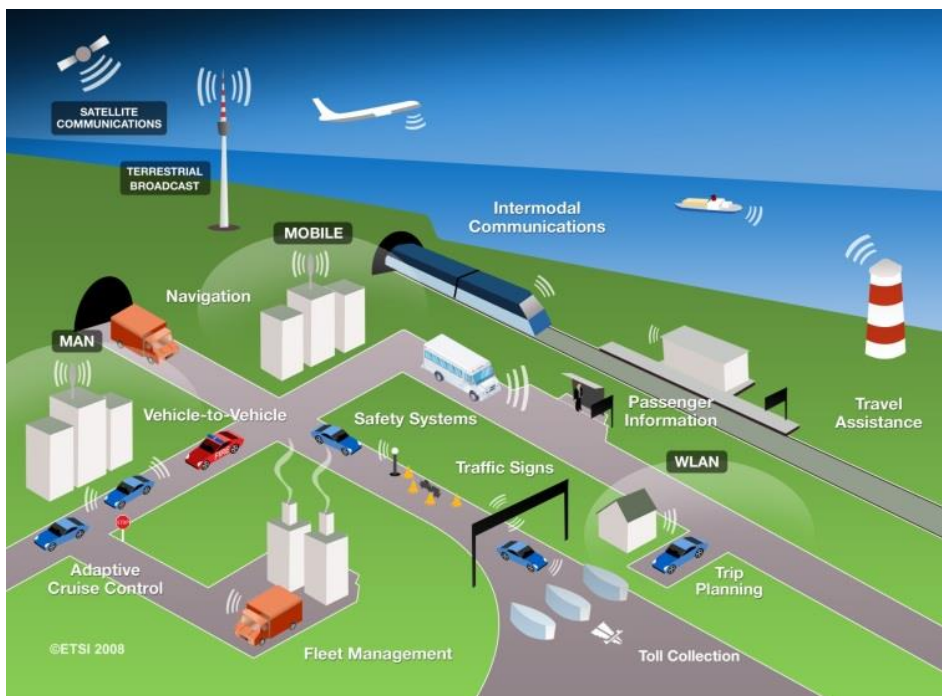


Figure 2: Overview picture illustrating the scope of ETSI standardisation of ITS.

This picture gives an overview of the total scope of ETSI, and it is also a good overview of elements for multimodal Cooperative ITS.
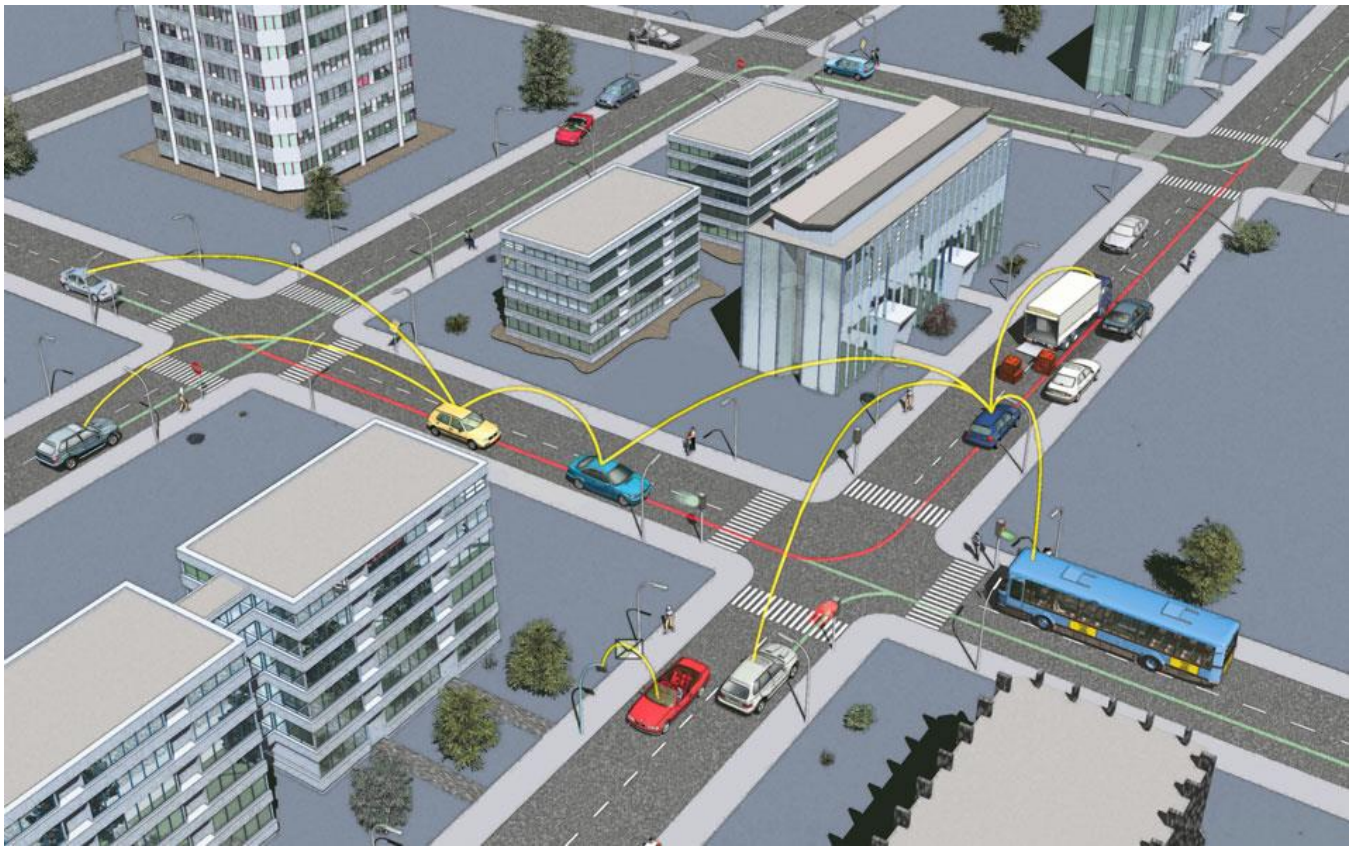
**Figure 3: Overview of the communication scenarios**

Note that ETSI TC ITS is currently limited to a small subset of this scope. The current focus is exclusively on 5.9GHz communications called G5A in ETSI terminology, connected via a special multi-hopping network function called GeoNet, and served by a small number of mainly safety applications for vehicle-to-vehicle and vehicle-to-roadside scenarios (see Figure 3). This vehicle-safety-centric scenario is supported by strong security provisions.

The strong focus on vehicle safety is promoted by the Car-to-Car Communications Consortium (C2C-CC) which is led by European car industry.

ETSI TC ITS has made very good use of EC financial support to pay for standardisation developments. The process is called Specialist Task Force (STF) and consists of groups of 3-5 experts that are paid to draft a standard over a limited period of time, typically 6-12 months. This is the same as CEN Project Teams (PTs). The financing formally comes from DG Enterprise, but is advised by DG INFSO and DG MOVE.

## 5.1 ETSI TC ITS Working Groups

There are five working groups in this committee. The structure of the committee is as follows:
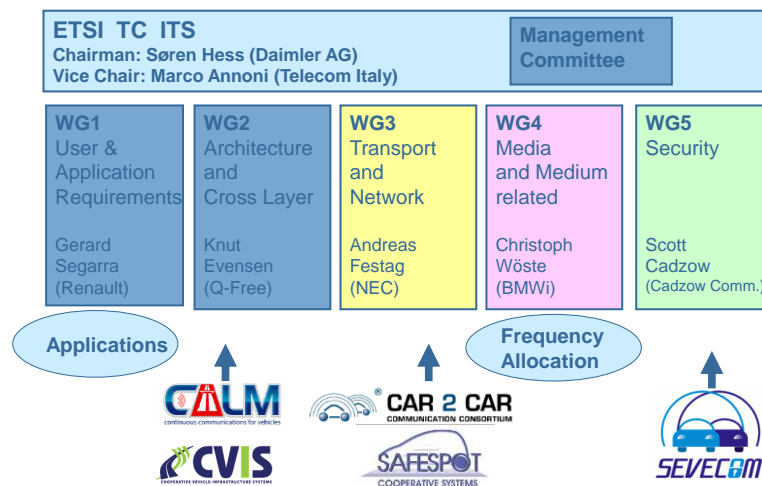


**Figure 4: Overview of ETSI WGs and the conveners of each group**

At the time of writing, the leadership of TC ITS is facing major changes. The TC chairman, as well as WG chairs for WG1, WG3 and WG5, has announced they are retiring, and no replacement has been announced or elected yet. The TC is therefore functioning partly by vice chairs, but a new officer will hopefully be elected by early 2014.

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### 5.1.1 WG1: User and Application requirements

WG1 is developing standards in three different areas:
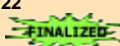
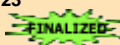1. Facilities are the upper layer or technical core standards that form the basis for applications. WG1 has several of these under development at the moment, but none have been published yet

2. Basic set of Applications is a list of around 50 core applications and services for Cooperative ITS. This list contains an overall description of each plus some parameters that are useful for sorting and characterizing the different applications. This document can be quite useful to understand the scope of Cooperative ITS as seen from ETSI, please see this link to BSA.

3. Data sets are defining CAM and DENM. These messages are broadcast from a vehicle and/or a roadside, and are used in a number of different applications. This work is partly based on data sets from TC278/WG4, TC278/WG8, TC204/WG3, TC204/WG14, TC204/WG16 and SAE J2735, and the results are also partly overlapping.

It should also be mentioned that WG1 has taken an active role in standards for Tyre Pressure and EV, Electric Vehicles, in particular for the use case of communicating charge status and opportunities, and guiding vehicles to charge points.

By following the links below further information on each WI can be found.

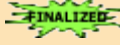| | IDENTIFICATION | TITLE (Formal & Working) | STATUS |
|---|---|---|---|
| 1 FINALIZED | Doc. Nb. TR 102 638 Ver. **1.1.1** Ref. **DTR/ITS-0010001** Technical Body: **ITS WG1** **Details and Download** | **Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Definitions** | **Published** Current Status: **Publication (2009-06-29)** |
| 2 FINALIZED | Doc. Nb. TR 102 698 Ver. **1.1.2** Ref. **RTR/ITS-00100011** Technical Body: **ITS WG1** **Details and Download** | **Intelligent Transport Systems (ITS); Vehicular Communications; C2C-CC Demonstrator 2008; Use Cases and Technical Specifications** Vehicular Communications C2C-CC Demonstrator 2008 | **Published** Current Status: **Publication (2010-07-05)** |
| 3 FINALIZED | Doc. Nb. TS 102 637-1 Ver. **1.1.1** Ref. **DTS/ITS-0010002-1** Technical Body: **ITS WG1** **Details and Download** | **Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 1: Functional Requirements** Basic set of applications; functional requirements | **Published** Current Status: **Publication (2010-09-08)** |
| 4 FINALIZED | Doc. Nb. TS 102 637-2 Ver. **1.1.1** Ref. **DTS/ITS-0010002-2** Technical Body: **ITS WG1** **Details and Download** | **Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2: Specification of Cooperative Awareness Basic Service** Basic set of applications; cooperative awareness basic service | **Published** Current Status: **Publication (2010-04-30)** |
| 5 FINALIZED | Doc. Nb. TS 102 637-3 Ver. **1.1.1** Ref. **DTS/ITS-0010002-3** Technical Body: **ITS WG1** **Details and Download** | **Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 3: Specifications of Decentralized Environmental Notification Basic Service** Basic set of applications; environmental notification | **Published** Current Status: **Publication (2010-09-08)** |
| 6 FINALIZED | Doc. Nb. TR 102 698 Ver. **1.1.1** Ref. **DTR/ITS-0010003** Technical Body: **ITS WG1** **Details and Download** | **Intelligent Transport Systems (ITS); Vehicular Communications; C2C-CC Demonstrator 2008; Use Cases and Technical Specifications** Vehicular Communications C2C-CC Demonstrator 2008 | **Published** Current Status: **Publication (2009-06-18)** |
| 7 FINALIZED | Doc. Nb. TS 102 894-1 Ver. **1.1.1** Ref. **DTS/ITS-0010004** Technical Body: **ITS WG1** **Details and Download** | **Intelligent Transport Systems (ITS); Users and applications requirements; Part 1: Facility layer structure, functional requirements and specifications** Facility layer structure, functional requirements and specifications; | **Published** Current Status: **Publication (2013-08-01)** |
| 8 | Doc. Nb. EN 302 895 Ver. **0.0.11** Ref. **DEN/ITS-0010005** Technical Body: **ITS WG1** **Details and Download** | **Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Local Dynamic Map (LDM)** Basic Set of Applications; Local Dynamic Map (LDM) | **Drafting Stage** Current Status: **WG approval (2013-10-23)** Next Status: **Start of TB approval process (2013-11-02)** |
| 9 | Doc. Nb. TR 102 863 Ver. **1.1.1** Ref. **DTR/ITS-0010006** | **Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Local** | **Published** Current Status: |

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| FINALIZED | Technical Body: ITS WG1<br>Details and Download | **Dynamic Map (LDM);**<br>**Rationale for and guidance on standardization**<br>LDM Rationale and Guidance | Publication (2011-06-07) |
| 10<br>FINALIZED | Doc. Nb. TS 102 868-1 Ver. **1.1.1**<br>Ref. **DTS/ITS-0010007-1**<br>Technical Body: ITS WG1<br>Details and Download | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specification for Co-operative Awareness Messages (CAM);**<br>**Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma**<br>CAM PICS | **Published**<br>Current Status:<br>Publication (2011-03-30) |
| 11<br>FINALIZED | Doc. Nb. TS 102 868-2 Ver. **1.1.1**<br>Ref. **DTS/ITS-0010007-2**<br>Technical Body: ITS WG1<br>Details and Download | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specification for Co-operative Awareness Messages (CAM);**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>CAM TSS&TP | **Published**<br>Current Status:<br>Publication (2011-03-30) |
| 12<br>FINALIZED | Doc. Nb. TS 102 868-3 Ver. **1.1.1**<br>Ref. **DTS/ITS-0010007-3**<br>Technical Body: ITS WG1<br>Details and Download | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specification for Co-operative Awareness Messages (CAM);**<br>**Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)**<br>CAM ATS | **Published**<br>Current Status:<br>Publication (2011-03-30) |
| 13<br>FINALIZED | Doc. Nb. TS 102 869-1 Ver. **1.1.1**<br>Ref. **DTS/ITS-0010008-1**<br>Technical Body: ITS WG1<br>Details and Download | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specification for Decentralized Environmental Notification Messages (DENM);**<br>**Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma**<br>DNM PICS | **Published**<br>Current Status:<br>Publication (2011-03-31) |
| 14<br>FINALIZED | Doc. Nb. TS 102 869-2 Ver. **1.1.1**<br>Ref. **DTS/ITS-0010008-2**<br>Technical Body: ITS WG1<br>Details and Download | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specification for Decentralized Environmental Notification Messages (DENM);**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>DNM TSS&TP | **Published**<br>Current Status:<br>Publication (2011-03-31) |
| 15<br>FINALIZED | Doc. Nb. TS 102 869-3 Ver. **1.1.1**<br>Ref. **DTS/ITS-0010008-3**<br>Technical Body: ITS WG1<br>Details and Download | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specification for Decentralized Environmental Notification Messages (DENM);**<br>**Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)**<br>DNM ATS | **Published**<br>Current Status:<br>Publication (2011-03-31) |
| 16<br>FINALIZED | Doc. Nb. TR 103 061-1 Ver. **1.1.1**<br>Ref. **DTR/ITS-0010011**<br>Technical Body: ITS WG1<br>Directives:<br>Details and Download | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Part 1: Conformance test specification for Co-operative Awareness Messages (CAM); CAM validation report**<br>CAM validation report | **Published**<br>Current Status:<br>Publication (2012-11-08) |
| 17<br>FINALIZED | Doc. Nb. TR 103 061-2 Ver. **1.1.1**<br>Ref. **DTR/ITS-0010012**<br>Technical Body: ITS WG1<br>Directives:<br>Details and Download | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Part 2: Conformance test specification for Decentralized Environmental Notification basic Service Message (DENM); DENM validation report**<br>DENM validation report | **Published**<br>Current Status:<br>Publication (2012-11-08) |
| 18<br>CHANGED | Doc. Nb. TS 102 890-3 Ver. **0.0.2**<br>Ref. **DTS/ITS-0010013**<br>Technical Body: ITS WG1<br>Directives:<br>Details and Download | **Intelligent Transport System (ITS);**<br>**Facilities layer function;**<br>**Position and time facility specification**<br>Facility Position and Time | **Drafting Stage**<br>Current Status:<br>Early draft (2013-01-17)<br>Next Status:<br>Stable draft (2014-10-01) |
| 19<br>FINALIZED | Doc. Nb. TS 101 556-1 Ver. **1.1.1**<br>Ref. **DTS/ITS-0010014**<br>Technical Body: ITS WG1<br>Directives:<br>Details and Download | **Intelligent Transport Systems (ITS);**<br>**Infrastructure to Vehicle Communication;**<br>**Electric Vehicle Charging Spot Notification Specification**<br>Electric Vehicle Charging Spot | **Published**<br>Current Status:<br>Publication (2012-07-20) |
| 20<br>CHANGED | Doc. Nb. TS 101 539-2 Ver. **0.0.6**<br>Ref. **DTS/ITS-0010015**<br>Technical Body: ITS WG1<br>Details and Download | **Intelligent Transport System (ITS);**<br>**V2X Applications;**<br>**Intersection Collision Risk Warning (ICRW) application requirements specification**<br>Intersection Collision Risk Warning Specification | **Drafting Stage**<br>Current Status:<br>Final draft for approval (2013-01-03)<br>Next Status:<br>WG approval (2014-11-02) |
| 21<br>FINALIZED | Doc. Nb. TS 101 539-3 Ver. **1.1.1**<br>Ref. **DTS/ITS-0010016**<br>Technical Body: ITS WG1<br>Directives: | **Intelligent Transport Systems (ITS);**<br>**V2X Applications;**<br>**Part 3: Longitudinal Collision Risk Warning (LCRW) application requirements specification** | **Published**<br>Current Status:<br>Publication (2013-11-05) |

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| | **Details and Download** | Longitudinal Collision Risk Warning | |
| **22**<br>FINALIZED | Doc. Nb. **TS 101 539-1** Ver. **1.1.1**<br>Ref. **DTS/ITS-0010017**<br>Technical Body: **ITS WG1**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**V2X Applications;**<br>**Part 1: Road Hazard Signalling (RHS) application requirements specification**<br>Road Hazard Signalling (RHS) | **Published**<br>Current Status:<br>**Publication (2013-08-01)** |
| **23**<br>FINALIZED | Doc. Nb. **TS 102 637-2** Ver. **1.2.1**<br>Ref. **RTS/ITS-0010018**<br>Technical Body: **ITS WG1**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Vehicular Communications; Basic Set of Applications;**<br>**Part 2: Specification of Cooperative Awareness Basic Service**<br>CAM STF405 Revision | **Published**<br>Current Status:<br>**Publication (2011-03-24)** |
| **24** | Doc. Nb. **EN 302 637-2** Ver. **1.3.0**<br>Ref. **REN/ITS-0010019**<br>Technical Body: **ITS WG1**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Vehicular Communications; Basic Set of Applications;**<br>**Part 2: Specification of Cooperative Awareness Basic Service**<br>CAM Revision and Conversion to EN | **Approval Stage**<br>Current Status:<br>**Start of EN Approval Procedure (2013-08-02)**<br>Next Status:<br>**End of EN Approval Procedure (2013-12-02)** |
| **25** | Doc. Nb. **EN 302 637-3** Ver. **1.2.0**<br>Ref. **REN/ITS-0010020**<br>Technical Body: **ITS WG1**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Vehicular Communications; Basic Set of Applications;**<br>**Part 3: Specifications of Decentralized Environmental Notification Basic Service**<br>DENM Revision and Conversion to EN | **Approval Stage**<br>Current Status:<br>**Start of EN Approval Procedure (2013-08-02)**<br>Next Status:<br>**End of EN Approval Procedure (2013-12-02)** |
| **26** | Doc. Nb. **TS 103 141** Ver. **0.0.2**<br>Ref. **DTS/ITS-0010021**<br>Technical Body: **ITS WG1**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Facilities layer;**<br>**Communication congestion control**<br>Communication congestion control | **Drafting Stage**<br>Current Status:<br>**Early draft (2013-10-23)**<br>Next Status:<br>**Stable draft (2013-10-01)** |
| **27**<br>FINALIZED | Doc. Nb. **TS 102 894-2** Ver. **1.1.1**<br>Ref. **DTS/ITS-0010022**<br>Technical Body: **ITS WG1**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Users and applications requirements;**<br>**Part 2: Applications and facilities layer common data dictionary**<br>Applications and facilities layer common data dictionary | **Published**<br>Current Status:<br>**Publication (2013-08-01)** |
| **28**<br>CHANGED | Doc. Nb. **TS 102 868-2** Ver. **0.0.2**<br>Ref. **RTS/ITS-0010026**<br>Technical Body: **ITS WG1**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specification for Co-operative Awareness Messages (CAM);**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>CAM TSS&TP | **Drafting Stage**<br>Current Status:<br>**WG approval (2013-06-19)**<br>Next Status:<br>**TB approval (2014-11-02)** |
| **29**<br>CHANGED | Doc. Nb. **TS 102 868-3**<br>Ref. **RTS/ITS-0010027**<br>Technical Body: **ITS WG1**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specification for Co-operative Awareness Messages (CAM);**<br>**Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)**<br>CAM ATS | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2011-10-28)**<br>Next Status:<br>**Start of work (2011-10-28)** |
| **30**<br>FINALIZED | Doc. Nb. **TS 102 869-2** Ver. **1.2.1**<br>Ref. **RTS/ITS-0010028**<br>Technical Body: **ITS WG1**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specification for Decentralized Environmental Notification Messages (DENM);**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>DNM TSS&TP | **Published**<br>Current Status:<br>**Publication (2013-08-01)** |
| **31**<br>FINALIZED | Doc. Nb. **TS 102 869-3** Ver. **1.2.1**<br>Ref. **RTS/ITS-0010029**<br>Technical Body: **ITS WG1**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specification for Decentralized Environmental Notification Messages (DENM);**<br>**Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)**<br>DENM ATS | **Published**<br>Current Status:<br>**Publication (2013-08-01)** |
| **32** | Doc. Nb. **TS 101 556-2** Ver. **0.0.5**<br>Ref. **DTS/ITS-0010030**<br>Technical Body: **ITS WG1**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Infrastructure to Vehicle Communication;**<br>**Communication system specification to support application requirements for Tyre Pressure Monitoring System (TPMS)**<br>Communication for TPMS | **Drafting Stage**<br>Current Status:<br>**Stable draft (2013-06-17)**<br>Next Status:<br>**Final draft for approval (2013-10-01)** |
| **33** | Doc. Nb. **TS 101 556-3** Ver. **0.9.0**<br>Ref. **DTS/ITS-0010031**<br>Technical Body: **ITS WG1**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Infrastructure to Vehicle Communications;**<br>**Communications system for the planning and reservation of EV energy supply using wireless networks**<br>EV charging using wireless networks | **Drafting Stage**<br>Current Status:<br>**Stable draft (2013-09-26)**<br>Next Status:<br>**Final draft for approval** |

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| 34 | Doc. Nb. TS 103 112-2<br>Ref. DTS/ITS-0010032<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport System (ITS);<br>Conformance test specification for Road Hazard Signalling application;<br>Part 2: Test Suite Structure and Test Purposes (TSS & TP)**<br>RHS conformance testing TSS & TP | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2012-07-06)**<br>Next Status:<br>**Start of work (2012-07-06)** |
| 35 | Doc. Nb. TS 103 112-3<br>Ref. DTS/ITS-0010033<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport System (ITS);<br>Conformance test specification;<br>Part 3: Abstract Test Suite (ATS) and Protocol implementation eXtra information Testing (PiXIT)**<br>RHS conformance testing ATS & PixIT | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2012-07-06)**<br>Next Status:<br>**Start of work (2012-07-06)** |
| 36 | Doc. Nb. TS 103 112-1 Ver. **0.0.2**<br>Ref. DTS/ITS-0010034<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);<br>Conformance test specification for Road Hazard Signalling application;<br>Part 1: Protocol Implementation Conformance Statement (PICS)**<br>RHS PICS | **Drafting Stage**<br>Current Status:<br>**Stable draft (2013-05-21)**<br>Next Status:<br>**Final draft for approval (2014-07-03)** |
| 37<br> | Doc. Nb. TS 102 868-1 Ver. **0.0.1**<br>Ref. RTS/ITS-0010035<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);<br>Testing; Conformance test specification for Co-operative Awareness Messages (CAM);<br>Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma**<br>CAM PICS | **Drafting Stage**<br>Current Status:<br>**Stable draft (2013-05-27)**<br>Next Status:<br>**Final draft for approval (2014-11-02)** |
| 38<br> | Doc. Nb. TS 102 869-1 Ver. **1.2.1**<br>Ref. RTS/ITS-0010036<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);<br>Testing; Conformance test specification for Decentralized Environmental Notification Messages (DENM);<br>Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma**<br>DENM PICS | **Published**<br>Current Status:<br>**Publication (2013-08-01)** |
| 39 | Doc. Nb. TS 103 152 Ver. **0.0.3**<br>Ref. DTS/ITS-00135<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);<br>V2X communication;<br>Multimedia Content Dissemination basic service specification**<br>MCD basic service specification | **Drafting Stage**<br>Current Status:<br>**Stable draft (2013-10-17)**<br>Next Status:<br>**Final draft for approval (2014-09-01)** |
| 40 | Doc. Nb. TS 103 191-3<br>Ref. DTS/ITS-00136<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);<br>Testing; Conformance test specification for Signal Phase And Timing (SPAT)/Map (MAP)<br>Part 3: Abstract Test Suite (ATS) and Implementation eXtra Information for Testing (IXIT)**<br>SPAT/MAP ATS | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-04-11)**<br>Next Status:<br>**Start of work (2013-04-11)** |
| 41 | Doc. Nb. TR 103 061-1<br>Ref. RTR/ITS-00137<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);<br>Testing;<br>Part 1: Conformance test specification for Co-operative Awareness Messages (CAM); CAM validation report**<br>CAM validation report revision | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-04-11)**<br>Next Status:<br>**Start of work (2013-04-11)** |
| 42 | Doc. Nb. TR 103 061-2<br>Ref. RTR/ITS-00138<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);<br>Testing;<br>Part 2: Conformance test specification for Decentralized Environmental Notification basic Service Message (DENM); DENM validation report**<br>DENM validation report | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-04-11)**<br>Next Status:<br>**Start of work (2013-04-11)** |
| 43 | Doc. Nb. TS 103 191-1<br>Ref. DTS/ITS-00139<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);<br>Testing; Conformance test specification for Signal Phase And Timing (SPAT) and Map (MAP);<br>Part 1: Implementation Conformance Statement (ICS) proforma**<br>SPAT/MAP ICS | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-04-11)**<br>Next Status:<br>**Start of work (2013-04-11)** |
| 44 | Doc. Nb. TS 103 191-2<br>Ref. DTS/ITS-00140<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);<br>Testing; Conformance test specification for Signal Phase And Timing (SPAT) and Map (MAP);<br>Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>SPAT/MAP TSS&TP | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-04-11)**<br>Next Status:<br>**Start of work (2013-04-11)** |
| 45 | Doc. Nb. TS 103 153-1<br>Ref. DTS/ITS-00141<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);<br>Testing;<br>Conformance test specification for TPMS-TPG messages; Part 1: Protocol Implementation Conformance Statement (PICS)**<br>TPMS-TPG PICS | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-04-22)**<br>Next Status:<br>**Start of work (2013-04-22)** |

| 46 | Doc. Nb. TS 103 153-2<br>Ref. **DTS/ITS-00142**<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Conformance test specification for TPMS-TPG messages; Part 2: Test**<br>**Suite Structure and Test Purposes (TSS&TP)**<br>TPMS-TPG TSS&TP | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-04-22)**<br>Next Status:<br>**Start of work (2013-04-22)** |
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| 47 | Doc. Nb. TS 103 153-3<br>Ref. **DTS/ITS-00143**<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Conformance test specification for TPMS-TPG messages; Part 3:**<br>**Abstract Test Suite (ATS) and Protocol Implementation eXtra**<br>**Information for Testing (PIXIT)**<br>TPMS-TPG ATS&PIXIT | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-04-22)**<br>Next Status:<br>**Start of work (2013-04-22)** |
| 48 | Doc. Nb. TS 103 192-1<br>Ref. **DTS/ITS-00144**<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Interoperability test specifications for ITS V2X use cases;**<br>**Part 1: Test requirements and Interoperability Feature Statement (IFS)**<br>**proforma**<br>ITS V2X Use Cases; Part 1 Test requirements | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-07-05)**<br>Next Status:<br>**Start of work (2013-07-05)** |
| 49 | Doc. Nb. TS 103 192-3<br>Ref. **DTS/ITS-00145**<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Interoperability test specifications for ITS V2X use cases;**<br>**Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra**<br>**Information for Testing (PIXIT)**<br>ITS V2X Use Cases; Part 3 ATS | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-07-05)**<br>Next Status:<br>**Start of work (2013-07-05)** |
| 50 | Doc. Nb. TR 103 193<br>Ref. **DTR/ITS-00146**<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Interoperability test specifications for ITS V2X use cases;**<br>**Architecture of ITS Interoperability Validation Framework**<br>Architecture of ITS Interoperability Validation Framework | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-07-05)**<br>Next Status:<br>**Start of work (2013-07-05)** |
| 51 | Doc. Nb. TS 103 192-2<br>Ref. **DTS/ITS-00147**<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Interoperability test specifications for ITS V2X use cases;**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>ITS V2X Use Cases; Part 2 TSS&TP | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-07-05)**<br>Next Status:<br>**Start of work (2013-07-05)** |
| 52 | Doc. Nb. TS 102 894-2<br>Ref. **RTS/ITS-00148**<br>Technical Body: ITS WG1<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Users and applications requirements;**<br>**Part 2: Applications and facilities layer common data dictionary**<br>Applications and facilities layer common data dictionary | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-10-24)**<br>Next Status:<br>**Start of work (2013-10-24)** |

### 5.1.2  *WG2 Architecture and Cross Layer*

Specification of ITS architecture is going on in several SDOs. In 2010, ISO published the ITS communications architecture standard ISO 21217, which is part of the published basic set of communication standards for cooperative systems in ITS. Later the same year, the ETSI version of the ITS communications architecture standard EN 302 665 was published, which is almost identical to ISO 21217. IEEE 1609 is developing an ITS communications architecture standard (IEEE 1609.0) for short-range 5.9GHz (IEEE 802.11/1609 (WAVE)) communications only (V2V / V2I). CEN/ISO are working together to create necessary standards for an Architecture of Cooperative ITS.
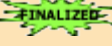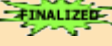
WG2 has three main responsibilities:
1. **Communications Reference Architecture** was the first full standard to be completed in TC ITS. This is coordination and extension of what has been produced in TC204/WG16 as the CALM standards, and is now fully harmonized with ISO and CEN. It embodies the ITS Station concept that is included in the definition of Cooperative ITS. At the moment there is also hope that IEEE P1609 will adopt or adapt to this reference architecture.
2. **Cross-layer coordination and management plane standards.** This is mainly the technical kernel of the ITS Station and defines how the different components work together to form a system. This part of the standard set has met heavy opposition and is currently dormant.
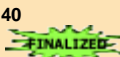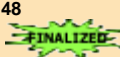
3. **Legacy DSRC standards**. The EC has funded several STFs in this domain, and the basic set of DSRC test suites in the EN 300 674 series are developed here. Also the test suites for the CALM set of standards are developed under this umbrella.

By following the links below further information on each WI can be found.

| | IDENTIFICATION | TITLE (Formal & Working) | STATUS |
|---|---|---|---|
| 1 FINALIZED | Doc. Nb. TS 102 708-1-1 Ver. **1.1.1** Ref. **DTS/ITS-0020002** Technical Body: **ITS WG2** **Details and Download** | **Intelligent Transport Systems (ITS); RTTT; Test specifications for High Data Rate (HDR) data transmission equipment operating in the 5,8 GHz ISM band; Part 1: Data Link Layer; Sub-Part 1: Protocol Implementation Conformance Statement (PICS) proforma specification** DSRC DLC PICS | **Published** Current Status: **Publication (2010-03-23)** |
| 2 FINALIZED | Doc. Nb. TS 102 708-1-2 Ver. **1.1.1** Ref. **DTS/ITS-0020003** Technical Body: **ITS WG2** **Details and Download** | **Intelligent Transport Systems (ITS); RTTT; Test specifications for High Data Rate (HDR) data transmission equipment operating in the 5,8 GHz ISM band; Part 1: Data Link Layer; Sub-Part 2: Test Suite Structure and Test Purposes (TSS&TP)** DSRC DLC TSS&TP | **Published** Current Status: **Publication (2010-03-23)** |
| 3 FINALIZED | Doc. Nb. TS 102 708-1-3 Ver. **1.1.1** Ref. **DTS/ITS-0020004** Technical Body: **ITS WG2** **Details and Download** | **Intelligent Transport Systems (ITS); RTTT; Test specifications for High Data Rate (HDR) data transmission equipment operating in the 5,8 GHz ISM band; Part 1: Data Link Layer; Sub-Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma** DSRC DLC ATS | **Published** Current Status: **Publication (2010-03-23)** |
| 4 FINALIZED | Doc. Nb. TS 102 708-2-1 Ver. **1.1.1** Ref. **DTS/ITS-0020005** Technical Body: **ITS WG2** **Details and Download** | **Intelligent Transport Systems (ITS); RTTT; Test specifications for High Data Rate (HDR) data transmission equipment operating in the 5,8 GHz ISM band; Part 2: Application Layer Common Application Service Elements; Sub-Part 1: Protocol Implementation Conformance Statement (PICS) proforma specification** DSRC APL PICS | **Published** Current Status: **Publication (2010-03-30)** |
| 5 FINALIZED | Doc. Nb. TS 102 708-2-2 Ver. **1.1.1** Ref. **DTS/ITS-0020006** Technical Body: **ITS WG2** **Details and Download** | **Intelligent Transport Systems (ITS); RTTT; Test specifications for High Data Rate (HDR) data transmission equipment operating in the 5,8 GHz ISM band; Part 2: Application Layer Common Application Service Elements; Sub-Part 2: Test Suite Structure and Test Purposes (TSS&TP)** DSRC APL TSS&TP | **Published** Current Status: **Publication (2010-03-30)** |
| 6 FINALIZED | Doc. Nb. TS 102 708-2-3 Ver. **1.1.1** Ref. **DTS/ITS-0020007** Technical Body: **ITS WG2** **Details and Download** | **Intelligent Transport Systems (ITS); RTTT; Test specifications for High Data Rate (HDR) data transmission equipment operating in the 5,8 GHz ISM band; Part 2: Application Layer Common Application Service Elements; Sub-Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma** DSRC APL ATS | **Published** Current Status: **Publication (2010-03-30)** |
| 7 FINALIZED | Doc. Nb. TS 102 760-1 Ver. **1.1.1** Ref. **DTS/ITS-0020008** Technical Body: **ITS WG2** **Details and Download** | **Intelligent Transport Systems (ITS); Test specifications for Intelligent Transport Systems; Communications Access for Land Mobiles (CALM); Medium Service Access Points (ISO 21218); Part 1: Implementation Conformance Statement (ICS) proforma** CALM ISO 21218 PICS | **Published** Current Status: **Publication (2009-11-27)** |
| 8 FINALIZED | Doc. Nb. TS 102 760-2 Ver. **1.1.1** Ref. **DTS/ITS-0020009** Technical Body: **ITS WG2** **Details and Download** | **Intelligent Transport Systems (ITS); Test specifications for Intelligent Transport Systems; Communications Access for Land Mobiles (CALM); Medium Service Access Points (ISO 21218); Part 2: Test Suite Structure and Test Purposes (TSS&TP)** CALM ISO 21218 TSS&TP | **Published** Current Status: **Publication (2009-11-27)** |
| 9 FINALIZED | Doc. Nb. TS 102 797-1 Ver. **1.1.1** Ref. **DTS/ITS-0020010** Technical Body: **ITS WG2** **Details and Download** | **Intelligent Transport Systems (ITS); Communications Access for Land Mobiles (CALM); Test specifications for ITS station management (ISO 24102); Part 1: Protocol Implementation Conformance Statement (PICS) specification** CALM Interface Manager ISO 24102 PICS | **Published** Current Status: **Publication (2012-08-03)** |
| 10 | Doc. Nb. TS 102 797-2 Ver. **1.1.1** Ref. **DTS/ITS-0020011** | **Intelligent Transport Systems (ITS); Communications Access for Land Mobiles (CALM); Test** | **Published** Current Status: |

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| FINALIZED | Technical Body: **ITS WG2**<br>**Details and Download** | **specifications for ITS station management (ISO 24102);**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>CALM Interface Manager ISO 24102 TSS&TP | **Publication (2012-08-03)** |
| 11<br>FINALIZED | Doc. Nb. **EN 302 665** Ver. **1.1.1**<br>Ref. **DEN/ITS-0020012**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Communications Architecture**<br><br>Architecture | **Published**<br>Current Status:<br>**Publication (2010-09-24)** |
| 12<br>FINALIZED | Doc. Nb. **TR 102 707** Ver. **1.1.1**<br>Ref. **DTR/ITS-0020013**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**ETSI object identifier tree;**<br>**ITS domain**<br>ITS OID | **Published**<br>Current Status:<br>**Publication (2009-05-25)** |
| 13<br>FINALIZED | Doc. Nb. **TS 102 723-1** Ver. **1.1.1**<br>Ref. **DTS/ITS-0020015**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**OSI cross-layer topics;**<br>**Part 1: Architecture and addressing schemes**<br>Architecture of AL adaptation | **Published**<br>Current Status:<br>**Publication (2012-11-09)** |
| 14<br>FINALIZED | Doc. Nb. **TS 102 723-2** Ver. **1.1.1**<br>Ref. **DTS/ITS-0020016**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**OSI cross-layer topics;**<br>**Part 2: Management information base**<br>Architecture of AL adaptation | **Published**<br>Current Status:<br>**Publication (2012-11-09)** |
| 15<br>FINALIZED | Doc. Nb. **TS 102 723-3** Ver. **1.1.1**<br>Ref. **DTS/ITS-0020017**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**OSI cross-layer topics;**<br>**Part 3: Interface between management entity and access layer**<br>Cross-layer topics | **Published**<br>Current Status:<br>**Publication (2012-11-09)** |
| 16<br>FINALIZED | Doc. Nb. **TS 102 723-4** Ver. **1.1.1**<br>Ref. **DTS/ITS-0020018**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**OSI cross-layer topics;**<br>**Part 4: Interface between management entity and networking &**<br>**transport layer**<br>Cross-layer topics | **Published**<br>Current Status:<br>**Publication (2012-11-09)** |
| 17<br>FINALIZED | Doc. Nb. **TS 102 723-5** Ver. **1.1.1**<br>Ref. **DTS/ITS-0020019**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**OSI cross-layer topics;**<br>**Part 5: Interface between management entity and facilities layer**<br>Cross-layer topics | **Published**<br>Current Status:<br>**Publication (2012-11-09)** |
| 18<br>CHANGED | Doc. Nb. **TS 102 723-6** Ver. **1.1.1**<br>Ref. **DTS/ITS-0020020**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems;**<br>**OSI cross-layer topics;**<br>**Part 6: Interface between management entity and security entity**<br>Cross-layer topics | **Drafting Stage**<br>Current Status:<br>**Start of work (2009-04-24)**<br>Next Status:<br>**WG approval (2014-11-02)** |
| 19<br>CHANGED | Doc. Nb. **TS 102 760-3** Ver. **0.0.0**<br>Ref. **DTS/ITS-0020021**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **ITS (Intelligent Transport Services);**<br>**Test specifications for Intelligent Transport Systems,**<br>**Communications Access for Land Mobiles (CALM), Medium Service**<br>**Access Points (IS 21218);**<br>**Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma**<br>ATS for IS 21218 | **Drafting Stage**<br>Current Status:<br>**Early draft (2013-10-16)**<br>Next Status:<br>**Stable draft (2014-01-13)** |
| 20<br>FINALIZED | Doc. Nb. **EG 202 798** Ver. **1.1.1**<br>Ref. **DEG/ITS-0020022**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Framework for conformance and interoperability testing**<br>ITS testing framework | **Published**<br>Current Status:<br>**Publication (2011-01-13)** |
| 21<br>FINALIZED | Doc. Nb. **TS 102 860** Ver. **1.1.1**<br>Ref. **DTS/ITS-0020023**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Classification and management of ITS application objects**<br><br>Classification and management of applications | **Published**<br>Current Status:<br>**Publication (2011-05-12)** |
| 22<br>CHANGED | Doc. Nb. **TS 102 981-1**<br>Ref. **DTS/ITS-0020024-1**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems;**<br>**Test specifications for Intelligent Transport Systems;**<br>**Communications Access for Land Mobiles (CALM); IP networking**<br>**(ISO 21210);**<br>**Part 1: Protocol Implementation Conformance Statement (PICS)**<br>**proforma**<br>PICS for ISO 21210 | **Drafting Stage**<br>Current Status:<br>**Start of work (2010-01-28)**<br>Next Status:<br>**Early draft (2014-05-01)** |
| 23<br>CHANGED | Doc. Nb. **TS 102 981-2**<br>Ref. **DTS/ITS-0020024-2**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems;**<br>**Test specifications for Intelligent Transport Systems;**<br>**Communications Access for Land Mobiles (CALM); IP networking**<br>**(ISO 21210);**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>TSS&TP for ISO 21210 | **Drafting Stage**<br>Current Status:<br>**Start of work (2010-01-28)**<br>Next Status:<br>**Early draft (2014-05-02)** |
| 24 | Doc. Nb. **TS 102 981-3**<br>Ref. **DTS/ITS-0020024-3** | **Intelligent Transport Systems;**<br>**Test specifications for Intelligent Transport Systems;** | **Drafting Stage**<br>Current Status: |

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| CHANGED | Technical Body: **ITS WG2**<br>**Details and Download** | **Communications Access for Land Mobiles (CALM); IP networking (ISO 21210);**<br>**Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma**<br>ATS for ISO 21210 | **Start of work (2010-01-28)**<br>Next Status:<br>**Early draft (2014-05-02)** |
| 25<br>FINALIZED | Doc. Nb. **TS 102 985-1** Ver. **1.1.1**<br>Ref. **DTS/ITS-0020028-1**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM); Test specifications for non-IP networking (ISO 29281);**<br>**Part 1: Protocol Implementation Conformance Statement (PICS) proforma**<br>PICS for ISO 29281 | **Published**<br>Current Status:<br>**Publication (2012-07-25)** |
| 26<br>FINALIZED | Doc. Nb. **TS 102 985-2** Ver. **1.1.1**<br>Ref. **DTS/ITS-0020028-2**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM); Test specifications for non-IP networking (ISO 29281);**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>TSS&TP for ISO 29281 | **Published**<br>Current Status:<br>**Publication (2012-07-25)** |
| 27<br>FINALIZED | Doc. Nb. **TS 102 985-3** Ver. **1.1.1**<br>Ref. **DTS/ITS-0020028-3**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM); Test specifications for non-IP networking (ISO 29281);**<br>**Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma**<br>ATS for ISO 29281 | **Published**<br>Current Status:<br>**Publication (2012-07-25)** |
| 28<br>FINALIZED | Doc. Nb. **TS 102 797-3** Ver. **1.1.1**<br>Ref. **DTS/ITS-0020030**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM); Test specifications for ITS station management (ISO 24102);**<br>**Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma**<br>ATS for ISO 24102 | **Published**<br>Current Status:<br>**Publication (2012-08-03)** |
| 29<br>FINALIZED | Doc. Nb. **TS 102 708-2-1** Ver. **1.2.1**<br>Ref. **RTS/ITS-0020031**<br>Technical Body: **ITS WG2**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**RTTT; Test specifications for High Data Rate (HDR) data transmission equipment operating in the 5,8 GHz ISM band;**<br>**Part 2: Application Layer; Sub-Part 1: Protocol Implementation Conformance Statement (PICS) proforma specification**<br>DSRC APL PICS | **Published**<br>Current Status:<br>**Publication (2012-02-29)** |
| 30<br>FINALIZED | Doc. Nb. **TS 102 708-2-2** Ver. **1.2.1**<br>Ref. **RTS/ITS-0020032**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**RTTT; Test specifications for High Data Rate (HDR) data transmission equipment operating in the 5,8 GHz ISM band;**<br>**Part 2: Application Layer; Sub-Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>DSRC APL TSS&TP | **Published**<br>Current Status:<br>**Publication (2012-02-29)** |
| 31<br>FINALIZED | Doc. Nb. **TS 102 708-2-3** Ver. **1.2.1**<br>Ref. **RTS/ITS-0020033**<br>Technical Body: **ITS WG2**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**RTTT; Test specifications for High Data Rate (HDR) data transmission equipment operating in the 5,8 GHz ISM band;**<br>**Part 2: Application Layer; Sub-Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma**<br>DSRC APL ATS | **Published**<br>Current Status:<br>**Publication (2012-03-20)** |
| 32<br>FINALIZED | Doc. Nb. **ES 200 674-1** Ver. **2.2.1**<br>Ref. **RES/ITS-0020034**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Road Transport and Traffic Telematics (RTTT); Dedicated Short Range Communications (DSRC);**<br>**Part 1: Technical characteristics and test methods for High Data Rate (HDR) data transmission equipment operating in the 5,8 GHz Industrial, Scientific and Medical (ISM) band**<br>DSRC EN | **Published**<br>Current Status:<br>**Publication (2011-02-17)** |
| 33<br>FINALIZED | Doc. Nb. **TR 102 962** Ver. **1.1.1**<br>Ref. **DTR/ITS-0020035**<br>Technical Body: **ITS WG2**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Framework for Public Mobile Networks in Cooperative ITS (C-ITS)**<br><br>Mobile network support of C-ITS | **Published**<br>Current Status:<br>**Publication (2012-02-24)** |
| 34<br>CHANGED | Doc. Nb. **TS 102 963-1**<br>Ref. **DTS/ITS-0020036**<br>Technical Body: **ITS WG2**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM);**<br>**IPv6 networking optimization (ISO 16788); Part 1: Protocol Implementation Conformance Statement (PICS) proforma**<br>PICS for ISO 16788 | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2011-05-05)**<br>Next Status:<br>**Start of work (2011-05-05)** |
| 35<br>CHANGED | Doc. Nb. **TS 102 963-2**<br>Ref. **DTS/ITS-0020037**<br>Technical Body: **ITS WG2**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM);**<br>**IPv6 networking optimization (ISO 16788); Part 2: Test Suite Structure & Test Purposes (TSS&TP)**<br>TSS&TP for ISO 16788 | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2011-05-05)**<br>Next Status:<br>**Start of work (2011-05-05)** |
| 36<br>CHANGED | Doc. Nb. **TS 102 963-3**<br>Ref. **DTS/ITS-0020038**<br>Technical Body: **ITS WG2** | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM);**<br>**IPv6 networking optimization (ISO 16788); Part 3: Abstract Test Suite** | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2011-05-05)** |

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| 37 | CHANGED | Doc. Nb. **TS 102 964-1**<br>Ref. **DTS/ITS-0020039**<br>Technical Body: **ITS WG2**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM);**<br>**IPv6 networking security (ISO 16789); Part 1: Protocol**<br>**Implementation Conformance Statement (PICS) proforma**<br>PICS for ISO 16789 | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2011-05-05)**<br>Next Status:<br>**Start of work (2011-05-05)** |
| 38 | CHANGED | Doc. Nb. **TS 102 964-2**<br>Ref. **DTS/ITS-0020040**<br>Technical Body: **ITS WG2**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM);**<br>**IPv6 networking security (ISO 16789); Part 2: Test Suite Structure &**<br>**Test Purposes (TSS&TP)**<br>TSS&TP for ISO 16789 | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2011-05-05)**<br>Next Status:<br>**Start of work (2011-05-05)** |
| 39 | CHANGED | Doc. Nb. **TS 102 964-3**<br>Ref. **DTS/ITS-0020041**<br>Technical Body: **ITS WG2**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM);**<br>**IPv6 networking security (ISO 16789); Part 3: Abstract Test Suite and**<br>**Partial PIXIT information (ATS)**<br>ATS for ISO 16789 | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2011-05-05)**<br>Next Status:<br>**Start of work (2011-05-05)** |
| 40 | FINALIZED | Doc. Nb. **TR 102 965** Ver. **1.1.1**<br>Ref. **DTR/ITS-0020042**<br>Technical Body: **ITS WG2**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Application Object Identifier (ITS-AID);**<br>**Registration list**<br>ETSI ITS registration list | **Published**<br>Current Status:<br>**Publication (2013-03-01)** |
| 41 | CHANGED | Doc. Nb. **TS 102 890-1** Ver. **0.0.2**<br>Ref. **DTS/ITS-0020043**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Facilities layer function;**<br>**Communication Management specification**<br>Facilities Communication Management | **Drafting Stage**<br>Current Status:<br>**Early draft (2013-04-09)**<br>Next Status:<br>**Stable draft (2014-05-02)** |
| 42 | | Doc. Nb. **TS 102 890-2** Ver. **0.0.2**<br>Ref. **DTS/ITS-0020044**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Facilities layer function;**<br>**Part 2: Services announcement specification**<br>Facilities Service Announcement | **Drafting Stage**<br>Current Status:<br>**End of pre-processing**<br>**(2013-02-05)**<br>Next Status:<br>**TB approval (2014-11-02)** |
| 43 | CHANGED | Doc. Nb. **TR 103 068**<br>Ref. **DTR/ITS-0020045**<br>Technical Body: **ITS WG2**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**ITS-S Management Procedures;**<br>**Study of requirements**<br>Management Procedures Requirements | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2011-07-20)**<br>Next Status:<br>**Start of work (2011-07-20)** |
| 44 | | Doc. Nb. **TS 103 175**<br>Ref. **DTS/ITS-0020046**<br>Technical Body: **ITS WG2**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Cross Layer DCC Management Entity for operation in the ITS G5A**<br>**and ITS G5B medium**<br>Cross Layer DCC control entity | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2012-04-26)**<br>Next Status:<br>**Start of work (2012-04-26)** |
| 45 | | Doc. Nb. **EN 302 665** Ver. **1.1.2**<br>Ref. **REN/ITS-0020047**<br>Technical Body: **ITS WG2**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Communications Architecture**<br>Architecture | **Drafting Stage**<br>Current Status:<br>**Stable draft (2013-03-25)**<br>Next Status:<br>**Final draft for approval**<br>**(2013-11-30)** |
| 46 | CHANGED | Doc. Nb. **TR 101 611** Ver. **0.0.2**<br>Ref. **DTR/ITS-0020048**<br>Technical Body: **ITS WG2**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Test suite validation**<br>**CALM Fast services**<br>Validation CALM Fast | **Drafting Stage**<br>Current Status:<br>**Early draft (2013-10-16)**<br>Next Status:<br>**Stable draft (2014-01-13)** |
| 47 | CHANGED | Doc. Nb. **TR 103 101**<br>Ref. **DTR/ITS-0020050**<br>Technical Body: **ITS WG2**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Test suite validation;**<br>**Access technology support ISO 21218**<br>Validation test suite for ISO 21218 | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2012-02-08)**<br>Next Status:<br>**Start of work (2012-02-08)** |
| 48 | FINALIZED | Doc. Nb. **ES 200 674-1** Ver. **2.3.1**<br>Ref. **RES/ITS-0020052**<br>Technical Body: **ITS WG2**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Road Transport and Traffic Telematics (RTTT); Dedicated Short**<br>**Range Communications (DSRC);**<br>**Part 1: Technical characteristics and test methods for High Data**<br>**Rate (HDR) data transmission equipment operating in the 5,8 GHz**<br>**Industrial, Scientific and Medical (ISM) band**<br>DSRC ES | **Published**<br>Current Status:<br>**Publication (2012-08-16)** |

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| 49 FINALIZED | Doc. Nb. TS 102 708-2-2 Ver. **1.3.1**<br>Ref. **RTS/ITS-0020053**<br>Technical Body: ITS WG2<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**RTTT; Test specifications for High Data Rate (HDR) data**<br>**transmission equipment operating in the 5,8 GHz ISM band;**<br>**Part 2: Application Layer; Sub-Part 2: Test Suite Structure and Test**<br>**Purposes (TSS&TP)**<br>DSRC APL TSS&TP | **Published**<br>Current Status:<br>**Publication (2012-06-11)** |
| 50 FINALIZED | Doc. Nb. TS 102 708-2-3 Ver. **1.3.1**<br>Ref. **RTS/ITS-0020054**<br>Technical Body: ITS WG2<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**RTTT; Test specifications for High Data Rate (HDR) data**<br>**transmission equipment operating in the 5,8 GHz ISM band;**<br>**Part 2: Application Layer; Sub-Part 3: Abstract Test Suite (ATS) and**<br>**partial PIXIT proforma**<br>DSRC APL ATS | **Published**<br>Current Status:<br>**Publication (2012-06-11)** |
| 51 | Doc. Nb. TR 101 612<br>Ref. **DTR/ITS-0020055**<br>Technical Body: ITS WG2<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Cross Layer DCC Management Entity;**<br>**Report on Cross layer DCC algorithms and performance evaluation**<br>Cross layer DCC algorithms and performance evaluation | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2012-06-19)**<br>Next Status:<br>**Start of work (2012-06-19)** |
| 52 | Doc. Nb. TR 101 613<br>Ref. **DTR/ITS-0020056**<br>Technical Body: ITS WG2<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Cross Layer DCC Management Entity for operation in the ITS G5A**<br>**and ITS G5B medium;**<br>**Validation set-up and results**<br>Cross Layer DCC Validation | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2012-06-19)**<br>Next Status:<br>**Start of work (2012-06-19)** |
| 53 FINALIZED | Doc. Nb. TS 102 708-2-1 Ver. **1.3.1**<br>Ref. **RTS/ITS-00257**<br>Technical Body: ITS WG2<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**RTTT; Test specifications for High Data Rate (HDR) data**<br>**transmission equipment operating in the 5,8 GHz ISM band;**<br>**Part 2: Application Layer; Sub-part 1: Protocol Implementation**<br>**Conformance Statement (PICS) proforma specification**<br>DSRC APL PICS | **Published**<br>Current Status:<br>**Publication (2013-03-15)** |
| 54 FINALIZED | Doc. Nb. TS 102 708-2-2 Ver. **1.4.1**<br>Ref. **RTS/ITS-00258**<br>Technical Body: ITS WG2<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**RTTT; Test specifications for High Data Rate (HDR) data**<br>**transmission equipment operating in the 5,8 GHz ISM band;**<br>**Part 2: Application Layer; Sub-Part 2: Test Suite Structure and Test**<br>**Purposes (TSS&TP)**<br>DSRC APL TSS&TP | **Published**<br>Current Status:<br>**Publication (2013-03-15)** |
| 55 FINALIZED | Doc. Nb. TS 102 708-2-3 Ver. **1.4.1**<br>Ref. **RTS/ITS-00259**<br>Technical Body: ITS WG2<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**RTTT; Test specifications for High Data Rate (HDR) data**<br>**transmission equipment operating in the 5,8 GHz ISM band;**<br>**Part 2: Application Layer; Sub-part 3: Abstract Test Suite (ATS) and**<br>**partial PIXIT proforma**<br>DSRC APL ATS | **Published**<br>Current Status:<br>**Publication (2013-03-15)** |
| 56 CHANGED | Doc. Nb. TS 102 760-1 Ver. **1.1.2**<br>Ref. **RTS/ITS-00260**<br>Technical Body: ITS WG2<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Test specifications for Intelligent Transport Systems;**<br>**Communications Access for Land Mobiles (CALM); Medium Service**<br>**Access Points (ISO 21218);**<br>**Part 1: Implementation Conformance Statement (ICS) proforma**<br>CALM ISO 21218 PICS | **Drafting Stage**<br>Current Status:<br>**Stable draft (2013-10-16)**<br>Next Status:<br>**Final draft for approval (2014-05-31)** |
| 57 FINALIZED | Doc. Nb. ES 200 674-1 Ver. **2.4.1**<br>Ref. **RES/ITS-00261**<br>Technical Body: ITS WG2<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Road Transport and Traffic Telematics (RTTT); Dedicated Short**<br>**Range Communications (DSRC);**<br>**Part 1: Technical characteristics and test methods for High Data**<br>**Rate (HDR) data transmission equipment operating in the 5,8 GHz**<br>**Industrial, Scientific and Medical (ISM) band**<br>DSRC ES | **Published**<br>Current Status:<br>**Publication (2013-05-17)** |
| 58 CHANGED | Doc. Nb. TS 102 760-2 Ver. **1.1.2**<br>Ref. **RTS/ITS-00263**<br>Technical Body: ITS WG2<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Test specifications for Intelligent Transport Systems;**<br>**Communications Access for Land Mobiles (CALM); Medium Service**<br>**Access Points (ISO 21218);**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>CALM ISO 21218 TSS&TP | **Drafting Stage**<br>Current Status:<br>**Stable draft (2013-10-16)**<br>Next Status:<br>**Final draft for approval (2014-05-31)** |
| 59 | Doc. Nb. TS 102 723-3<br>Ref. **RTS/ITS-00265**<br>Technical Body: ITS WG2<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**OSI cross-layer topics;**<br>**Part 3: Interface between management entity and access layer**<br>Cross-layer topics | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-04-12)**<br>Next Status:<br>**Start of work (2013-04-12)** |
| 60 | Doc. Nb. TS 102 797-1<br>Ref. **RTS/ITS-00266**<br>Technical Body: ITS WG2<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM); Test**<br>**specifications for ITS station management (ISO 24102);**<br>**Part 1: Protocol Implementation Conformance Statement (PICS)**<br>**specification** | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-10-24)**<br>Next Status:<br>**Start of work (2013-10-24)** |

| | | CALM Interface Manager ISO 24102 PICS | |
|---|---|---|---|
| **61** | Doc. Nb. <u>TS 102 797-2</u><br>Ref. **RTS/ITS-00267**<br>Technical Body: <u>ITS WG2</u><br>Directives:<br><u>Details and Download</u> | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM); Test**<br>**specifications for ITS station management (ISO 24102);**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>Maintenance ISO 24102 TSS&TP | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-10-24)**<br>Next Status:<br>**Start of work (2013-10-24)** |
| **62** | Doc. Nb. <u>TS 102 797-3</u><br>Ref. **RTS/ITS-00268**<br>Technical Body: <u>ITS WG2</u><br>Directives:<br><u>Details and Download</u> | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM); Test**<br>**specifications for ITS station management (ISO 24102);**<br>**Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma**<br>ATS for ISO 24102 | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-10-24)**<br>Next Status:<br>**Start of work (2013-10-24)** |
| **63** | Doc. Nb. <u>TS 102 985-1</u><br>Ref. **RTS/ITS-00269**<br>Technical Body: <u>ITS WG2</u><br>Directives:<br><u>Details and Download</u> | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM); Test**<br>**specifications for non-IP networking (ISO 29281);**<br>**Part 1: Protocol Implementation Conformance Statement (PICS)**<br>**proforma**<br>Maintenance of PICS for ISO 29281 | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-10-24)**<br>Next Status:<br>**Start of work (2013-10-24)** |
| **64** | Doc. Nb. <u>TS 102 985-2</u><br>Ref. **RTS/ITS-00270**<br>Technical Body: <u>ITS WG2</u><br>Directives:<br><u>Details and Download</u> | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM); Test**<br>**specifications for non-IP networking (ISO 29281);**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>TSS&TP for ISO 29281 | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-10-24)**<br>Next Status:<br>**Start of work (2013-10-24)** |
| **65** | Doc. Nb. <u>TS 102 985-3</u><br>Ref. **RTS/ITS-00271**<br>Technical Body: <u>ITS WG2</u><br>Directives:<br><u>Details and Download</u> | **Intelligent Transport Systems (ITS);**<br>**Communications Access for Land Mobiles (CALM); Test**<br>**specifications for non-IP networking (ISO 29281);**<br>**Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma**<br>ATS for ISO 29281 | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-10-24)**<br>Next Status:<br>**Start of work (2013-10-24)** |

### 5.1.3 WG3: Transport and Network

WG3 is focused on the middle communications layers for network and data transport functions. All efforts are concentrated on GeoNetworking/GeoRouting which is a concept that uses GPS positions as an address, and where intermediate stations can be used as relay stations in case there is no direct connection. This work has been described as experimental, unproven and containing IPR from the main promoters, see a discussion in this document from the EU-US Task Force.

There is significant pressure from C2C-CC for this protocol to be deployed in Europe.

By following the links below further information on each WI can be found.

| | IDENTIFICATION | TITLE (Formal & Working) | STATUS |
|---|---|---|---|
| 1 FINALIZED | Doc. Nb. TS 102 636-4-1 Ver. **1.1.1** Ref. **DTS/ITS-0030001** Technical Body: **ITS WG3** **Details and Download** | **Intelligent Transport System (ITS); Vehicular communications; GeoNetworking; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 1: Media-Independent Functionality** Geonetworking; geographical addressing; media independent | **Published** Current Status: **Publication (2011-06-14)** |
| 2 FINALIZED | Doc. Nb. TS 102 636-1 Ver. **1.1.1** Ref. **DTS/ITS-0030002** Technical Body: **ITS WG3** **Details and Download** | **Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 1: Requirements** Geonetworking; requirements | **Published** Current Status: **Publication (2010-03-23)** |
| 3 FINALIZED | Doc. Nb. TS 102 636-2 Ver. **1.1.1** Ref. **DTS/ITS-0030003** Technical Body: **ITS WG3** **Details and Download** | **Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 2: Scenarios** Geonetworking; scenarios | **Published** Current Status: **Publication (2010-03-16)** |
| 4 FINALIZED | Doc. Nb. TS 102 636-3 Ver. **1.1.1** Ref. **DTS/ITS-0030004** Technical Body: **ITS WG3** **Details and Download** | **Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 3: Network architecture** Geonetworking; network architecture | **Published** Current Status: **Publication (2010-03-16)** |
| 5 FINALIZED | Doc. Nb. TS 102 636-6-1 Ver. **1.1.1** Ref. **DTS/ITS-0030005** Technical Body: **ITS WG3** **Details and Download** | **Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 6: Internet Integration; Sub-part 1: Transmission of IPv6 Packets over GeoNetworking Protocols** Geonetworking; Protocols | **Published** Current Status: **Publication (2011-03-30)** |
| 6 FINALIZED | Doc. Nb. TS 102 636-5-1 Ver. **1.1.1** Ref. **DTS/ITS-0030006** Technical Body: **ITS WG3** **Details and Download** | **Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 5: Transport Protocols; Sub-part 1: Basic Transport Protocol** Geonetworking; transport protocols | **Published** Current Status: **Publication (2011-02-02)** |
| 7 FINALIZED | Doc. Nb. TS 102 636-4-2 Ver. **1.1.1** Ref. **DTS/ITS-0030007** Technical Body: **ITS WG3** **Details and Download** | **Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 2: Media-dependent functionalities for ITS-G5** Geonetworking; geographical addressing; media dependent | **Published** Current Status: **Publication (2013-10-28)** |
| 8 CHANGED | Doc. Nb. TS 102 723-11 Ver. **0.0.2** Ref. **DTS/ITS-0030008** Technical Body: **ITS WG3** **Details and Download** | **Intelligent Transport Systems; OSI cross-layer topics; Part 11: Interface between networking & transport layer and facilities layer** Cross-layer topics | **Drafting Stage** Current Status: **WG approval (2013-10-23)** Next Status: **TB approval (2014-05-02)** |
| 9 FINALIZED | Doc. Nb. TS 102 859-2 Ver. **1.1.1** Ref. **DTS/ITS-0030009** Technical Body: **ITS WG3** **Details and Download** | **Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Transmission of IP packets over GeoNetworking; Part 2: Test Suite Structure and Test Purposes (TSS&TP)** IP over GeoNetworking TSS & TP | **Published** Current Status: **Publication (2011-03-30)** |
| 10 FINALIZED | Doc. Nb. TS 102 870-3 Ver. **1.1.1** Ref. **DTS/ITS-0030010** Technical Body: **ITS WG3** **Details and Download** | **Intelligent Transport Systems (ITS); Testing; Conformance test specifications for Geonetworking Basic Transport Protocol (BTP); Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)** BTP ATS and PIXIT | **Published** Current Status: **Publication (2011-03-23)** |
| 11 | Doc. Nb. TS 102 870-1 Ver. **1.1.1** | **Intelligent Transport Systems (ITS);** | **Published** |

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|---|---|---|---|
| FINALIZED | Ref. **DTS/ITS-0030011**<br>Technical Body: **ITS WG3**<br>**Details and Download** | **Testing; Conformance test specifications for GeoNetworking Basic Transport Protocol (BTP);**<br>**Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma**<br>BTP PICS | Current Status:<br>**Publication (2011-03-23)** |
| 12<br>FINALIZED | Doc. Nb. **TS 102 870-2** Ver. **1.1.1**<br>Ref. **DTS/ITS-0030012**<br>Technical Body: **ITS WG3**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specifications for GeoNetworking Basic Transport Protocol (BTP);**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>BTP TSS&TP | **Published**<br>Current Status:<br>**Publication (2011-03-23)** |
| 13<br>FINALIZED | Doc. Nb. **TS 102 871-3** Ver. **1.1.1**<br>Ref. **DTS/ITS-0030013**<br>Technical Body: **ITS WG3**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specifications for GeoNetworking ITS-G5;**<br>**Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)**<br>GeoNetworking/ITS-G5 ATS and PIXIT | **Published**<br>Current Status:<br>**Publication (2011-06-14)** |
| 14<br>FINALIZED | Doc. Nb. **TS 102 871-1** Ver. **1.1.1**<br>Ref. **DTS/ITS-0030014**<br>Technical Body: **ITS WG3**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specifications for GeoNetworking ITS-G5;**<br>**Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma**<br>GeoNetworking/ITS-G5 PICS | **Published**<br>Current Status:<br>**Publication (2011-06-14)** |
| 15<br>FINALIZED | Doc. Nb. **TS 102 871-2** Ver. **1.1.1**<br>Ref. **DTS/ITS-0030015**<br>Technical Body: **ITS WG3**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specifications for GeoNetworking ITS-G5;**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>GeoNetworking ITS-G5 TSS&TP | **Published**<br>Current Status:<br>**Publication (2011-06-14)** |
| 16<br>FINALIZED | Doc. Nb. **TS 102 859-3** Ver. **1.1.1**<br>Ref. **DTS/ITS-0030016**<br>Technical Body: **ITS WG3**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specifications for Transmission of IP packets over GeoNetworking;**<br>**Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)**<br>IP over GeoNetworking ATS and PIXIT | **Published**<br>Current Status:<br>**Publication (2011-03-30)** |
| 17<br>FINALIZED | Doc. Nb. **TS 102 859-1** Ver. **1.1.1**<br>Ref. **DTS/ITS-0030017**<br>Technical Body: **ITS WG3**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specifications for Transmission of IP packets over GeoNetworking;**<br>**Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma**<br>IP over GeoNetworking PICS | **Published**<br>Current Status:<br>**Publication (2011-03-30)** |
| 18<br>FINALIZED | Doc. Nb. **TR 103 061-5** Ver. **1.1.1**<br>Ref. **DTR/ITS-0030018**<br>Technical Body: **ITS WG3**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Part 5: IPv6 over GeoNetworking validation report**<br>IPv6 over GeoNetworking validation report | **Published**<br>Current Status:<br>**Publication (2012-11-08)** |
| 19<br>FINALIZED | Doc. Nb. **TR 103 061-4** Ver. **1.1.1**<br>Ref. **DTR/ITS-0030019**<br>Technical Body: **ITS WG3**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Part 4: Conformance test specification for GeoNetworking Basic Transport Protocol (BTP); GeoNetworking BTP validation report**<br>Geo BTP validation report | **Published**<br>Current Status:<br>**Publication (2012-11-08)** |
| 20<br>FINALIZED | Doc. Nb. **TR 103 061-3** Ver. **1.1.1**<br>Ref. **DTR/ITS-0030020**<br>Technical Body: **ITS WG3**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Part 3: Conformance test specification for Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; GeoNetworking validation report**<br>GeoNetworking validation report | **Published**<br>Current Status:<br>**Publication (2012-11-08)** |
| 21<br>FINALIZED | Doc. Nb. **EN 302 931** Ver. **1.1.1**<br>Ref. **DEN/ITS-0030021**<br>Technical Body: **ITS WG3**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Vehicular Communications;**<br>**Geographical Area Definition**<br>Geographical Area Definition | **Published**<br>Current Status:<br>**Publication (2011-07-20)** |
| 22<br>CHANGED | Doc. Nb. **TS 102 871-1** Ver. **0.0.2**<br>Ref. **RTS/ITS-0030022**<br>Technical Body: **ITS WG3**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Conformance test specifications for Geonetworking ITS-G5;**<br>**Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma**<br>GeoNetworking/ITS-G5 PICS | **Drafting Stage**<br>Current Status:<br>**WG approval (2013-06-19)**<br>Next Status:<br>**TB approval (2014-11-02)** |
| 23 | Doc. Nb. **TS 102 871-2** Ver. **0.0.3** | **Intelligent Transport Systems (ITS);** | **Drafting Stage** |

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|---|---|---|---|
| CHANGED | Ref. **RTS/ITS-0030023**<br>Technical Body: ITS WG3<br>Directives:<br>**Details and Download** | **Testing;**<br>**Conformance test specifications for Geonetworking ITS-G5;**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>GeoNetworking/ITS-G5 PICS | Current Status:<br>**Stable draft (2013-10-14)**<br>Next Status:<br>**TB approval (2014-11-02)** |
| 24<br>CHANGED | Doc. Nb. TS 102 871-3<br>Ref. **RTS/ITS-0030024**<br>Technical Body: ITS WG3<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Conformance test specifications for Geonetworking ITS-G5;**<br>**Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)**<br>GeoNetworking/ITS-G5 ATS and PIXIT | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2010-11-03)**<br>Next Status:<br>**Start of work (2010-11-03)** |
| 25 | Doc. Nb. TS 102 870-1<br>Ref. **RTS/ITS-0030025**<br>Technical Body: ITS WG3<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Conformance test specifications for Geonetworking Basic Transport Protocol (BTP); Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma**<br>BTP PICS | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2010-11-03)**<br>Next Status:<br>**Start of work (2010-11-03)** |
| 26<br>CHANGED | Doc. Nb. TS 102 859-3 Ver. **0.0.1**<br>Ref. **RTS/ITS-0030026**<br>Technical Body: ITS WG3<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Conformance test specifications for Transmission of IP packets over Geonetworking; Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT);**<br>IP over GeoNetworking ATS and PIXIT | **Drafting Stage**<br>Current Status:<br>**Early draft (2013-04-04)**<br>Next Status:<br>**Stable draft (2014-02-02)** |
| 27 | Doc. Nb. TS 102 870-2<br>Ref. **RTS/ITS-0030027**<br>Technical Body: ITS WG3<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Conformance test specifications for Geonetworking Basic Transport Protocol (BTP); Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>BTP TSS&TP | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2010-11-03)**<br>Next Status:<br>**Start of work (2010-11-03)** |
| 28<br>CHANGED | Doc. Nb. TS 102 870-3<br>Ref. **RTS/ITS-0030028**<br>Technical Body: ITS WG3<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Conformance test specifications for Geonetworking Basic Transport Protocol (BTP); Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT);**<br>BTP ATS and PIXIT | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2010-11-03)**<br>Next Status:<br>**Start of work (2010-11-03)** |
| 29<br>CHANGED | Doc. Nb. TS 102 859-1 Ver. **0.0.2**<br>Ref. **RTS/ITS-0030029**<br>Technical Body: ITS WG3<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Conformance test specifications for Transmission of IP packets over Geonetworking; Part 1: Test requirements and Protocol Implementation Conformance Statement (PICS) proforma**<br>IP over GeoNetworking PICS | **Drafting Stage**<br>Current Status:<br>**Stable draft (2013-05-28)**<br>Next Status:<br>**Final draft for approval (2014-07-01)** |
| 30<br>CHANGED | Doc. Nb. TS 102 859-2 Ver. **0.0.2**<br>Ref. **RTS/ITS-0030030**<br>Technical Body: ITS WG3<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing;**<br>**Conformance test specifications for Transmission of IP packets over Geonetworking; Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>IP over GeoNetworking TSS & TP | **Drafting Stage**<br>Current Status:<br>**Stable draft (2013-05-28)**<br>Next Status:<br>**Final draft for approval (2014-07-02)** |
| 31 | Doc. Nb. TR 101 555 Ver. **0.0.1**<br>Ref. **DTR/ITS-0030031**<br>Technical Body: ITS WG3<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Network & Transport Layer;**<br>**Analysis of IPv6 for networking**<br>IPv6 analysis for networking | **Drafting Stage**<br>Current Status:<br>**Early draft (2013-04-08)**<br>Next Status:<br>**Stable draft (2013-05-31)** |
| 32 | Doc. Nb. EN 302 636-1 Ver. **1.2.0**<br>Ref. **REN/ITS-0030032**<br>Technical Body: ITS WG3<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Vehicular Communications; GeoNetworking;**<br>**Part 1: Requirements**<br>Geonetworking; requirements | **Approval Stage**<br>Current Status:<br>**Start of EN Approval Procedure (2013-08-02)**<br>Next Status:<br>**End of EN Approval Procedure (2013-12-02)** |
| 33 | Doc. Nb. EN 302 636-2 Ver. **1.2.0**<br>Ref. **REN/ITS-0030033**<br>Technical Body: ITS WG3<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Vehicular Communications; GeoNetworking;**<br>**Part 2: Scenarios**<br>Geonetworking; scenarios | **Approval Stage**<br>Current Status:<br>**End of EN Approval Procedure (2013-10-31)**<br>Next Status:<br>**Start of TB review after AP comments (2013-10-31)** |

| 34 | Doc. Nb. EN 302 636-3 Ver. 0.0.9<br>Ref. REN/ITS-0030034<br>Technical Body: ITS WG3<br>Details and Download | Intelligent Transport Systems (ITS);<br>Vehicular Communications; GeoNetworking;<br>Part 3: Network Architecture<br>Geonetworking; network architecture | Drafting Stage<br>Current Status:<br>Final draft for approval<br>(2012-10-19)<br>Next Status:<br>WG approval (2014-05-02) |
|---|---|---|---|
| 35 | Doc. Nb. EN 302 636-4-1 Ver. 1.2.0<br>Ref. REN/ITS-0030035<br>Technical Body: ITS WG3<br>Details and Download | Intelligent Transport Systems (ITS);<br>Vehicular Communications; GeoNetworking; Part 4:<br>Geographical addressing and forwarding for point-to-point<br>and point-to-multipoint communications;<br>Sub-part 1: Media-Independent Functionality<br>Geonetworking; geographical addressing; media independent | Approval Stage<br>Current Status:<br>Start of EN Approval Procedure<br>(2013-10-04)<br>Next Status:<br>End of EN Approval Procedure<br>(2014-02-03) |
| 36 | Doc. Nb. EN 302 636-5-1 Ver. 1.2.0<br>Ref. REN/ITS-0030036<br>Technical Body: ITS WG3<br>Details and Download | Intelligent Transport Systems (ITS);<br>Vehicular Communications; GeoNetworking;<br>Part 5: Transport Protocols; Sub-part 1: Basic Transport<br>Protocol<br>Geonetworking BTP | Approval Stage<br>Current Status:<br>Start of EN Approval Procedure<br>(2013-10-04)<br>Next Status:<br>End of EN Approval Procedure<br>(2014-02-03) |
| 37 | Doc. Nb. EN 302 636-6-1 Ver. 1.2.0<br>Ref. REN/ITS-0030037<br>Technical Body: ITS WG3<br>Directives:<br>Details and Download | Intelligent Transport Systems (ITS);<br>Vehicular Communications; GeoNetworking;<br>Part 6: Internet Integration; Sub-part 1: Transmission of IPv6<br>Packets over GeoNetworking Protocols<br>Geonetworking; Protocols | Approval Stage<br>Current Status:<br>Start of EN Approval Procedure<br>(2013-10-04)<br>Next Status:<br>End of EN Approval Procedure<br>(2014-02-03) |
| 38<br>FINALIZED | Doc. Nb. TR 103 099 Ver. 1.1.1<br>Ref. DTR/ITS-0030038<br>Technical Body: ITS WG3<br>Directives:<br>Details and Download | Intelligent Transport Systems (ITS);<br>Architecture of conformance validation framework<br><br>Conformance validation framework | Published<br>Current Status:<br>Publication (2012-11-06) |
| 39 | Doc. Nb. TR 103 099<br>Ref. RTR/ITS-00340<br>Technical Body: ITS WG3<br>Directives:<br>Details and Download | Intelligent Transport Systems (ITS);<br>Architecture of conformance validation framework<br><br>Conformance validation framework | Drafting Stage<br>Current Status:<br>TB adoption of WI (2013-04-11)<br>Next Status:<br>Start of work (2013-04-11) |
| 40 | Doc. Nb. TR 103 061-3<br>Ref. RTR/ITS-00341<br>Technical Body: ITS WG3<br>Directives:<br>Details and Download | Intelligent Transport Systems (ITS);<br>Testing;<br>Part 3: Conformance test specification for Geographical<br>addressing and forwarding for point-to-point and point-to-<br>multipoint communications; GeoNetworking validation report<br>GeoNetworking validation report | Drafting Stage<br>Current Status:<br>TB adoption of WI (2013-04-11)<br>Next Status:<br>Start of work (2013-04-11) |
| 41 | Doc. Nb. TR 103 061-5<br>Ref. RTR/ITS-00342<br>Technical Body: ITS WG3<br>Directives:<br>Details and Download | Intelligent Transport Systems (ITS);<br>Testing;<br>Part 5: IPv6 over GeoNetworking validation report<br>IPv6 over GeoNetworking validation report | Drafting Stage<br>Current Status:<br>TB adoption of WI (2013-04-11)<br>Next Status:<br>Start of work (2013-04-11) |

### 5.1.4 WG4: Media

WG4 is the media of physical interface group. The work can be split in two parts as follows:

1. The work related to 5.9GHz called G5A. Here we have the basic standards deciding legal operation in Europe called Harmonised ENs followed with the relevant test standards, but also technical regulations how to use the channels effectively. One of the work areas is regarding interference between the CEN DSRC on 5.8GHz, and the G5A on 5.9 GHz which is likely to be of special interest for current operators of DSRC systems. A potential new allocation of WiFi (802.11ac) at 5.9GHz will cause potential interference, and there are several studies on-going to determine how much interference this would entail.

2. All the other media like 700 MHz digital dividend, LTE, new digital broadcast media and so on are also included in the WG scope, but have a much lower priority than G5A. There are some voluntary efforts around this but no real work items leading to standards soon.

By following the links below further information on each WI can be found.

| | IDENTIFICATION | TITLE (Formal & Working) | STATUS |
|---|---|---|---|
| 1 FINALIZED | Doc. Nb. TS 102 486-1-2 Ver. **1.2.1** Ref. **RTS/ITS-0040006** Technical Body: **ITS WG4** **Details and Download** | **Intelligent Transport Systems (ITS); Road Transport and Traffic Telematics (RTTT); Test specifications for Dedicated Short Range Communication (DSRC) transmission equipment; Part 1: DSRC data link layer: medium access and logical link control; Sub-Part 2: Test Suite Structure and Test Purposes (TSS&TP)** Protocol Testing for DSC MAC and LLC layers | **Published** Current Status: **Publication (2008-10-06)** |
| 2 FINALIZED | Doc. Nb. TS 102 486-1-3 Ver. **1.2.1** Ref. **RTS/ITS-0040007** Technical Body: **ITS WG4** **Details and Download** | **Intelligent Transport Systems (ITS); Road Transport and Traffic Telematics (RTTT); Test specifications for Dedicated Short Range Communication (DSRC) transmission equipment; Part 1: DSRC data link layer: medium access and logical link control; Sub-Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma** DSRC data link layer; ATS and partial PIXIT proforma | **Published** Current Status: **Publication (2008-10-06)** |
| 3 FINALIZED | Doc. Nb. TS 102 486-2-1 Ver. **1.2.1** Ref. **RTS/ITS-0040008** Technical Body: **ITS WG4** **Details and Download** | **Intelligent Transport Systems (ITS); Road Transport and Traffic Telematics (RTTT); Test specifications for Dedicated Short Range Communication (DSRC) transmission equipment; Part 2: DSRC application layer; Sub-Part 1: Protocol Implementation Conformance Statement (PICS) proforma specification** DSRC application layer; PICS proforma specification | **Published** Current Status: **Publication (2008-10-06)** |
| 4 FINALIZED | Doc. Nb. TS 102 486-2-2 Ver. **1.2.1** Ref. **RTS/ITS-0040009** Technical Body: **ITS WG4** **Details and Download** | **Intelligent Transport Systems (ITS) Road Transport and Traffic Telematics (RTTT); Test specifications for Dedicated Short Range Communication (DSRC) transmission equipment; Part 2: DSRC application layer; Sub-Part 2: Test Suite Structure and Test Purposes (TSS&TP)** DSRC application layer; TSS&TP | **Published** Current Status: **Publication (2008-10-06)** |
| 5 FINALIZED | Doc. Nb. TS 102 486-2-3 Ver. **1.2.1** Ref. **RTS/ITS-0040010** Technical Body: **ITS WG4** **Details and Download** | **Intelligent Transport Systems (ITS); Road Transport and Traffic Telematics (RTTT); Test specifications for Dedicated Short Range Communication (DSRC) transmission equipment; Part 2: DSRC application layer; Sub-Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma** DSRC application layer; ATS and partial PIXIT proforma | **Published** Current Status: **Publication (2008-10-06)** |
| 6 FINALIZED | Doc. Nb. TS 102 792 Ver. **1.1.1** Ref. **DTS/ITS-0040013** Technical Body: **ITS WG4** **Details and Download** | **Intelligent Transport Systems (ITS); Mitigation techniques to avoid interference between European CEN Dedicated Short Range Communication (CEN DSRC) equipment and Intelligent Transport Systems (ITS) operating in the 5 GHz frequency range** Mitigation DSRC ITS | **Published** Current Status: **Publication (2012-10-29)** |
| 7 FINALIZED | Doc. Nb. TS 102 687 Ver. **1.1.1** Ref. **DTS/ITS-0040014** Technical Body: **ITS WG4** | **Intelligent Transport Systems (ITS); Decentralized Congestion Control Mechanisms for Intelligent Transport Systems operating in the 5 GHz range;** | **Published** Current Status: **Publication (2011-07-01)** |

| | | Access layer part<br>DCC ITS 5 GHz | |
|---|---|---|---|
| 8 FINALIZED | Doc. Nb. ES 202 663 Ver. **1.1.0**<br>Ref. **DES/ITS-0040015**<br>Technical Body: **ITS WG4**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**European profile standard for the physical and medium access control layer of Intelligent Transport Systems operating in the 5 GHz frequency band**<br><br>European Profile 5 GHz | **Published**<br>Current Status:<br>**Publication (2010-01-14)** |
| 9 FINALIZED | Doc. Nb. TS 102 724 Ver. **1.1.1**<br>Ref. **DTS/ITS-0040016**<br>Technical Body: **ITS WG4**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Harmonized Channel Specifications for Intelligent Transport Systems operating in the 5 GHz frequency band**<br><br>Channel specifications 5 GHz | **Published**<br>Current Status:<br>**Publication (2012-10-29)** |
| 10 FINALIZED | Doc. Nb. TS 102 486-1-3 Ver. **1.2.2**<br>Ref. **RTS/ITS-0040017**<br>Technical Body: **ITS WG4**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Road Transport and Traffic Telematics (RTTT); Test specifications for Dedicated Short Range Communication (DSRC) transmission equipment;**<br>**Part 1: DSRC data link layer: medium access and logical link control; Sub-Part 3: Abstract Test Suite (ATS) and partial PIXIT proforma**<br>DSRC data link layer; ATS and partial PIXIT proforma | **Published**<br>Current Status:<br>**Publication (2009-05-27)** |
| 11 FINALIZED | Doc. Nb. TS 102 723-10 Ver. **1.1.1**<br>Ref. **DTS/ITS-0040018**<br>Technical Body: **ITS WG4**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**OSI cross-layer topics;**<br>**Part 10: Interface between access layer and networking & transport layer**<br>Interface(s) between Access Layer and Network & Transport Layer | **Published**<br>Current Status:<br>**Publication (2012-11-09)** |
| 12 FINALIZED | Doc. Nb. TR 102 861 Ver. **1.1.1**<br>Ref. **DTR/ITS-0040020**<br>Technical Body: **ITS WG4**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**STDMA recommended parameters and settings for cooperative ITS;**<br>**Access Layer Part**<br>STDMA Recommend | **Published**<br>Current Status:<br>**Publication (2012-01-27)** |
| 13 FINALIZED | Doc. Nb. TR 102 862 Ver. **1.1.1**<br>Ref. **DTR/ITS-0040021**<br>Technical Body: **ITS WG4**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Performance Evaluation of Self-Organizing TDMA as Medium Access Control Method Applied to ITS;**<br>**Access Layer Part**<br>STDMA Scenarios | **Published**<br>Current Status:<br>**Publication (2011-12-05)** |
| 14 FINALIZED | Doc. Nb. TS 102 916-1 Ver. **1.1.1**<br>Ref. **DTS/ITS-0040022**<br>Technical Body: **ITS WG4**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Test specifications for the methods to ensure coexistence of Cooperative ITS G5 with RTTT DSRC;**<br>**Part 1: Protocol Implementation Conformance Statement (PICS)**<br>DSRC/G5 Radio Test PICS | **Published**<br>Current Status:<br>**Publication (2012-05-22)** |
| 15 FINALIZED | Doc. Nb. TS 102 916-2 Ver. **1.1.1**<br>Ref. **DTS/ITS-0040023**<br>Technical Body: **ITS WG4**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Test specifications for the methods to ensure coexistence of Cooperative ITS G5 with RTTT DSRC;**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>DSRC/G5 Radio Test TSS & TP | **Published**<br>Current Status:<br>**Publication (2012-05-22)** |
| 16 FINALIZED | Doc. Nb. TS 102 916-3 Ver. **1.1.1**<br>Ref. **DTS/ITS-0040024**<br>Technical Body: **ITS WG4**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Test specifications for the methods to ensure coexistence of Cooperative ITS G5 with RTTT DSRC;**<br>**Part 3: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT)**<br>DSRC/G5 Radio Test ATS | **Published**<br>Current Status:<br>**Publication (2012-05-22)** |
| 17 FINALIZED | Doc. Nb. TS 102 917-1 Ver. **1.1.1**<br>Ref. **DTS/ITS-0040025**<br>Technical Body: **ITS WG4**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Test specifications for the channel congestion control algorithms operating in the 5,9 GHz range;**<br>**Part 1: Protocol Implementation Conformance Statement (PICS)**<br>G5 Radio Test PICS | **Published**<br>Current Status:<br>**Publication (2013-01-18)** |
| 18 FINALIZED | Doc. Nb. TS 102 917-2 Ver. **1.1.1**<br>Ref. **DTS/ITS-0040026**<br>Technical Body: **ITS WG4**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Test specifications for the channel congestion control algorithms operating in the 5,9 GHz range;**<br>**Part 2: Test Suite Structure and Test Purposes (TSS & TP)**<br>G5 Radio Test TSS & TP | **Published**<br>Current Status:<br>**Publication (2013-01-18)** |
| 19 FINALIZED | Doc. Nb. TS 102 917-3 Ver. **1.1.1**<br>Ref. **DTS/ITS-0040027**<br>Technical Body: **ITS WG4**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Test specifications for the channel congestion control algorithms operating in the 5,9 GHz range;**<br>**Part 3: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT)**<br>G5 Radio Test ATS | **Published**<br>Current Status:<br>**Publication (2013-01-18)** |

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|---|---|---|---|
| 20 | Doc. Nb. **EN 302 663** Ver. **1.2.1**<br>Ref. **REN/ITS-0040028**<br>Technical Body: **ITS WG4**<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Access layer specification for Intelligent Transport Systems**<br>**operating in the 5 GHz frequency band**<br><br>Access layer ITS 5 GHz | **Published**<br>Current Status:<br>**Publication (2013-07-05)** |
| 21 | Doc. Nb. **TR 102 960** Ver. **1.1.1**<br>Ref. **DTR/ITS-0040029**<br>Technical Body: **ITS WG4**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Mitigation techniques to avoid interference between European CEN**<br>**Dedicated Short Range Communication (RTTT DSRC) equipment**<br>**and Intelligent Transport Systems (ITS) operating in the 5 GHz**<br>**frequency range;**<br>**Evaluation of mitigation methods and techniques**<br>Mitigation CEN DSRC vs. ITS | **Published**<br>Current Status:<br>**Publication (2012-11-15)** |
| 22 | Doc. Nb. **TS 102 687** Ver. **0.0.1**<br>Ref. **RTS/ITS-00430**<br>Technical Body: **ITS WG4**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Decentralized Congestion Control Mechanisms for Intelligent**<br>**Transport Systems operating in the 5 GHz range;**<br>**Access layer part**<br>DCC Access ITS 5 GHz | **Drafting Stage**<br>Current Status:<br>**Early draft (2013-10-21)**<br>Next Status:<br>**Stable draft (2013-04-01)** |
| 23 | Doc. Nb. **TS 102 917-1**<br>Ref. **RTS/ITS-00431**<br>Technical Body: **ITS WG4**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Test specifications for the channel congestion control algorithms**<br>**operating in the 5,9 GHz range;**<br>**Part 1: Protocol Implementation Conformance Statement (PICS)**<br>G5 Radio Test PICS | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-02-20)**<br>Next Status:<br>**Start of work (2013-02-20)** |
| 24 | Doc. Nb. **TS 102 724**<br>Ref. **RTS/ITS-00432**<br>Technical Body: **ITS WG4**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Harmonized Channel Specifications for Intelligent Transport**<br>**Systems operating in the 5 GHz frequency band**<br><br>Channel specifications 5 GHz | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-04-11)**<br>Next Status:<br>**Start of work (2013-04-11)** |
| 25 | Doc. Nb. **TS 102 917-3**<br>Ref. **RTS/ITS-00433**<br>Technical Body: **ITS WG4**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Test specifications for the channel congestion control algorithms**<br>**operating in the 5,9 GHz range;**<br>**Part 3: Abstract Test Suite (ATS) and partial Protocol**<br>**Implementation eXtra Information for Testing (PIXIT)**<br>G5 Radio Test ATS | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-02-20)**<br>Next Status:<br>**Start of work (2013-02-20)** |
| 26 | Doc. Nb. **TS 102 917-2**<br>Ref. **RTS/ITS-00435**<br>Technical Body: **ITS WG4**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Test specifications for the channel congestion control algorithms**<br>**operating in the 5,9 GHz range;**<br>**Part 2: Test Suite Structure and Test Purposes (TSS & TP)**<br>G5 Radio Test TSS & TP | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-02-20)**<br>Next Status:<br>**Start of work (2013-02-20)** |
| 27 | Doc. Nb. **TS 102 723-10**<br>Ref. **RTS/ITS-00436**<br>Technical Body: **ITS WG4**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**OSI cross-layer topics;**<br>**Part 10: Interface between access layer and networking & transport**<br>**layer**<br>Interface(s) between Access Layer and Network & Transport Layer | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2013-04-11)**<br>Next Status:<br>**Start of work (2013-04-11)** |
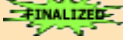
### 5.1.5 WG5: Security

Security is considered to be one of the most important and most difficult areas in Cooperative ITS. To illustrate the challenge, just imagine a 15 year old Japanese produced car registered in Norway, and a new American car registered in Italy, meeting somewhere in France. These two cars will have to understand and trust the information the other is sending, and prove that the other car is not a fake installation sending spoofed information.

WG5 consist of cryptography experts and has several STFs to help. The individual experts are the same is those in IEEE P1609.2 and ISO TC204/WG16, so the basic concepts are harmonized in this area. Unfortunately the resulting standards are still not fully compatible due to different requirements. The process goes over several steps where the first step is to characterize the entire environment using an ETSI concept called TVRA for Threat, Vulnerability and Risk Analysis. WG5 has performed this analysis, but limited the scope to G5A in a V2V/V2I scenario which is driven by the C2C-CC needs. Note that the EU-US Task Force has suggested several improvements to make the WG5 standards more applicable for ITS in general. These suggestions have been adopted both by WG5 and P1609, making the transition much easier. There is also some new security harmonization work of special interest for authorities starting in 2014, see chapter on EU-US Task Force.

By following the links below further information on each WI can be found.

| | IDENTIFICATION | TITLE (Formal & Working) | STATUS |
|---|---|---|---|
| 1 FINALIZED | Doc. Nb. TS 102 731 Ver. 1.1.1<br>Ref. DTS/ITS-0050001<br>Technical Body: ITS WG5<br>Details and Download | Intelligent Transport Systems (ITS);<br>Security;<br>Security Services and Architecture<br>Security Services and Architecture | Published<br>Current Status:<br>Publication (2010-09-21) |
| 2 FINALIZED | Doc. Nb. TR 102 893 Ver. 1.1.1<br>Ref. DTR/ITS-0050005<br>Technical Body: ITS WG5<br>Details and Download | Intelligent Transport Systems (ITS);<br>Security;<br>Threat, Vulnerability and Risk Analysis (TVRA)<br>ITS; Security; Threat Vulnerabiity and Risk Analysis | Published<br>Current Status:<br>Publication (2010-03-11) |
| 3 CHANGED | Doc. Nb. TS 102 723-7 Ver. 1.1.1<br>Ref. DTS/ITS-0050007<br>Technical Body: ITS WG5<br>Details and Download | Intelligent Transport Systems;<br>OSI cross-layer topics;<br>Part 7: Interface between security entity and access layer<br>Cross-layer topics | Drafting Stage<br>Current Status:<br>Start of work (2009-04-24)<br>Next Status:<br>WG approval (2014-11-02) |
| 4 CHANGED | Doc. Nb. TS 102 723-8 Ver. 1.0.1<br>Ref. DTS/ITS-0050008<br>Technical Body: ITS WG5<br>Details and Download | Intelligent Transport Systems (ITS);<br>OSI cross-layer topics;<br>Part 8: Interface between security entity and network and transport layer<br>Cross-layer topics | Drafting Stage<br>Current Status:<br>Final draft for approval (2013-10-18)<br>Next Status:<br>TB approval (2014-11-02) |
| 5 CHANGED | Doc. Nb. TS 102 723-9 Ver. 0.0.1<br>Ref. DTS/ITS-0050009<br>Technical Body: ITS WG5<br>Details and Download | Intelligent Transport Systems;<br>OSI cross-layer topics;<br>Part 9: Interface between security entity and facilities layer<br>Cross-layer topics | Drafting Stage<br>Current Status:<br>Early draft (2012-04-19)<br>Next Status:<br>WG approval (2014-11-02) |
| 6 FINALIZED | Doc. Nb. TS 102 867 Ver. 1.1.1<br>Ref. DTS/ITS-0050013<br>Technical Body: ITS WG5<br>Details and Download | Intelligent Transport Systems (ITS);<br>Security;<br>Stage 3 mapping for IEEE 1609.2<br>IEEE 1609.2 profile | Published<br>Current Status:<br>Publication (2012-06-13) |
| 7 FINALIZED | Doc. Nb. TS 102 940 Ver. 1.1.1<br>Ref. DTS/ITS-0050014<br>Technical Body: ITS WG5<br>Directives:<br>Details and Download | Intelligent Transport Systems (ITS);<br>Security;<br>ITS communications security architecture and security management<br>Security architecture and Management | Published<br>Current Status:<br>Publication (2012-06-19) |
| 8 FINALIZED | Doc. Nb. TS 102 941 Ver. 1.1.1<br>Ref. DTS/ITS-0050015<br>Technical Body: ITS WG5<br>Directives: | Intelligent Transport Systems (ITS);<br>Security;<br>Trust and Privacy Management<br>Trust and Privacy Management | Published<br>Current Status:<br>Publication (2012-06-19) |

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|---|---|---|---|
| 9 **FINALIZED** | Doc. Nb. TS 102 942 Ver. **1.1.1**<br>Ref. **DTS/ITS-0050016**<br>Technical Body: **ITS WG5**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Security;**<br>**Access Control**<br>Security; Access Control | **Published**<br>Current Status:<br>**Publication (2012-06-19)** |
| 10 **FINALIZED** | Doc. Nb. TS 102 943 Ver. **1.1.1**<br>Ref. **DTS/ITS-0050017**<br>Technical Body: **ITS WG5**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Security;**<br>**Confidentiality services**<br>Security; Confidentiality services | **Published**<br>Current Status:<br>**Publication (2012-06-19)** |
| 11 | Doc. Nb. TR 102 893 Ver. **1.1.3**<br>Ref. **RTR/ITS-0050018**<br>Technical Body: **ITS WG5**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Security;**<br>**Threat, Vulnerability and Risk Analysis (TVRA)**<br>TVRA Revision | **Drafting Stage**<br>Current Status:<br>**Stable draft (2013-01-10)**<br>Next Status:<br>**Final draft for approval (2014-05-02)** |
| 12 **FINALIZED** | Doc. Nb. TS 103 096-2 Ver. **1.1.1**<br>Ref. **DTS/ITS-0050019**<br>Technical Body: **ITS WG5**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specification for TS 102 867 and TS 102 941;**<br>**Part 2: Test Suite Structure and Test Purposes (TSS&TP)**<br>Security TSS&TP | **Published**<br>Current Status:<br>**Publication (2013-07-16)** |
| 13 **FINALIZED** | Doc. Nb. TS 103 096-3 Ver. **1.1.1**<br>Ref. **DTS/ITS-0050020**<br>Technical Body: **ITS WG5**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specification for TS 102 867 and TS 102 941;**<br>**Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)**<br>Security Testing ATS | **Published**<br>Current Status:<br>**Publication (2013-07-16)** |
| 14 **FINALIZED** | Doc. Nb. TS 103 096-1 Ver. **1.1.1**<br>Ref. **DTS/ITS-0050021**<br>Technical Body: **ITS WG5**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specification for TS 102 867 and TS 102 941;**<br>**Part 1: Protocol Implementation Conformance Statement (PICS)**<br>Security PICS | **Published**<br>Current Status:<br>**Publication (2013-07-16)** |
| 15 **CHANGED** | Doc. Nb. TR 103 096-4<br>Ref. **DTR/ITS-0050022**<br>Technical Body: **ITS WG5**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Testing; Conformance test specification for TS 102 867 and TS 102 941;**<br>**Part 4: Validation report**<br>Conformance testing validation report | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2012-04-26)**<br>Next Status:<br>**Start of work (2012-04-26)** |
| 16 **FINALIZED** | Doc. Nb. TS 103 097 Ver. **1.1.1**<br>Ref. **DTS/ITS-0050023**<br>Technical Body: **ITS WG5**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Security;**<br>**Security header and certificate formats**<br>Security Header and Certificate Formats | **Published**<br>Current Status:<br>**Publication (2013-04-03)** |
| 17 **CHANGED** | Doc. Nb. TS 102 941 Ver. **1.1.2**<br>Ref. **RTS/ITS-00524**<br>Technical Body: **ITS WG5**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Security;**<br>**Trust and Privacy Management**<br>Trust and Privacy Management | **Drafting Stage**<br>Current Status:<br>**Early draft (2013-01-11)**<br>Next Status:<br>**Stable draft (2014-04-30)** |
| 18 | Doc. Nb. TS 102 867<br>Ref. **RTS/ITS-00525**<br>Technical Body: **ITS WG5**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Security;**<br>**Stage 3 mapping for IEEE 1609.2**<br>IEEE 1609.2 profile | **Drafting Stage**<br>Current Status:<br>**TB adoption of WI (2012-10-19)**<br>Next Status:<br>**Start of work (2012-10-19)** |
| 19 | Doc. Nb. TS 103 097 Ver. **2.1.1**<br>Ref. **RTS/ITS-00526**<br>Technical Body: **ITS WG5**<br>Directives:<br>**Details and Download** | **Intelligent Transport Systems (ITS);**<br>**Security;**<br>**Security header and certificate formats**<br>Security Header and Certificate Formats | **Drafting Stage**<br>Current Status:<br>**Early draft (2013-06-08)**<br>Next Status:<br>**Stable draft (2013-09-27)** |

## 6 ISO TC204

**ISO TC204** is the International ITS committee. It was originally called Transport Information Control Systems (TICS), but changed its name to Intelligent Transport Systems some years ago. This was the second ITS standardisation body to start after CEN TC278.

TC204 was patterned on TC278, and the cooperation is regulated by the Vienna Agreement (VA) between ISO and CEN, which means that many working groups have joint meetings to ensure alignment.

All Work Items, both drafts and finished standards, can be searched via this search engine in this ISO search page.

The following table shows the overlap and common working groups between CEN TC278 and ISO TC204.

### Alignment CEN TC278 – ISO TC204 Working Groups



**Figure 5: Overlapping WGs between CEN/TC278 and ISO TC 204**

### 6.1 ISO TC204 Working Groups
The following drawing gives a quick overview of the full set of working groups:

| WG | ISO TC204 – Intelligent Transport System | Country | Convenor |
|----|------------------------------------------|---------|----------|
| 1 | Architecture | UK | R. Bossom |
| 2 | Quality and reliability requirements | USA | dormant |
| 3 | TICS Database Technology | JAP | J. Shibata |
| 4 | Automatic Vehicle and Equipment Identification | NO | K. Evensen |
| 5 | Fee and Toll Collection | NL | J. Engdahl |
| 6 | General Fleet Management | USA | dormant |
| 7 | General Fleet Management and Commercial Freight | CAN | L. Sabounghi |
| 8 | Public Transport – Emergency | USA | M. Olayi |
| 9 | Integrated Transport Information, Management, Control | AUS | D. Zabrieszach |
| 10 | Traveler Information Systems | UK | P. Burton |
| 11 | Route Guidance and Navigation Systems | GER | dormant |
| 12 | Parking Management/Off-Road Commercial | | dorman |
| 13 | Man-Machine Interface (Off-vehicle) | USA | dormant |
| 14 | Vehicle-Roadway Warning and Control Systems | JAP | M. Misumi |

| 15 | Dedicated Short Range Communications and For TICS Applications | GER | dormant |
|----|------------------------------------------------------------------|------|---------|
| 16 | Wide Area Communications-Protocols and Interfaces | USA | S. Sprouffske |
| 17 | Nomadic & Portable Devices for ITS Services | KOR | Y. Moon |
| 18 | Co-Operative Systems | GER | H-J. Schade |

**Figure 6: Working groups of ISO TC204 and the conveners for each group**

### 6.1.1 WG1 Architecture

WG1 is an active WG producing standards that mainly support ITS specification tasks. The WG is responsible for maintaining terms and dictionaries, and has links to basic ITS architectures such as the European FRAME work and the US National ITS Architecture work.

Several of the standards describe how to write other ITS standards, so this can be considered as meta-standards. Examples are how to include machine readable data definitions like XML and ASN.1 in the standards, and how to use UML effectively to describe architectures and processes in ITS standards

This Working Group continues to support and work with CEN TC278 WG16 and other WG's to assist in the creation of some of the standards for Cooperative ITS that are identified in the CEN/ETSI response to Mandate M/453.

| Reference | Document title | Reg. date | Crnt stage | Stage date |
|---|---|---|---|---|
| ISO/PWI 24097-3 | Intelligent transport systems -- System architecture, taxonomy and terminology -- Part 3: Elaboration of interoperable ITS web services' quality of services (QoS) | | 00.00 | 2013-08-15 |
| ISO/TR 24098:2007 | Intelligent transport systems -- System architecture, taxonomy and terminology -- Procedures for developing ITS deployment plans utilizing ITS system architecture | 2006-01-05 | 60.60 | 2007-03-09 |
| ISO/TR 26999:2012 | Intelligent transport systems -- Systems architecture -- Use of process-oriented methodology in ITS International Standards and other deliverables | 2012-04-01 | 60.60 | 2012-10-30 |
| ISO/TR 28682:2008 | Intelligent transport systems -- Joint APEC-ISO study of progress to develop and deploy ITS standards | 2005-10-01 | 60.60 | 2008-11-10 |
| ISO/NP 13189 | Business Case Template for ITS Projects | | 10.00 | 2010-08-31 |
| ISO/DTR 17465-1 | Intelligent transport systems -- Cooperative ITS -- Part 1: Terms and definitions | 2012-10-03 | 30.99 | 2013-09-12 |
| ISO/DTR 17465-2 | Intelligent transport systems -- Cooperative ITS -- Part 2: Guidelines for standards documents | 2012-10-03 | 30.99 | 2013-09-12 |
| ISO/DTR 17465-3 | Intelligent transport systems -- Cooperative ITS -- Part 3: Release procedures for standards documents | 2013-04-14 | 30.99 | 2013-09-12 |
| ISO/DIS 14813-1 | Intelligent transport systems -- Reference model architecture(s) for the ITS sector -- Part 1: ITS service domains, service groups and services | 2010-09-08 | 40.00 | 2013-10-24 |
| ISO/TR 12859:2009 | Intelligent transport systems -- System architecture -- Privacy aspects in ITS standards and systems | 2008-06-12 | 60.60 | 2009-05-28 |
| ISO/TR 14813-2:2000 | Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 2: Core TICS reference architecture | 1998-09-24 | 60.60 | 2000-12-21 |
| ISO 14813-5:2010 | Intelligent transport systems -- Reference model architecture(s) for the ITS sector -- Part 5: Requirements for architecture description in ITS standards | 2007-03-19 | 60.60 | 2010-06-29 |
| ISO 14813-6:2009 | Intelligent transport systems -- Reference model architecture(s) for the ITS sector -- Part 6: Data presentation in ASN.1 | 2006-03-05 | 60.60 | 2009-09-03 |
| ISO/TR 17452:2007 | Intelligent transport systems -- Using UML for defining and documenting ITS/TICS interfaces | 2006-01-15 | 60.60 | 2007-04-17 |
| ISO 24097-1:2009 | Intelligent transport systems -- Using web services (machine-machine delivery) for ITS service delivery -- Part 1: Realization of interoperable web services | 2006-01-05 | 60.60 | 2009-09-01 |
| ISO/TR 24529:2008 | Intelligent transport systems -- Systems architecture -- Use of unified modelling language (UML) in ITS International Standards and deliverables | 2005-10-15 | 60.60 | 2008-04-08 |
| ISO 24531:2013 | Intelligent transport systems -- System architecture, taxonomy and terminology -- Using XML in ITS standards, data registries and data dictionaries | 2010-09-08 | 60.60 | 2013-05-14 |

| | | | | |
|---|---|---|---|---|
| ISO/TR 24532:2006 | Intelligent transport systems -- Systems architecture, taxonomy and terminology -- Using CORBA (Common Object Request Broker Architecture) in ITS standards, data registries and data dictionaries | 2005-01-12 | 60.60 | 2006-06-09 |
| ISO/TR 25100:2012 | Intelligent transport systems -- Systems architecture -- Harmonization of ITS data concepts | 2011-04-26 | 60.60 | 2012-09-13 |
| ISO/TR 25102:2008 | Intelligent transport systems -- System architecture -- 'Use Case' pro-forma template | 2005-08-15 | 60.60 | 2008-02-07 |
| ISO/TR 25104:2008 | Intelligent transport systems -- System architecture, taxonomy, terminology and data modelling -- Training requirements for ITS architecture | 2005-08-15 | 60.60 | 2008-01-28 |
| ISO 14813-1:2007 | Intelligent transport systems -- Reference model architecture(s) for the ITS sector -- Part 1: ITS service domains, service groups and services | 2004-10-07 | 90.92 | 2010-09-08 |
| ISO/TR 14813-3:2000 | Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 3: Example elaboration | 1997-08-14 | 90.93 | 2009-01-15 |
| ISO/TR 14813-4:2000 | Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 4: Reference model tutorial | 1994-12-09 | 90.93 | 2009-01-15 |
| ISO 14817:2002 | Transport information and control systems -- Requirements for an ITS/TICS central Data Registry and ITS/TICS Data Dictionaries | 2001-07-10 | 90.93 | 2009-01-15 |
| ISO/TR 14813-1:1999 | Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 1: TICS fundamental services | 1998-08-26 | 95.99 | 2007-02-02 |
| ISO/TR 14813-5:1999 | Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 5: Requirements for architecture description in TICS standards | 1998-08-26 | 95.99 | 2010-06-29 |
| ISO/TR 14813-6:2000 | Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 6: Data presentation in ASN.1 | 1998-05-07 | 95.99 | 2009-09-03 |
| ISO 24531:2007 | Intelligent transport systems -- System architecture, taxonomy and terminology -- Using XML in ITS standards, data registries and data dictionaries | 2004-10-08 | 95.99 | 2013-05-14 |
| ISO/TR 25100:2008 | Intelligent transport systems -- Systems architecture -- Harmonization of ITS data concepts | 2005-08-15 | 95.99 | 2012-09-13 |

### 6.1.2  WG2 Quality and reliability requirements

This was a proposed WG from USA, but it never got the necessary support to start real work. This WG is fully dormant at this time.

### 6.1.3  WG3 Database technology

WG3 maintains the European Geographical Data Files (GDF) and will extend the current GDF 4.0 to a new GDF 5.0. GDF5.0 was approved as Draft International Standard (ISO/DIS14825) in June 2010. GDF is an international standard that is used to model, describe and transfer road networks and other geographic data. Major GDF5.0 enhancements include UML model migration & refinements; harmonization with linear referencing and geo-spatial web standards; support for 3-D content and time coordinates; comprehensive character set and phonetic representations; and new XML and SQL based delivery formats. Apart from that, this WG has mainly concentrated on map databases and common interfaces for navigation systems. WG3 includes several OEMs and will standardise the electronic map layers of LDM.

The following sub working groups are established:

SWG3.1: Geographic Data Files
SWG3.2: Physical Storage Format and Data Delivery
SWG3.3: Location Referencing
SWG3.4: (Passive) Application Programming Interface

This working group is supporting M/453 through WG18 providing map related functional requirements, data model (logical data model/logical data organization), and data elements for Local Dynamic Map for those applications of Cooperative ITS that require information derived from map databases (such as Cooperative Traveller Assistance). The scope will be focused on data elements of a static nature (see below ISO/NP 14296).

SWG3.3 Location Referencing sub-working group has been reactivated as the IS 17572 series standards are being revised. An active participation of WG18 and TISA has been requested by the sub-working group.

| Reference | Document title | Reg. date | Crnt stage | Stage date |
|-----------|----------------|-----------|------------|------------|
| ISO/TS 17931:2013 | Intelligent transport systems -- Extension of map database specifications for Local Dynamic Map for applications of Cooperative ITS | 2012-01-19 | 60.60 | 2013-06-19 |
| ISO 24099:2011 | Navigation data delivery structures and protocols | 2006-04-15 | 60.60 | 2011-01-06 |
| ISO/PWI 14826 | Physical storage for TICS database technology | | 00.00 | 2006-07-06 |
| ISO/PWI 19297 | Shareable geospatial database for ITS applications | | 00.00 | 2013-07-09 |
| ISO/AWI 14296 | Intelligent Transport Systems -- Extension of map database specifications for applications of cooperative ITS | 2011-04-26 | 20.00 | 2013-07-24 |
| ISO/DIS 17572-1 | Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 1: General requirements and conceptual model | 2013-01-10 | 40.99 | 2013-08-15 |
| ISO/DIS 17572-2 | Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 2: Pre-coded location references (pre-coded profile) | 2013-01-10 | 40.99 | 2013-08-15 |
| ISO/DIS 17572-3 | Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 3: Dynamic location references (dynamic profile) | 2013-01-10 | 40.99 | 2013-08-15 |
| ISO 14825:2011 | Intelligent transport systems -- Geographic Data Files (GDF) -- GDF5.0 | 2009-06-11 | 60.60 | 2011-07-08 |
| ISO 17267:2009 | Intelligent transport systems -- Navigation systems -- Application programming interface (API) | 2007-07-19 | 60.60 | 2009-11-04 |

| ISO 17572-3:2008/Cor 1:2009 | Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 3: Dynamic location references (dynamic profile) -- Technical Corrigendum 1 | 2009-06-15 | 60.60 | 2009-07-09 |
|---|---|---|---|---|
| ISO/TS 20452:2007 | Requirements and Logical Data Model for a Physical Storage Format (PSF) and an Application Program Interface (API) and Logical Data Organization for PSF used in Intelligent Transport Systems (ITS) Database Technology | 2005-07-30 | 90.20 (Start date: 2013-10-15 End date: 2014-03-18) | 2013-10-15 |
| ISO 17572-1:2008 | Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 1: General requirements and conceptual model | 2007-03-09 | 90.92 | 2013-01-10 |
| ISO 17572-2:2008 | Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 2: Pre-coded location references (pre-coded profile) | 2007-03-09 | 90.92 | 2013-01-10 |
| ISO 17572-3:2008 | Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 3: Dynamic location references (dynamic profile) | 2007-03-09 | 90.92 | 2013-01-10 |
| ISO 14825:2004 | Intelligent transport systems -- Geographic Data Files (GDF) -- Overall data specification | 1998-05-20 | 95.99 | 2011-07-08 |
| ISO/TR 14825:1996 | Geographic Data Files (GDF) | 1994-12-09 | 95.99 | 2004-02-03 |

### 6.1.4   WG4 Automatic Vehicle and Equipment Identification (AVI/AEI)
This WG is fully joint with CEN TC278/WG12. Please refer the work item status there.

### 6.1.5   WG5: Electronic Fee Collection (EFC)
This is a fully joint WG with CEN WG1. Please refer the work item status there.

### 6.1.6   WG7: Commercial Fleet Management
WG7 was passive for a long time, but was restarted based on needs from US Army to manage and control goods transport to their military deployed areas around the world. Japan and Australia has also become quite active here the last year in order to look at combined, end-to-end transports involving everything from Electronic Digital Identification to RFID tagging. As mentioned, WG2 in CEN has been restarted as a European companion to extend the work into Cooperative ITS. Much of the work in ISO WG7 is also linked to work that will be carried out in CEN TC278/WG2.

The scope of WG7 is intermodal in its nature, and there is a close relationship with WG4 (AVI/AEI) including some joint meetings. The main adopted standard relates to hazardous materials electronic marking, and this may be relevant for controlling and monitoring access of dangerous goods to sensitive areas (city centres, tunnels etc). Japan and Australia is currently doing significant work to improve multimodal interchanges.

This WG may be important to follow regarding standardised solutions for "green (and safe) transport". Efforts to decrease fuel consumption, better usage of multimodal transport, good overview of trailers to minimize empty carriage transport etc. will all be part of a green transport effort, and is linked to the EC directives and actions like iMobility Support.

| Reference | Document title | Reg. date | Crnt stage | Stage date |
|---|---|---|---|---|
| ISO/NP 26683-3 | Intelligent transport systems -- Freight and conveyance content identification and communication architecture -- Part 3: Handling of cargo stress information during road transport | | 10.00 | 2010-10-21 |
| ISO/NP TS 26683-3 | Intelligent transport systems -- Freight land conveyance content identification and communication architecture -- Part 3: Monitoring cargo stress measurement information during road transport | | 10.00 | 2010-10-21 |
| ISO/NP TS 15638-4 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 4: System security requirements | 2011-04-26 | 10.99 | 2011-04-26 |
| ISO/NP 18495 | Intelligent transport systems -- New manufactured vehicles visibility in the supply chain | 2013-03-13 | 10.99 | 2013-03-13 |
| ISO/DTS 15638-13 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 13: Mass Penalties and Levies (VMC) | 2012-05-03 | 30.92 | 2013-08-27 |
| ISO/CD 15638-13 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 13: Mass Penalties and Levies (VMC) | 2012-05-04 | 30.92 | 2013-08-27 |
| ISO/CD 15638-9 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 9: Remote electronic tachograph monitoring (RTM) | 2012-05-03 | 30.99 | 2013-01-11 |
| ISO/CD 15638-10 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 10: Emergency messaging system/eCall (EMS) | 2012-05-03 | 30.99 | 2013-01-11 |

| | | | | |
|---|---|---|---|---|
| ISO/CD 15638-18 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 18: ADR (Dangerous Goods) transport monitoring (ADR) | 2012-05-04 | 30.99 | 2013-01-11 |
| ISO/CD 15638-19 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 19: Vehicle parking facilities (VPF) | 2012-05-04 | 30.99 | 2013-01-11 |
| ISO/DIS 15638-6 | Intelligent transport systems -- Framework for cooperative telematics applications for regulated commercial freight Vehicles (TARV) -- Part 6: Regulated applications | 2011-04-26 | 40.60 | 2013-10-05 |
| ISO/DIS 15638-8 | Intelligent transport systems -- Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) -- Part 8: Vehicle access management | 2012-05-03 | 40.60 | 2013-10-05 |
| ISO/DIS 15638-11 | Intelligent transport systems -- Framework for cooperative telematics applications for Regulated commercial freight vehicles (TARV) -- Part 11: Driver work records | 2012-05-03 | 40.60 | 2013-10-05 |
| ISO/DIS 15638-12 | Intelligent transport systems -- Framework for cooperative telematics applications for Regulated commercial freight vehicles (TARV) -- Part 12: Vehicle mass monitoring | 2012-05-03 | 40.60 | 2013-10-05 |
| ISO/DIS 15638-14 | Intelligent transport systems -- Framework for cooperative telematics applications for Regulated commercial freight vehicles (TARV) -- Part 14: Vehicle access control | 2012-05-04 | 40.60 | 2013-10-05 |
| ISO/DIS 15638-15 | Intelligent transport systems -- Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) -- Part 15: Vehicle location monitoring | 2012-05-04 | 40.60 | 2013-10-05 |
| ISO/DIS 15638-16 | Intelligent transport systems -- Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) -- Part 16: Vehicle speed monitoring | 2012-05-04 | 40.60 | 2013-10-05 |
| ISO/DIS 15638-17 | Intelligent transport systems -- Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) -- Part 17: Consignment and location monitoring | 2012-05-04 | 40.60 | 2013-10-05 |
| ISO/PRF TS 17187 | Intelligent transport systems -- Electronic information exchange to facilitate the movement of freight and its intermodal transfer -- Governance rules to sustain electronic information exchange methods | 2013-04-05 | 50.20 (Start date: 2013-10-23 End date: 2013-11-07) | 2013-10-23 |
| ISO 15638-1:2012 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 1: Framework and architecture | 2011-04-26 | 60.60 | 2012-11-14 |
| ISO 15638-2:2013 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 2: Common platform parameters using CALM | 2011-04-26 | 60.60 | 2013-06-03 |
| ISO 15638-3:2013 | Intelligent transport systems -- Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) -- Part 3: Operating requirements, 'Approval Authority' procedures, and enforcement provisions for the providers of regulated services | 2011-04-26 | 60.60 | 2013-06-03 |
| ISO 15638-5:2013 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 5: Generic vehicle information | 2011-04-26 | 60.60 | 2013-06-03 |
| ISO 15638-7:2013 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 7: Other applications | 2011-04-26 | 60.60 | 2013-06-03 |
| ISO/TS 24533:2012 | Intelligent transport systems -- Electronic information exchange to facilitate the movement of freight and its intermodal transfer -- Road transport information exchange methodology | 2010-11-04 | 60.60 | 2012-07-11 |
| ISO 26683-1:2013 | Intelligent transport systems -- Freight land conveyance content identification and communication -- Part 1: Context, architecture and referenced standards | 2010-09-28 | 60.60 | 2013-03-14 |
| ISO 26683-2:2013 | Intelligent transport systems -- Freight land conveyance content identification and communication -- Part 2: Application interface profiles | 2010-10-21 | 60.60 | 2013-02-15 |
| ISO/TS 15638-6:2013 | Intelligent transport systems --- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 6: Regulated applications | 2011-04-26 | 90.92 | 2013-08-20 |
| ISO/TS 15638-8:2013 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 8: Vehicle access monitoring (VAM) | 2012-05-03 | 90.92 | 2013-08-20 |

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|---|---|---|---|---|
| ISO/TS 15638-9:2013 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 9: Remote electronic tachograph monitoring (RTM) | 2012-05-03 | 90.92 | 2013-08-20 |
| ISO/TS 15638-10:2013 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 10: Emergency messaging system/eCall (EMS) | 2012-05-03 | 90.92 | 2013-08-20 |
| ISO/TS 15638-11:2013 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 11: Driver work records (work and rest hours compliance) (DWR) | 2012-05-03 | 90.92 | 2013-08-20 |
| ISO/TS 15638-12:2013 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 12: Vehicle mass monitoring (VMM) | 2012-08-31 | 90.92 | 2013-08-20 |
| ISO/TS 15638-14:2013 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 14: Vehicle access control (VAC) | 2012-05-03 | 90.92 | 2013-09-16 |
| ISO/TS 15638-15:2013 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 15: Vehicle location monitoring (VLM) | 2012-05-03 | 90.92 | 2013-08-20 |
| ISO/TS 15638-16:2013 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 16: Vehicle speed monitoring (VSM) | 2012-05-03 | 90.92 | 2013-09-16 |
| ISO/TS 15638-17:2013 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 17: Consignment and location monitoring (CLM) | 2012-05-03 | 90.92 | 2013-09-16 |
| ISO/TS 15638-18:2013 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 18: ADR (Dangerous Goods) transport monitoring (ADR) | 2012-05-03 | 90.92 | 2013-09-16 |
| ISO/TS 15638-19:2013 | Intelligent transport systems -- Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) -- Part 19: Vehicle parking facilities (VPF) | 2012-08-31 | 90.92 | 2013-09-16 |
| ISO 17687:2007 | Transport Information and Control Systems (TICS) -- General fleet management and commercial freight operations -- Data dictionary and message sets for electronic identification and monitoring of hazardous materials/dangerous goods transportation | 2000-06-05 | 90.93 | 2010-07-15 |
| ISO/TS 26683-1:2012 | Intelligent transport systems -- Freight land conveyance content identification and communication (FLC-CIC) -- Part 1: Context, architecture and referenced standards | 2010-10-21 | 95.99 | 2013-03-14 |
| ISO/TS 26683-2:2012 | Intelligent transport systems -- Freight land conveyance content identification and communication (FLC-CIC) -- Part 2: Application interface profiles | 2010-10-21 | 95.99 | 2013-02-15 |

### 6.1.7 WG8: Public Transport and Emergency services

WG8 has not been very active, and has a split scope since it covers both public transport and emergency services. It seems that WG8 is moving closer to the more active CEN TC278/WG3 as far as public transport is concerned. There is some exchange of documents and experts in the domain for ticketing system standards between the groups.

Reaching good cooperation between different transports systems is an important area for effective transport of people and goods, in addition to effective emergency handling.

| Reference | Document title | Reg. date | Crnt stage | Stage date |
|---|---|---|---|---|
| ISO/PWI TR 19415 | Intelligent transport systems -- Public transport - Conformance test guidelines of fare media and reader in public transport | | 00.00 | 2013-08-15 |
| ISO/NP 17185-2 | Intelligent transport systems -- Public transport user information -- Part 2: Data and interface standards catalogue and cross reference | | 10.00 | 2012-02-10 |
| ISO/NP 17185-3 | Intelligent transport systems -- Public transport user information -- Part 3: Use cases for journey planning systems and their interoperation | | 10.00 | 2012-02-10 |
| ISO/NP 17185-4 | Intelligent transport systems -- Part 4: Mobile architecture designs promoting competition and integration across varying mobile platforms | | 10.00 | 2012-02-10 |
| ISO/NP 17185-5 | Intelligent transport systems -- Part 5: Governance of mandatory public transport standards | | 10.00 | 2012-02-10 |
| ISO/NP 17185-6 | Intelligent transport systems -- Part 6: Modelling stops and network topology | | 10.00 | 2012-02-10 |
| ISO/NP 17185-7 | Intelligent transport systems -- Part 7: Conformance test of interoperable fare management system (ISO 24014-1) | | 10.00 | 2012-02-10 |
| ISO/NP 17185-8 | Intelligent transport systems -- Part 8: Framework message architecture | | 10.00 | 2012-02-10 |
| ISO/DIS 17185-1 | Intelligent transport systems - Public transport user information -- Part 1: Standards framework for public information systems | 2012-09-11 | 40.60 | 2013-10-31 |
| ISO/TR 14806:2013 | Intelligent transport systems -- Public transport requirements for the use of payment applications for fare media | 2011-11-16 | 60.60 | 2013-06-19 |
| ISO/PWI 18525 | Intelligent transport systems -- Public transport/emergency -- Transit enterprise reference architecture (TERA) | | 00.00 | 2012-09-12 |
| ISO/NP 19083-2 | Intelligent transport systems -- Public transport -- Emergency evacuation and disaster response and recovery -- Part 2: Data flow | | 10.00 | 2013-06-15 |
| ISO/NP 19083-3 | Intelligent transport systems -- Public transport -- Emergency evacuation and disaster response and recovery -- Part 3: Use cases | | 10.00 | 2013-06-15 |
| ISO/NP 19083-1 | Intelligent transport systems -- Public transport -- Emergency evacuation and disaster response and recovery -- Part 1: Framework | | 10.60 | 2013-10-02 |
| ISO/NP 19373 | Intelligent transport systems -- Public transport -- Conformance test guidelines of fare media and reader in public transport | | 10.60 | 2013-10-02 |
| ISO/NP 24014-1 | Intelligent transport systems -- Interoperable fare management system -- Part 1: Architecture | 2012-02-10 | 10.99 | 2012-02-10 |
| ISO 22951:2009 | Data dictionary and message sets for preemption and prioritization signal systems for emergency and public transport vehicles (PRESTO) | 2007-03-20 | 60.60 | 2009-01-12 |
| ISO/TR 24014-2:2013 | Public transport -- Interoperable fare management system -- Part 2: Business practices | 2012-06-14 | 60.60 | 2013-08-07 |
| ISO/TR 24014-3:2013 | Public transport -- Interoperable fare management system -- Part 3: Complementary concepts to Part 1 for multi-application media | 2012-06-14 | 60.60 | 2013-04-04 |
| ISO 24014-1:2007 | Public transport -- Interoperable fare management system -- Part 1: Architecture | 2005-04-21 | 90.93 | 2010-09-22 |

### 6.1.8  WG9: Integrated Transport Information, Management and Control

This is a very active working group centred round the needs from Road Authorities for information interoperability and sharing. The WG is led by Dean Zabrieszach from Victoria Road Administration in Australia, and the WG consist of a mix of suppliers and authorities. Also refer to CENTC278/WG8.

WG9 spans a relatively wide area of ITS data centres including Centre-to-Centre and Centre-to-Roadside communications. The scope includes relevant interface protocols, data definitions/data dictionary, simulation models and quality of data. Since this is the "road authority" group in TC204, the WG has been assigned tasks related to policy questions and evolution of ITS. WG9 is trying to standardise roadside controller interfaces as well as central to central interfaces, but there seems to be some resistance and challenges to this undertaking.

WG9 is also in relatively close contact with CEN TC278/WG8 led by the Dutch road administration, but these WGs are not joint. WG9 is the home of DATEX-ASN in ISO. Also NTCIP which is the US protocol is hosted here.

*It is recommended to follow WG9 closely to be able to early see developments that can influence Road Authorities DATEX II work and real time transport information sharing internationally.*

| Reference | Document title | Reg. date | Crnt stage | Stage date |
|---|---|---|---|---|
| ISO/NP TS 19468 | Intelligent transport systems -- Data interfaces between centres for transport information and control systems -- Platform independent model specifications for data exchange protocols for transport information and control systems | | 10.00 | 2013-09-18 |
| ISO/AWI 19082 | Intelligent transport systems -- Architecture for signal control systems utilizing information collected by vehicle-to-infrastructure communication | 2013-09-16 | 20.00 | 2013-09-16 |
| ISO/CD 14827-3 | Intelligent transport systems -- Data interfaces between centres for transport information and control systems -- Part 3: Data interfaces between centres for intelligent transport systems (ITS) using XML | 2012-04-03 | 30.20 (Start date: 2013-10-26) | 2013-10-26 |
| ISO/DTR 16786 | Intelligent transport systems -- The use of simulation models for evaluation of traffic management systems: input parameters and reporting template for simulation of traffic signal control systems | 2011-08-08 | 30.99 | 2013-10-04 |
| ISO/DIS 15784-2 | Data Exchange involving roadside modules communication -- Part 2: Centre to Field Device Communication | 2009-12-18 | 40.20 (Start date: 2013-09-23 End date: 2013-12-24) | 2013-09-23 |
| ISO 10711:2012 | Intelligent Transport Systems -- Interface Protocol and Message Set Definition between Traffic Signal Controllers and Detectors | 2007-10-29 | 60.60 | 2012-01-12 |
| ISO/TR 21707:2008 | Intelligent transport systems -- Integrated transport information, management and control -- Data quality in ITS systems | 2005-12-15 | 60.60 | 2008-05-19 |
| ISO 15784-1:2008 | Intelligent transport systems (ITS) -- Data exchange involving roadside modules communication -- Part 1: General principles and documentation framework of application profiles | 2006-07-06 | 90.60 | 2012-03-17 |
| ISO 15784-3:2008 | Intelligent transport systems (ITS) -- Data exchange involving roadside modules communication -- Part 3: Application profile-data exchange (AP-DATEX) | 2006-06-15 | 90.60 | 2012-03-17 |
| ISO 14827-1:2005 | Transport information and control systems -- Data interfaces between centres for transport information and control systems -- Part 1: Message definition requirements | 2004-10-12 | 90.93 | 2009-05-11 |
| ISO 14827-2:2005 | Transport information and control systems -- Data interfaces between centres for transport information and control systems -- Part 2: DATEX-ASN | 2004-10-12 | 90.93 | 2009-05-11 |

### 6.1.9 WG10: Traveller Information Systems

This WG is parallel to CEN TC278/WG4 which recently went dormant. WG 10 has now taken over the main contact to TISA in the development of TPEG standards, and the standards responsibility has been moved from CEN/WG4 to here.

| Reference | Document title | Reg. date | Crnt stage | Stage date |
|---|---|---|---|---|
| ISO/NP TS 14823 | Intelligent transport systems -- Graphic data dictionary | 2012-02-10 | 10.99 | 2012-02-10 |
| ISO/TS 14823:2008 | Traffic and travel information -- Messages via media independent stationary dissemination systems -- Graphic data dictionary for pre-trip and in-trip information dissemination systems | 2005-10-04 | 90.92 | 2012-02-10 |
| ISO/NP TS 21219-1 | Intelligent transport systems -- Traffic and Travel Information via Transport Protocol Experts Group, generation 2 (TPEG2) -- Part 1: Introduction, numbering and versions (TPEG2-INV) | | 10.00 | 2012-11-12 |
| ISO/NP TS 21219-7 | Intelligent transport systems -- Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) -- Part 7: Location referencing container (TPEG2-LOC) | | 10.00 | 2012-11-12 |
| ISO/NP TS 21219-9 | Intelligent transport systems -- Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) -- Part 9: Service and network information (TPEG2-SNI) | | 10.00 | 2012-11-12 |
| ISO/NP TS 21219-10 | Intelligent transport systems -- Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) -- Part 10: Conditional access information (TPEG2-CAI) | | 10.00 | 2012-11-12 |
| ISO/NP TS 21219-14 | Intelligent transport systems -- Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) -- Part 14: Parking information application (TPEG2-PKI) | | 10.00 | 2012-11-12 |
| ISO/NP TS 21219-15 | Intelligent transport systems -- Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) -- Part 15: Traffic event compact (TPEG2-TEC) | | 10.00 | 2012-11-12 |
| ISO/NP TS 21219-16 | Intelligent transport systems -- Traffic and travel information (TTI) via transport protocol expert group, generation 2 (TPEG2) -- Part 16: Fuel price information application (TPEG2-FPI) | | 10.00 | 2012-11-12 |
| ISO/NP TS 21219-19 | Intelligent transport systems -- Traffic and travel information (TTI) via Transport protocol expert group, generation 2 (TPEG2) -- Part 19: Weather information for travellers application (TPEG2-WEA) | | 10.00 | 2012-11-12 |
| ISO/NP TS 21219-20 | Intelligent transport systems -- Traffic and travel information (TTI) via transport protocol expert group, generation 2 (TPEG2) -- Part 20: Extended TMC locations for applications (TPEG2-ETL) | | 10.00 | 2012-11-12 |
| ISO/NP TS 21219-21 | Intelligent transport systems -- Traffic and Travel Information via Transport Protocol Experts Group, generation 2 (TPEG2) -- Part 21: Geographic Location Referencing (TPEG-GLR) | | 10.00 | 2012-11-12 |
| ISO/NP TS 21219-22 | Intelligent transport systems -- Traffic and travel information (TTI) via transport protocol expert group, generation 2 (TPEG2) -- Part 22: OpenLR location reference (TPEG2-OLR) | | 10.00 | 2012-11-12 |
| ISO/NP TS 21219-23 | Intelligent transport systems -- Traffic and travel information via transport protocol experts group, generation 2 (TPEG2) -- Part 23: Roads and multi-modal routes (TPEG2-RMR) | | 10.00 | 2013-07-09 |
| ISO/PRF TS 21219-3 | Intelligent transport systems - Traffic and travel information (TTI) via transport protocol expert group, generation 2 (TPEG2) -- Part 3: UML to binary conversion rules | 2010-10-04 | 50.00 | 2013-02-15 |
| ISO/PRF TS 21219-4 | Intelligent transport systems -- Traffic and travel information (TTI) via transport protocol expert group, generation 2 (TPEG2) -- Part 4: UML to XML conversion rules | 2011-04-28 | 50.00 | 2013-02-15 |
| ISO/PRF TS 21219-5 | Intelligent transport systems - Traffic and travel information (TTI) via transport protocol expert group, generation 2 (TPEG2) -- Part 5: Service framework (TPEG2-SWF) | 2010-10-04 | 50.00 | 2013-02-15 |
| ISO/PRF TS 21219-6 | Intelligent transport systems - Traffic and travel information via transport protocol expert group, generation 2(TPEG2) -- Part 6: Message management container (TPEG2-MMC) | 2010-10-04 | 50.00 | 2013-02-15 |

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|---|---|---|---|---|
| ISO/PRF TS 21219-18 | Intelligent transport systems - Traffic and travel information (TTI) via transport protocol expert group, generation 2 (TPEG2) -- Part 18: Traffic flow and prediction application (TPEG2-TFP) | 2010-10-04 | 50.00 | 2013-07-16 |
| ISO/PRF TS 21219-2 | Intelligent transport systems -- Traffic and travel information (TTI) via transport protocol expert group, generation 2 (TPEG2) -- Part 2: UML modelling rules | 2010-10-04 | 50.60 | 2013-04-08 |
| ISO 14819-1 | Intelligent transport systems -- Traffic and travel information messages via traffic message coding -- Part 1: Coding protocol for Radio Data System -- Traffic Message Channel (RDS-TMC) using ALERT-C | 2011-02-07 | 60.00 | 2013-10-28 |
| ISO 14819-2 | Intelligent transport systems -- Traffic and travel information messages via traffic message coding -- Part 2: Event and information codes for Radio Data System -- Traffic Message Channel (RDS-TMC) using ALERT-C | 2011-02-07 | 60.00 | 2013-10-28 |
| ISO 14819-3 | Intelligent transport systems -- Traffic and travel information messages via traffic message coding -- Part 3: Location referencing for Radio Data System -- Traffic Message Channel (RDS-TMC) using ALERT-C | 2011-02-07 | 60.00 | 2013-10-28 |
| ISO/TS 18234-1:2013 | Intelligent transport systems -- Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format -- Part 1: Introduction, numbering and versions (TPEG1-INV) | 2010-10-04 | 60.60 | 2013-10-10 |
| ISO/TS 18234-3:2013 | Intelligent transport systems -- Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format -- Part 3: Service and network information (TPEG1-SNI) | 2011-02-01 | 60.60 | 2013-01-14 |
| ISO/TS 18234-7:2013 | Intelligent transport systems -- Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format -- Part 7: Parking information (TPEG1-PKI) | 2011-02-02 | 60.60 | 2013-10-10 |
| ISO/TS 18234-8:2012 | Intelligent transport systems -- Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format -- Part 8: Congestion and Travel Time application (TPEG1-CTT) | 2007-03-01 | 60.60 | 2012-10-02 |
| ISO/TS 18234-9:2013 | Intelligent transport systems -- Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format -- Part 9: Traffic event compact (TPEG1-TEC) | 2011-02-02 | 60.60 | 2013-10-10 |
| ISO/TS 18234-10:2013 | Intelligent transport systems -- Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format -- Part 10: Conditional access information (TPEG1-CAI) | 2011-02-02 | 60.60 | 2013-10-10 |
| ISO/TS 18234-11:2013 | Intelligent transport systems -- Traffic and Travel Information (TTI) via transport protocol experts group, generation 1 (TPEG1) binary data format -- Part 11: Location Referencing Container (TPEG1-LRC) | 2011-04-28 | 60.60 | 2013-01-15 |
| ISO 14819-1:2003 | Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 1: Coding protocol for Radio Data System -- Traffic Message Channel (RDS-TMC) using ALERT-C | 2002-02-06 | 90.92 | 2011-01-27 |
| ISO 14819-2:2003 | Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 2: Event and information codes for Radio Data System -- Traffic Message Channel (RDS-TMC) | 1997-08-14 | 90.92 | 2011-01-27 |
| ISO 14819-3:2004 | Traffic and Travel Information (TTI) -- TTI messages via traffic message coding -- Part 3: Location referencing for ALERT-C | 2001-06-22 | 90.92 | 2011-01-27 |
| ISO 14819-6:2006 | Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 6: Encryption and conditional access for the Radio Data System -- Traffic Message Channel ALERT C coding | 2004-05-07 | 90.93 | 2009-11-23 |
| ISO/TS 18234-4:2006 | Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 4: Road Traffic Message (RTM) application | 2006-02-02 | 90.93 | 2009-10-31 |
| ISO/TS 18234-5:2006 | Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 5: Public Transport Information (PTI) application | 2002-05-19 | 90.93 | 2009-10-30 |
| ISO/TS 18234-6:2006 | Traffic and Travel Information (TTI) - TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 6: Location referencing applications | 2003-01-09 | 90.93 | 2009-10-31 |

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|---|---|---|---|---|
| ISO/TS 24530-1:2006 | Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 1: Introduction, common data types and tpegML | 2004-06-01 | 90.93 | 2009-10-31 |
| ISO/TS 24530-2:2006 | Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 2: tpeg-locML | 2004-06-01 | 90.93 | 2009-10-31 |
| ISO/TS 24530-3:2006 | Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 3: tpeg-rtmML | 2004-06-01 | 90.93 | 2009-10-31 |
| ISO/TS 24530-4:2006 | Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 4: tpeg-ptiML | 2004-06-01 | 90.93 | 2009-10-31 |
| ISO/TS 14819-3:2000 | Traffic and Travel Information (TTI) -- TTI messages via traffic message coding -- Part 3: Location referencing for ALERT-C | 1998-10-02 | 95.99 | 2005-08-22 |
| ISO/TS 14822-1:2006 | Traffic and Travel Information -- General specifications for medium-range pre-information via dedicated short-range communication -- Part 1: Downlink | 2004-04-15 | 95.99 | 2009-10-20 |
| ISO/TS 18234-1:2006 | Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 1: Introduction, numbering and versions | 2006-02-02 | 95.99 | 2013-10-10 |
| ISO/TS 18234-2:2006 | Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 2: Syntax, Semantics and Framing Structure (SSF) | 2006-02-02 | 95.99 | 2013-10-10 |
| ISO/TS 18234-3:2006 | Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 3: Service and Network Information (SNI) application | 2006-02-02 | 95.99 | 2013-01-14 |

### 6.1.10 WG14: Vehicle Control Systems

This WG is standardizing performance requirements and test procedures for many of the new ITS features in cars, such as automatic parking, intelligent cruise control, backing-up aid, lane departure warning, collision warning and so on. Both vehicle manufacturers and authorities are well represented. This is one of the more active and productive WGs; not in the number of produced standards, but in the consistent deployment of these standards into vehicles on the road today.

New work is under way, and the long term trend is moving towards a more and more automated driver support systems based on advanced sensors enhanced by cooperative awareness of the surroundings. A study of automated driving with no human interaction is on-going, and standards for this field are likely to be required soon.

Since this WG is closely related to road vehicles, this particular WG is under scrutiny from ISO TC22 who wants to take over this responsibility. This proposal is not accepted by TC204, and at the time of writing the issue is still open.

ISO TC 204 WG14 and ETSI TC ITS WG1 are co-developing the draft CIWS (ISO: Cooperative Intersection signal information and violation Warning Systems) & ICRW (ETSI: Intersection Collision Risk Warning) and will develop compatible standards which enables the development of interoperable systems with the aim of achieving globally accepted standards.

The convenor of WG14 has been recently changed: the new convenor – nominated by Japan – is Mr. Misanori Misumi from Mazda Motor Corporation.

WG14 is interesting in the results of the ongoing Automation Working Group of iMobility Forum.

| Reference | Document title | Reg. date | Crnt stage | Stage date |
|---|---|---|---|---|
| ISO/DIS 11270 | Intelligent transport systems -- Lane keeping assistance systems (LKAS) -- Performance requirements and test procedures | 2010-02-04 | 40.99 | 2013-08-15 |
| ISO 22178:2009 | Intelligent transport systems -- Low speed following (LSF) systems -- Performance requirements and test procedures | 2006-03-15 | 60.60 | 2009-03-23 |
| ISO 22179:2009 | Intelligent transport systems -- Full speed range adaptive cruise control (FSRA) systems -- Performance requirements and test procedures | 2006-03-06 | 60.60 | 2009-08-31 |
| ISO/PWI 19237 | Intelligent Transport Systems -- Pedestrian Collision Mitigation Systems -- Operation, Performance, and Verification Requirements | | 00.00 | 2013-06-07 |
| ISO/NP 18682 | Intelligent Transport Systems -- Basic requirements for cooperative awareness systems (CAS) | | 10.00 | 2012-12-01 |
| ISO/AWI 16787 | Intelligent Transport Systems - Assisted Parking System (APS) - Parking with reference to other parked vehicles - Performance and Test Procedures | 2013-10-08 | 20.00 | 2013-10-08 |
| ISO/CD 11067 | Intelligent transport systems -- Curve speed warning systems (CSWS) -- Performance requirements and test procedures | 2012-03-29 | 30.99 | 2013-04-04 |
| ISO/DIS 26684 | Intelligent transport systems -- Cooperative intersection signal information and violation warning systems (CIWS) -- Performance requirements and test procedures | 2009-10-09 | 40.99 | 2013-08-15 |
| ISO 15622:2010 | Intelligent transport systems -- Adaptive Cruise Control systems -- Performance requirements and test procedures | 2007-07-19 | 60.60 | 2010-04-08 |
| ISO 15623:2013 | Intelligent transport systems -- Forward vehicle collision warning systems -- Performance requirements and test procedures | 2010-05-05 | 60.60 | 2013-07-23 |
| ISO/TS 15624:2001 | Transport information and control systems -- Traffic Impediment Warning Systems (TIWS) -- System requirements | 1996-10-01 | 60.60 | 2001-01-18 |

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|---|---|---|---|---|
| ISO 17386:2010 | Transport information and control systems -- Manoeuvring Aids for Low Speed Operation (MALSO) -- Performance requirements and test procedures | 2008-06-10 | 60.60 | 2010-03-10 |
| ISO 22839:2013 | Intelligent transport systems -- Forward vehicle collision mitigation systems -- Operation, performance, and verification requirements | 2010-04-15 | 60.60 | 2013-05-24 |
| ISO 22840:2010 | Intelligent transport systems -- Devices to aid reverse manoeuvres -- Extended-range backing aid systems (ERBA) | 2006-04-15 | 60.60 | 2010-03-30 |
| ISO 17387:2008 | Intelligent transport systems -- Lane change decision aid systems (LCDAS) -- Performance requirements and test procedures | 2005-04-22 | 90.60 | 2011-09-17 |
| ISO 17361:2007 | Intelligent transport systems -- Lane departure warning systems -- Performance requirements and test procedures | 2004-03-17 | 90.93 | 2010-07-21 |
| ISO 15622:2002 | Transport information and control systems -- Adaptive Cruise Control Systems -- Performance requirements and test procedures | 1996-10-01 | 95.99 | 2010-04-08 |
| ISO 15623:2002 | Transport information and control systems -- Forward vehicle collision warning systems -- Performance requirements and test procedures | 1996-10-01 | 95.99 | 2013-07-23 |
| ISO 17386:2004 | Transport information and control systems -- Manoeuvring Aids for Low Speed Operation (MALSO) -- Performance requirements and test procedures | 1999-04-28 | 95.99 | 2010-03-10 |

### 6.1.11  WG16: Wide Area Communications

This is one of the most productive ISO TC204 WGs.

The main output is the CALM standard series (Communications Access for Land Mobiles) of communications standards. This WG is also handling vehicle probe data systems (called floating car data in Europe) and security issues, and has taken over maintenance of DSRC in ISO. A cooperation agreement with ETSI means that conformance test standards for CALM are developed by ETSI TC ITS WG2. CALM has been tested and validated in several European projects such as CVIS (Cooperative Vehicle-Infrastructure System) and SAFESPOT (European Integrated Project on cooperative vehicular systems for road safety), and is now used as the baseline in several new projects.

The convenor is delegated by the US TAG, Mr. Steve Sprouffske from Kapsch.

| Reference | Document title | Reg. date | Crnt stage | Stage date |
|---|---|---|---|---|
| ISO/PWI 16461 | Intelligent transport systems -- Criteria for privacy and integrity protection in probe vehicle information systems | | 00.20 (Start date: 2010-05-27) | 2010-05-27 |
| ISO/PWI 13181-1 | Intelligent Transport Systems - Communications Access for Land Mobiles (CALM) - Security -- Part 1: Framework | | 00.00 | 2008-11-14 |
| ISO/PWI 13181-2 | Intelligent Transport Systems - Communications Access for Land Mobiles (CALM) - Security -- Part 2: Threat, vulnerability and risk anlaysis | | 00.00 | 2008-11-14 |
| ISO/PWI 13181-3 | Intelligent Transport Systems - Communications Access for Land Mobiles (CALM) - Security -- Part 3: Objectives and Requirements | | 00.00 | 2008-11-14 |
| ISO/PWI 13181-4 | Intelligent Transport Systems - Communications Access for Land Mobiles (CALM) - Security -- Part 4: Countermeasures | | 00.00 | 2008-11-14 |
| ISO/PWI 19405 | Intelligent transport systems -- Communications access for land mobiles (CALM) - IPv6 over low power wireless personal area networks (6LowPAN) | | 00.00 | 2013-08-15 |
| ISO/PWI 19406 | Intelligent transport systems -- Communications access for land mobiles (CALM) - Constrained application protocol (CoAP) | | 00.00 | 2013-08-15 |
| ISO/PWI 16444 | Intelligent Transport Systems -- Communications access for land mobiles (CALM) -- Geo-routing | | 00.20 (Start date: 2010-05-27) | 2010-05-27 |
| ISO/PWI 16445 | Intelligent Transport Systems -- Communications access for land mobiles (CALM) -- Handover mechanisms | | 00.20 (Start date: 2010-05-27) | 2010-05-27 |
| ISO/NP 24100 | Intelligent transport systems -- Basic principles for personal data protection in probe vehicle information services | | 10.00 | 2011-04-26 |
| ISO/NP 16460 | Intelligent Transport Systems -- Communications access for land mobiles (CALM) -- WAVE | | 10.20 (Start date: 2013-11-01) | 2013-11-01 |
| ISO/NP 19414 | Intelligent transport systems -- Service architecture of probe vehicle systems | | 10.20 (Start date: 2013-11-01) | 2013-11-01 |
| ISO/DIS 21217 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Architecture | 2012-02-13 | 40.99 | 2013-08-15 |
| ISO/TR 11766:2010 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Security considerations for lawful interception | 2008-02-10 | 60.60 | 2010-03-29 |
| ISO/TR 11769:2010 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Data retention for law enforcement | 2008-02-10 | 60.60 | 2010-09-21 |
| ISO 21216:2012 | Intelligent transport systems -- Communication access for land mobiles (CALM) -- Millimetre wave air interface | 2011-04-26 | 60.60 | 2012-03-12 |
| ISO 29281-1:2013 | Intelligent transport systems -- Communication access for land mobiles (CALM) -- Non-IP networking -- Part 1: Fast networking & transport layer protocol (FNTP) | 2012-02-13 | 60.60 | 2013-04-11 |
| ISO 29281-2:2013 | Intelligent transport systems -- Communication access for land mobiles (CALM) -- Non-IP networking -- Part 2: Legacy system support | 2012-02-13 | 60.60 | 2013-04-11 |

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|---|---|---|---|---|
| ISO 29282:2011 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Satellite networks | 2008-12-29 | 60.60 | 2011-07-07 |
| ISO 29283:2011 | ITS CALM Mobile Wireless Broadband applications using Communications in accordance with IEEE 802.20 | 2008-09-02 | 60.60 | 2011-01-26 |
| ISO 21217:2010 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Architecture | 2007-09-14 | 90.92 | 2012-02-13 |
| ISO 24100:2010 | Intelligent transport systems -- Basic principles for personal data protection in probe vehicle information services | 2006-09-04 | 90.92 | 2011-04-26 |
| ISO 21216:2011 | Intelligent transport systems -- Wireless communications -- CALM using millimetre communications -- Air interface | 2010-07-22 | 95.99 | 2012-03-12 |
| ISO 29281:2011 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Non-IP networking | 2007-11-22 | 95.99 | 2013-04-11 |
| ISO/PWI 16788 | Intelligent Transport Systems -- Communications access for land mobiles (CALM) -- IPv6 Networking Security | | 00.00 | 2010-11-17 |
| ISO/PWI 16789 | Intelligent Transport Systems -- Communications access for land mobiles (CALM) -- IPv6 Networking Optimisation | | 00.00 | 2010-11-17 |
| ISO/NP 18376 | Intelligent Transport Systems -- Criteria for Privacy and Integrity protection in Probe Vehicle Information Systems | | 10.00 | 2012-06-07 |
| ISO/NP 18378 | Intelligent Transport Systems -- Communications access for land mobiles (CALM) - Multicast | | 10.00 | 2012-06-07 |
| ISO/NP 18380 | Intelligent Transport Systems -- Communications access for land mobiles (CALM) - IPv4-IPv6 interoperability | | 10.00 | 2012-06-07 |
| ISO/NP 19079 | Intelligent Transport Systems -- Communications access for land mobiles (CALM) -- 6LoWPAN networking | | 10.00 | 2012-12-10 |
| ISO/NP 19080 | Intelligent Transport Systems -- Communications access for land mobiles (CALM) - CoAP facility | | 10.00 | 2012-12-10 |
| ISO/NP 22837 | Vehicle probe data for wide area communications | | 10.00 | 2011-04-26 |
| ISO/NP TS 25114 | Intelligent transport systems -- Probe data reporting management (PDRM) | | 10.00 | 2011-04-26 |
| ISO/NP 18317 | Intelligent transport systems -- Pre-emption of ITS communication networks for disaster relief and emergency communications | | 10.20 (Start date: 2013-11-01) | 2013-11-01 |
| ISO/NP 18377 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- CALM conformance requirements | | 10.20 (Start date: 2013-11-01) | 2013-11-01 |
| ISO/NP 15662 | Intelligent transport systems -- Wide area communication -- Protocol management information | 2012-02-13 | 10.99 | 2012-02-13 |
| ISO/NP 24102-2 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- ITS station management -- Part 2: Remote management | 2012-02-13 | 10.99 | 2012-02-13 |
| ISO/NP 24102-6 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- ITS station management -- Part 6: Path and flow management | 2012-06-07 | 10.99 | 2012-06-07 |
| ISO/AWI 17515-1 | Intelligent transport systems -- Communications access for land mobiles (CALM) - Evolved Universal Terrestrial Radio Access Network (E-UTRAN) -- Part 1: General usage | 2013-08-16 | 20.00 | 2013-08-16 |
| ISO/DIS 21214 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Infra-red systems | 2010-07-13 | 40.99 | 2011-08-30 |
| ISO 13183:2012 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Using broadcast communications | 2010-04-06 | 60.60 | 2012-04-26 |
| ISO 15628:2013 | Intelligent transport systems -- Dedicated short range communication (DSRC) -- DSRC application layer | 2012-10-23 | 60.60 | 2013-11-04 |
| ISO 21210:2012 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- IPv6 Networking | 2007-04-27 | 60.60 | 2012-06-14 |
| ISO 21215:2010 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- M5 | 2008-02-04 | 60.60 | 2010-11-05 |

| | | | | |
|---|---|---|---|---|
| ISO 21218:2013 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Access technology support | 2012-02-13 | 60.60 | 2013-02-21 |
| ISO 24101-2:2010 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Application management -- Part 2: Conformance test | 2008-03-03 | 60.60 | 2010-08-30 |
| ISO 24102-1:2013 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- ITS station management -- Part 1: Local management | 2012-02-13 | 60.60 | 2013-06-24 |
| ISO 24102-3:2013 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- ITS station management -- Part 3: Service access points | 2012-02-13 | 60.60 | 2013-06-24 |
| ISO 24102-4:2013 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- ITS station management -- Part 4: Station-internal management communications | 2012-02-13 | 60.60 | 2013-06-24 |
| ISO 24102-5:2013 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- ITS station management -- Part 5: Fast service advertisement protocol (FSAP) | 2012-02-13 | 60.60 | 2013-06-24 |
| ISO 24103:2009 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Media adapted interface layer (MAIL) | 2007-02-27 | 60.60 | 2009-05-26 |
| ISO 24978:2009 | Intelligent transport systems -- ITS Safety and emergency messages using any available wireless media --  Data registry procedures | 2005-11-15 | 60.60 | 2009-09-29 |
| ISO 25111:2009 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- General requirements for using public networks | 2005-07-22 | 60.60 | 2009-10-30 |
| ISO 25112:2010 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Mobile wireless broadband using IEEE 802.16 | 2006-09-04 | 60.60 | 2010-02-25 |
| ISO 25113:2010 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Mobile wireless broadband using HC-SDMA | 2006-09-04 | 60.60 | 2010-02-25 |
| ISO/TS 29284:2012 | Intelligent transport systems -- Event-based probe vehicle data | 2008-09-12 | 60.60 | 2012-12-13 |
| ISO 21212:2008 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- 2G Cellular systems | 2006-11-03 | 90.60 | 2012-03-17 |
| ISO 21213:2008 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- 3G Cellular systems | 2006-11-03 | 90.60 | 2012-03-17 |
| ISO 24101-1:2008 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Application management -- Part 1: General requirements | 2007-07-31 | 90.60 | 2011-06-17 |
| ISO 21214:2006 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Infra-red systems | 2003-12-15 | 90.92 | 2008-04-11 |
| ISO 22837:2009 | Vehicle probe data for wide area communications | 2007-02-03 | 90.92 | 2011-04-26 |
| ISO 24102:2010 | Intelligent transport systems -- Communications access for land mobiles (CALM) -- Management | 2006-11-13 | 90.92 | 2012-02-13 |
| ISO/TS 25114:2010 | Intelligent transport systems -- Probe data reporting management (PDRM) | 2006-11-13 | 90.92 | 2011-04-26 |
| ISO 15662:2006 | Intelligent transport systems -- Wide area communication -- Protocol management information | 2006-04-26 | 90.93 | 2009-05-15 |
| ISO 15628:2007 | Road transport and traffic telematics -- Dedicated short range communication (DSRC) -- DSRC application layer | 2006-05-17 | 95.99 | 2013-11-04 |
| ISO 21218:2008 | Intelligent transport systems -- Communications access for land mobiles  (CALM)-- Medium service access points | 2006-04-15 | 95.99 | 2013-02-21 |

### 6.1.12 WG17: Nomadic Devices

This is a fairly new group that started out looking at integration of smartphones in cars.

The work now includes the use of nomadic and mobile devices to support ITS service and multimedia provision in vehicles. The work relates to vehicle interfaces or gateways for vehicle-internal data access including security, data definitions and protocols.

Several standards are in the process of completion. Part of the work regarding vehicle gateways has met some opposition from car manufacturers, but an agreement with ISO TC22 seems to have solved most of the challenges. The convenor is Dr Young-Jun MOON from the Republic of Korea. Experts from Europe are following the work closely.

| Reference | Document title | Reg. date | Crnt stage | Stage date |
|---|---|---|---|---|
| ISO/NP 18561-1 | Intelligent transport systems -- The use of personal ITS station for green city transportation information and management -- Part 1: General information and use cases definition | | 10.00 | 2012-10-03 |
| ISO/AWI 13111-1 | Intelligent transport systems -- The use of personal ITS station to support ITS service provision for travellers -- Part 1: General information and use cases definition | 2013-09-16 | 20.00 | 2013-09-16 |
| ISO/TR 10992:2011 | Intelligent transport systems -- Use of nomadic and portable devices to support ITS service and multimedia provision in vehicles | 2007-10-08 | 60.60 | 2011-12-16 |
| ISO/TR 13184-1:2013 | Intelligent transport systems -- Guidance protocol via personal ITS station for advisory safety systems -- Part 1: General information and use case definitions | 2010-10-20 | 60.60 | 2013-03-22 |
| ISO/TR 13185-1:2012 | Intelligent transport systems -- Vehicle interface for provisioning and support of ITS services -- Part 1: General information and use case definition | 2010-02-23 | 60.60 | 2012-05-11 |
| ISO/NP 13184-3 | Intelligent transport systems -- Guidance protocol via personal ITS station for advisory safety systems -- Part 3: Protocol conformance test cases | | 10.00 | 2013-02-11 |
| ISO/NP 13185-3 | Intelligent transport systems -- Vehicle interface for provisioning and support of ITS Services -- Part 3: Configuration process requirements and specification for vehicle ITS station gateway (V-ITS-SG) | | 10.00 | 2012-02-13 |
| ISO/NP 17438-1 | Intelligent transport systems (ITS) -- Indoor navigation for personal and vehicle ITS stations -- Part 1: General information and use case definition | 2012-05-07 | 10.99 | 2012-05-07 |
| ISO/AWI 13184-2 | Intelligent transport systems -- Guidance protocol via personal ITS station for advisory safety systems -- Part 2: Road guidance protocol (RGP) requirements and specification | 2013-02-13 | 20.00 | 2013-02-13 |
| ISO/CD 13185-2 | Intelligent transport systems -- Vehicle interface for provisioning and support of ITS services -- Part 2: Unified gateway protocol (UGP) requirements and specification for vehicle ITS station gateway (V-ITS-SG) interface | 2011-11-22 | 30.99 | 2013-02-25 |

### 6.1.13 WG18: Cooperative ITS

This is a group fully parallel to CEN TC278. WG16 please see that entry in the CEN section.

WG18 has similar roles in ISO as in CEN: Firstly, to develop new standards within the field of Cooperative ITS, and secondly, to help coordinate and foster new Cooperative ITS thinking within the existing WGs.

The following table shows the status of ISO standards, which in some cases are different from their CEN equivalents.

| Reference | Document title | Reg. date | Crnt stage | Stage date |
|---|---|---|---|---|
| ISO/PWI 19416 | Intelligent transport systems -- Cooperative ITS - Using I2V communications for applications related to in-vehicle information (IVI) | | 00.00 | 2013-08-15 |
| ISO/NP TS 18750 | Intelligent transport systems -- Cooperative ITS -- Definition of a global concept for Local Dynamic Maps | | 10.00 | 2012-09-12 |
| ISO/NP TS 17425 | Intelligent transport systems -- Co-operative systems -- Data exchange specification for in-vehicle presentation of external road and traffic related data | 2012-08-06 | 10.99 | 2012-08-06 |
| ISO/NP 17429 | "Intelligent transport systems -- Co-operative systems -- Profiles for processing and transfer of information between ITS stations for applications related to transport infrastructure management, control and guidance." | 2012-12-04 | 10.99 | 2012-12-04 |
| ISO/AWI TS 19091 | Intelligent transport systems -- Cooperative ITS -- Using V2I and I2V communications for applications related to signalized intersections | 2013-10-07 | 20.00 | 2013-10-07 |
| ISO/AWI TS 19321 | Intelligent transport systems -- Cooperative ITS -- Dictionary of in-vehicle information (IVI) data structures | 2013-10-07 | 20.00 | 2013-10-07 |
| ISO/WD TR 17424 | Intelligent transport systems -- Cooperative ITS -- State of the art of Local Dynamic Maps concepts | 2013-06-11 | 20.20 (Start date: 2013-06-11) | 2013-06-11 |
| ISO/CD TS 17426 | Intelligent transport systems -- Co-operative systems -- Contextual speeds | 2012-08-06 | 30.00 | 2013-05-17 |
| ISO/PRF TS 17419 | Intelligent transport systems -- Co-operative systems -- Classification and management of ITS applications in a global context | 2012-04-30 | 50.00 | 2013-10-29 |
| ISO/PRF TS 17423 | Intelligent transport systems -- Co-operative systems -- ITS application requirements and objectives for selection of communication profiles | 2012-04-30 | 50.00 | 2013-10-24 |
| ISO/PRF TS 17427 | Intelligent transport systems -- Co-operative systems -- Roles and responsibilities in the context of co-operative ITS based on architecture(s) for co-operative systems | 2012-08-06 | 50.00 | 2013-07-25 |

## 7  IEEE (Institute of Electrical and Electronic Engineers)

IEEE is mainly a US-based organisation, but it is well known for its ITS standardisation work. There are two groups in IEEE that should be mentioned in particular:

**IEEE 802.11p** has defined the basic medium-range V2V/V2I (vehicle-to-vehicle and vehicle-to-roadside) communication link dedicated to ITS. This operates on 5.9 GHz and is currently accepted throughout Europe, North America, Australia and New Zeeland, and in some Central and South American countries. Some countries in Asia and Africa are currently considering the use of it.
802.11p has been "rolled up" in the main 802.11 wireless standard, and it has become an operational mode of normal 802.11.

The 802.11p Task Group has completed their work, and the approved 802.11p amendment was published on 15 July 2010. This standard is available for free download, but please be advised that it consists of several thousand pages and the ITS/802.11p part is well hidden!

There are some new ongoing studies that are the result of a request from the traditional Wi-Fi suppliers to get more spectrum in the 5GHz band. The request is to extend this band all the way up to 5.9GHz, which would overlap with the ITS band and potentially cause problems for the ITS safety applications at 5.9GHz. Studies have been launched in Europe by CEPT at ERO, and also by FCC at IEEE in the USA. Results are expected in early 2014; a decision sometime later.

One of the challenges is the use of DSRC (Dedicated Short-Range Communication) as an acronym for the 5.9GHz technology. Traditionally, this acronym has been used for the CEN TC278/WG9 technology, and the use of the same acronym for very different technologies has already caused significant confusion.
**Please be aware that DSRC in US context is different from the traditional European DSRC used in tolling systems (ISO WG5).**

**IEEE P1609** adds the higher layers, including some applications. P1609 has approved four preliminary test standards (P1609.1 – 1609.4), and it is in the process of updating and adding two more standards related to architecture (P1609.0) and EFC application for 5.9GHz (P1609.11). P1609 is the preferred standardisation body for 5.9GHz operation in the US. Standards can also be accessed or purchased from this site.

Please note that the dates in the tables below may appear somewhat old compared to CEN/ETSI/ISO ITS standards. However, this is not the case. IEEE and SAE have provided national reference standards for many years, and these standards have been used in operational systems for decades. They are still relevant and they are being maintained, and they are often used as a source of inspiration for the newer ITS standards, as is the case for several of the standards in the following list.

The links below are referring to the list of published standards gathered by the ITS Standards Program of the US DOT RITA (http://www.standards.its.dot.gov/DevelopmentActivities/PublishedStandards ):

IEEE 1512.3-2006 Standard for Hazardous Material Incident Management Message Sets for Use by Emergency Management Centers;

IEEE 1609.2-2013 Standard for Wireless Access in Vehicular Environments - Security Services for Applications and Management Messages;

IEEE 1609.3-2010 Standard for Wireless Access in Vehicular Environments (WAVE) - Networking Services;

IEEE 1570-2002 Standard for the Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection;

IEEE 1512 -2006 Standard for Common Incident Management Message Sets for use by Emergency Management Centers ;

IEEE 1512.1-2006 Standard for Traffic Incident Management Message Sets for Use by Emergency Management Centers;

IEEE 1609.4-2010 Standard for Wireless Access in Vehicular Environments (WAVE) - Multi-Channel Operation;

IEEE 1609.12-2012 Standard for Wireless Access in Vehicular Environments (WAVE) - Identifier Allocations;

IEEE 802.11-2012 Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part II: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specification;

IEEE 1609.11 - 2010 Standard for Wireless Access in Vehicular Environments (WAVE)-- Over-the-Air Electronic Payment Data Exchange Protocol for Intelligent Transportation Systems (ITS);

# 8    SAE (Society of Automotive Engineers)

**SAE J2735** is the name of both a group and a standard. J2735 is a collection of data types and messages that are primarily intended for the 5.9GHz link, i.e. V2V/V2R communications. This is the US data set definition for ITS, and, regrettably, the links between J2735 and the ISO and European work have been minimal until recently. During 2013, this has changed significantly, and the data sets intended for the 5.9GHz link are coming together at the global level, with cooperation between ETSI, ISO and SAE. The intention is to achieve a fully harmonised set, where there will be regional differences based on the same basic data elements.

There are also a number of other data definitions and ITS relevant standards in the following list.

The links below are referring to the list of published standards gathered by the ITS Standards Program of the US DOT RITA (http://www.standards.its.dot.gov/DevelopmentActivities/PublishedStandards ):

SAE J2630 Converting ATIS Message Standards from ASN.1 to XML;

SAE J2399 Adaptive Cruise Control (ACC) Operating Characteristics and User Interface;

SAE J1663 Truth-in-Labeling Standard for Navigation Map Databases;

SAE J2540/2 ITIS (International Traveler Information Systems) Phrase Lists;

SAE J2540/3 National Names Phrase List;

SAE J2540/1 RDS (Radio Data System) Phrase Lists;

SAE J2735 Dedicated Short Range Communications (DSRC) Message Set Dictionary;

SAE J2266 Location Referencing Message Specification (LRMS);

SAE J1757/1 Standard Metrology for Vehicular Displays;

SAE J2366/1L ITS Data Bus - Low Impedance Stereo Audio;

SAE J2365 Calculation of the Time to Complete In-Vehicle Navigation and Route Guidance Tasks;

SAE J2539 Comparison of GATS Messages to SAE ATIS Standards Information Report;

SAE J2372 Field Test Analysis Information Report;

SAE J2400 Human Factors in Forward Collision Warning Systems: Operating Characteristics and User Interface Requirements;

SAE J1746 ISP-Vehicle Location Referencing Standard ;

SAE J2355 ITS Data Bus Architecture Reference Model Information Report;

SAE J1760 ITS Data Bus Data Security Services;

SAE J2366/7 ITS Data Bus - Application Message Layer;

SAE J2366/2 ITS Data Bus - Link Layer;

SAE J2366/1 ITS Data Bus - lDB-C Physical Layer;

SAE J2366/4 ITS Data Bus - Thin Transport Layer;

SAE J2395 ITS In-Vehicle Message Priority;

SAE J2352 Mayday Industry Survey Information Report;

SAE J2396 Definitions and Experimental Measures Related to the Specification of Driver Visual Behavior Using Video Based Techniques;

SAE J2354 Message Set for Advanced Traveler Information System (ATIS);

SAE J2540 Messages for Handling Strings and Look-Up Tables in ATIS Standards;

SAE J2313 On-Board Land Vehicle Mayday Reporting Interface;

SAE J1708 Serial Data Communications Between Microcomputer Systems in Heavy-Duty Vehicle Applications;

SAE J2373 Stakeholders Workshop Information Report;

SAE J2369 Standard for ATIS Message Sets Delivered Over Reduced Bandwidth Media;

## 9   IETF

The Internet Engineering Task Force supplies all the basic Internet standards. "Normal" Internet access is of course already the basis for almost all communication, except short range vehicle access. C-ITS is dependent on a new level of mobility, which the current Internet Protocol (IPv4) cannot supply out of the box.  Consequently, an IETF task force has developed a better solution for the new IPv6, to which we are all being moved these days, as the addressable range of IPv4 is becoming depleted.

The task force relevant to ITS was initially called NEMO for Network Mobility, but it has now been merged with other (intermodal) use cases to the group MEXT, Mobility EXTensions. The work of MEXT, too, is more or less completed.

The current implementations in the European pilots, and the work of CALM, are fully based on NEMO/MEXT, and the introduction of these essential standards to the core Internet operation has been a joint effort.

IETF is also studying the further needs of ITS and is considering to initiate a route optimisation and fast handover operation. This work may commence in 2014.

## 10 New paradigm in ITS: Cooperative ITS

C-ITS (previously called Cooperative Systems) is the new paradigm in ITS. The most common understanding is that Cooperative ITS is required in order to escape the multitude of proprietary stand-alone boxes invading the driver environment. Putting a new box with antennas, display, keyboard, etc., for each new application going into the car has not been perceived as sustainable. It is too expensive and too unsafe; it does not give interoperability, and is simply not sustainable from a windshield real estate point of view.

The following drawing illustrates the present situation in Europe; based on mandated applications:
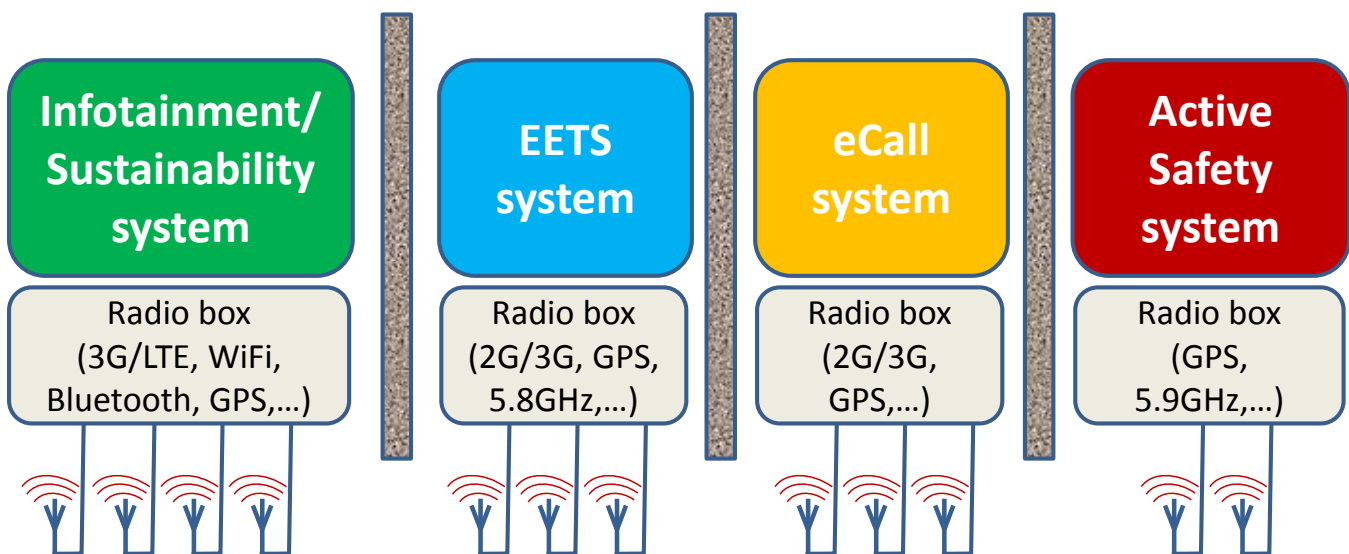


**Figure 7: Sharing of common resources for various ITS applications**

We had to go from "silos", or vertical integration of all functions for each new application, to a new world of sharing common resources wherever possible.

### 10.1 What is a "Cooperative ITS"?

Defining a cooperative system has proven to be difficult. There are obvious reasons for this, and most of them have to do with turf wars and commercial pressures from participants in existing markets who feel threatened by this new world. This has led to several definitions of C-ITS. ISO TC204/WG1 has published a technical report with the definition: TR17465-1

### 10.2 The European Commission basic definition

The most prevalent understanding is the EC definition: "A C-ITS involves V2V and V2I communication". This definition is obviously not a threat since it covers all potential C-ITS scenarios. The problem is the same: this definition is so wide that it covers everything from 1990's tolling systems, via regular GSM voice communications, to highly advanced ITS services. As standardisers, we therefore had to identify a more precise definition.

### 10.3 The vehicle active safety viewpoint

A more precise understanding is the use of 5.9GHz 802.11p communication for V2V and V2I links, where the main application is active safety. The idea is that all vehicles broadcast information that will be received by other vehicles or roadsides at a distance of 300-800 metres. Typical applications are warnings or active collision avoidance determined in each vehicle. This is the understanding from

OEMs and authorities involved in the active safety world, such as the Car-to-Car Communication Consortium (C2C-CC, http://www.car-to-car.org/).

## 10.4 The CEN/ETSI/ISO definition

The C2C-CC view is often seen as too restrictive both in terms of technology and services. Therefore, CEN/ISO and ETSI has agreed on another definition:

**A cooperative ITS is a subset of the overall ITS that**
- **communicates and**
- **shares information**

**between ITS Stations[*] to**
- **give advice or**
- **facilitate actions**

**with the objective of improving**
- **safety, sustainability, efficiency and comfort**

**beyond the scope of stand-alone systems.**

*\*) ITS Station defined in ETSI EN 302 665 / ISO 21217, e. g. units installed in vehicles, at the roadside, in traffic control/ management centres, in service centres, or hand-held units.*

This is the definition that seems to attract the most support at the moment, and it is important to see that it also defines the boundary towards existing, non-cooperative ITS.

C-ITS is still a new paradigm in ITS, and it will influence all existing systems to a certain extent. This is an ongoing process in CEN and ISO. ETSI TC ITS started directly into this new paradigm and is already organised towards this way of thinking.

## 10.5 Cooperative System Communication

The idea of splitting communication from the applications came from ISO TC204/WG16 about ten years ago. Up to that time, all ITS standards and ITS system implementations had been done in a "silo". In 2001/2002, the basic architecture and core standards for CALM were developed, and they have remained basically intact until now. In recent years, the architecture has been extended by the CVIS project and ETSI standardisation to include the application level.

The concept of CALM is actually very simple: There are a number of media or physical (radio) interfaces available, each of which tries to stay continuously connected to the external world. The available connections, together with key parameters such as cost, available rate, latency, etc., are continuously sent to a Communications Manager. At the same time, the applications and services that needs connection register with the same Communications Manager. They register the preferred parameters in a similar format as above, as well as their relative priority class. The communications manager is tasked with mixing and matching the available interfaces with the applications that need service. This also implies that applications might be using different interfaces.

Using the same drawing elements as above, the new architecture would look something like this:
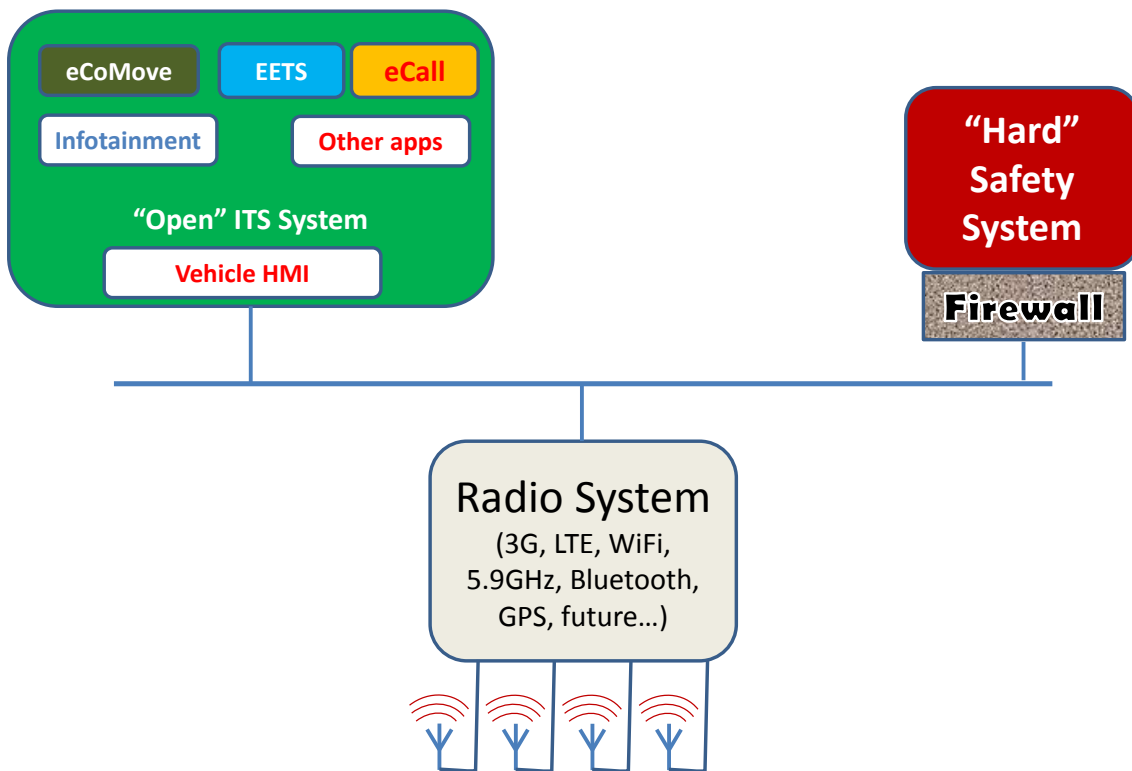
**Figure 8: Communication architecture for Cooperative systems**

## 10.6   Cooperative ITS Messages

A basic concept of Cooperative ITS is that vehicles and roadsides will broadcast information to its surroundings using relatively short-range communication means. This could be infrared, millimetre wave (61 GHz), 700 MHz (in Japan) or the incumbent 5.9GHz link. The typical range is 300-800 meters for most of these media, but 700MHz can achieve a much longer range if needed.

The main purpose is to broadcast three different types of messages:
1. The primary "here I am and this is what I am doing" message is sent from all vehicles and equipped roadside infrastructure 2-10 times per second, and it is received by other vehicles/roadsides within 300-800 meters away. This message is called Cooperative Awareness Message (CAM) in Europe, and Basic Safety Message (BSM) in the USA.
2. In addition, there are several messages for special events, in particular safety-critical events. In Europe, these are called Decentralized Environmental Notification Message (DENM/DEM), and in the USA, they have different names depending on the event type.
3. The third main broadcast group is the Service Announcement, where potential services are offered from a roadside (or vehicle) to any other partners. One special sub-group of this is mandatory services that are made compulsory by (local) authorities. This service announcement message is called a SAM.

## 11 The ITS Station Concept

An ITS Station is the core building block for the new Cooperative ITS. The idea is that any vehicle or roadside system will contain certain functions such as processing, communication, storage like an LDM, interfaces to sensors and actuators, and not least: Security to protect the ITS-S. The operation and integrity of the ITS Station is controlled via a Management entity.

The basic drawing looks like this:

When several such ITS Stations are connected, they form an ITS System and belong to an ITS Network. This is further described in ISO 21217 and ETSI EN 302 665.
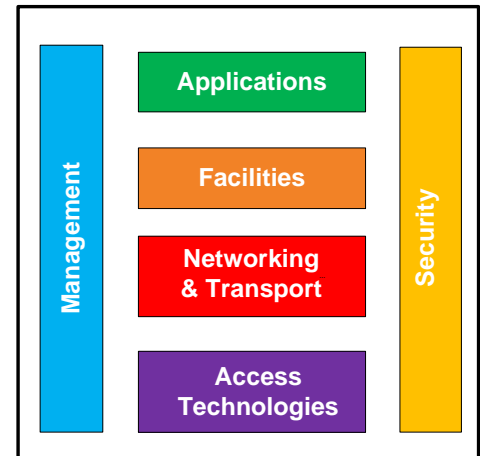


An ITS Station may be implemented as one box. In fact, the smallest ITS-S may be a software module inside a smartphone or tablet/pad.

In larger installations, such as in a vehicle, the ITS-S will often consist of a communication device (Mobile Router) and one or more computers (Mobile Hosts and Gateways to ECUs). The example in section 11.5 therefore constitutes an ITS Station.

For a roadside installation (Roadside ITS Station), there may be several communication devices in an internal network (Access Routers), and several computers running the actual services.

The important aspect is that they form one logical security entity, a "Bounded Secure Domain".

## 12   Projects and Organisations that influence ITS Standards

There are a number of stakeholders in ITS standardisation. In many ways, everyone who is planning, implementing or deploying ITS will at the very least need to use and implement standards actively, or more likely, need to be involved in the development of the C-ITS standards. If the R&D projects are not doing this, they are most likely moving in the wrong direction.

Note that the scope of this report does not allow any in-depth explanation of the projects or of the direct influence these projects have had on standards. The reader is therefore advised to follow the links to obtain more info where relevant or needed.

Mandates
One of the primary tools of the European Commission is called Mandates.
Areas that are considered important from a policy perspective will often need Directives to attend to the legal aspects of pan-European introduction and operation. Directives should normally not contain any direct technical requirements; it will suffice to refer to European Standards (ENs) for the detailed specifications.
Mandates is the tool the EC uses to get such technical standards in writing. These standards will often be referred to by European legislation (Directives), so the standards are subject to time restrictions and strict quality requirements.

Mandate process
The expectation from the EC and the requirements for developing technical standards will be described in a document, which will be offered to the three European SDOs (CEN, CENELEC and ETSI). In turn, the SDOs will assess the Mandate and either declare that it is outside their area of interest, or accept responsibility for developing standards within that domain. The SDO will then prepare a plan for developing relevant standards within the requested time. These plans are often followed by requests for financial support for PTs (CEN name for funded Project Teams), or STFs (ETSI name for funded Specialist Task Force). Mandates can be fairly complex, as several DGs are involved in determining the requirements, e.g. DG INFSO from a technical/research perspective, DG MOVE responsible for the legal perspective, and DG ENTEPRISE will finance the actual work.

M/338: The EFC mandate
Mandate 338 is dedicated to Electronic Fee Collection, and it is the second such mandate. It is held by DG MOVE and DG ENTERPRISE and directed towards TC278/WG1 only. The mandate to support the EFC directive and the EETS operation continues for several years. M/338 has performed well in the past, and continues to do so at the end of 2013 too. One interesting convergence issue is how EFC could become a service within a Cooperative ITS Station, similar to the drawing is section 11.5.

M/453: The ITS Mandate
Mandate 453 is considered to be the main ITS mandate. Its purpose from the start was to support part of the ITS Action Plan and ITS Directive.
M/453 was a collaboration between DG INFSO, DG MOVE and DG ENTERPRISE. It described 69 areas of work for a complete Cooperative System, and requested a "minimum set of standards" to deploy C-ITS.
This task has been assumed by ETSI and CEN, and the responsibility has been divided between the two bodies. ETSI TC ITS mainly deals with communication and active safety applications, and CEN TC278 assumes responsibility for the rest. The work was originally scheduled to be completed by the end of

2012, but it was delayed until 3Q2013. Work has continued after the completion of the formal M/453, and it will most likely continue into 2014, until a new mandate will replace it.

The work has resulted in a large distribution of standards within a short period of time; from both ETSI and CEN. Formal reports are available on the ETSI and CEN home pages, but the key message is to keep in mind that there are still gaps and incomplete issues in the deliverables. These issues are being addressed by the WGs in a successive manner and will hopefully be completed in 2014.

For further information, please contact Knut Evensen, who is involved with M/453 from both the CEN and ETSI sides.

## 12.1 EU-US Task Force

A central cooperation between ITS authorities is the EU-US Task Force was set up between US DoT Research and Innovative Technology Administration Joint Programme Office (RITA/JPO) and the European Commission Directorate General Information Society (DG INFSO) in 2009/2010. This cooperation was extended to include Japan in early 2011.

The idea is twofold:
- to coordinate the Cooperative ITS research activities between the regions, to pool resources and achieve better results by experience exchange,
- to coordinate standardisation to avoid duplications and conflicting standards that would slow or prevent the implementation of Cooperative ITS.

From a policy perspective, the US and Europe agreed on a policy statement called "EU-US Joint Declaration of Intent (13th November 2009)". This policy principally regulates the R&D activities. The following links provide further details, from the European and US point of view.

The EU-US TF has held several meetings, during which the main focus has been to plan for future R&D activities. Two safety applications and one efficiency application have been being singled out as examples for further studies. The safety side is run by car manufacturers, from the European side by C2C-CC with Daimler in lead, and from the US side by CAMP (Crash Avoidance Metrics Partnership) with GM in lead.

Since this main focus of the report is standardisation, it is interesting to see the clear policy wording in clause 10:

### 12.1.1 EU-US Joint Declaration of Intent (13th November 2009) Clause 10:
*Globally harmonized standards are essential to support and accelerate the deployment and adoption of Cooperative ITS. The parties strongly support development of global open standards which ensure interoperability through appropriate actions including, but not limited to, coordinating the activities of the standardization organizations. In particular, the parties intend to make efforts to preclude the development and adoption of redundant standards. The adoption of multiple standards within a given area of interest should be limited to those cases where there are demonstrated technical needs, such as differing frequency spectrum allocations, and legal requirements, such as privacy protection laws. The parties welcome the participation of other countries and regions.*

This cooperation has later been extended to include Japan, and more recently Korea, Canada and Australia, and several other road authorities have joined the collaboration.

Two Harmonisation Task Groups (HTG1+HTG3) analysed the available standards from ETSI, CEN/ISO and IEEE. The groups were active in the period March-August 2012, and involved 14 experts from the USA and Europe, with Japanese participation. The main focus area was communication and security features. A set of reports are available on the [European Commission website](#) and on the [US DoT website. The reports](#) include a gap analysis that describes areas not covered by any standard, and suggestions as to who could potentially fill these gaps. The reports also include an overlap analysis with recommendations on how to update current standard with a view to becoming interoperable. A good summary of the entire sector is presented in the "Background Document. Finally, there is also a set of documents on how to test and validate the C-ITS standards in a way that allows both US and European standards in the same system.

A new HTG6 is planned to start in January 2014, tasked with analysing and suggesting actions for setting up C-ITS at a national level. HTG6 will focus on the authoritative role of security and privacy, from both a legal and operational perspective. HTG6 is scheduled to deliver its results by the end of 2014.

## 13  European Framework Programme activities

The European Commission, through DG INFSO in particular, has actively promoted ITS throughout the last twenty-some years. As previously mentioned, Fotis Karamitsos initiated this field through the DRIVE programme in the late eighties, and since then, the EC has continuously maintained this focus by providing new research opportunities in every new framework programme call. In the last years, the main driving force has been Juhani Jaaskelainen, who has achieved a lot in promoting and lifting ITS to its current level. He will retire at the end of 2013. This Directorate General started off as DG 13, and it recently changed its name to DG CONNECT. The work is continued in Directorate H: Sustainable & Secure Society, and in Unit H.5 Smart Cities and Sustainability.

These R&D projects are of the utmost importance to the European standardisation work. The policy has, from the outset, been that the projects should be directly involved in standards, and part of the funding is therefore earmarked to this end.  Many CEN/ISO and ETSI standards are funded in part by EC sponsored projects, and, more importantly, the projects often implement and test/validate draft standards as part of the development and quality assurance process.

The EC has several "instruments" or project types to deploy within this area. The main one is called a **STREP or Specific Targeted Research Projects**. This is a "regular" R&D project, which can receive as much as 67% EC funding support.

The next phase of R&D, Horizon 2020, will continue the work and hopefully strengthen the international harmonisation aspects.

### 13.1.1  CEN DSRC projects
Examples of historic ITS R&D projects are Delta, EVI and RCI. These example projects actually helped the current generation of technology, CEN DSRC, to become demonstrated, stable products that could be trusted in deployment, and they played a pivotal role in ITS standardisation. These early projects drafted core specifications and requirements, and they implemented and validated the standards to prove the concepts, and they submitted the results to CEN and ETSI so that corrections could be made with a view to commercial deployment. In a way, there was a Ping-Pong match relationship between CEN and these projects that ultimately resulted in significant commercial success and competitive quality systems for users and operators alike.

A more recent "instrument" is the **IP or Integrated Project**. This is the larger size EC R&D projects, which consist of multiple sub-projects. The typical size is EUR 10-40 million over a period of 3-4 years. Examples include SAFESPOT, CVIS, SmartFreight, which all belonged to the new generation of Cooperative System technology projects.

### 13.1.2  SAFESPOT
SafeSpot was led by FIAT research and enquired into using C-ITS technology for V2V collision avoidance. SafeSpot was based primarily on technology from CVIS, and the project contributed to CALM and ETSI throughout its lifetime.

### 13.1.3  SmartFreight
SmartFreight was led by SINTEF, and the project was mainly located in Trondheim. The idea was to manage goods transport through a multimodal transport chain. The project used CVIS technology and CEN DSRC technology in combination, and several interesting findings as a result. The project's

contribution to standards was not very significant; however, the validation of the technology in various intermodal situations has proven to be interesting feedback to the SDOs.

### 13.1.4  CVIS

CVIS was the main platform developer of Cooperative ITS. It was the largest ITS project in the world to date, with a budget of around EUR 43 million. To sum up this project in a few sentences will not do it justice, so the reader is advised to follow the link and download some of the main documents and project presentations here.

Q-Free has been a central participant in the technical part of this project, and SINTEF too has supplied a considerable part of the results that formed the Open Cooperative System Platform. This platform is a combination of communication sub-systems (5.9GHz, IR, 3G, DSRC, GPS and satellite), of sensor integration, vehicle integration, an LDM implementation, a facilities layer based on an extended OSGi standard implementation, hardware developments and several test applications for freight and fleet, urban and interurban, and safety scenarios.

From a standardisation perspective, CVIS supported a large portion of the ISO CALM developments, and sent people to ISO, CEN, ETSI, IETF and IEEE to achieve standardisation harmonisation. While the project was still running, it formed a good counterweight to the OEM active safety dominance in standardisation, but after the CVIS project came to an end, this balance has largely disappeared.

### 13.1.5  Drive C2X

The recently completed Drive C2X developed a commonly agreed upon roadmap based on the OEM perspective. It is important to consider the cost for system implementation as well as on the benefits and potential revenues generated by vehicular communication. DRIVE C2X results provide decision makers representing all stakeholders with the information that is needed to make an implementation decision. Based on the data generated in field trials with Cooperative ITS technology on seven European test sites, the benefits of Cooperative ITS with regard to traffic safety and efficiency and drivers' convenience are identified and, in a second step, quantified in monetary terms. In parallel, the costs for system implementation were calculated and compared to the identified benefits. This was done from a socio-economic and a business-economic point of view. Consequently, the outcome of the project included a benefit/cost analysis addressing the societal aspects of vehicular communication, as well as detailed business models addressing the needs of the stakeholders who are tasked with making decisions on major technological investments.

Having a commonly agreed upon roadmap for system implementation and insight into the benefits and costs related to the implementation of Cooperative ITS technology is an important prerequisite for the successful implementation of a cooperative system. The availability of standards to build the system on is another. Therefore, DRIVE C2X contributed to the standardisation process in ETSI TC ITS under the EC standardisation mandate by making DRIVE C2X staff available to the various standardisation working groups and by making documents that are relevant for standardisation available to ETSI TC ITS. Furthermore, DRIVE C2X participated at various ETSI events, such as the annual ETSI TC ITS workshop or ETSI plug-tests.

Thus, DRIVE C2X covered all aspects of market implementation. It brought together all stakeholders involved, prepared an implementation roadmap and provided the necessary certainty required for market introduction through investigation of the socio-economic and business-economic aspects of cooperative driving, and it contributed significantly to the European ITS standardisation.

**Support Action projects** are small, specialised European Framework R&D projects that will facilitate and support the coordination of other projects. This means that the project does not perform any research itself, but it will assist partners and other projects in arranging meetings, funding travels and small studies, preparing position papers for the EC, etc. These projects are usually 100% funded  since there are no long-term benefits for the project partners once the project is completed.

Examples include COMeSafety and iCar Support; projects with standardisation support as an area of responsibility.

### 13.1.6   COMeSafety

COMeSafety and the follow-up COMeSafety2 were Support Action projects led by the car industry, more specifically by BMW. The COMeSafety2 ended in 2013. COMeSafety supported the drafting of the new ITS Station Reference Architecture as a combination of ETSI and ISO, as well as the CVIS and SAFESPOT project.

### 13.1.7   iCar Support

This project was run by ERTICO, and was an extension of the eSafety Forum tasked with preparing meetings, documents, studies, etc. A small part of the project was dedicated to giving an overview of ITS Standardisation, covering both European and overseas SDOs. This project did, for instance, fund some participation in the EU-US Task Force, as well as meeting contributions to some of the ISO meetings.

iCS also maintained a standardisation web page with a lot of the same types of information as is covered in this report. The project concluded in 2012.

### 13.1.8   iMobility Support

iMobility Support is a direct continuation of iCar Support and started in January 2013. The project has published a considerable amount of information on the web page.

### 13.1.9   Safety Pilot

A US project of particular interest is the Safety Pilot. This programme is run by the US Department of Transportation, and the main objective is to evaluate the effectiveness of 5.9 GHz technology in lives saved. The programme is described in great detail in this link. For the purposes of this report, it suffices to inform that the NHTSA will deliver a decision in late 2013 on whether this should be mandated to new cars, or if it should be a NCAP certification requirement.

## 14   Standardisation interests in line with the ITS action plan and ITS directive

The ITS directive, supported by mandate 453, puts forward certain requirements and guidelines for the implementation of ITS to ensure a more rapid implementation of ITS services in Europe. The aim of the European Union's land transport policy is to promote a mobility that is efficient, safe, secure and environmentally friendly. The directive emphasises the need for interoperability and homogeneous solutions across borders. It also promotes a layered architecture to ensure better compatibility between communication solutions and services. Trans-national deployment of continuous cross-border services for travel information and traffic management cannot be achieved by Member States alone.

The work on cooperating systems is one major step in this direction. Usage of DATEX2 as a common traveller information system element is one such step to harmonise transport information across borders. A common system for automatic vehicle identification and EETS are other initiatives.

The global nature of road communication demands interoperability. Following and impacting the standardisation groups working with international systems that will affect the European transport system are important steps and must be followed up. Good cooperation between the European countries with common borders are therefore of special interest.

Areas that are of special interest linked to the ITS action plan include:

- Real time traffic and traveller data sharing to support a safer and more relaxed driving situation

- International road signing and information layout and formats to support a common understanding across borders

- International Automatic vehicle identification/Automatic fee collection systems to support common payment services and a greener transport sectors due to various emission fees.

- Emergency call and safety warnings to reduce the number of traffic fatalities and accidents

Following up and impacting the SDOs and forums working on these aspects will lead to specifications in line with Europe's special interests.

## 15   Annex B: Standard development and standardisation organisation mapping



Figure 9: Structure of SDOs at various levels

In this picture, global standardisation resides at the top, regional standardisation in the middle and national standardisation efforts at the bottom.

The idea is that higher layers should take precedence, so if global standardisation is implemented, regional and national standardisation should stop and all efforts should be focused on the international domain. There are agreements and conventions between the different SDOs to this effect, such as the stand-still agreement between national SDOs and CEN/ISO, and the Vienna Agreement, which regulates the cooperation between CEN and ISO. The situation between the other bodies is usually based on bilateral agreement on a case by case basis, or, often, there are no agreements at all.

Unfortunately, the world of ITS standardisation has significant overlaps between some SDOs. This particularly applies to communication sub-system and some of the new applications, such as safety. The main overlaps are currently seen between ETSI TC ITS, ISO TC204/WG16 (CALM), and IEEE P1609 (WAVE/DSRC).

The relevant authorities in Europe (EC DG INFSO) and the USA (US DoT RITA/JPO) are monitoring the situation, and they are signatories to a Joint Declaration policy statement, see the chapter on **EU-US Task Force**.

**Types of standards:**
We distinguish between the following main groups or levels of standards.
1.  The top level in Europe is called an EN (European Norm). An EN can only be issues by CEN, CENELEC or ETSI. This is the real, permanent standard voted by 27 European national members according to a key decided by the population of each country. ENs have some legal implication for public bodies pursuant to the European Public Procurement Directive, but implementation is mainly voluntary as long as it is not referenced in national or European law (Directives).

    At the same level, we have full International Standards (IS). These are also voted by national members, but according to the one country – one vote principle. An IS has less binding force than an EN.

2. The second level is usually called a TS for Technical Specification. A TS is decided by the technical committee itself and is a faster process. TS is often used as an intermediate step towards a full EN/IS. TS can be referenced in public procurement, but it is more common to require a full EN/IS to assure a better consensus. Older document types that are not used any more are ENVs (preliminary EN standards), and these references can still be found in some specifications.
3. The third level can be called a Technical Report (TR), ETSI Specification (ES), Workshop Agreement (WS), and several other names. These documents can be used as support material, when a specification is needed quickly, or in cases in which consensus cannot be achieved but the documents are still registered.

There are also other types of documents issued by SDOs, and their status will usually be described in the introduction of the document.

**Time to produce standards**

Standardisation is a very time-consuming process. If we go for the full standard EN or ISO above, there are four steps or stages to go through, as indicated in the following drawing:



Each of these steps may take anywhere from 6 to 18 months, and the typical duration is around three years for a full standard. Further details can be found in the various bodies' rules for development, see for example the ETSI Status Codes and the CEN/ISO Stage Codes.

| STAGE | SUBSTAGE | | | 90 Decision Substages | | | |
|---|---|---|---|---|---|---|---|
| | 00 Registration | 20 Start of main action | 60 Completion of main action | 92 Repeat an earlier phase | 93 Repeat current phase | 98 Abandon | 99 Proceed |
| 00 Preliminary stage | 00.00 Proposal for new project received | 00.20 Proposal for new project under review | 00.60 Close of review | | | 00.98 Proposal for new project abandoned | 00.99 Approval to ballot proposal for new project |
| 10 Proposal stage | 10.00 Proposal for new project registered | 10.20 New project ballot initiated | 10.60 Close of voting | 10.92 Proposal returned to submitter for further definition | | 10.98 New project rejected | 10.99 New project approved |
| 20 Preparatory stage | 20.00 New project registered in TC/SC work programme | 20.20 Working draft (WD) study initiated | 20.60 Close of comment period | | | 20.98 Project deleted | 20.99 WD approved for registration as CD |
| 30 Committee stage | 30.00 Committee draft (CD) registered | 30.20 CD study/ballot initiated | 30.60 Close of voting/ comment period | 30.92 CD referred back to Working Group | | 30.98 Project deleted | 30.99 CD approved for registration as DIS |
| 40 Enquiry stage | 40.00 DIS registered | 40.20 DIS ballot initiated: 5 months | 40.60 Close of voting | 40.92 Full report circulated: DIS referred back to TC or SC | 40.93 Full report circulated: decision for new DIS ballot | 40.98 Project deleted | 40.99 Full report circulated: DIS approved for registration as FDIS |
| 50 Approval stage | 50.00 FDIS registered for formal approval | 50.20 FDIS ballot initiated: 2 months. Proof sent to secretariat | 50.60 Close of voting. Proof returned by secretariat | 50.92 FDIS referred back to TC or SC | | 50.98 Project deleted | 50.99 FDIS approved for publication |
| 60 Publication stage | 60.00 International Standard under publication | | 60.60 International Standard published | | | | |
| 90 Review stage | | 90.20 International Standard under periodical review | 90.60 Close of review | 90.92 International Standard to be revised | 90.93 International Standard confirmed | | 90.99 Withdrawal of International Standard proposed by TC or SC |
| 95 Withdrawal stage | | 95.20 Withdrawal ballot initiated | 95.60 Close of voting | 95.92 Decision not to withdraw International Standard | | | 95.99 Withdrawal of International Standard |

**Figure 10. ISO stage codes**

The focus is on enabling standards. As long as the function and external behaviour is the same, a typical standard can be achieved in several ways. The responsibility of defining exact product specifications does not rest with the SDOs, which often leads to misunderstandings even within the Working Groups.

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