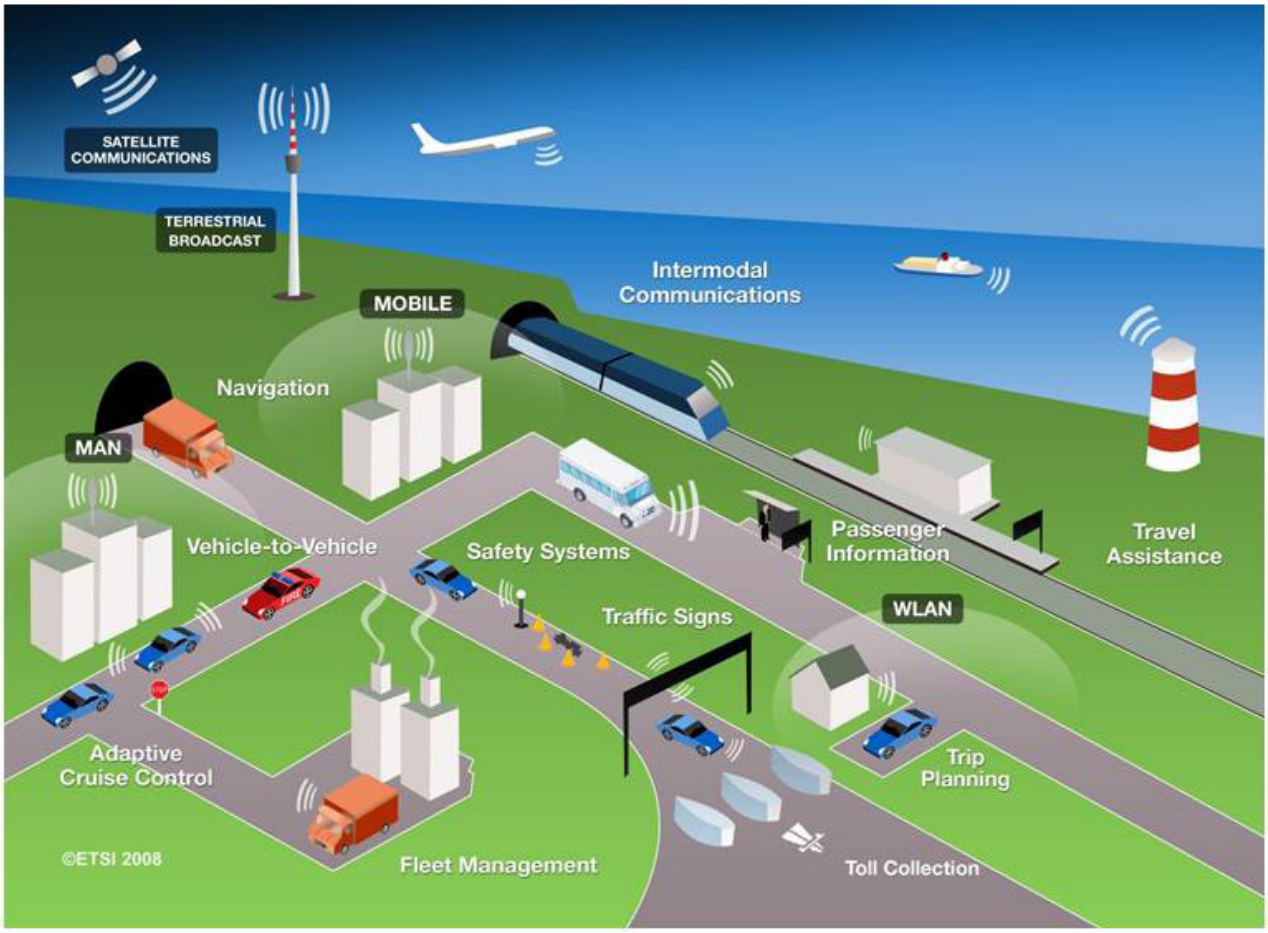
Statens vegvesen

ITS - standardisering

Statusrapport på engelsk 2011

VD rapport Vegdirektoratet Nr. 54



Vegdirektoratet
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VD rapport

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ITS - standardisering

Undertittel
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Forfatter
Knut Evensen, Q-Free

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Forord

Denne ITS standardiseringsrapporten er utført av Q-Free i Trondheim på oppdrag fra Statens vegvesen i løpet av våren 2011.

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 er og nevnt som bruker ny ITS teknologi, og som gjennom sitt arbeid indirekte gir input til og påvirker standardisering av ITS teknologi. 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 Vegvesens valg av teknologiske løsninger på kort og langs sikt. Slike aspekter er bakt inn i teksten under grupper som man anser er 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 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 utvikling av 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 2011
Vegdirektoratet
Seksjon for trafikkforvaltning (VT)
Seksjon for ITS (TMT)

ITS Standardisation

Overview and Status Report 2011

Norwegian Public Roads Administration
Traffic Management Section
ITS Section
2011

Executive Summary

Standardisation, which has been important ever since the emergence of ITS, is now becoming increasingly urgent.

Up until now, most of the ITS standards have been stand-alone standards such as Electronic Fee Collection and traffic information (RDS-TMC). There is no doubt that EFC and RDS-TMC standards have been essential in bringing ITS technology to the mass market, have driven down product prices, and have allowed these services to become interoperable. This report gives a good overview of current standards and goes on to explain the next stage of ITS standards.

ITS can be used to prevent accidents, increase transport efficiency, reduce environmental impact and improve sustainability, while providing an improved user experience.
Policies are being set both on the national level, on the regional level such as EU Directives, and lately also between regions, such as between the US and Europe. It is clear that some targets are incompatible, and the systems trying to incorporate them will need to handle many parameters and be flexible for the future. Taken together, there is no doubt that the next stage of ITS will see increased complexity. The task for standardisation is to hide this complexity from the users.

The good news is that the standardisation domain, together with R&D projects, is focusing on this task. There are many organisations at work now, and good standards are being produced.
Unfortunately, there is duplication of work between these organisations, and the standards being produced are not necessarily interoperable with each other. This problem has been recognised, and both the EC and US DoT are actively trying to bridge the gaps.

The perceived situation at the present is that the balance between Safety requirements and Efficiency requirements has been tilted in favour of anti-collision vehicle safety. This is a result of the car makers being a strong group politically and financially, and there is no comparable group from the efficiency side to counter this strength.

From a policy perspective, there is significant on-going work to support the policy documents from the EC (ITS Action Plan and ITS Directive). Topics in the ITS action plan that are of special interest 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 differentiated emission fees
- Emergency call and safety warnings to reduce the number of traffic fatalities and accidents

These topics are consistent with the overall road transport development strategy of the Norwegian Ministry of Transport and Communications. Following up and impacting the standardisation organisations (SDOs) and forums working on these aspects will lead to specifications in line with Norway’s special interests.

Table of Contents

1 Preface

This report gives an overview of ITS Standardisation and is the result of a project financed by the Norwegian Public Roads Administration (NPRA). The work has been carried out by Q-Free in Trondheim during the spring 2011.

1.1 Disclaimer

All facts and figures are believed to be correct as of March 2011 unless otherwise noted. Effort has been made to produce a report that can be maintained and updated easily. Relevance of subjects and contents has been decided together with NPRA to fit within the given time and resources.
Some minor additions and editing has been carried out by NPRA as a final wrapping of the document to embrace some certain issues which were of special interest.
Note that the standardisation scene changes rapidly, and that information from some of the groups is limited. Some information in this report may thus be out dated when reading. Please refer to the embedded 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 acquired in a legal way respecting the intellectual property rights for the different sources and types of standards. Weblinks are provided throughout the document for open sources where available. Please refer to these links for more in-depth information. Resources protected by copyright cannot be accessed without the corresponding access rights, and these are usually noted by a reference. Unfortunately most working documents from the SDOs are restricted for members only until they are finished. This makes it difficult to give detailed information about the technical work progress within each Work item.

1.3 How to get hold of standards

There are several possible ways to get hold of copyrighted material, depending on the source of the material, the user of the material and the purpose the material will be used for. In general all standards are free for standards development but protected by copyright while in the process of development. Finished standards are often sold on a commercial basis by ISO, CEN and the national standardisation organisations (NSOs). In general the best way to get hold of finished or draft standards is to contact Standards Norway (SN).

1.4 Contact persons

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

The person within 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 NPRA is Thor Gunnar Eskedal. (TRAFF)

2 Introduction

2.1 The aim of ITS standardization

The term Intelligent Transport Systems (ITS) refers to tasks to collect, store and provide traffic information. This aim is to maximize the utilisation efficiency, provide convenient safe transport and reduce energy consumption by applying advanced electronics, information and telecommunication technologies into roads, automobiles and goods. Whatever transport system that former was controlled, managed and operated predominantly by human intervention should now make more use of technology to automate diverse functions and gather traffic and road information.

The air transportation system has for decades made extensive use of ITS for all kinds of control of the aircraft and airspace. This has not, to the same extent, been the case for the road transportation system. Lights signals, automatic speed control systems, camera surveillance, tunnel safety systems and some other services have been operative for many years. These however only cover a fragment of possible traffic control, information and surveillance systems that may be implemented to alleviate the increasing traffic problems especially in urban areas.

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

Standardisation of technological solutions for road transport is one important aspect to increase the uptake of ITS to reap the estimated benefits. In addition ITS standardisation has the following benefits:

- Enable interoperability of systems/services and between different implementations that will give users seamless plug-and-play functionality.
- Encourage innovation, foster enterprise and open up new markets for suppliers.
- Create trust and confidence in products and services. This includes tests that will assure that products/solutions are safe, healthy, secure, flexible and supports the correct quality.
- Expand the market, bring down costs and increase competition.
- Help to prevent duplication of effort and improve communication
- Assisting Governments, Administrations and Regulators to support
    - legislation,
    - regulation and
    - policy initiatives
- For the industry, manufacturers and suppliers of systems, standardisation brings important benefits. This includes a solid foundation upon which to develop new technologies, and an opportunity to share and enhance existing practices such as:
    - Provide technology stability
    - enable multi-market access
    - create active markets
    - encourage innovation

Knowledge of emerging ITS services and standards is important for NPRA to be able to make optimal use of them in all areas and phases of the road transportation system. This is in line with NPRAs and the national governments overall ITS strategy and requirements regarding the Norwegian road transportation system.

2.2 ITS standardization organizations

Within ITS standardisation there are three standardisation bodies which are of special interest for NPRA. These are CEN TC 278, ETSI TC ITS and ISO 204. Of these the European SDOs CEN TC 278 and ETSI TC ITS are of particular interest since the European community has special focus on European legislation and regulations which Norway is a natural part of. The ITS Coordination Group (ITS-CG) between CEN and ETSI has been established to ensure ongoing coordination of the standardisation activities within these two SDOs.

ISO, IEC and ITU is global SDOs who standardise ITS on a global level. Many of the work groups within CEN are overlapping with ISO. To harmonise and obtain a good and fruitful cooperation CEN 278 and ISO 204 has joint meetings twice a year.

ITS standardisation is also going on in US.
An EU-U.S. joint declaration of Intent on Research Cooperation in Cooperative systems has been established, and is coordinating standardisation work to some extent.

In addition to the mentioned SDOs there are lots of organisations working with ITS standardisation. Please refer to chapter 8 and onward for some 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:

- Depending on the type of standard, there is a limited lifetime of three to five years after which it needs to be reconsidered. It may then be re-adopted, modified and re-voted, or withdrawn if there is not enough interest to keep it at all.
- New standards are started that covers aspects of existing standards. In the case of full overlap, existing standards are usually withdrawn.
- Paradigm shifts like the Cooperative System paradigm will generate a lot of new standards in a comparatively short time.
- Shifting user requirements will lead to new standards being developed.

Cooperation with global ITS standards organisations is important in order to achieve harmonised standards providing 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 standard development the EC has created so called mandates. These shall ensure that standards are developed within certain high focused areas. Ref section 13. The ITS directive is supported by mandate M/453.

It is important to get a good understanding of what is being standardised, who is working with what and the importance and impact of the standardisation for NPRAs work and responsibilities.

The facts listed for each SDO in this report is believed to be correct at early March 2011. Note however that this changes rapidly so the reader is advised to use the links given in the text to check the most recent updates.

2.3 What is being standardized

The scope of what is being standardized is very broad and covers more or less the complete ITS field. This includes amongst other:

- 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

The usage areas of the standards can be grouped into categories such as:

- Traveller information systems
- Transport control systems
- Vehicle-centric communication
- Goods and vehicle information
- Public transport aspect including emergency systems

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, “here-I-am, and this is my status”.
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. Used as synonym for CS when ITS is needed as a qualifier.
CS	Cooperative Systems, the new paradigm of ITS involving communications and sharing of information. See later chapters.
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 an 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 has two meanings.*** 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 5.9 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, eCoMove
IPR	Intellectual Property Rights, this covers patents and other ownership claims. 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

Term	Explanation and link
	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. The NSO/SDO for Norway is Standards Norway
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
TF	Task Force
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 with the name of Road Transport and Traffic Telematics (RTTT). This was the first ITS standardisation body, and TC278 has laid the ground works 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. Norway has been active since the start, and was for instance involved in the initial small group (Transport Expert Team) that drafted the work programme.

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 recently opened a new 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.compumax.nl/tc278/index.php?option=com_content&view=article&id=83&Itemid=92

Looking into the *application areas* drop down menu information about the various active working groups can be found.

The following working group information is intended to give a rapid overview of the status. To increase readability, all the tabular information has been moved to the last chapter.
Note 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 website. Please look under the TC278 website tab "**Application Areas**

4.1 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).

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, and has been of high interest for Norway since the start. 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 (Project Teams funded by the European Commission). 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. Chapter 2.1.1 gives an detailed overview of the activities in this highly active WG.

4.2 WG2: Freight and Fleet Management Systems

The work in this WG has been dormant for over ten years, and is recently restarted under new leadership. It will concentrate on information gathering and information collection about goods and vehicles/trailers/containers. The following aspects are in the scope:

- 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. The list of active WIs from the group can be found in chapter 2.1.2.

Two of the reports are connected to truck parking. These are linked with safety and the requirements concerning rest hours for truck drivers on long journeys, and therefore directly linked to the ITS Directive.

4.3 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

The main aspects are concerned with real time status information and ticketing. Please see chapter 2.1.3 for more details

The ISO equivalent WG is a quite closed group with little information coming out from the work process. In ISO TC204 the group is also focused on emergency situations linked to public transport which is an important issue to follow.

4.4 WG4: Traffic and Travel Information

WG4 has been very active in the past, but the activity is mostly moved to TISA (Traveller Information Services Association) which is a commercial organisation for TPEG and RDS-TMC (Alert C). 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 medias.

This is one of the most prolific WGs with around 40 developing + published standards, and considered to be the most successful set of ITS standards globally. Perhaps with the exception of CEN DSRC/EFC.
There are no known Norwegian experts directly in the WG, but TISA has Norwegian partners through Bjarte Johannesen from NRK and for time to time also participation from NPRA.

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 some argue that it will eventually take over for RDS-TMC. TPEG is included as a communication and location standard for Datex2. NPRA 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 Norway or if TPEG should be seen upon as a compliment to RDS-TMC.

4.5 WG5: Traffic Control

Dormant WG with no active standards or work items. Some of the ideas are taken up by ISO TC204 WG9.

4.6 WG6: Parking Management

Dormant WG with no active standards or work items.

4.7 WG7: Geographic Road Databases

Currently dormant WG. There is still 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.

4.8 WG8: Road Traffic Data

This is the DATEX II working group. EasyWay now provides the user forum for DATEX II. Earlier attempts were made at standardising interfaces for roadside infrastructure and controllers, but the current situation is 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 the “global” Datex II WG.

The DatexII standards are steadily adopting new material as new technologies emerge and as member states apply for new material to be included. A new location technology, OpenLR, is included in the last standard which will be voted on in April. In addition new mechanisms for easier linking of point locations to namelists have been added to identify the location of a traffic situation such as an accident. These are both additions of class A/B.

This WG is of high interest for NPRA since NPRA is in the phase of deploying DatexII as the real time traffic data information format in the new emerging service oriented architecture.

4.9 WG9: Dedicated Short-Range Communication (DSRC)

Dormant WG This WG used to be joint with ISO TC204 WG15 which is also dormant. This used to be one of the most controversial WGs. 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 with more than 40 million on-board units in daily use.
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.

4.10 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.

4.11 TC278/WG11: Inter-system Interfaces

This WG never met.

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, and AutoPASS in Norway is following this registration regime.

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 is recently finished.

The Electronic registration Identification work may be of special interest for NPRA 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 have already decided and started 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.

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). Since different countries may have different enforcements of electronic registration legislation these documents must be mapped against Norwegian legislation to evaluate the precise boundaries of usage.

4.13 WG13: Architecture

WG13 is one of the later additions to the committee. Originally TC278 intended to do architecture, terminology and several other such tasks directly at the TC level. After ISO TC204 got started, it became clear that architecture is so central that a European WG had to be created. Norway participated in the initial phases.

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.

4.14 WG14 After Theft Systems for Vehicle Recovery

This group was started as a cooperation between police and insurance companies. The idea was originally to use ITS to track and recover stolen vehicles, in particular on border crossings towards east Europe. These standards are mainly finished now, and the need is reduced because of better anti-theft technology in new cars. Only some testing is carried on 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.

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 a TS. In the first instance this is only relevant for heavy vehicles/special vehicles that can be used for terrorism and serious crime.

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. Road transport burns one quarter of the EU's overall energy consumption, and one fifth of the CO2 emissions are caused by road vehicles. See the following video: 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 CO2 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. The project iCar Support is funding and supporting parts of the standardisation activity.

The majority of work is in the final stages of development, but there have been some controversy regarding privacy of privately operated systems.

The reports under work from the group are listed below. The scope of the WG is wider than only eCall, but there are no WIs beyond eCall at this time.

- prEN 16072 Pan-European eCall – Operating requirements. Passed Enquiry ballot. Comment Resolution successfully completed. Draft revised and submitted for affirmation vote.
- prEN 15722 ESafety - ECall minimum set of data. Passed Enquiry ballot. Comment Resolution successfully completed. Draft revised and submitted for affirmation vote.
- prEN 16062 eCall - High level application protocols. Passed Enquiry ballot. Comment Resolution successfully completed. Draft revised and submitted for affirmation vote.
- prEN 16102 eCall - Operating requirements for third party support. On 2010-02-10, Passed Enquiry ballot. Comment Resolution successfully completed. Draft revised and submitted for

affirmation vote. Note that Norway has proposed changes to this standard regarding privacy of medical information linked to the listen in of third parties on the ecall between the medical centre and the caller.

- EN/ISO 24978 ITS Safety and emergency messages using any available wireless media — Data registry procedures. Approved ISO/EN 2009

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. Co-operative systems 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 Systems. This WG is fully joint with ISO WG18, and has two main roles:

- Firstly to develop new standards in the field of CS, and
- secondly to help coordinate and foster new CS 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 behind schedule. 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.

All reports from this group are thus still preliminary. 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 major 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 boarders and international systems.

5 ISO TC204

ISO TC204 is the International ITS committee. Originally called Transport Information Control Systems (TICS), but changed its name to Intelligent Transport Systems some years ago. ISO TC204 started two years 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 the Working Groups often have joint meetings, and all Work Items are handled so as to ensure alignment.

All Work Items can be searched via this search engine in this ISO page.

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

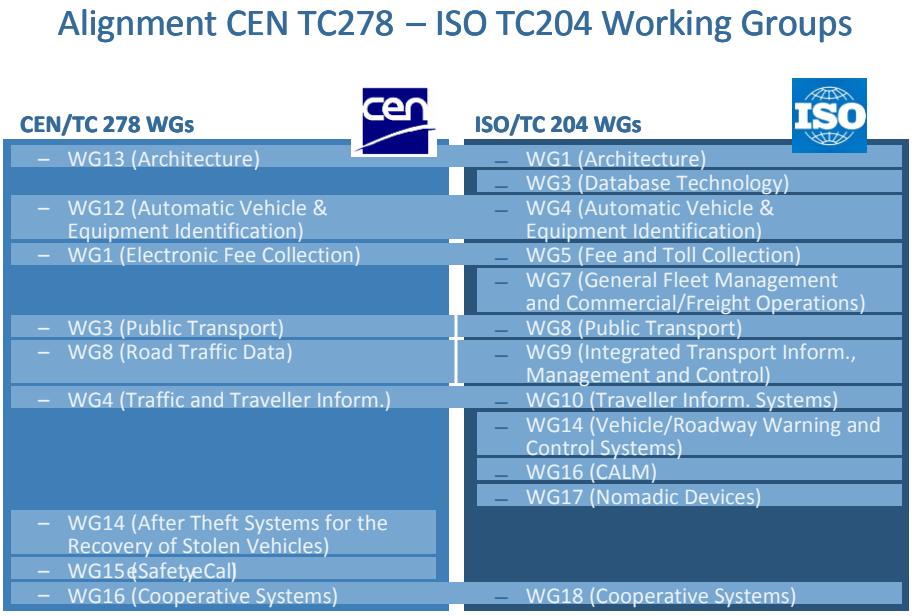

Figure 1: Overlapping WGs between CEN/TC278 and ISO TC 204

The following drawing gives a quick overview of the full set of working groups:

WG	ISO TC204 - TICS	Country	Convenor
1	Architecture	UK	R. Bosom
2	Quality and reliability requirements	USA	dormant
3	TICS Database Technology	JAP	J. Shibata
4	AVI/AEI	NO	K. Evensen
5	Automatic Fee and Toll Collection	NL	J. Engdahl
6	General Fleet Management	USA	dormant
7	Commercial Fleet Management	CAN	L. Sabounghi
8	Public Transport/Emergency Services	USA	M. Olayi
9	Integrated Transport Management and Control	AUS	D. Zabrieszach
10	Traveller Information Systems	UK	P. Burton
11	Route Guidance and Navigation Systems	DE	dormant
12	Parking management/off-road commercial		dormant
13	Man-Machine Interface (Off-vehicle)	USA	dormant
14	Vehicle Control Systems with External Interfaces	JAP	Y.Furukawa
15	DSRC for TICS applications	DE	dormant
16	Wide Area Communication/protocols/interfaces	USA	R.Shields
17	Nomadic Devices	KOR	Y. Moon
18	Cooperative Systems	GER	H-J. Schade

Figure 2: Working groups of ISO TC204 and the conveners for each group

5.1 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 is a fully joint WG with CEN TC278/WG13, meaning all results coming out of ISO WG1 are also directly relevant for Europe.
Norwegian experts were participating from the start where Knut Evensen and Prof. Steinar Andresen used to be members, but the last years our national participation has been reduced.

5.2 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 stage.

5.3 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.

5.4 WG4 Automatic Vehicle and Equipment Identification (AVI/AEI)

This WG is fully joint with CEN TC278/WG12. Please find further details here.

5.5 WG5: Electronic Fee Collection (EFC)

This is a fully joint WG with CEN WG1. Please find further details here.

5.6 WG6: General Fleet Management

Never started, work scope folded in under TC204/WG7

5.7 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 there are some ideas to restart WG2 in CEN as a European companion to extend the work into Cooperative ITS. Much of the work in ISO WG7 is also linked to work 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.

5.8 WG8: Public Transport and Emergency services

WG8 has not been very active, and has a very 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.

Very little is known of WG8 since the convenor does not report much to the TC, apart from a note refusing any involvement of Cooperative Systems on behalf of WG8. This statement seems a little strange since public transport surely should be closely focused on cooperation with other transport media.
Reaching good cooperation between different transports systems is an important area for effective transport of people and goods, in addition to effective emergency handling.

5.9 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. A fair part of the meetings are allocated to national updates from the participating countries. 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 evaluation of ITS. WG9 is trying to standardise roadside controller interfaces as well as central to central interfaces, but there seems to be some resistance from the supplier side to this undertaking.

WG9 is also in relatively close contact with CEN TC278/WG8 lead by the Dutch road administration, but these WGs are not joint. WG9 is the home of DATEX II 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 NPRAs Datex II work and real time transport information sharing internationally.

5.10 WG10: Traveller Information Systems

This WG is parallel to CEN TC278/WG4. Please refer to CENTC278/ WG4 for further details.

5.11 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 OEMs and authorities are well represented. This is one of the more active 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.

WG14 could potentially be interesting for Nordic vehicle Authorities since it is a precursor to UN ECE WP29.

5.12 WG16: Wide Area Communications

This is one of the most productive ISO WGs, and is on the same level as the EFC group.
The main output is the CALM standard series (Communications Access for Land Mobiles) of communications standards. This WG is also developing a variety of vehicle probe data (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. Norway has been very active from early on in this WG, and is leading several of the activities. 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). CALM technology is also used in Test Site Norway.

5.13 WG17: Nomadic Devices

This is a relatively new group looking at integration of smart phones in cars. No standards are completed yet, and part of the work has met some opposition from OEMs.

The work includes the use of nomadic and mobile devices to support ITS service and multimedia provision in vehicles The work relates to vehicle interfaces for data access including security, data definitions and protocols.
Knut Evensen participated in the group at the start, but there is no Norwegian participation now. Experts from Sweden and Germany are following the work closely.

5.14 WG18: Cooperative Systems

This is a full parallel group to CEN WG16, please see that entry in the CEN section.
WG18 has similar roles in ISO as in CEN: Firstly to develop new standards in the field of CS, and secondly to help coordinate and foster new CS thinking in the existing WGs.

6 ETSI TC ITS

ETSI is the European Telecom Standardisation Institute, and is a major contributor to global telecom standards such as GSM 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 voting is done according to weighted votes according to membership size.
Since the members pay for the secretariat, the resulting standards and finished documents can be downloaded for free. The main link to ETSI gives a good overview has further links to search for freely downloadable standards.

Under study at ISO/TC 204 are standardization proposals for (1) system architecture, (2) interface (message set, etc.), (3) framework (data dictionary and message template), (4) performance requirements of a system and (5) test methods.

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 consist of groups of 3-5 experts that are paid to draft a standard over a limited period of time, typically 3-6 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.

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 3: 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 systems.
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. 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.

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

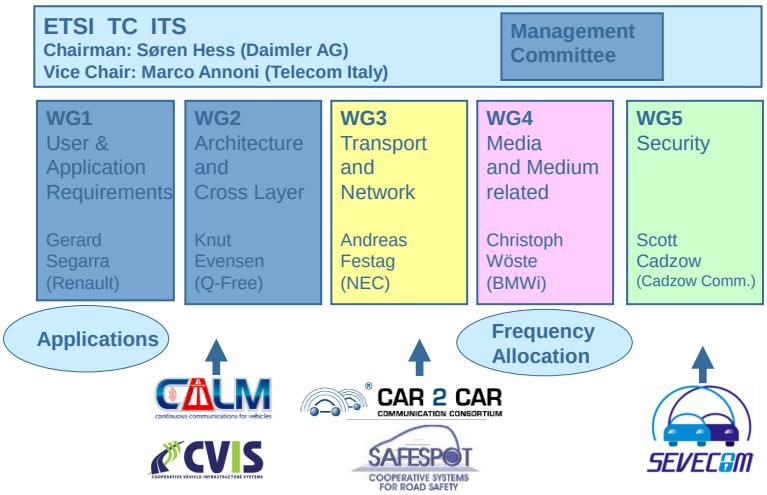

Figure 4: Overview of ETSI WGs and the conveners of each group

6.1 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 systems. 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 Systems 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 EV, Electric Vehicles, in particular for the use case of communicating charge status and opportunities, and guiding vehicles to charge points.

6.2 WG2: Architecture and Cross Layer

Specification of ITS architecture is going on in several SDOs. In April 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. In September 2010, 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 a 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.

6.3 WG3: Transport and Network

WG3 is focused on the middle communications layers for network and data transport functions. All efforts are concentrated on GeoNet/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, but there is significant pressure from C2C-CC so it is likely that this protocol will be the dominant in Europe.

6.4 WG4: Media

WG4 is the media of physical interface group. The work can be split in three 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.
2. One of the work areas is regarding interference between the current CEN DSRC on 5.8GHz, and the G5A on 5.9 GHz. This issue regards potential disturbance on current tolling systems from the new 5.9GHz OBUs, and this is of special interest for current toll system operators. There is a proposal for a test programme being run by ETSI during 2011 to validate the level of interference and potential problems for current users of DSRC.
3. All the other medias like 700 MHz digital dividend, LTE, new digital broadcast media and so on are 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.

6.5 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 the future:
A 15 year old Japanese car coming from Norway, meets a new American car coming from Italy somewhere in France. These two cars will have to 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 we are sure the basic concepts are harmonized. Unfortunately the resulting standards are still not compatible due to different requirements. The process goes over several steps where the first step is to analyse and 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. A new, more comprehensive analysis is planned.
Privacy is a big issue in this WG, and contacts with the EC regarding the privacy Directive is an on-going effort.

7 IEEE (Institute of Electrical and Electronic Engineers)

IEEE is mainly a USA based organisation, but it has some work relevant for global ITS standardisation. Two groups in IEEE needs to be mentioned is particular:

7.1 IEEE 802.11p

This working group 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 in all of Europe, Northern America, Australia and New Zeeland, some central and South American countries, and some countries in Asia and Africa are considering the use at the moment. 802.11p will be “rolled up” in the main 802.11 wireless standard and 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 July 15, 2010. The complete 802.11 standard is available for free download, but please be warned that it consist of several thousand pages and the ITS/802.11p part is well hidden!

7.2 IEEE P1609

This full ITS standards project adds the higher layers including some applications. P1609 has approved four preliminary test standards (P1609.1 – 1609.4), and is in the process of updating and adding three more related to architecture, application register and EFC application for 5.9GHz. P1609 is the preferred standardisation body for 5.9GHz operation in the US. Standards can also be accessed or bought from this site.

8 SAE (Society of Automotive Engineers)

SAE is another large ITS actor in USA, and registered as a full Standards Developing Organisation. **Note** that even though this is called DSRC (Dedicated Short-Range Communication), it has nothing in common with the original European DSRC as used in electronic fee collection systems elsewhere in the world.

There are two main groups currently dealing with ITS matters:

8.1 SAE J2735 DSRC Message Set Dictionary

The SAE J2735 defines the message and data format for use over 5.9GHz 802.11p WAVE links.. J2735 is the US data set definition is a collection of data types and messages that are primarily intended for 5.9GHz link, i.e. V2V/V2R communications. This work is currently under full revision under the lead of US DoT, and as part of this process attempts are made to harmonize with data sets developed in ETSI and CEN/ISO. The current 2009 version has minimal links with the European standards.

8.2 SAE J2945 DSRC Minimum Performance Requirements

SAE J2945 defines the minimum communication performance requirements of the elements defined in the SAE J2735 DSRC Message Set Dictionary and covers how the data and message shall be used, such as message transmission rate, channel usage, optional data usage in various situation. This work is intended to be harmonized with the similar work taking place in ETSI TC ITS, and in the EU-US Task Force mentioned in later chapters.

9 IETF

The Internet Engineering Task Force supplies all the basic Internet standards. “Normal” Internet access is already the basis for almost all ITS communications except short range vehicle access. C-ITS is depending on a new level of mobility that current Internet Protocol (IPv4) cannot supply out of the box. Therefore IETF has had a task force working on a better solution for the new IPv6 that we all are being moved into these days as the adressable range of IPv4 is getting depleted.

The task force relevant for ITS used to be called NEMO for Network Mobility, but is now merged with other (intermodal) use cases to the group MEXT, Mobility EXTensions. There is a number of essential Internet standards that are touched by MEXT regarding how to use the current (IPv4) Internet, how to connect fast and optimize routing, how to initiate network connections, how to address a roaming vehicle and so on.

The current implementations from CVIS and the work of CALM is fully based on NEMO/MEXT, and has cooperated to introduce these essential standards for the core Internet operation.

10 New paradigm in ITS: Cooperative Systems

CS is the new paradigm in ITS. The most common understanding is that Cooperative Systems is to get away from the multitude of proprietary stand-alone boxes invading the driver environment. The feeling was that it is not sustainable to put a new box with antennas, display, keyboard, etc, etc for each new application that was going into the car. This is too costly, to unsafe, does not give interoperability, and is just not safe or sustainable from a windshield real estate point of view.
So we had to go from “silos” or vertical integration of all functions for each new application, into a new world of sharing common resources where possible.

10.1 What is a “Cooperative System”?

The definition of what a cooperative system is has proven to be difficult. There are obvious reasons for this, mostly to do with turf wars and commercial pressures from actors in existing markets feeling threatened by this new world. This has led to several definitions of CS.

10.2 The European Commission basic definition

The most prevalent understanding is the EC definition: “ A CS involves V2V and V2I communication”. This definition is obviously not a threat since covers all potential CS 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 find a more precise definition.

10.3 The vehicle active safety viewpoint

A more precise understanding is the use of 5.9GHz 802.11p communications 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 meters. The typical applications are warnings or active collision avoidance decided in each vehicle. This is the understanding from OEMs and authorities involved in the active safety world, such as the Car to Car Communications 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 co-operative 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 road side, in traffic control/ management centers, in service centers, or hand-held units.*

Figure 5 Definition of Cooperative ITS

This definition 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.

CS is a new paradigm in ITS, and it will influence all existing systems to a certain extent. This is an on-going process in CEN and ISO now, while 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 communications and applications, came from ISO TC204/WG16 about ten years ago. Up to that time all ITS standards and ITS system implementations had been done as a closed vertical integration, often called “silo”. In 2001/2002 the basic architecture and core standards for CALM where developed, and has remained basically intact until now. The architecture has been extended up to the application level in recent years by the CVIS project and ETSI standardisation.

The concept of CALM is actually very simple: There are a number of medias or physical (radio) interfaces available, and each of these tries to stay continuously connected to the external world. The available connections together with key parameters such as cost, available rate, latency and so on 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, and also their relative priority class. The communications manager has a simple task in mix-and-match the available interfaces with the applications that need service. It also means that applications might be using different interfaces.

10.6 Cooperative System Messages

One basic concept of Cooperative Systems is that vehicles and roadsides will broadcast information to its surroundings, using relatively short range communication means. The normal medium for these short range messages is the 5.9GHz systems based on 802.11p. Other medias can be InfraRed, Millimetre wave (61 GHz), 700 MHz (in Japan). The typical range is 300-800 meters, but 700MHz can achieve 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 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 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 US 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 (ITS-S) 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 the 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:

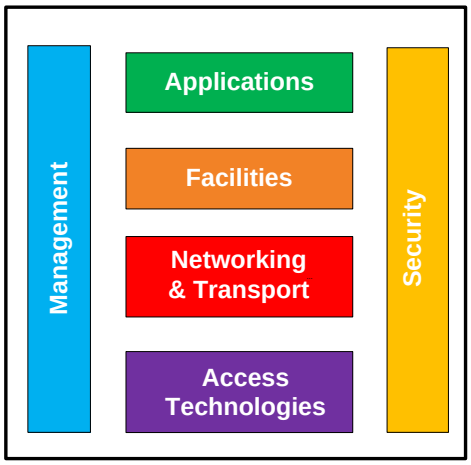

Figure 6 ITS Station

When several such ITS Stations are connected together, they form an ITS System and belong to an ITS Network. This is well 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 other handheld device.

In larger installations such as in a vehicle, the ITS-S will often consist of a communications device (Mobile Router) and one or more computers (Mobile Hosts and Gateways to ECUs)

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 and security entity, a “Bounded Secure Domain”.

12 Policy influence over ITS Standards

There are a number of stakeholders in ITS standardisation. In many ways we can say that everyone that are implementing or deploying ITS at any phase of planning or real work, needs to either use standards very actively, or be involved to influence the core standards. Policy makers are seeing the standardisation process as an important tool, and are therefore both directly involved in setting policy requirements through the Mandate process, and indirectly via funding related activities in R&D projects Note that the space does not allow any in-depth explanation of the direct influence these projects have had, so the reader is advised to follow the links to get more info where relevant or needed.

12.1 Mandates

One of the primary tools for the European Commission is called Mandates.

Areas that are considered important from a policy viewpoint will often need Directives to handle the legal aspects of pan-European introduction and operation. Directives should usually not contain any direct technical requirements, but should primarily point to European Standards (ENs) for the detailed specifications.

Mandates is the tool the EC uses to get such technical standards written. The resulting standards will often be referenced by European legislation (Directives), so there are both time restrictions and the expectation of high technical quality on these standards.

12.1.1 Mandate process

The expectation from the EC will be described in a document together with requirements to develop technical standards, and offered to the three European SDOs (CEN, CENELEC and ETSI). These SDOs will in turn consider the Mandate, and either declare that it is outside their area of interest, or accept responsibility to develop standards in that domain. The SDO will then return 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 relatively complex as seen from the EC, since several DGs are involved in setting the requirements. As an example, DG INFSO from a technical/research perspective, DG MOVE responsible for the legal and operations perspective, and DG ENTEPRISE will finance the actual standardisation work.

12.1.2 M/338: The EFC mandate

Mandate 338 is dedicated to Electronic Fee Collection, and is the second such mandate. It is held between DG MOVE and DG ENTERPRISE, and is directed to TC278/WG1 only. The mandate goes over several years to support the EFC directive and the EETS operation. M/338 has performed well in the past, and is likely to conclude with success in 2012.

12.1.3 M/453: The ITS Mandate

Mandate 453 is considered to be the main ITS mandate. It is intended to support part of the ITS Action Plan and ITS Directive.

M/453 is a cooperation between DG INFSO, DG MOVE and DG ENTERPRISE. It describes 69 areas of work for a complete Cooperative System, and requests a “minimum set of standards” to deploy C-ITS.

This task has been taken up by ETSI and CEN, and there is a split of responsibility between the two bodies where ETSI TC ITS mainly deals with communications and active safety applications, while CEN TC278 takes responsibility for the rest. The work should be completed mid-2012

The work is not progressing well for CEN, while ETSI TC ITS likely will be able to have a core set of active safety standards finished in time.

The main reasons for CEN falling behind is that the TC and WG structure is adapted for “silo” type of normal ITS standards, so adapting to a new way of thinking will take time. The scope for CEN is also a lot wider, even though the number of bullet items in the Mandate is similar.

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

12.2 EU-US Task Force

One central cooperation between ITS authorities is the EU-US Task Force (TF) that 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 early 2011.

The idea is twofold:

- on one hand to coordinate the Cooperative ITS research activities between the regions, to pool resources and get better results by learning from each other's experiences
- and to coordinate standardisation to avoid duplicating and getting conflicting standards that would slow or prevent the uptake of Cooperative ITS.

From a policy perspective, US and Europe agreed on a policy statement called "EU-US Joint Declaration of Intent (13th November 2009)". This policy mainly regulates the R&D activities. The following links gives more details as seen from the European and US viewpoint.

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

Since this report is mainly focused on standardisation, it is interesting to see the clear policy wording we can find in clause 10:

12.2.1 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 Systems. 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, but late March 2011, the final signature from Europe was not yet completed.

13 European Framework Programme activities

The European Commission, in particular through DG INFSO, have been highly active in promoting ITS through the last twenty-odd years. As mentioned earlier, Fotis Karamitsos started this field through the DRIVE programme in the late eighties, and since then the EC has held a continuous focus by providing new research opportunities in every new framework programme call. In the last years, the main driver has been Juhani Jaaskelainen, and he has achieved much in promoting ITS to the level it has now.

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

13.1 CEN DSRC projects

Examples of completed projects are Delta, EVI and RCI. These example project actually helped the current generation of technology, CEN DSRC, to become proven, stable products that could be trusted in deployment, and they had a pivotal role in ITS standardisation. Partly these early projects did drafting of core specifications and requirements, and partly they implemented and validated the standards to prove the concepts, and finally they fed results back to CEN and ETSI to correct everything for commercial deployment. In a way there was a Ping-Pong match relationship between Cen and these projects that ultimately has meant a significant commercial success, as well as competitive quality systems for users and operators alike.

13.2 SmartFreight

SmartFreight was a STREP that ended 2011. As a large European R&D project led by SINTEF and primarily located in Trondheim, this gave Norway a high visibility. The idea was to manage goods transport through a multimodal transport chain. The project used CVIS technology and also CEN DSRC technology in combination, and several interesting findings in the end. The contribution to standards was not so high, but still the validation of the technology in various intermodal situations has proven to be interesting feedback to the SDOs.

A more recent "instrument" is the **IP or 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, eCoMove who belong or belonged to the new generation of Cooperative System technology projects.

13.3 SAFESPOT

SafeSpot was led by FIAT research, and looked into using CS technology for V2V collision avoidance. SafeSpot was based primarily of technology from CVIS, and contributed to CALM and ETSI throughout the project lifetime.

13.4 CVIS

CVIS has been the main platform developer of Cooperative Systems. This was the largest ITS project in the world so far, with a budget of around 43 M€. To give full justice to this project in a small space is difficult, so the reader is advised to follow the link and download some of the main documents and project presentations from here.

Q-Free has been central in the technical part of this project, and SINTEF has also been supplying a lot of the results that formed the Open Cooperative System Platform. This platform is a combination of communication subsystems (5.9GHz, IR, 3G, DSRC, GPS and satellite), of sensor integration, vehicle integration, a 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, 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 CVIS ended this balance has largely disappeared.

13.5 eCoMove

eCoMove continues part of the technology from CVIS, but focuses on sustainability in transport, and in particular goods transport. The project is led by ERTICO, and has many of the same partners as CVIS. The project is for three years, and started in 2010.

Support Action projects are small, specialised European Framework R&D projects that will facilitate and support coordination of other projects. This means that the project does not perform any research itself, but will help partners and other projects by arranging meetings, funding travels and small studies, prepare position papers for the EC, and so on. These projects are usually funded 100% since there is no long term benefit for the project partners after the project finishes.
Examples are COMeSafety and iCar Support who have standardisation support as part of their task.

13.6 COMeSafety

This project is a Support Action lead by the car industry, more specifically by Timo Kosch at BMW. The SA has recently been extended for a new three-year period. COMeSafety did support the drafting of the new ITS Station Reference Architecture as a combination of ETSI and ISO on one side, and the CVIS and SAFESPOT project on the other side.

13.7 iCar Support

This project is run by ERTICO, and can mainly be seen as an arm of the eSafety Forum, that prepares meetings, documents, studies and so on. One small part of the project is dedicated to give an overview

of ITS Standardisation covering both European and overseas SDOs. This project is for instance funding Knut Evensen participation in the EU-US Task Force, as well as meeting contributions to some of the ISO meetings.
iCar Support also maintains a standardisation web page with many of the same types of information as this report covers

14 Conclusion

14.1 The status and outlook of ITS Standardisation

This conclusion will necessarily be somewhat subjective.
The perceived situation at this time, is that the needed balance between Safety requirements and Efficiency requirements has been tilted in favour of Active Safety. This is a result of the car makers being a strong group politically and financially, and there is no longer a comparable group from the efficiency side to counter this strength. Therefore a lot of the standards coming from ETSI are only relevant for anti-collision in a very restricted understanding of Cooperative Systems.
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. Therefore the work is progressing at a much slower pace.
The author of this report is still convinced that Cooperative ITS will succeed, but there is a lot of ground to be covered in order to satisfy the needs of authorities and road operators. Even if the car makers will claim that the goal has been achieved, they are only referring to their part of the equation.
Another challenge we are facing is the overlap of standardisation. Even though the EU-US TF has issued policies to the contrary, there is an absolute trend that ETSI is completing a fully overlapping and competing standard with the already existing CALM set. The same is happening with IEEE and SAE. There are therefore at least three competing full sets of standards that needs to be taken into account, and this is an added challenge when designing for a global marketpalce

14.2 Standardisation impact on NPRAs work with 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 NPRA should develop its infrastructure and system architecture to cope with the upcoming ITS services to ensure compatibility. Usage 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. Following and impacting the standardisation groups working with international systems that will affect the Norwegian transport system is important and must be followed up. Good cooperation with the countries with common boarders with Norway are thus 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 common understand ability across boarders
- International Automatic vehicle identification/Automatic fee collection systems to support common paying service and a greener transport sector due to diverse emission fees.
- Emergency call and safety warnings to drive down the number of traffic fatalities and accidents

These aspects are also common with the overall road transport development strategy from the Norwegian national department of communication. Following up and impacting the SDOs and forums working on these aspects will lead to specifications in line with Norway's special interests.

Annexes

1 Standard development and standardisation organisation mapping

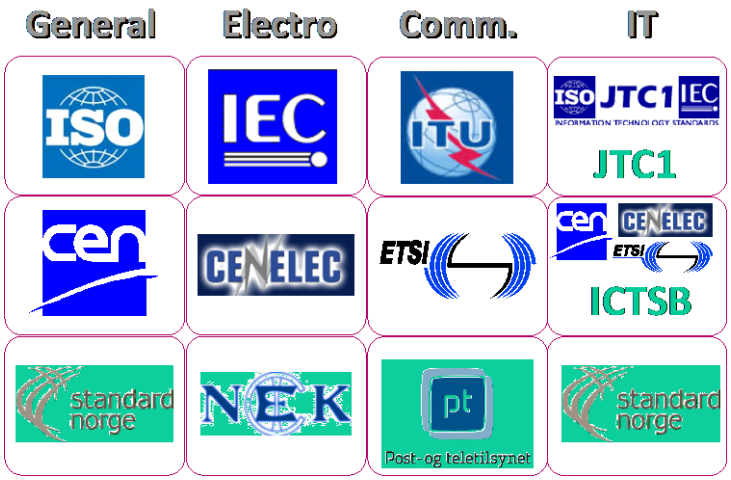

Figure 7: Structure of SDOs on various levels

In this picture global standardisation resides on top, with regional standardisation in the middle, and with national standardisation efforts on the lower end.

The idea is that higher layers should take precedence, so that if global standardisation is started, then regional and national standardisation should stop and all efforts should be focused to 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 that regulates the cooperation between CEN and ISO. The situation between the other bodies are usually based on bilateral agreement on a case by case basis, or often lack of any agreements at all.

Unfortunately the world of ITS standardisation has significant overlaps between some SDOs, in particular regarding communication subsystem 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 USA (US DoT RITA/JPO) are following this situation, and has signed a policy statement as a Joint Declaration, see chapter on **EU-US Task Force**.

Types of standards:
We broadly 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 population in each country. ENs have some legal implication for public bodies according to the European Public Procurement Directive, but is mainly voluntary for implementation 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 with one country-one vote. 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 are documents that either are intended as

supporting material, or if a specification is needed very fast, or where consensus cannot be achieved but the documents still are registered.

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

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:

Figure 8 Standardisation stages

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

The focus is on enabling standards. This means that a typical standard will allow several ways to achieve the goal, as long as the function and external behaviour is the same.Exact product specifications are not the responsibility of SDOs, which often leads to misunderstandings even within the Working Groups.

2 Overview per Working Group: work items and links

Please note that the list of work items for each Working Group is copied from the ISO website automatic table generator that is known to have reliability issues. The following tables should therefore only be used to get an idea of the type of standards, and refer to the real website to get the latest, full status of the various deliverables.

2.1 CEN TC278 – Tabular view

Some key facts for TC278:

- Home Page
- Established in 1992
- 30 members (CEN/ISO member bodies)
- 150 work items, 86 adopted standards
- 10 active working groups with nominated experts; 6 passive working groups
- Well connected to European R&D
- Secretary: Jelte Dijkstra, NEN, Netherlands
- Chair: Lex Eggink, Rijkswaterstaat, Netherlands

Note that the chairman Lex Eggink is new from beginning of 2011 and replaces Henk Stoelhorst who also came from the Dutch Road Authorities. The secretary Jelte Dijkstra will be replaced end of 2011 by Maarten Peelen from NEN, Netherlands.

2.1.1 TC278/WG1: Electronic Fee Collection

- ~40 members (average turning up at meetings)
- 21 active work items, 19 adopted standards
- 3 active sub groups, 3 passive
- Joint group with **ISO TC204/WG5**
- Norwegian expert: Trond Foss, SINTEF
- Secretary: Johan Hedin, Hybris Konsult, Sweden
- Convenor: Jesper Engdahl RAPP, Switzerland
- SG1 - Trond Foss: Info exchange, architecture, security
- SG2 - Jean François Jouen: DSRC based EFC, testing
- SG5 - Ian Catling: GNSS/CN based EFC

Below is the latest list (March 2011) of reports under various stages of development. FV = Formal Vote.

WI	Reference	Title	Status	
00278233	EN ISO 12855	Electronic fee collection - Information exchange between service provision and toll charging	Preparing for FV	
00278234	EN ISO 14906	Electronic fee collection - Application interface definition for Dedicated Short-Range Communication (review)	Preparing for FV	
00278239	CEN ISO/TS 17575-3	Electronic fee collection - Application interface definition for autonomous systems - Part 3: Context data	Adopted	
00278240	CEN ISO/TS 17575-4	Electronic fee collection - Application interface definition for autonomous systems - Part 4: Roaming	Adopted	
00278248	CEN ISO/TS 13143-1	Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to CEN ISO/TS 12813 - Part 1: Test suite structure and test purposes	Adopted	
00278249	CEN ISO/TS 13140-1	Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to CEN ISO/TS 13141 - Part 1: Test suite structure and test purposes	Adopted	
00278254	CEN ISO/TS 13143-2	Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to CEN ISO/TS 12813 - Part 2: Abstract test suite	Formal Vote closed	
00278255	CEN ISO/TS 13140-2	Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to CEN ISO/TS 13141 - Part 2: Abstract test suite	Preparing for FV	
00278257	CEN ISO/TS 16407-1	Electronic fee collection - Evaluation of equipment for conformity to CEN ISO/TS 17575-1 - Part 1: Test suite structure and test purposes	Preparing for FV	
00278258	CEN ISO/TS 16401-1	Electronic fee collection - Evaluation of equipment for conformity to CEN ISO/TS 17575-2 - Part 1: Test suite structure and test purpose	Preparing for FV	
00278259	CEN TR 16219	Electronic fee collection - Value added services based on EFC on-board equipment	Formal Vote closed	
00278270	CEN TS	Electronic fee collection - Security framework	Under development	
00278272	CEN TS	Electronic fee collection - Interoperable application profiles for autonomous systems	Under	

			development	
00278273	CEN TS	Electronic fee collection - Charging performance - Part 1: Metrics	Under development	
00278274	CEN ISO/TS 16410-1	Electronic fee collection - Evaluation of equipment for conformity to CEN ISO/TS 17575-3 - Part 1: Test suite structure and test purposes	Preparing for FV	
00278275	CEN ISO/TS 16403-1	Electronic fee collection - Evaluation of equipment for conformity to CEN ISO/TS 17575-4 - Part 1: Test suite structure and test purpose	Preparing for FV	
00278276	CEN ISO/TS 16407-2	Electronic fee collection - Evaluation of equipment for conformity to CEN ISO/TS 17575-1 - Part 2: Abstract test suite	Under development	
00278277	CEN ISO/TS 16401-2	Electronic fee collection - Evaluation of equipment for conformity to CEN ISO/TS 17575-2 - Part 2: Abstract test suites	Preparing for FV	
00278278	CEN ISO/TS 16410-2	Electronic fee collection - Evaluation of equipment for conformity to CEN ISO/TS 17575-3 - Part 2: Abstract test suites	Preparing for FV	
00278279	CEN ISO/TS 16403-2	Electronic fee collection - Evaluation of equipment for conformity to CEN ISO/TS 17575-4 - Part 2: Abstract test suites	Preparing for FV	
00278281	CEN TS	Electronic fee collection- Secure monitoring for autonomous toll systems - Trusted recorder	Preliminary	
00278282	CEN TS	Electronic fee collection- Secure monitoring for autonomous toll systems - Compliance checking	Preliminary	
00278283	CEN ISO/TS 14907-2	Electronic fee collection - Test procedures for user and fixed equipment - Part 2: Conformance test for the onboard unit application interface (Review)	Preparing for FV	
00278299	EN 17573	Electronic fee collection - Systems architecture for vehicle-related tolling (ISO 17573:2010)	Preparing for FV	

2.1.2 TC278/WG2: Freight and Fleet management

- TBD members (average turning up at meetings)
- 21 active work items, 19 adopted standards
- No sub groups
- May start cooperation with **ISO TC204/WG7**
- Norwegian expert: None
- Secretary: None
- Convenor: Jonathan Harrod Booth, UK

This table is incomplete since group is just restarting and has not held its first meeting at the time of writing.

WI	Reference	Title	Status
00278304	CEN TS	ITS Standardisation requirements for Freight, Logistics and Commercial Vehicle Operations	Preliminary
00278305	CEN TS	Framework Architecture, Roles and Responsibilities to support Intelligent Truck Parking Information and Reservations services.	Preliminary
00278306	CEN TR	ITS Standardisation requirements for Intelligent Truck Parking Information and Reservations services	Preliminary

2.1.3 TC278/WG3: Public Transport

- 30 members (average turning up at meetings)
- 5 active work items, 17 adopted standards
- 2 active sub groups
- Some overlaps with **ISO TC204/WG8**
- Norwegian expert: Jarl Eliassen, Trafikanten
- Secretary: none
- Convenor: Jean-Laurent Franchineau, Veolia, France

WI	Reference	Title	Status
00278218	CEN TS 15531-4	Public transport - Service interface for real-time information relating to public transport operations - Part 4: Real-time status monitoring information of facilities	Adopted
00278219	CEN TS 15531-5	Public transport - Service interface for real-time information relating to public transport operations - Part 5: Traffic incident monitoring service	Formal Vote closed

00278222	EN ISO 24014-2	Public transport - Interoperable fare management system - Part 2: Recommended business practices for set of rules	Preliminary
00278260	EN	Public transport - Network and Timetable Exchange (NeTEx)	Preliminary
00278261	CEN TS	Public transport - European ticketless and ticket on departure for rail distribution	Preliminary
00278307	EN	Public transport - Network and Timetable Exchange (NeTEx) - Part 1: Public transport network topology	Preliminary
00278308	EN	Public transport - Network and Timetable Exchange (NeTEx) - Part 2: Scheduled time table	Preliminary
00278309	CEN TS	Traveller Information for Visually Impaired People (TI-VIP)	Preliminary

2.1.4 TC278/WG4: Traffic and Travel Information

- 30 members (average turning up at meetings)
- 15 active work items, 25 adopted standards
- 2 active sub groups
- Joint group with **ISO TC204/WG10**
- Norwegian expert: Unknown
- Secretary: (none)
- Convenor: Paul Burton, SERCO, UK

WI	Reference	Title	Status
00278197	EN ISO 14819-2	Traffic and Travel Information (TTI) - TTI Messages via traffic message coding - Part 2: Event and information codes for Radio Data System - Traffic Message Channel (RDS-TMC) (Review)	Under Review
00278290	CEN ISO/TS 18234-7	Traffic and Travel Information (TTI) - TTI via Transport Protocol Expert Group (TPEG) - Part 7: TPEG-PKI	Under development
00278291	CEN ISO/TS 18234-1	TTI via Transport Protocol Expert Group (TPEG) data-streams - Part 1: Introduction, Numbering and Versions (review)	Under development
00278292	CEN ISO/TS 18234-9	TTI via Transport Protocol Expert Group (TPEG) data-streams - Part 9 : Traffic Event Compact (TEC) application (TPEG-TEC)	Under development
00278293	CEN ISO/TS 18234-10	TTI via Transport Protocol Expert Group (TPEG) data-streams - Part 10: Conditional Access Information (TPEG-CAI)	Under development
00278294	CEN ISO/TS 21219-2	Traffic and Travel Information (TTI) - TTI via Transport Protocol Expert Group (TPEG) - Part 2 : TPEG2-UML modelling rules	Under development
00278295	CEN ISO/TS 21219-3	Traffic and Travel Information (TTI) - TTI via Transport Protocol Expert Group (TPEG) - Part 3 : TPEG2-UML to binary conversion rules	Under development
00278296	CEN ISO/TS 21219-5	Traffic and Travel Information (TTI) - TTI via Transport Protocol Expert Group (TPEG) - Part 5 : service framework (TPEG2-SFW) to binary conversion rules	Under development
00278297	CEN ISO/TS 21219-6	Traffic and Travel Information (TTI) - TTI via Transport Protocol Expert Group (TPEG) - Part 6 : Message Manamenetn Container (TPEG2-MMC)	Under development
00278298	CEN ISO/TS 21219-18	Traffic and Travel Information (TTI) - TTI via Transport Protocol Expert Group (TPEG) - Part 18 : Traffic Flow and Prediction (TPEG2-TFP)	Under development
00278300	EN 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 (review)	Under Review
00278301	EN 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 (review)	Under Review
00278310	CEN ISO/TS 21219-4	Intelligent transport systems - Traffic and Travel Information via Transport Protocol Expert Group, Generation 2 (TPEG2) - Part 4: UML to XML conversion rules	Under development
00278311	CEN ISO/TS 21219-16	Intelligent Transport Systems - Traffic and Travel Information via Transport Protocol Experts Group, Generation 2 (TPEG2) - Part 16: Fuel Price Information and availability application	Under development
00278312	CEN ISO/TS 18234-3	Intelligent transport systems - Traffic and travel information via transport protocol expert group (TPEG) data-streams - Part 3: Service and Network Information (TPEG-SNI) (Review)	Under development
00278313	CEN ISO/TS 18234-11	Intelligent transport systems - Traffic and Travel Information (TTI) via Transport Protocol Expert Group (TPEG) binary data format - Part 11: Location Referencing Container (TPEG-LRC)	Under development

2.1.5 TC278/WG5: Traffic Control

Dormant WG with no active standards or work items. Used to be led by Terry Sullivan from UK DfT.

2.1.6 TC278/WG6: Parking Management

Dormant WG with no active standards or work items. Used to be led by J.P. de Borgo, France.

2.1.7 TC278/WG7: Geographic Road Databases

Dormant WG that used to be led by Wolf Zechnall from Bosch, Germany

2.1.8 TC278/WG8: Road Traffic Data

- 15 members (average turning up at meetings)
- 4 active work items, 3 adopted standards
- Not full Joint group, but close cooperation with **ISO TC204/WG9**
- Norwegian expert: Unknown
- Secretary: None
- Convenor: Dick de Winter, Rijkswaterstaat

WI	Reference	Title	Status
00278225	CEN TS 16157-1	DATEX II data exchange specifications for traffic management and information - Part 1: Context and framework	Formal Vote closed
00278226	CEN TS 16157-2	DATEX II data exchange specifications for traffic management and information - Part 2: location referencing	Formal Vote closed
00278227	CEN TS 16157-3	DATEX II data exchange specifications for traffic management and information - Part 3: Situation publication	Formal Vote closed

2.1.9 TC278/WG9: Dedicated Short-Range Communication (DSRC)

Dormant WG since several years. Used to be led by Dr. Rokitansky.

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

2.1.10 TC278/WG10: Man-machine Interfaces

This WG was transferred ISO/TC22/SC13/WG8 to since it was mainly related to in-vehicle systems which is in the scope of ISO TC22 (Road Vehicles). The convenor is Christian Heinrich from Daimler, Germany.

WI	Reference	Title	Status
00278271	EN ISO 15006	Road vehicles - Ergonomic aspects of transport information and control systems - Specification and compliance procedures for in-vehicle auditory presentations (Review)	Preparing for FV

2.1.11 TC278/WG11: Inter-system Interfaces

This WG never met.

2.1.12 TC278/WG12: Automatic Vehicle and Equipment Identification

- 20 members (average turning up at meetings)
- 3 active work items, 13 adopted standards
- no sub group structure
- Joint group with **ISO TC204/WG4**
- Secretary: Per Furnes, Q-Free, Norway
- Convenor: Knut Evensen, Q-Free, Norway

WI	Reference	Title	Status
00278229	EN ISO 24534-1	Automatic vehicle and equipment identification - Electronic Registration Identification (ERI) for vehicles - Part 1: Architecture (review)	Adopted
00278263	EN ISO 17261	Intelligent transport systems - Automatic vehicle and equipment identification - Intermodal goods transport architecture and terminology (Review)	Under Enquiry
00278264	EN ISO 17262	Intelligent transport systems - Automatic vehicle and equipment identification - Numbering and data	Under Enquiry

		structures (Review)	
00278265	EN ISO 17263	Intelligent transport systems - Automatic vehicle and equipment identification - System parameters (Review)	Under Enquiry
00278285	CEN TS	Automatic Vehicle and Equipment Registration(AVI/AEI) - Interoperable application profile for AVI/AEI and Electronic Register Identification using dedicated short range communication	Preliminary
00278302	EN ISO 24534-3	Automatic vehicle and equipment identification - Electronic registration identification (ERI) for vehicles - Part 3: Vehicle data (review)	Under Review

2.1.13 TC278/WG13: Architecture

- 20 members (average turning up at meetings)
- No specific CEN work items since all WIs are developed as ISO WIs
- No subgroups
- Joint group with **ISO TC204/WG1**
- Norwegian expert: Currently none
- Secretary: none
- Convenor: Richard Bossom, Siemens, UK

WI	Reference	Title	Status
00278314	CEN TR	Privacy aspects in ITS standards and systems in Europe	Preliminary

2.1.14 TC278/WG14: After-theft System for Vehicle Recovery

- 10 members (average turning up at meetings)
- No active work items, one six-part adopted standard
- No sub groups
- No ISO equivalent
- No Norwegian expert
- Secretary: none
- Convenor: Mr. Alan McInnes, ACPO, UK

WI	Reference	Title	Status
00278214	CEN TS 15213-6	After-theft systems for the recovery of stolen vehicles - Part 6: Test procedures	Adopted

2.1.15 TC278/WG15: eSafety

- 20 members (average turning up at meetings)
- 6 active work items at different stages
- No sub group structure
- No ISO equivalent
- Norwegian expert: Egil Bovim
- Secretary: no secretary
- Convenor: Bob Williams, CSI, UK

WI	Reference	Title	Status
00278220	EN 16072	Intelligent transport systems - eSafety - Pan-European eCall Operating requirements	Preparing for FV
00278242	EN 15722	Intelligent transport systems - eSafety - eCall minimum set of data (MSD) (review)	Under Formal Vote
00278243	EN 16062	Intelligent transport systems - eCall - High level application protocols	Preparing for FV
00278244	EN 16102	Intelligent transport systems - eCall - Operating requirements for third party support	Preparing for FV
00278284	CEN TS	ITS - eSafety - eCall additional optional data set for heavy goods vehicles eCall	Preliminary

2.1.16 TC278/WG16: Cooperative Systems

- 40 members (average turning up at meetings)
- 7 active work items, no adopted standards yet
- Sub groups are being created
- Joint group with **ISO TC204/WG18**
- Norwegian expert: Knut Evensen
- Secretary: no secretary
- Convenor: Hans-Joachim Schade, Siemens, Germany

WI	Reference	Title	Status
00278288	CEN TS	Intelligent transport systems (ITS) - Co operative systems - Transfer of information from vehicles for infrastructure management, control and guidance applications	Preliminary
00278289	CEN TS	Intelligent transport systems (ITS) - Co operative systems - Contextual speeds	Preliminary
00278286	CEN TS	Intelligent transport systems (ITS) - Co operative systems - Roles and responsibilities in the context of co-operative ITS based on architecture(s) for co-operative systems	Preliminary
00278287	CEN TS	Intelligent transport systems (ITS) - Co operative systems - Data exchange specification for in-vehicle presentation of external road and traffic related data	Preliminary
00278266	EN	Intelligent transport systems - Co-operative systems - Classification and management of ITS applications in a global context	Preliminary
00278268	EN	Intelligent transport systems - Co-operative systems - ITS application requirements for automatic selection of communication interfaces	Preliminary
00278269	EN	Intelligent transport systems - Co-operative systems - Definition of local dynamic map concept	Preliminary

2.2 ISO TC204 ITS – Tabular view

All Work Items can be searched via this search engine in this ISO page.

- TIA TC204 Home page
- Formal ISO TC204 Home page
- Established in 1993
- 26 P-members (Countries with voting rights)
- 59 active work items, 111 adopted standards
- 12 active working groups, 6 passive
- Close connection to CEN TC278
- Secretary: Tyler Messa, ITSA, USA
- Chair: Mike Noblett, IBM, USA

2.2.1 TC204/WG1 Architecture

- 20 members (average turning up at meetings)
- 18 active work items and completed standards
- No subgroups
- Joint group with **CEN TC278/WG13**
- No regular attending Norwegian expert,
- Secretary: none
- Convenor: Richard Bossom, Siemens, UK

2.2.2 TC204/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 stage.

2.2.3 TC204/WG3 Database technology

- 40 members (average turning up at meetings)
- 3 active work items, 7 adopted standards
- 2 active sub groups, 2 passive
- No joint WG after CEN TC278/WG7 closed
- No regular attending Norwegian expert

- Secretary: None
- Convenor: Jun Shibata, Mazda, Japan
- SWG3.1: Geographic Data Files
- SWG3.2: Physical Storage Format and Data Delivery
- SWG3.3: (Passive) Location Referencing
- SWG3.4: (Passive) Application Programming Interface

2.2.4 TC204/WG4 Automatic Vehicle and Equipment Identification (AVI/AEI)

- 20 members (average turning up at meetings)
- 12 active work items and adopted standards (minor differences to CEN WG1)
- no sub groups
- Norwegian experts: Furnes and Evensen
- Joint group with **CEN TC278/WG12**
- Secretary: Per Jarle Furnes, Q-Free
- Convenor: Knut Evensen, Q-Free

2.2.5 TC204/WG5: Electronic Fee Collection (EFC)

- ~40 members (average turning up at meetings)
- 25 active work items, 19 adopted standards
- 3 active sub groups, 3 passive
- Norwegian expert: Trond Foss
- Joint group with **CEN TC278/WG1**
- Secretary: Johan Hedin, Hybris Konsult, Sweden
- Convenor: Jesper Engdahl RAPP, Switzerland
- SG1 - Trond Foss: Info exchange, architecture, security
- SG2 - Jean François Jouen: DSRC based EFC, testing
- SG5 - Ian Catling: GNSS/CN based EFC

2.2.6 TC204/WG6: General Fleet management

This WG was defined under US lead but did not succeed to start its work. There are no active Work Items contributed to this WG. Part of the scope has been taken over by WG7.

2.2.7 TC204/WG7: Commercial Fleet Management

- 20 members (average turning up at meetings)
- 4 active work items, 2 adopted standards
- 3 active sub groups
- Currently no joint group with **CEN TC278**
- Norwegian expert: Knut Evensen
- Secretary: Bill Johnson, Canada
- Convenor: Lewis Sabounghi, Canada

2.2.8 TC204/WG8: Public Transport and Emergency services

- ~15 members (average turning up at meetings)
- 2 active work items, 2 adopted standards
- no sub groups
- Currently no joint group, but some cooperation with **CEN TC278/WG3**
- Norwegian expert: not known
- Secretary: none
- Convenor: Mr. Olayi, USA

2.2.9 TC204/WG9: Integrated Transport Information, Management and Control

- 20 members (average turning up at meetings)
- 1 active work items, 5 adopted standards (data probably wrong in database)
- No sub groups
- Some overlaps with **CEN TC278/WG8**
- No regular attending Norwegian expert
- Secretary: none
- Convenor: Dean Zabrieszach, VIC Roads, Australia.

2.2.10 TC204/WG10: Traveller Information Systems

- 30 members (average turning up at meetings)
- 15 active work items, 25 adopted standards
- 2 active sub groups
- Joint group with **CEN TC204/WG4**
- Secretary: (none)
- Convenor: Paul Burton, SERCO, UK

2.2.11 TC204/WG11: Route Guidance and Navigation Systems

This WG was started with a German convenor and held a few meetings before it was stopped. One work item was progressed. The working scope is mainly handled by TC204/WG3 now.

2.2.12 TC204/WG12: Parking management/Off-road commercial

This WG never got started.

2.2.13 TC204/WG13: Man-Machine Interface (off-vehicle)

WG13 never got started.

2.2.14 TC204/WG14: Vehicle Control Systems

- 30 members (average turning up at meetings)
- 8 active work items, 6 adopted standards
- No CEN Joint group
- Norwegian expert: not known
- Secretary: (none)
- Convenor: Yousuke Akatsu, NISSAN, Japan

2.2.15 TC204/WG15: DSRC

This WG went passive around 2002.

2.2.16 TC204/WG16: Wide Area Communications

- 40 members (average turning up at meetings)
- 19 active work items, 21 adopted standards
- 6 sub groups
- No CEN Joint group, but agreement with ETSI TC ITS
- Norwegian expert: Knut Evensen
- Secretary: Andras Czepinsky, ERTICO
- Convenor: T. Russel Shields, Ygomi, USA

2.2.17 TC204/WG17: Nomadic Devices

- 25 members (average turning up at meetings)
- 5 active work items, no adopted standards
- No CEN Joint group
- No sub groups
- Norwegian expert: None
- Secretary: none
- Convenor: Young-Jun Moon, ETRI, Korea

2.2.18 TC204/WG18: Cooperative Systems

- 40 members (average turning up at meetings)
- 7 active work items, no adopted standards yet
- Sub groups are being created
- Joint group with **CEN TC278/WG16**
- Secretary: no secretary
- Convenor: Hans-Joachim Schade, Siemens, Germany

2.3 ETSI TC ITS – Tabular view

- ETSI TC ITS Web Site and Development Portal

- Established in 2007
- ~50 active members (not registered formally, any ETSI member can turn up at meetings)
- 99 active work items, 30 adopted documents of which 15 are legacy CEN/TelePASS DSRC specs.
- 5 active working groups with nominated experts
- Secretary: Martin Arndt, ETSI
- Vice Chair: Marco Annoni, Telecom Italy
- Chair: Søren Hess, C2C-CC/Daimler

2.3.1 WG1: User and Application Requirements

- Portal link
- 13 active work items, see below
- Vice chair: Lan Lin, Hitachi
- Chair: Gerard Segarra, Renault

By clicking on the specifications below short information is given about the scope of the WI and status.

Work item number		Version	Current status	Next status	Rapporteur name
ITS WG1					
DTS/ITS-0010002-4 (TS 102 637-4)		1.1.1	Start of work (2008-04-10)	WG approval	SÃ©garra GÃ©rard
DTS/ITS-0010004 (TS 102 894)		0.0.5	Early draft (2011-01-25)	Stable draft	LIN Lan
DEN/ITS-0010005 (EN 302 895)			Start of work (2009-10-15)	Early draft	Bogdanovic Miro
DTR/ITS-0010006 (TR 102 863)	C	0.0.27	WG approval (1900-01-01)	TB approval	Bogdanovic Miro
DTS/ITS-0010009 (TS 102 890-2)		0.0.1	Stable draft (2010-09-28)	Final draft for approval	SÃ©garra GÃ©rard
DTS/ITS-0010010 (TS 102 890-1)		0.0.1	Early draft (2010-07-12)	Stable draft	LIN Lan
DTR/ITS-0010011 (TR 103 061-1)			Start of work (2010-08-31)	Early draft	SÃ©garra GÃ©rard
DTR/ITS-0010012 (TR 103 061-2)			Start of work (2010-08-31)	Early draft	LIN Lan
DTS/ITS-0010013 (TS 102 890-3)			TB adoption of WI (2010-10-18)	Start of work	LIN Lan
DTS/ITS-0010014 (TS 101 556-1)		0.0.5	! Early draft (2011-04-26)	Stable draft	Wetterwald Michelle
DTS/ITS-0010015 (TS 101 539-2)		0.0.1	! Early draft (2011-04-22)	Stable draft	LIN Lan
DTS/ITS-0010016 (TS 101 539-3)		0.0.1	Early draft (2011-01-03)	Stable draft	SÃ©garra GÃ©rard
DTS/ITS-0010017 (TS 101 539-1)		0.0.1	Early draft (2011-01-03)	Stable draft	

2.3.2 WG2: Architecture and Cross Layer

- Portal link
- 30 active work items, of which 15 are legacy CEN/TelePASS DSRC standards.
- Vice chair: Hans-Joachim Fischer, ESF
- Chair: Knut Evensen, Q-Free

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

ITS WG2					
DTS/ITS-0020010 (TS 102 797-1)		1.1.1	Final draft for approval (2008-07-01)	WG approval	Fischer Hans-Joachim
DTS/ITS-0020011 (TS 102 797-2)		1.1.1	Start of work (2007-07-01)	Final draft for approval	Fischer Hans-Joachim
DTS/ITS-0020015 (TS 102 723-1)	C	0.1.2	WG approval (2011-01-18)	TB approval	Fischer Hans-Joachim
DTS/ITS-0020016 (TS 102 723-2)	C	0.1.1	WG approval (2011-01-18)	TB approval	Fischer Hans-Joachim
DTS/ITS-0020017 (TS 102 723-3)		0.1.0	Final draft for approval (2011-01-10)	WG approval	Fischer Hans-Joachim
DTS/ITS-0020018 (TS 102 723-4)		0.0.2	Stable draft (2011-01-10)	WG approval	Fischer Hans-Joachim
DTS/ITS-0020019 (TS 102 723-5)		0.0.2	Early draft (2011-01-10)	WG approval	Fischer Hans-Joachim
DTS/ITS-0020020 (TS 102 723-6)		1.1.1	Start of work (2009-04-24)	WG approval	Moe Marie
DTS/ITS-0020021 (TS 102 760-3)		1.1.1	Start of work (2009-04-24)	Early draft	Fischer Hans-Joachim
DTS/ITS-0020023 (TS 102 860)		1.1.1	! Final draft for approval (2011-04-06)	WG approval	Fischer Hans-Joachim
DTS/ITS-0020024-1 (TS 102 981-1)			Start of work (2010-01-28)	Early draft	Fischer Hans-Joachim
DTS/ITS-0020024-2 (TS 102 981-2)			Start of work (2010-01-28)	Early draft	Fischer Hans-Joachim
DTS/ITS-0020024-3 (TS 102 981-3)			Start of work (2010-01-28)	Early draft	Fischer Hans-Joachim
DTS/ITS-0020025-1 (TS 102 982-1)			Start of work (2010-01-28)	Early draft	Fischer Hans-Joachim
DTS/ITS-0020025-2 (TS 102 982-2)			Start of work (2010-01-28)	Early draft	Fischer Hans-Joachim

DTS/ITS-0020025-3 (TS 102 982-3)		Start of work (2010-01-28)	Early draft	Fischer Hans-Joachim
DTS/ITS-0020026-1 (TS 102 983-1)		Start of work (2010-01-28)	Early draft	
DTS/ITS-0020026-2 (TS 102 983-2)		Start of work (2010-01-28)	Early draft	Fischer Hans-Joachim
DTS/ITS-0020026-3 (TS 102 983-3)		Start of work (2010-01-28)	Early draft	Fischer Hans-Joachim
DTS/ITS-0020027-1 (TS 102 984-1)		Start of work (2010-01-28)	Early draft	Fischer Hans-Joachim
DTS/ITS-0020027-2 (TS 102 984-2)		Start of work (2010-01-28)	Early draft	Fischer Hans-Joachim
DTS/ITS-0020028-1 (TS 102 985-1)		Start of work (2010-01-28)	Early draft	Fischer Hans-Joachim
DTS/ITS-0020028-2 (TS 102 985-2)		Start of work (2010-01-28)	Early draft	Fischer Hans-Joachim
DTS/ITS-0020028-3 (TS 102 985-3)		Start of work (2010-01-28)	Early draft	Fischer Hans-Joachim
DTS/ITS-0020030 (TS 102 797-3)		TB adoption of WI (2010-04-14)	Early draft	Fischer Hans-Joachim
RTS/ITS-0020031 (TS 102 708-2-1)		Start of work (2010-08-31)	Early draft	Caneschi Fausto
RTS/ITS-0020032 (TS 102 708-2-2)		Start of work (2010-08-31)	Early draft	Caneschi Fausto
RTS/ITS-0020033 (TS 102 708-2-3)		Start of work (2010-08-31)	Early draf	

2.3.3 WG3: Transport and Network

- Portal link
- 19 active work items,
- Vice chair: Thierry Ernst, Inria
- Chair: Andreas Festag, NEC Europe

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

ITS WG3					
DTS/ITS-0030001 (TS 102 636-4-1)		0.1.2	Final draft for approval (2011-04-04)	TB approval	Festag Andreas
DTS/ITS-0030007 (TS 102 636-4-2)		0.0.5	Early draft (2010-09-27)	WG approval	Tomatis Andrea
DTS/ITS-0030008 (TS 102 723-11)		1.1.1	Start of work (2009-04-24)	WG approval	Festag Andreas
DTS/ITS-0030013 (TS 102 871-3)		0.0.3	Waiting - see "Remarks" (2011-03-17)	Draft receipt by ETSI Secretariat	Festag Andreas
DTS/ITS-0030014 (TS 102 871-1)		0.0.9	Waiting - see "Remarks" (2011-03-17)	Draft receipt by ETSI Secretariat	Festag Andreas
DTS/ITS-0030015 (TS 102 871-2)		0.1.3	Waiting - see "Remarks" (2011-03-17)	Draft receipt by ETSI Secretariat	Festag Andreas
DTR/ITS-0030018 (TR 103 061-5)			TB adoption of WI (2010-08-02)	Start of work	Festag Andreas
DTR/ITS-0030019 (TR 103 061-4)			Start of work (2010-07-31)	Early draft	Festag Andreas
DTR/ITS-0030020 (TR 103 061-3)			Start of work (2010-07-31)	Early draft	Festag Andreas
DEN/ITS-0030021 (EN 302 931)		1.0.0	Start of TB review of PE comments (2011-04-05)	Start of TB approval process	Festag Andreas
RTS/ITS-0030022 (TS 102 871-1)			TB adoption of WI (2010-11-03)	Start of work	Festag Andreas
RTS/ITS-0030023 (TS 102 871-2)			TB adoption of WI (2010-11-03)	Start of work	Festag Andreas
RTS/ITS-0030024 (TS 102 871-3)			TB adoption of WI (2010-11-03)	Start of work	Festag Andreas
RTS/ITS-0030025 (TS 102 870-1)			TB adoption of WI (2010-11-03)	Start of work	Festag Andreas
RTS/ITS-0030026 (TS 102 859-3)			TB adoption of WI (2010-11-03)	Start of work	Festag Andreas
RTS/ITS-0030027 (TS 102 870-2)			TB adoption of WI (2010-11-03)	Start of work	Festag Andreas
RTS/ITS-0030028 (TS 102 870-3)			TB adoption of WI (2010-11-03)	Start of work	Festag Andreas
RTS/ITS-0030029 (TS 102 859-1)			TB adoption of WI (2010-11-03)	Start of work	Festag Andreas
RTS/ITS-0030030 (TS 102 859-2)			TB adoption of WI (2010-11-03)	Start of work	Festag Andreas
DTR/ITS-0030031 (TR 101 555)			TB adoption of WI (2011-02-21)	Start of work	

2.3.4 WG4: Media

- Portal link
- 16 active work items, of which two are CEN legacy
- Vice chair: Achim Brakemeier Daimler
- Chair: Christoph Wöste, BundesNetzAgentur (German PTT Regulator)

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

ITS WG4					
DTS/ITS-0040001 (TS 102 696)		1.1.1	Start of work (2004-12-14)	Final draft for approval	Schalk Andreas
DTS/ITS-0040013 (TS 102 792)		0.1.1	Stable draft (2010-10-01)	Stable draft	Smely Dieter
DTS/ITS-0040014 (TS 102 687)		1.0.6	Final draft for approval (2011-03-24)	WG approval	Brakemeier Achim
DTS/ITS-0040016 (TS 102 724)		1.1.1	Start of work (2008-10-04)	WG approval	Brakemeier Achim

DTS/ITS-0040018 (TS 102 723-10)	0.0.0	Early draft (2010-09-14)	WG approval	Brakemeier Achim
DTS/ITS-0040019 (TS 102 987)		Start of work (2009-10-12)	Early draft	Wilson Nigel
DTR/ITS-0040020 (TR 102 861)		Start of work (2009-11-28)	Early draft	Sjoeberg Katrin
DTR/ITS-0040021 (TR 102 862)		Start of work (2009-11-28)	Early draft	Sjoeberg Katrin
DTS/ITS-0040022 (TS 102 916-1)		TB adoption of WI (2010-04-15)	Start of work	Smely Dieter
DTS/ITS-0040023 (TS 102 916-2)		TB adoption of WI (2010-04-15)	Start of work	Smely Dieter
DTS/ITS-0040024 (TS 102 916-3)		TB adoption of WI (2010-04-15)	Start of work	Smely Dieter
DTS/ITS-0040025 (TS 102 917-1)		TB adoption of WI (2010-04-15)	Start of work	Ritter Thomas
DTS/ITS-0040026 (TS 102 917-2)		TB adoption of WI (2010-04-15)	Start of work	Ritter Thomas
DTS/ITS-0040027 (TS 102 917-3)		TB adoption of WI (2010-04-15)	Start of work	Ritter Thomas
REN/ITS-0040028 (EN 302 663)		TB adoption of WI (2010-04-15)	Start of work	Kasslatter

2.3.5 WG5: Security

- Portal link
- 11 active work items,
- Vice chair: Brigitte Lonc, Renault
- Chair: Scott Cadzow, Cadzow Comm

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

ITS WG5					
DTS/ITS-0050007 (TS 102 723-7)		1.1.1	Start of work (2009-04-24)	WG approval	Friederici Florian
DTS/ITS-0050008 (TS 102 723-8)		1.1.1	Start of work (2009-04-24)	WG approval	Friederici Florian
DTS/ITS-0050009 (TS 102 723-9)		1.1.1	Start of work (2009-04-24)	WG approval	Friederici Florian
DES/ITS-0050010 (ES 202 910)		0.0.1	Early draft (2011-03-26)	Stable draft	Cadzow Scott
DTS/ITS-0050013 (TS 102 867)		0.0.10	Final draft for approval (2011-04-27)	Early draft	Cadzow Scott
DTS/ITS-0050014 (TS 102 940)		0.0.2	Early draft (2011-03-29)	Stable draft	Lonc Brigitte
DTS/ITS-0050015 (TS 102 941)		0.0.2	Early draft (2011-04-26)	Stable draft	Lonc Brigitte
DTS/ITS-0050016 (TS 102 942)		0.0.1	Early draft (2011-03-25)	Stable draft	Lonc Brigitte
DTS/ITS-0050017 (TS 102 943)		0.0.1	Early draft (2011-03-25)	Stable draft	Lonc Brigitte
RTR/ITS-0050018 (TR 102 893)	N		TB adoption of WI (2011-04-18)	Start of work	Cadzow Scott

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