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7th Framework Programme

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Review of consumer tests and standards

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REVISION CHART AND HISTORY LOG

When the "Review of earlier Consumer test and Standards_v1" was completed, MagnetiMarelli and Telefonica conducted an internal Peer Review according to TeleFOT quality assurance system. ADAC received this synthesis report from the coordinator on 20 July 2009 with the comment "Accepted with reservations". In addition to some modifications in the target text and the tables, the document contains various adjustments and comments (TeleFOT_4.8.1_Review of earlier Consumer test and Standards_v2). The EU Commission released the report on 11 September 2009 adding a comment "Front page needs updating to meet naming conventions". The update titled "TeleFOT_4.8.1_Review of consumer tests and standards_v3" includes the relevant corrections. In addition to the nominated authors, some final minor corrections, format changes and edits were performed by the project coordinator Petri Mononen / VTT.

LIST OF TABLES

The latter part of this document (after page 31, based on MS-Excel-file "ADAC review of standards") contains all tables mentioned below.

Table 1: All standards_short:
Standards\All standards_short.xls

Table 2: All standards_detailed:
Standards\All standards_detailed.xls

Table 3: Relevant standards for nomadic devices_short:
Standards\Relevant standards for nomadic devices_short.xls

Table 4: Relevant standards for nomadic devices_detailed:
Standards\Relevant standards for nomadic devices_detailed.xls

Table 5: Standards_2003 and earlier_short:
Standards\Standards_2003 and earlier_short.xls

Table 6: Standards_2003 and earlier_detailed:
Standards\Standards_2003 and earlier_detailed.xls

EXECUTIVE SUMMARY

The tables give an overview on the European standards applying to nomadic devices. The lists detail the contents of the standards. A thorough review of all standards is recommended, focussing on the question whether or not a dedicated nomadic devices standard should be developed under the TeleFOT project.

The outline of consumer tests aims at illustrating consumer aspects with a view to nomadic devices testing. It is important to know the basic assessment criteria applied in consumer tests. We extracted the key criteria to identify the test scope for nomadic devices.

1.1 Review of European standards

The market for nomadic devices has grown rapidly in the past few years all over Europe. A rich variety of different technologies are available on the market. Many standards also refer to the design and development of nomadic devices.

The following European and ISO standards have been reviewed:

- ISO TC22 (Road Vehicles)
- ISO TC204 (Intelligent transport systems)
- European Statement of Principles (ESoP)
- Documents of subcommittees and working groups
- Draft and new items of TC204

The contents of the standards are listed in tables 1 to 6:

- **Table 1 'All standards_short'**
Table 2 'All standards_detailed'
give an overview of all documents of ISO TC22, ISO 204, ESOP, subcommittees and working groups as well as draft and new items of TC204.

- **Table 3 'Relevant standards_short'**

- **Table 4 'Relevant standards_detailed'**

give an overview of all documents of ISO TC22, ISO 204, ESOP, subcommittees and working groups as well as draft and new items of TC204 that are relevant for the design and development of nomadic devices. Some of these standards even cover requirements for the design and development as well as testing methods for nomadic devices. They contain the basic knowledge required for further developments.

- **Table 5 'Standards_2003 and earlier_short'**

- **Table 6 'Standards_2003 and earlier _detailed'**

contain all standards that have existed for more than five years. With regard to the fast development of electronic and communication devices these standards may no longer be up-to-date.

A new standard for nomadic devices should be developed on the basis of the European Statement of Principles (ESoP). Such standard should, however, establish more specific requirements for the design of nomadic devices than those described in the ISO standards. All relevant standards listed in table 3 and table 4 should be considered.

Additionally, the following key requirements should be covered:

- **communication interface between vehicle and nomadic device** (on-board network, TMC and connection to the speaker system for all types of nomadic devices)
- **specific position and interface design for installation and integration of nomadic devices in vehicles** (standardised docking stations for nomadic devices allowing safe connection to the dashboard)
- **communication interface for additional functions** (supplementary vehicle information feed to mobile devices such as, for instance, wheel sensor data allowing precise identification of the steering wheel position or control of steering movements)

1.2 Review of earlier consumer tests

All over Europe, automobile clubs, consumer organisations and communication magazines carry out comparative studies helping consumers to make informed choices. 31 organisations in 14 different countries conduct or publish tests of nomadic devices.

Most tests cover mobile navigation devices in general. Some tests are collaborative projects. For example, the ADAC test of mobile navigation devices is supported by ÖAMTC and also published by TCS and RACC.

ADAC recommends testing all new products according to the following key test criteria:

- Operation
- Handling:
- Installation
- Route calculation
- Navigation functions
- Other features and functions

Consumer tests have the purpose of providing purchase advice to potential buyers. Before testing nomadic devices in the framework of the TeleFOT project, the devices should be subject to comprehensive testing according to consumer test criteria. This will allow safety risks and ease of operation aspects to be identified and evaluated in advance. Elements from ADAC consumer tests of mobile navigation devices in combination with the criteria applied by the various testing organisations may serve as a basis to define benchmarks that could help us compare and evaluate nomadic devices from the consumers' point of view.

The test criteria collected by ADAC will be used in the TeleFOT WP 4.8.3 Benchmarking of Different Navigation Systems work plan.

INTRODUCTION

TeleFOT is a Large Scale Collaborative Project under the Seventh Framework Programme, co-funded by the European Commission DG Information Society and Media within the strategic objective "ICT for Cooperative Systems".

Officially started on June 1st 2008, TeleFOT aims to test the impacts of driver support functions on the driving task with large fleets of test drivers in real-life driving conditions.

In particular, TeleFOT assesses via Field operational Tests the impacts of functions provided by aftermarket and nomadic devices, including future interactive traffic services that will become part of driving environment systems within the next five years.

Field Operational Tests developed in TeleFOT aim at a comprehensive assessment of the efficiency, quality, robustness and user friendliness of in-vehicle systems, such as ICT, for smarter, safer and cleaner driving.

This Report:

The market for nomadic devices has grown rapidly over the past few years in Europe. A rich variety of different technologies are available on the market. Many standards relate to the design and development of nomadic devices, but there is no uniform definition of the minimum requirements.

For consumers, this situation is very confusing. This is why organisations all over Europe have conducted comparative studies over the last years in order to give consumers more information for their purchase decision.

The aim is to compile an overview of all applicable European standards relating to nomadic devices. The TeleFOT project aims to investigate whether or not a dedicated nomadic devices standard should be developed.

Another work package consists of portraying the organisations in Europe testing nomadic devices. The aim is to identify the types of devices under review, the test frequency and the basic test criteria, highlighting any overlap in the scope of testing and the assessment criteria. As a result, a list of recommended test criteria for the evaluation of nomadic devices will be developed.

This report aims to give an overview of existing standards and consumer tests that may be relevant for the design and development of nomadic devices.

This TeleFOT deliverable 4.8.1 is the first of three deliverables within WP 4.8. The two other reports, (D4.8.2 Report on Consumer Survey and D4.8.3 Report on benchmarking

of Nomadic and aftermarket systems) will be delivered in months 24 and 48 respectively. This deliverable gives useful information for:

- i)* R&D engineers who are developing nomadic devices or their vehicle mountings;
- ii)* For test houses who expect to test nomadic devices or their vehicle mountings and;
- iii)* For researchers who are defining new standards in regard nomadic devices and/or their vehicle mountings.

Most importantly though, and in the short term, this deliverable will act as guidance and reference source in regard standards for TeleFOT partners - especially in TeleFOT Framework in SP2 and TeleFOT test sites and TeleFOT test site responsible organisations in SP3.

REVIEW OF EXISTING STANDARDS

The following European and ISO standards have been reviewed:

- ISO TC22 (Road Vehicles)
- ISO TC204 (Intelligent transport systems)
- European Statement of Principles (ESoP)
- Documents of subcommittees and working groups
- Draft and new items of TC204

Existing standards are:

ISO TC22 (Road Vehicles)

All questions of standardization concerning compatibility, interchangeability and safety, with particular reference to terminology and test procedures (including the characteristics of instrumentation) for evaluating the performance of the following types of road vehicles and their equipment as defined in the relevant items of Article 1 of the 1968 Vienna Convention on Road Traffic signed under the auspices of the United Nations:

- mopeds (item m);
- motor cycles (item n);
- motor vehicles (item p);
- trailers (item q);
- semi-trailers (item r);
- light trailers (item s);
- combination vehicles (item t);
- articulated vehicles (item u).

ISO TC204 (Intelligent transport systems)

Standardization of information, communication and control systems in the field of urban and rural surface transportation, including intermodal and multimodal aspects thereof, traveller information, traffic management, public transport, commercial transport, emergency services and commercial services in the intelligent transport systems (ITS) field.

The '**European Statement of Principles (ESoP)** on the Design of Human Machine Interaction' gives basic guidelines but it has no mandatory status. It is not very specific, but it has a very high relevance for nomadic devices.

In order to get an overview, the documents have been sorted in different lists. There are too many documents to be listed directly in this report. The attached 'Review of standards.xls' file gives a much better overview. Most standards are linked to the website of the International Organization of Standardization (www.iso.org).

The following document lists have been produced:

- **Table 1 'All standards_short'**

- **Table 2 'All standards_detailed'**

- give an overview of all documents of ISO TC22, ISO 204, ESOP, subcommittees and working groups as well as draft and new items of TC204. Table 2 provides additional information about the content of the documents. Many documents concern electrical equipment that is not relevant for nomadic devices. Therefore these have been reduced to all relevant documents.

- **Table 3 'Relevant standards_short'**

- **Table 4 'Relevant standards_detailed'**

- give an overview of all documents of ISO TC22, ISO 204, ESOP, subcommittees and working groups as well as draft and new items of TC204, that are **relevant for the design and development of nomadic devices**. Table 4 provides additional information about the content of the documents. These standards cover even partially requirements for the design and development as well as testing methods for nomadic devices. They contain the base knowledge for further developments.

- Some of the standards already exist for a long time.

- **Table 5 'Standards_2003 and earlier_short'**
Table 6 'Standards_2003 and earlier _detailed'
contain all standards that are existing for more than five years. Table 6 provides additional information about the content of the documents. With regard to the quick development of electronic and communication devices it is not ensured, that these standards are still up-to-date.

RECOMMENDATIONS FOR STANDARDS

At present, no standard is available which regulates design and usage issues for nomadic devices. Many standards deal at least partially with compatibility, interchangeability and safety, with particular reference to terminology and test procedures (including the characteristics of instrumentation) for evaluating the performance of road vehicles and their equipment as well as information, communication and control systems in the field of urban and rural surface transportation.

The situation is difficult because

- developers must be familiar with underlying standards
- standards should define the minimum requirements
- standards are the basis of any assessment
- standards should be clear and easy to understand

Therefore a new standard for nomadic devices should be developed on the basis of the European Statement of Principles (ESoP). Such standard should, however, contain more specific requirements for the design of nomadic devices as described in the ISO standards. All relevant standards listed in table 3 and table 4 should be considered.

Particularly earlier standards, listed in table 5 and table 6, should be carefully reviewed for whether the provisions relating to the design and development of nomadic devices are up-to-date.

From the consumer point of view, the following key requirements should be covered:

- **specific position and interface design for installation and integration of nomadic devices in vehicles** (standardised docking stations for nomadic devices allowing safe connection of mobile devices to the dashboard. Vehicle manufacturers should identify the most ergonomically suitable location for such devices. In addition, it must be ensured that all devices are designed to fit in the docking stations.)
- **communication interface between vehicle and nomadic device** (on-board network, TMC and connection to the speaker system for all types of nomadic devices.)
- **communication interface for additional functions** (supplementary vehicle information feed to mobile devices such as, for instance, wheel sensor data allowing precise identification of the steering wheel position or control of steering movements)

Relation to FOT:

A FOT cannot be a part of a standard but its results should be made available to the decision makers in charge of defining new standards. Example: DVB-T driver distraction by can be assessed in a FOT. The results should be incorporated in the standard.

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REVIEW OF EXISTING CONSUMER TESTS

All over Europe, automobile clubs, consumer organisations and communication magazines carry out comparative studies helping consumers to make informed choices.

Organisations in 26 countries all over Europe have been contacted to provide information about tests of nomadic devices. 31 organisations in 14 different countries conduct or publish tests of nomadic devices.

Germany

- ADAC e.V.
(<http://www.adac.de/Tests/Zubehoertests/navigationsgeraete/default.asp>)
- Stiftung Warentest
(<http://www.test.de/themen/computer-telefon/test/-Navigationsgeraete/1688470/1688470/1686384/>)
- connect
(http://www.connect.de/uebersicht/Testberichte-Plug-Play-Navigation_247356.html)
- Navi Magazin (<http://www.navi-magazin.de/inhalt.html>)
- Chip

Italy

- Altro Consumo
(http://www.altroconsumo.it/accessori/20070401/navigatori-gps-monoblocco-Attach_s149293.pdf)
- QUATTORUOTE (http://www.quattoruote.it/gps_recensioni/index.cfm)
- Il Sole 24 Ore

- Tecnologia & Business, I trend e i mercati, Speciale Navigatore Gps (<http://www.ilsole24ore.com/art/SoleOnLine4/SpecialiDossier/2007/special-e-navigatori-gps/speciale-navigatori-default.shtml?uuid=e14158e4-92d4-11dc-8e36-00000e251029>)
- Tom's Hardware (<http://www.tomshw.it/digitrends.php?guide=20080825>)

Austria

- ÖAMTC
- Verein für Konsumenteninfo.

Switzerland

- TCS

Czech Republic

- Navigovat.cz (<http://www.navigovat.cz>)
- dTest

Hungary

- NACPH (National Association for Consumer Protection in Hungary)

United Kingdom

- Which (<http://www.which.co.uk/>)
- Whatcar (<http://www.whatcar.com/news-article.aspx?NA=229194>)
- OCU Ediciones (EDU)

Belgium

- Test Achats

Netherlands

- Consumentenbond

Sweden

- mobil
(http://www.mobil.se/ArticlePages/200805/05/20080505131827_MOB098/20080505131827_MOB098.dbp.asp)
- teknikens värld

Denmark

- Forbrugrade

Spain

- Rad & Ron
- Revista TRÁFICO
- Instituto de Seguridad Vial, Fundacion MAPFRE
- RACE&Blaupunkt
- RACC automovil club

France

- Que Choisir

Portugal

- Deco Proteste

Most tests cover mobile navigation devices in general. Some tests are collaborative projects. For example, the ADAC test of mobile navigation devices is supported by ÖAMTC and also published by TCS and RACC.

The following table shows detailed information about tests conducted by the different organisations.

	Countries																	
	Germany					Italy					Austria		Switzerland		Czech Republic		United Kingdom	
	ADAC	Stiftung Warentest	connect	Navi Magazin	Chip	Altro Consumo	QUATTRRUOTE	QUATTRRUOTE (web site)	Tecnologia & Business	Tom's Hardware	ÖAMTC	TCS	NAVIGOVAT.CZ	Which	Whatcar			
Tested products (N=mobile navigation systems, H=smart phones, PDA, OEM devices)	NH	N	N	N	N	N	NH	N	N	N			NH		NH			
Publication of products (N=mobile navigation systems, H=smart phones, PDA, OEM devices)	NH	NH	NH	NH	NH	N	NH		N	N	NH	NH	NH	all	N			
Number of tests per year	2	2	12	6	4	1		1			2	1	40	1	1			
Number of tested devices	12	13	4	18	12	35	10	6	7	5	12	12	40	80	30			
Brand																		
Model	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Price	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	
Price range in Euros approx.	X	X				X			X		X	X		X	X	X	X	
Average price in Euros approx.	X	X	X	X			X	X			X	X		X		X		
Map material (installed)	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	
Map material (DVD)				X		X								X		X		
Map manufacturer	X		X	X					X	X	X	X	X	X				
Revision date map material	X		X	X							X	X	X					

Countries	Germany	ADAC	Stiftung Warentest	connect	Navi Magazin	Chip	Italy	Altro Consumo	QUATTRRUOTE	QUATTRRUOTE (web site)	Tecnologia & Business	Tom's Hardware	Austria	ÖAMTC	Switzerland	TCS	Czech Republic	Navigovat.cz	United Kingdom	Which	Whatcar
Scope of delivery and functionality																					
Navigation																					
Display reading angle				X															X		
Alternative route/manual traffic jam function		X		X										X		X					
Display of street name current/next		X		X										X		X			X	X	X
Display (dimension)		X	X	X				X	X	X		X		X		X			X	X	X
Display (number of pixels)			X							X		X							X		
Display distance to destination/time remaining		X		X	X									X		X			X		
Automatic brightness adjustment		X	X		X									X		X			X		
Number of countries in map material		X	X		X				X					X		X			X	X	X
Speed alerter		X	X		X			X				X		X		X			X	X	X
Traffic data: TMC		X	X	X	X			X			X	X		X		X			X	X	X
Traffic data: TMC pro																				X	X
Traffic data: GSM				X															X	X	X
Number of voices in your own language		X	X											X		X			X		
Voice-output: street name (text to speech)		X	X		X									X		X			X	X	X
Audio sound control/DSP		X		X										X		X					
mp-3, photo, video player		X	X		X									X		X					
Compass mode					X														X		

	Countries																			
	Germany		Germany																	
	ADAC		Stiftung Warentest																	
			connect																	
			Navi Magazin																	
			Chip																	
			Italy																	
			Altro Consumo																	
			QUATTRRUOTE																	
			QUATTRRUOTE (web site)																	
			Tecnologia & Business																	
			Tom's Hardware																	
			Austria																	
			ÖAMTC																	
			Switzerland																	
			TCS																	
			Czech Republic																	
			Navigovat.cz																	
			United Kingdom																	
			Which																	
			Whatcar																	
Dynamic navigation TMC/TMC pro/GSM	X																			
Congestion warning via Internet	X																			
Colour display diameter (inches)	X																			
2D/3D map display	X																			
Intersection zoom/automatic zoom	X																			
Arrow display/superimposed																				
POI alert/own POIs can be used	X																			
Route info in text/map	X																			
Destination input: house number/intersection/postcode	X																			
Destination input: POI location/destination	X																			
Destination input: intermediate destinations	X																			
Destination input: dimmed-out letters/preselection	X																			
Destination input: coordination	X																			
Destination input: last destination (more than one)	X																			
Destination memory machinable																				
Detection of double name in one location	X																			
Detection of double location	X																			
Dimming-out of unsuitable letters	X																			

	Countries	Germany	Stiftung Warentest	connect	Navi Magazin	Chip	Italy	Altro Consumo	QUATTORUOTE	QUATTORUOTE (web site)	Tecnologia & Business	Tom's Hardware	Austria	ÖAMTC	Switzerland	TCS	Czech Republic	Navigovat.cz	United Kingdom	Which	Whatcar
Dimming-out of unsuitable list entries		X					X							X	X		X				
Route selection: quickest and shortest		X	X											X	X		X				
Route exclusion: avoid toll roads/avoid ferries		X		X	X									X		X		X		X	
Route advance info (text/map)		X			X									X		X		X			
Speed-dial		X		X										X		X				X	
Number of POIs and categories		X		X										X		X					
Hardware																					
Additional map material available		X		X								X		X		X		X		X	X
Headset connection/FM transmitter		X	X											X		X		X			X
Voltage converter provided		X	X						X			X		X		X		X		X	X
Provided memory card in Gigabyte		X	X									X		X		X		X		X	
Interfaces		X		X										X		X		X			
Memory medium / capacity (MB)		X		X								X		X		X		X			
Entertainment																					
MP3/Picture/video viewer		X		X				X	X	X				X		X		X		X	X
Connecting facilities for additional equipment		X		X							X			X		X		X			
Travel guide functions		X		X	X									X		X		X		X	
DVD Video/DAB/DVB-T		X		X										X		X		X		X	
Email/SMS functions		X		X	X									X		X		X		X	
CC/CD				X																X	

Service
Update of map material

x

x

Stability of functions
Value for money
Strengths and weaknesses
Emergency features
Theft protection
Motorcycle

Countries

Germany

ADAC

Stiftung Warentest

connect

Navi Magazin

Chip

Italy

Altro Consumo

QUATTORUOTE

QUATTORUOTE (web site)

Tecnologia & Business

Tom's Hardware

Austria

ÖAMTC

Switzerland

TCS

Czech Republic

Navigovat.cz

United Kingdom

Which

Whatcar

x

x

x

x

x

x

x

x

x

x

x

x

x

x

x

x

x

x

x

x

x

x

Results and differences between testing organisations:

The most comprehensive consumer tests for nomadic devices at European level were conducted in Germany by ADAC, Stiftung Warentest, in the Czech Republic by Navigovat and in the United Kingdom by Which. ÖAMTC in Austria and TCS in Switzerland publish the ADAC test results. For competitive reasons, the testing organisations did not disclose further details about their tests which is why a detailed description is not possible. Our comparison revealed the differences below:

- Type of devices, number of tests and frequency of publication per year

We found that nomadic devices tests mainly involved mobile navigation devices and smart phones. Which? is the only organisation having tested all different systems (mobile navigation devices, smart phones, PDAs, OEM devices). The number of models per test run ranged between 5 units (Tom's Hardware) and 80 units (Which?). The frequency of testing per year was between one test (Altro Consume, Quattroroute, TCS, Which? and Whatcar?) and 40 tests per year (Navigovat).

- Verification of the scope of delivery

Differences were identified in the approach the various organisations in verifying the scope of delivery. ADAC, Stiftung Warentest, Navigovat and Which? very thoroughly checked the scope of delivery. Detailed examination of all 13 organisations (excluding ÖAMTC and TCS, since part of ADAC tests) revealed the following facts:

Brand Available **Map Material on DVD**: verified by only one third of the organisations

Navigation **Display reading angle**: verified by only two organisations
Display (number of pixels): verified by only one third of the organisations

Traffic data (TMX pro): worthy of testing for the UK organisations only (Which? and Whatcar)

Traffic data GSM: covered by only four organisations

Compass mode: tested by Navi Magazin and Navigovat only

Congestion warning via Internet: verified by only five organisations

Three organisations verified **Arrow display/superimposed**

Destination input: intermediate destinations: no issue for nine organisations

Destination memory machinable: covered by only two organisations

Speed Dial: important for only three testing organisations

Entertainment

CC/CD functions were covered by only two organisations

- Test parameters

With a view to test parameters, different aspects apply. Detailed examination of all 13 organisations (excluding ÖAMTC and TCS, since part of ADAC tests) revealed the following facts:

Handling

Instructions: included in the test scope of four organisations

Route option selection: important for less than one third of the organisations

Battery charging time: tested by only one organisation

Processing speed: worthy of testing for only four testing organisations

Navigation

Reaction to leaving route: tested by one fourth of the testing organisations

Routing: covered by only three testing organisations

Route calculation

Stop over function: was an issue for only three organisations

TMC: covered by about half of the organisations

Further criteria

Deflection: worthy of testing only for ADAC and Tom's Hardware

After-sales **service:** examined by only one organisation

Update of map material: was an issue only for Navigovat, as was **stability of functions**

Value for money: not an issue for all but three organisations

In some countries, no consumer tests for navigation devices were carried out. The reasons include:

- Not enough map material for this country available
- No consumer organisation in this country found
- Consumer organisation buy test results from organisations in other countries

Consumer tests have the purpose of providing purchase advice to potential buyers of nomadic devices. Additional user requirements such as DVB-T are not part of the benchmark, since these functions have a potential risk of driver distraction (ADAC approach is based on ESoP system requirements).

RECOMMENDATIONS FOR CONSUMER TESTING

Comprehensive consumer tests enable buyers of nomadic devices to make informed choices. They are equally important for system developers of device and vehicle manufacturers and ensure due consideration of consumer requirements at an early stage.

All stakeholders should be familiar with the consumer tests and apply the test criteria in their product tests.

This will allow safety risks and ease of operation aspects to be identified and evaluated in advance. Integrating the ADAC consumer test procedure for mobile navigation devices with additional test criteria of other testing organisations would be the ideal approach.

Ideal test criteria:

1. Operation

- User instructions/manual (structure, intelligibility, errors, safety instructions, illustrations, language(s), hard-copy or CD/DVD format, short instructions, manufacturer contact information and possibility to update).

2. Handling:

- Installation (car, motorcycle, bicycle). Obstruction of view, wiring
- Controls (keys, touch-screen etc.)
- Intuitive operation
- Logical menu structure
- Size and accuracy of key fields. Stylus necessary?
- Entry of destination; clarity and variability of entry mode; speed of entry (number of keys from start screen), "smart speller"
- Street number support, comparison with original map data (tour planner), localisation on map.
- Preview of suggested route (is function available, and – if so – easily and quickly?)
- Entry of stopovers or special destinations [POI] before and during the trip
- Selection of POI without known address (e.g. airport)
- Selection of route options (fastest, shortest, dynamic, suppression of certain types of roads, avoiding turn-back instructions)
- Manual/automatic congestion detour routing
- Changing route options while driving
- Specific device settings (e.g. shortcuts to voice guidance volume, brightness, contrast, day/night graphics, 2D/3D display, colours, individual display settings)

3. Installation

- Adaptation to vehicle
- Stable installation in vehicle
- Tendency to vibrate
- Obstructing driver's view

4. Route calculation

- Activation delay for vehicle positioning (time to first satellite contact) and start-up of routing
- Route calculation time from initial start-up (especially for long distances)
- Repositioning and/or rerouting delay after an interruption of GPS signal, if applicable (tunnel, underground parking, other failure in reception)
- Rerouting delay after leaving initial route
- Accuracy of vehicle positioning in reference points, while stationary/moving, with/without routing

5. Navigation

- Voice output (timeliness, lane change suggestions, intelligibility, clarity, adequate frequency, concordance with mapped route)
- Graphic display (accurate display of actual road situation, meaningful instructions, overcrowding with irrelevant symbols), congruence between mapped position and actual position on road (also see □)
- Automatic zoom (speed-related) at intersections or when turning off a road (intersection zoom)
- Additional/exclusive arrow guidance
- Reaction to departure from initial route (timeliness, clarity of new route)
- Speed and smoothness of map display
- Reaction to TMC messages and detour routing delay (automatic re-routing, automatic re-routing with confirmation, manual re-routing only by entering new stopover/destination?)
- Clarity of suggested route depending on route options (fastest, shortest or dynamic route)

- Display of driving time, ETA, length of route, speed, warnings against excessive speed
6. Features
- Comprehensiveness and quality (updates) of the standard and optional digital maps; map provider
 - Possibility to update the software
 - Size of storage media
 - Language versions (voice output/operation)
 - Selection of voices
7. Other
- Clarity of display in different daytime/night lighting conditions, settings, glare
 - Display of fixed speed limits
 - Stability and adjustability of device holder/mounting
 - TMC receiver integrated/connectivity
 - Quality of TCM reception
 - Processing of TCM updates
 - Fitness for out-of-vehicle navigation (pedestrians; cyclists; motorcyclists)
 - Battery capacity time when used outside vehicle
 - Additional functions, e.g. Bluetooth, MP3, pictures, travel guides etc.
 - deflection

With a view to TMC testing, even the above comprehensive test reaches its limits, since it is not possible to evaluate the quality of alternative routes and the impact on the traffic dynamics. The findings of the FOT could provide valuable input here. Further FOT findings could apply to issues such as driver distraction, user friendliness, and in-vehicle installation.

The test criteria collected by ADAC will be used in the TeleFOT WP 4.8.3 Benchmarking of Different Navigation Systems work plan.

TABLE 1:
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Deliverable n.	12M	
Sub Project	SP n.4	Evaluation & assessment
Workpackage	WP n.4.8	Benchmarking from the consumer point of view
Task n.	T n. 4.8.1	Review of earlier consumer tests and European standards
Author(s)	S. Grabmaier	C. Gauss
	File name	TeleFOT_4.8.1_Review of consumer tests and standards_v2.doc
Status	Draft	
Distribution	Public (PU)	
Issue date	09.06.2009	Creation date: 10.07.2009

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ISO	SC	Content (original language)
ISO	TC 22	Road Vehicle - Economics applicable to road vehicles - Transport information and control systems, on-board man-machine interface
	SC 1	Ignition equipment
	SC 2	Braking systems and equipment
	SC 3	Electrical and electronic equipment
	ISO 1185:2003	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- 7-pole connector type 24 N (normal) for vehicles with 24 V nominal supply voltage
	ISO 1724:2003	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- 7-pole connector type 12 N (normal) for vehicles with 12 V nominal supply voltage
	ISO 3731:2003	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- 7-pole connector type 24 S (supplementary) for vehicles with 24 V nominal supply voltage

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ISO 3732:2003	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- 7-pole connector type 12 S (supplementary) for vehicles with 12 V nominal supply voltage
ISO 4091:2003	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- Definitions, tests and requirements
ISO 4141-1:2005	Road vehicles -- Multi-core connecting cables -- Part 1: Test methods and requirements for basic performance sheathed cables
ISO 4141-2:2006	Road vehicles -- Multi-core connecting cables -- Part 2: Test methods and requirements for high performance sheathed cables
ISO 4141-3:2006	Road vehicles -- Multi-core connecting cables -- Part 3: Construction, dimensions and marking of unscreened sheathed low-voltage cables
ISO 4141-4:2001	Road vehicles -- Multi-core connecting cables -- Part 4: Articulation test method and requirements for coiled cable assemblies
ISO 4165:2001	Road vehicles -- Electrical connections -- Double-pole connection
ISO 6722:2006	Road vehicles -- 60 V and 600 V single-core cables -- Dimensions, test methods and requirements
ISO 6969:2004	Road vehicles -- Sound signalling devices -- Tests after mounting on vehicle
ISO 7588-1:1998	Road vehicles -- Electrical/electronic switching devices -- Part 1: Relays and flashers
ISO 7588-2:1998	Road vehicles -- Electrical/electronic switching devices -- Part 2: Electronic devices
ISO 7588-3:1998	Road vehicles -- Electrical/electronic switching devices -- Part 3: Microrelays
ISO 7637-1:2002	Road vehicles -- Electrical disturbances from conduction and coupling -- Part 1: Definitions and general considerations
ISO 7637-1:2002/Amd 1:2008	
ISO 7637-2:2004	Road vehicles -- Electrical disturbances from conduction and coupling -- Part 2: Electrical transient conduction along supply lines only
ISO 7637-2:2004/Amd 1:2008	
ISO 7637-3:2007	Road vehicles -- Electrical disturbances from conduction and coupling -- Part 3: Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines
ISO 7638-1:2003	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- Part 1: Connectors for braking systems and running gear of vehicles with 24 V nominal supply voltage
ISO 7638-2:2003	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- Part 2: Connectors for braking systems and running gear of vehicles with 12 V nominal supply voltage
ISO 7639:1985	Road vehicles -- Diagnostic systems -- Graphical symbols
ISO 8092-1:1996	Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 1: Tabs for single-pole connections -- Dimensions and specific requirements

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ISO 8092-2:2005	Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 2: Definitions, test methods and general performance requirements
ISO 8092-3:1996	Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 3: Tabs for multi-pole connections -- Dimensions and specific requirements
ISO 8092-4:1997	Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 4: Pins for single- and multi-pole connections -- Dimensions and specific requirements
ISO 8093:1985	Road vehicles -- Diagnostic testing of electronic systems
ISO 8820-1:2008	Road vehicles -- Fuse-links -- Part 1: Definitions and general test requirements
ISO 8820-2:2005	Road vehicles -- Fuse-links -- Part 2: User's guide
ISO 8820-3:2002	Road vehicles -- Fuse-links -- Part 3: Fuse-links with tabs (blade type)
ISO 8820-4:2002	Road vehicles -- Fuse-links -- Part 4: Fuse-links with female contacts (type A) and bolt-in contacts (type B) and their test fixtures
ISO 8820-5:2007	Road vehicles -- Fuse-links -- Part 5: Fuse-links with axial terminals (Strip fuse-links) Types SF 30 and SF 51 and test fixtures
ISO 8820-6:2007	Road vehicles -- Fuse-links -- Part 6: Single-bolt fuse-links
ISO 8820-7:2007	Road vehicles -- Fuse-links -- Part 7: Fuse-links with tabs (Type G) with rated voltage of 450 V
ISO 8854:1988	Road vehicles -- Alternators with regulators -- Test methods and general requirements
ISO 9141:1989	Road vehicles -- Diagnostic systems -- Requirements for interchange of digital information
ISO 9141-2:1994	Road vehicles -- Diagnostic systems -- Part 2: CARB requirements for interchange of digital information
ISO 9141-2:1994/Amd 1:1996	
ISO 9141-3:1998	Road vehicles -- Diagnostic systems -- Part 3: Verification of the communication between vehicle and OBD II scan tool
ISO 9259:1991/Amd 1:2001	
ISO 9458:1988	Passenger cars -- Starter motor electrical connections
ISO 9534:1989	Road vehicles -- Fuel pump electric connections
ISO/TR 10305-1:2003	Road vehicles -- Calibration of electromagnetic field strength measuring devices -- Part 1: Devices for measurement of electromagnetic fields at frequencies > 0 Hz
ISO/TR 10305-2:2003	Road vehicles -- Calibration of electromagnetic field strength measuring devices -- Part 2: IEEE standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz
ISO 10483-1:2004	Road vehicles -- Intelligent power switches -- Part 1: High-side intelligent power switch
ISO 10483-2:1996	Road vehicles -- Intelligent power switches -- Part 2: Low-side intelligent power switch
ISO 10605:2008	Road vehicles -- Test methods for electrical disturbances from electrostatic discharge
ISO 11446:2004	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- 13-pole connectors for vehicles with 12 V nominal supply voltage
ISO 11451-1:2005	Road vehicles -- Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 1: General principles and terminology

ISO 11451-1:2005/Amd 1:2008	
ISO 11451-2:2005	Road vehicles -- Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 2: Off-vehicle radiation sources
ISO 11451-3:1994	Road vehicles -- Electrical disturbances by narrowband radiated electromagnetic energy -- Vehicle test methods -- Part 3: On-board transmitter simulation
ISO 11451-3:2007	Road vehicles -- Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 3: On-board transmitter simulation
ISO 11451-4:2006	Road vehicles -- Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 4: Bulk current injection (BCI)
ISO 11452-1:2005	Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 1: General principles and terminology
ISO 11452-1:2005/Amd 1:2008	
ISO 11452-2:2004	Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 2: Absorber-lined shielded enclosure
ISO 11452-3:2001	Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 3: Transverse electromagnetic mode (TEM) cell
ISO 11452-4:2005	Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 4: Bulk current injection (BCI)
ISO 11452-5:2002	Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 5: Stripline
ISO 11452-7:2003	Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 7: Direct radio frequency (RF) power injection
ISO 11452-8:2007	Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 8: Immunity to magnetic fields
ISO 11519-1:1994	Road vehicles -- Low-speed serial data communication -- Part 1: General and definitions
ISO 11519-3:1994	Road vehicles -- Low-speed serial data communication -- Part 3: Vehicle area network (VAN)
ISO 11519-3:1994/Amd 1:1995	
ISO 11748-1:2001	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 1: Content of exchanged documents
ISO 11748-2:2001	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 2: Documentation agreement
ISO 11748-3:2002	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 3: Application example
ISO 11898-1:2003	Road vehicles -- Controller area network (CAN) -- Part 1: Data link layer and physical signalling
ISO 11898-1:2003/Cor 1:2006	
ISO 11898-2:2003	Road vehicles -- Controller area network (CAN) -- Part 2: High-speed medium access unit
ISO 11898-3:2006	Road vehicles -- Controller area network (CAN) -- Part 3: Low-speed, fault-tolerant, medium-dependent interface

ISO 11898-3:2006/Cor 1:2006	
ISO 11898-4:2004	Road vehicles -- Controller area network (CAN) -- Part 4: Time-triggered communication
ISO 11898-5:2007	Road vehicles -- Controller area network (CAN) -- Part 5: High-speed medium access unit with low-power mode
ISO 11992-1:2003	Road vehicles -- Interchange of digital information on electrical connections between towing and towed vehicles -- Part 1: Physical and data-link layers
ISO 11992-2:2003	Road vehicles -- Interchange of digital information on electrical connections between towing and towed vehicles -- Part 2: Application layer for brakes and running gear
ISO 11992-2:2003/Amd 1:2007	
ISO 11992-3:2003	Road vehicles -- Interchange of digital information on electrical connections between towing and towed vehicles -- Part 3: Application layer for equipment other than brakes and running gear
ISO 11992-3:2003/Amd 1:2008	
ISO 11992-4:2005	Road vehicles -- Interchange of digital information on electrical connections between towing and towed vehicles -- Part 4: Diagnostics
ISO 11992-4:2005/Cor 1:2006	
ISO 12098:2004	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- 15-pole connector for vehicles with 24 V nominal supply voltage
ISO/TR 12155:1994	Commercial vehicles -- Obstacle detection device during reversing -- Requirements and tests
ISO/TR 12343:1997	Road vehicles -- Symbols for electrotechnical diagrams
ISO 14229-1:2006	Road vehicles -- Unified diagnostic services (UDS) -- Part 1: Specification and requirements
ISO 14230-1:1999	Road vehicles -- Diagnostic systems -- Keyword Protocol 2000 -- Part 1: Physical layer
ISO 14230-2:1999	Road vehicles -- Diagnostic systems -- Keyword Protocol 2000 -- Part 2: Data link layer
ISO 14230-3:1999	Road vehicles -- Diagnostic systems -- Keyword Protocol 2000 -- Part 3: Application layer
ISO 14230-4:2000	Road vehicles -- Diagnostic systems -- Keyword Protocol 2000 -- Part 4: Requirements for emission-related systems
ISO 14572:2006	Road vehicles -- Round, screened and unscreened 60 V and 600 V multi-core sheathed cables -- Test methods and requirements for basic and high-performance cables
ISO 14572:2001	Road vehicles -- Round, unscreened 60 V and 600 V multicore sheathed cables -- Test methods and requirements for basic and high performance cables
ISO 15031-1:2001	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 1: General information
ISO/TR 15031-2:2004	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 2: Terms, definitions, abbreviations and acronyms
ISO 15031-3:2004	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 3: Diagnostic connector and related electrical circuits, specification and use

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ISO 15031-4:2005	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 4: External test equipment
ISO 15031-5:2006	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 5: Emissions-related diagnostic services
ISO 15031-6:2005	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 6: Diagnostic trouble code definitions
ISO 15031-7:2001	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 7: Data link security
ISO 15170-1:2001	Road vehicles -- Four-pole electrical connectors with pins and twist lock -- Part 1: Dimensions and classes of application
ISO 15170-2:2001	Road vehicles -- Four-pole electrical connectors with pins and twist lock -- Part 2: Tests and requirements
ISO/TR 15497:2000	Road vehicles -- Development guidelines for vehicle based software
ISO 15764:2004	Road vehicles -- Extended data link security
ISO 15765-1:2004	Road vehicles -- Diagnostics on Controller Area Networks (CAN) -- Part 1: General information
ISO 15765-2:2004	Road vehicles -- Diagnostics on Controller Area Networks (CAN) -- Part 2: Network layer services
ISO 15765-3:2004	Road vehicles -- Diagnostics on Controller Area Networks (CAN) -- Part 3: Implementation of unified diagnostic services (UDS on CAN)
ISO 15765-4:2005	Road vehicles -- Diagnostics on Controller Area Networks (CAN) -- Part 4: Requirements for emissions-related systems
ISO/TS 16553:2006	Road vehicles -- Data cables -- Test methods and requirements
ISO 16750-1:2006	Road vehicles -- Environmental conditions and testing for electrical and electronic equipment -- Part 1: General
ISO 16750-2:2006	Road vehicles -- Environmental conditions and testing for electrical and electronic equipment -- Part 2: Electrical loads
ISO 16750-3:2007	Road vehicles -- Environmental conditions and testing for electrical and electronic equipment -- Part 3: Mechanical loads
ISO 16750-4:2006	Road vehicles -- Environmental conditions and testing for electrical and electronic equipment -- Part 4: Climatic loads
ISO 16750-5:2003	Road vehicles -- Environmental conditions and testing for electrical and electronic equipment -- Part 5: Chemical loads
ISO 16844-1:2001	Road vehicles -- Tachograph systems -- Part 1: Electrical connectors
ISO 16844-1:2001/Cor 1:2005	
ISO 16844-2:2004	Road vehicles -- Tachograph systems -- Part 2: Recording unit, electrical interface
ISO 16844-3:2004	Road vehicles -- Tachograph systems -- Part 3: Motion sensor interface
ISO 16844-3:2004/Cor 1:2006	
ISO 16844-4:2004	Road vehicles -- Tachograph systems -- Part 4: CAN interface

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ISO 16844-5:2004	Road vehicles -- Tachograph systems -- Part 5: Secured CAN interface
ISO 16844-6:2004	Road vehicles -- Tachograph systems -- Part 6: Diagnostics
ISO 16844-7:2004	Road vehicles -- Controller area network (CAN) -- Conformance test plan
ISO 16845:2004	Road vehicles -- Controller area network (CAN) -- Conformance test plan
ISO 17356-1:2005	Road vehicles -- Open interface for embedded automotive applications -- Part 1: General structure and terms, definitions and abbreviated terms
ISO 17356-2:2005	Road vehicles -- Open interface for embedded automotive applications -- Part 2: OSEK/VDX specifications for binding OS, COM and NM
ISO 17356-3:2005	Road vehicles -- Open interface for embedded automotive applications -- Part 3: OSEK/VDX Operating System (OS)
ISO 17356-4:2005	Road vehicles -- Open interface for embedded automotive applications -- Part 4: OSEK/VDX Communication (COM)
ISO 17356-5:2006	Road vehicles -- Open interface for embedded automotive applications -- Part 5: OSEK/VDX Network Management (NM)
ISO 17356-6:2006	Road vehicles -- Open interface for embedded automotive applications -- Part 6: OSEK/VDX Implementation Language (OIL)
ISO 19072-1:2007	Road vehicles -- Connection interface for pyrotechnic devices, two-way and three-way connections - Part 1: Pocket interface definition
ISO 19072-2:2007	Road vehicles -- Connection interface for pyrotechnic devices, two-way and three-way connections - Part 2: Test methods and general performance requirements
ISO/TS 19072-3:2008	Road vehicles -- Connection interface for pyrotechnic devices, two-way and three-way connections - Part 3: Pyrotechnic device and harness connector assembly - type 1
ISO 20653:2006	Road vehicles -- Degrees of protection (IP-Code) -- Protection of electrical equipment against foreign objects, water and access
ISO 20828:2006	Road vehicles -- Security certificate management
ISO/TS 21609:2003	Road vehicles -- (EMC) guidelines for installation of aftermarket radio frequency transmitting equipment
ISO 21848:2005	Road vehicles -- Electrical and electronic equipment for a supply voltage of 42 V -- Electrical loads
ISO 22896:2006	Road vehicles -- Deployment and sensor bus for occupant safety systems
ISO 22900-1:2008	Road vehicles -- Modular vehicle communication interface (MVCI) -- Part 1: Hardware design requirements
ISO 22901-1:2008	Road vehicles -- Open diagnostic data exchange (ODX) -- Part 1: Data model specification
ISO 22902-1:2006	Road vehicles -- Automotive multimedia interface -- Part 1: General technical overview
ISO 22902-2:2006	Road vehicles -- Automotive multimedia interface -- Part 2: Use cases
ISO 22902-3:2006	Road vehicles -- Automotive multimedia interface -- Part 3: System requirements
ISO 22902-4:2006	Road vehicles -- Automotive multimedia interface -- Part 4: Network protocol requirements for vehicle interface access

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ISO 22902-5:2006	Road vehicles -- Automotive multimedia interface -- Part 5: Common message set
ISO 22902-6:2006	Road vehicles -- Automotive multimedia interface -- Part 6: Vehicle interface requirements
ISO 22902-7:2006	Road vehicles -- Automotive multimedia interface -- Part 7: Physical specification
ISO 25981:2008	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- Connectors for electronically monitored charging systems with 12 V or 24 V nominal supply voltage
ISO 25981:2008/Cor 1:2008	
ISO 26021-1:2008	Road vehicles -- End-of-life activation of on-board pyrotechnic devices -- Part 1: General information and use case definitions
ISO 26021-2:2008	Road vehicles -- End-of-life activation of on-board pyrotechnic devices -- Part 2: Communication requirements
ISO 26021-2:2008/Cor 1:2009	
ISO/PAS 27145-1:2006	Road vehicles -- Implementation of WWH-OBD communication requirements -- Part 1: General information and use case definition
ISO/PAS 27145-2:2006	Road vehicles -- Implementation of WWH-OBD communication requirements -- Part 2: Common emissions-related data dictionary
ISO/PAS 27145-3:2006	Road vehicles -- Implementation of WWH-OBD communication requirements -- Part 3: Common message dictionary
ISO/PAS 27145-4:2006	Road vehicles -- Implementation of WWH-OBD communication requirements -- Part 4: Connection between vehicle and test equipment
SC 4	Caravans and light trailers
SC 5	Engine tests
SC 6	Terms and definitions of dimensions and masses
SC 7	Injection equipment and filters for use on road vehicles
SC 8	Lighting and signalling
SC 9	Vehicle dynamics and road-holding ability
SC 10	Impact test procedures
SC 11	Safety glazing materials
SC 12	Passive safety crash protection systems
SC 13	Ergonomics applicable to road vehicles
ISO 2575:2004	Road vehicles -- Symbols for controls, indicators and tell-tales
ISO 2575:2004/Amd 1:2005	
ISO 2575:2004/Amd 2:2006	
ISO 2575:2004/Amd 3:2008	
ISO 3409:1975	Passenger cars -- Lateral spacing of foot controls
ISO 3958:1996	Passenger cars -- Driver hand-control reach
ISO 4040:2001	Road vehicles -- Location of hand controls, indicators and tell-tales in motor vehicles
ISO 6549:1999	Road vehicles -- Procedure for H- and R-point determination

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ISO/TR 9511:1991	Road vehicles -- Driver hand-control reach -- In-vehicle checking procedure
ISO/TS 12104:2003	Road vehicles -- Gearshift patterns -- Manual transmissions with power-assisted gearchange and automatic transmissions with manual-gearshift mode
ISO 12214:2002	Road vehicles -- Direction-of-motion stereotypes for automotive hand controls
ISO 15005:2002	Road vehicles -- Ergonomic aspects of transport information and control systems -- Dialogue management principles and compliance procedures
ISO 15006:2004	Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle auditory presentation
ISO 15007-1:2002	Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 1: Definitions and parameters
ISO/TS 15007-2:2001	Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 2: Equipment and procedures
ISO 15008:2003	Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle visual presentation
ISO 16121-1:2005	Road vehicles -- Ergonomic requirements for the driver's workplace in line-service buses -- Part 2: Visibility
ISO 16121-2:2005	Road vehicles -- Ergonomic requirements for the driver's workplace in line-service buses -- Part 3: Information devices and controls
ISO 16121-3:2005	Road vehicles -- Ergonomic requirements for the driver's workplace in line-service buses -- Part 3: Information devices and controls
ISO 16121-4:2005	Road vehicles -- Ergonomic requirements for the driver's workplace in line-service buses -- Part 4: Cabin environment
ISO/TR 16352:2005	Road vehicles -- Ergonomic aspects of in-vehicle presentation for transport information and control systems -- Warning systems
ISO 16673:2007	Road vehicles -- Ergonomic aspects of transport information and control systems -- Occlusion method to assess visual demand due to the use of in-vehicle systems
ISO/TS 16951:2004	Road vehicles -- Ergonomic aspects of transport information and control systems (TICS) -- Procedures for determining priority of on-board messages presented to drivers
ISO 17287:2003	Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving
ISO 20176:2006	Road vehicles -- H-point machine (HPM II) -- Specifications and procedure for H-point determination
SC 14	Exterior fittings
SC 15	Interchangeability of components of commercial vehicles and buses
SC 16	Reduction of fire risks
SC 17	Visibility
ISO 4513:2003	Road vehicles -- Visibility -- Method for establishment of eyellipses for driver's eye location

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[ISO 7397-1:1993](#) Passenger cars -- Verification of driver's direct field of view -- Part 1: Vehicle positioning for static measurement

[ISO 7397-2:1993](#) Passenger cars -- Verification of driver's direct field of view -- Part 2: Test method

[SC 19](#)

[SC 21](#)

[ISO 6469-1:2001](#) Electric road vehicles -- Safety specifications -- Part 1: On-board electrical energy storage

[ISO 6469-2:2001](#) Electric road vehicles -- Safety specifications -- Part 2: Functional safety means and protection against failures

[ISO 6469-3:2001](#) Electric road vehicles -- Safety specifications -- Part 3: Protection of persons against electric hazards

[ISO 8713:2005](#) Electric road vehicles -- Vocabulary

[ISO 8714:2002](#) Electric road vehicles -- Reference energy consumption and range -- Test procedures for passenger cars and light commercial vehicles

[SC 22](#)

[SC 23](#)

[SC 25](#)

[SC 26](#)

Electrically propelled road vehicles

Motorcycles

Mopeds

Vehicles using gaseous fuels

Accessibility of vehicles to the physically handicapped

[TC 204](#)

[ISO 14813-1:2007](#) Intelligent transport systems -- Reference model architecture(s) for the ITS sector -- Part 1: ITS service domains, service groups and services

[ISO/TR 14813-2:2000](#) Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 2: Core TICS reference architecture

[ISO/TR 14813-3:2000](#) Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 3: Example elaboration

[ISO/TR 14813-4:2000](#) Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 4: Reference model tutorial

[ISO/TR 14813-5:1999](#) Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 5: Requirements for architecture description in TICS standards

[ISO/TR 14813-6:2000](#) Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 6: Data presentation in ASN.1

[ISO 14814:2006](#) Road transport and traffic telematics -- Automatic vehicle and equipment identification -- Reference architecture and terminology

[ISO 14815:2005](#) Road transport and traffic telematics -- Automatic vehicle and equipment identification -- System specifications

[ISO 14816:2005](#) Road transport and traffic telematics -- Automatic vehicle and equipment identification -- Numbering and data structure

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ISO 14817:2002	Transport information and control systems -- Requirements for an ITS/TICS central Data Registry and ITS/TICS Data Dictionaries
ISO 14819-1:2003	Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 1: Coding protocol for Radio Data System -- Traffic Message Channel (RDS-TMC) using ALERT-C
ISO 14819-2:2003	Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 2: Event and information codes for Radio Data System -- Traffic Message Channel (RDS-TMC)
ISO 14819-3:2004	Traffic and Travel Information (TTI) -- TTI messages via traffic message coding -- Part 3: Location referencing for ALERT-C
ISO 14819-6:2006	Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 6: Encryption and conditional access for the Radio Data System -- Traffic Message Channel ALERT C coding
ISO/TS 14822-1:2006	Traffic and Travel Information -- General specifications for medium-range pre-information via dedicated short-range communication -- Part 1: Downlink
ISO/TS 14823:2008	Traffic and travel information -- Messages via media independent stationary dissemination systems -- Graphic data dictionary for pre-trip and in-trip information dissemination systems
ISO 14825:2004	Intelligent transport systems -- Geographic Data Files (GDF) -- Overall data specification
ISO 14827-1:2005	Transport information and control systems -- Data interfaces between centres for transport information and control systems -- Part 1: Message definition requirements
ISO 14827-2:2005	Transport information and control systems -- Data interfaces between centres for transport information and control systems -- Part 2: DATEX-ASN
ISO/TS 14904:2002	Road transport and traffic telematics -- Electronic fee collection (EFC) -- Interface specification for clearing between operators
ISO 14906:2004	Road transport and traffic telematics -- Electronic fee collection -- Application interface definition for dedicated short-range communication
ISO/TS 14907-1:2005	Road transport and traffic telematics -- Electronic fee collection -- Test procedures for user and fixed equipment -- Part 1: Description of test procedures
ISO/TS 14907-2:2006	Road transport and traffic telematics -- Electronic fee collection -- Test procedures for user and fixed equipment -- Part 2: Conformance test for the onboard unit application interface
ISO 15075:2003	Transport information and control systems -- In-vehicle navigation systems -- Communications message set requirements
ISO 15622:2002	Transport information and control systems -- Adaptive Cruise Control Systems -- Performance requirements and test procedures
ISO 15623:2002	Transport information and control systems -- Forward vehicle collision warning systems -- Performance requirements and test procedures
ISO/TS 15624:2001	Transport information and control systems -- Traffic Impediment Warning Systems (TIWS) -- System requirements

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ISO 15628:2007	Road transport and traffic telematics -- Dedicated short range communication (DSRC) -- DSRC application layer
ISO 15662:2006	Intelligent transport systems -- Wide area communication -- Protocol management information
ISO 15784-1:2008	Intelligent transport systems (ITS) -- Data exchange involving roadside modules communication -- Part 1: General principles and documentation framework of application profiles
ISO 15784-3:2008	Intelligent transport systems (ITS) -- Data exchange involving roadside modules communication -- Part 3: Application profile-data exchange (AP-DATEX)
ISO/TS 17261:2005	Intelligent transport systems - Automatic vehicle and equipment identification -- Intermodal goods transport architecture and terminology
ISO/TS 17261:2005/Cor 1:2005	
ISO/TS 17262:2003	Automatic vehicle and equipment identification -- Intermodal goods transport -- Numbering and data structures
ISO/TS 17263:2003	Automatic vehicle and equipment identification -- Intermodal goods transport -- System parameters
ISO 17361:2007	Intelligent transport systems -- Lane departure warning systems -- Performance requirements and test procedures
ISO/TR 17384:2008	Intelligent transport systems -- Interactive centrally determined route guidance (CDRG) -- Air interface message set, contents and format
ISO 17386:2004	Transport information and control systems -- Manoeuvring Aids for Low Speed Operation (MALSO) -- Performance requirements and test procedures
ISO 17387:2008	Intelligent transport systems -- Lane change decision aid systems (LCDAS) -- Performance requirements and test procedures
ISO/TR 17452:2007	Intelligent transport systems -- Using UML for defining and documenting ITS/TICS interfaces
ISO 17572-1:2008	Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 1: General requirements and conceptual model
ISO 17572-2:2008	Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 2: Pre-coded location references (pre-coded profile)
ISO 17572-3:2008	Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 2: Pre-coded location references (pre-coded profile)
ISO 17572-3:2008	Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 3: Dynamic location references (dynamic profile)
ISO/TS 17573:2003	Road Transport and Traffic Telematics -- Electronic Fee Collection (EFC) -- Systems architecture for vehicle related transport services
ISO/TS 17574:2004	Road transport and traffic telematics -- Electronic fee collection (EFC) -- Guidelines for EFC security protection profiles
ISO/PAS 17684:2003	Transport information and control systems -- In-vehicle navigation systems -- ITS message set translator to ASN.1 format definitions

ISO 17687:2007	Transport Information and Control Systems (TICS) -- General fleet management and commercial freight operations -- Data dictionary and message sets for electronic identification and monitoring of hazardous materials/dangerous goods transportation
ISO/TS 18234-1:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 1: Introduction, numbering and versions
ISO/TS 18234-2:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 2: Syntax, Semantics and Framing Structure (SSF)
ISO/TS 18234-3:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 3: Service and Network Information (SNI) application
ISO/TS 18234-4:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 4: Road Traffic Message (RTM) application
ISO/TS 18234-5:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 5: Public Transport Information (PTI) application
ISO/TS 18234-6:2006	Traffic and Travel Information (TTI) - TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 6: Location referencing applications
ISO/TS 20452:2007	Requirements and Logical Data Model for a Physical Storage Format (PSF) and an Application Program Interface (API) and Logical Data Organization for PSF used in Intelligent Transport Systems (ITS) Database Technology
ISO 21212:2008	Intelligent transport systems -- Communications access for land mobiles (CALM) -- 2G Cellular systems
ISO 21213:2008	Intelligent transport systems -- Communications access for land mobiles (CALM) -- 3G Cellular systems
ISO 21214:2006	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Infra-red systems
ISO 21218:2008	Intelligent transport systems -- Communications access for land mobiles (CALM)-- Medium service access points
ISO/TR 21707:2008	Intelligent transport systems -- Integrated transport information, management and control -- Data quality in ITS systems
ISO 22837:2009	Vehicle probe data for wide area communications
ISO 22951:2009	Data dictionary and message sets for preemption and prioritization signal systems for emergency and public transport vehicles (PRESTO)
ISO 24014-1:2007	Public transport -- Interoperable fare management system -- Part 1: Architecture
ISO/TR 24098:2007	Intelligent transport systems -- System architecture, taxonomy and terminology -- Procedures for developing ITS deployment plans utilizing ITS system architecture
ISO 24101-1:2008	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Application management -- Part 1: General requirements
ISO/TR 24529:2008	Intelligent transport systems -- Systems architecture -- Use of unified modelling language (UML) in ITS International Standards and deliverables

All standards_short

WG 4	Automatic vehicle and equipment identification
WG 5	Fee and toll collection
WG 7	General fleet management and commercial/freight
WG 8	Public transport/emergency
WG 9	Integrated transport information, management and control
WG 10	Traveller information systems
WG 11	Route guidance and navigation systems
WG 14	Vehicle/roadway warning and control systems
WG 15	Dedicated short range communications for TICS applications
WG 16	Wide area communications/protocols and interfaces
WG 17	Nomadic Devices in ITS Systems

drafts and new work items of TC 204

ISO/AWI 10711	Intelligent Transport Systems -- Interface Protocol and Message Set Definition between Traffic Signal Controllers and Detectors(IPMSTSCD)
ISO/AWI TR 10992	Nomadic Devices to support ITS Service and Multimedia Provision in Vehicles
ISO/CD TR 11766	Lawful Interception in ITS and CALM
ISO/CD TR 11769	Data retention for law enforcement in ITS and CALM
ISO/WD 11915	Communications Access for Land Mobiles: high speed, air interface parameters and protocols for broadcast, point-point, vehicle-vehicle, and vehicle-point communications in the ITS Sector using IEEE802.11 Wireless LAN standard in normal operational modes
ISO/NP TS 12813	Electronic fee collection -- Compliance checking of GNSS/CN systems over DSRC
ISO/CD TR 12859	Intelligent Transport Systems -System Architecture - Data Privacy Aspects of ITS
ISO/NP 13181-1	Intelligent Transport Systems - Communications Access for Land Mobiles (CALM) - Security -- Part 1: Framework
ISO/NP 13181-2	Communications access for land mobiles (CALM) - CALM receiving public broadcast communications -- Part 2: Threat Vulnerability and Risk Anlysis
ISO/NP 13181-3	Intelligent Transport Systems - Communications Access for Land Mobiles (CALM) - Security -- Part 3: Objectives and Requirements
ISO/NP 13181-4	Intelligent Transport Systems - Communications Access for Land Mobiles (CALM) - Security -- Part 4: Countermeasures
ISO/NP 13183	Communications access for land mobiles (CALM) - CALM receiving public broadcast communications
ISO/NP TS 13184	Real-time decision support system at all-way stop control intersections via nomadic and mobile devices
ISO/NP TS 13185	Vehicle Interface for Provisioning and Support of ITS Services
ISO/NP 13189	Business Case Template for ITS Projects

All standards_short

ISO/DIS 14813-5	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 5: Requirements for architecture description in TICS standards
ISO/DIS 14813-6	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 6: Data presentation in ASN.1
ISO/DIS 14906	Road transport and traffic telematics -- Electronic fee collection -- Application interface definition for dedicated short-range communication
ISO/CD TS 14907-1	Road transport and traffic telematics -- Electronic fee collection -- Test procedures for user and fixed equipment -- Part 1: Description of test procedures
ISO/DIS 15622	Transport information and control systems -- Adaptive Cruise Control Systems -- Performance requirements and test procedures
ISO/DIS 17264	Road transport and traffic telematics -- Automatic vehicle and equipment identification -- Interfaces
ISO/DIS 17267	Navigation System Application Program Interface (API)
ISO/DIS 17386	Transport information and control systems -- Manoeuvring Aids for Low Speed Operation (MALSO) -- Performance requirements and test procedures
ISO/DIS 17573	Electronic fee collection -- Systems architecture for vehicle related tolling
ISO/NP TS 17574	Road transport and traffic telematics -- Electronic fee collection (EFC) -- Guidelines for EFC security protection profiles
ISO/CD TS 17575-1	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 1: Charging
ISO/CD TS 17575-2	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 2: Communication and connections to the lower layers
ISO/NP TS 17575-3	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 3: Provisions for updating on-board equipment (OBE)
ISO/NP TS 17575-4	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 4: Roaming
ISO/NP TS 18234-7	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 7: Packing information (PKI) application (TPEG-PKI_1.0/001)
ISO/NP TS 18234-8	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 8: Congestion and Travel-Time Information (CTT) application (TPEG-CTT_1.0/001)
ISO/NP TS 18234-9	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 9: Traffic Event Compact (TEC) application (TPEG-TEC_1.0/001)

All standards_short

ISO/NP TS 18234-10	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 10: Weather information (WEA) application (TPEC-WEA_1.0/001)
ISO/DIS 21210	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Networking Protocols
ISO/CD 21215	CALM-M5: Medium and long range, high speed, air interface parameters and protocols for broadcast, point-point, vehicle-vehicle, and vehicle-point communications in the ITS Sector using MICROWAVE COMMUNICATIONS at 5.8 GHz-5.9 GHz, including specifications for Master/Slave and Peer to Peer Communications
ISO/CD 21216-1	CALM-MM: Medium and long range, high speed, air interface parameters and protocols for broadcast, point-point, vehicle-vehicle, and vehicle-point communications in the ITS Sector using MILLIMETRE WAVE MICROWAVE COMMUNICATIONS, including specifications for Master/Slave and Peer to Peer Communications -- Part 1: CALM Millimetre, Physical Layer CALM Millimetre, Physical Layer
ISO/DIS 21217	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Architecture
ISO/PRF 22178	Intelligent transport systems -- Low speed following (LSF) systems -- Performance requirements and test procedures
ISO/PRF 22179	Intelligent transport systems -- Full speed range adaptive cruise control (FSRA) systems -- Performance requirements and test procedures
ISO/DIS 22840	Intelligent transport systems -- Devices to aid reverse manoeuvres -- Extended range backing aid systems (ERBA)
ISO/DIS 24097-1	Using Web Services (machine-machine delivery) for ITS service delivery -- Part 1: Realization of interoperable web services
ISO/CD 24099	Navigation data delivery structure and protocol
ISO/DIS 24100	Privacy - the basic principles for probe personal data protection
ISO/CD 24101-2	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Application management -- Part 2: Conformance test
ISO/CD 24102	CALM Management
ISO/DIS 24103	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Media adapted interface layer (MAIL)
ISO/NP TS 24530-5	Traffic and Traveller Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 5: tpeg-pkiML
ISO/NP TS 24530-6	Traffic and Traveller Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 6: tpeg-pkiML
ISO/NP TS 24530-7	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 7: tpeg-weaML application
ISO/DIS 24534-1	Automatic vehicle and equipment identification -- Electronic Registration Identification (ERI) for vehicles -- Part 1: Architecture

All standards_short

ISO/DIS 24534-2	Automatic vehicle and equipment identification -- Electronic Registration Identification (ERI) for vehicles -- Part 2: Operational requirements
ISO/DIS 24534-3	Automatic vehicle and equipment identification -- Electronic Registration Identification (ERI) for vehicles -- Part 3: Vehicle data
ISO/DIS 24534-4	Automatic vehicle and equipment identification -- Electronic Registration Identification (ERI) for vehicles -- Part 4: Secure communications using asymmetrical techniques
ISO/DIS 24978	Intelligent transport systems -- ITS Safety and emergency messages using any available wireless media -- Data Registry procedures
ISO/WD TR 25103	Business justification for ITS Architecture
ISO/CD TR 25109	Example high level architecture elaboration : Emergency Call
ISO/DIS 25111	CALM using Public Networks -- General requirements
ISO/DIS 25112	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Mobile wireless broadband using IEEE 802.16e/IEEE 802.16g
ISO/DIS 25113	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Mobile wireless broadband using high capacity spatial division multiple access (HC-SDMA)
ISO/CD TS 25114	Probe Data Reporting Management
ISO/NP TR 26682	Crash and Emergency Notification Reference Architecture
ISO/NP 26999	Rules and Guidance for the use of Process (Functional) Oriented Methodology in ITS Standards, Data Registries and Data Dictionaries
ISO/NP TS 28701	Public Transport -- Identifications of Fixed Objects in Public Transport (IFOPT)
ISO/CD 29281	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Non-IP communication mechanisms
ISO/CD 29282	CALM Applications using Satellite
ISO/CD 29283	CALM - Mobile wireless broadband using HC-SDMA
ISO/NP 29284	Event based Probe Vehicle Data

Based on ESoP (European Statement of Principles)

ISO 4040:2001	Road vehicles - Location of hand controls, indicators and tell-tales in motor vehicles
ISO 16673:2007	Road vehicles -- Ergonomic aspects of transport information and control systems -- Occlusion method to assess visual demand due to the use of in-vehicle systems
ISO 20176:2006	Road vehicles -- H-point machine (HPM II) -- Specifications and procedure for H-point determination
ISO 16121-4:2005	Road vehicles -- Ergonomic requirements for the driver's workplace in line-service buses -- Part 4: Cabin environment
ISO 4513:2003	Road vehicles -- Visibility -- Method for establishment of eyellipses for driver's eye location
ISO 15008:2003	Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle visual presentation

All standards_short

ISO 15007-1:2002	Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 1: Definitions and parameters
ISO/TS 15007-2:2001	Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 2: Equipment and procedures
ISO 16673:2007	Road vehicles -- Ergonomic aspects of transport information and control systems -- Occlusion method to assess visual demand due to the use of in-vehicle systems
ISO 16121-3:2005	Road vehicles -- Ergonomic requirements for the driver's workplace in line-service buses -- Part 3: Information devices and controls
ISO 15006:2004	Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle auditory presentation
ISO 2575:2004	Road vehicles -- Symbols for controls, indicators and tell-tales
ISO 2575:2004/Amd 3:2008	
ISO 2575:2004/Amd 1:2005	
ISO 2575:2004/Amd 2:2006	
ISO 7000:2004	Graphical symbols for use on equipment -- Index and synopsis
IEC 80416-1:2008	Basic principles for graphical symbols for use on equipment -- Part 1: Creation of graphical symbols for registration
ISO 80416-4:2005	Basic principles for graphical symbols for use on equipment -- Part 4: Guidelines for the adaptation of graphical symbols for use on screens and displays (icons)
IEC 80416-3:2002	Basic principles for graphical symbols for use on equipment -- Part 3: Guidelines for the application of graphical symbols
ISO/IEC 13251:2004	Collection of graphical symbols for office equipment
ISO/IEC 24752-5:2008	Information technology -- User interfaces -- Universal remote console -- Part 5: Resource description
ISO/IEC 24752-4:2008	Information technology -- User interfaces -- Universal remote console -- Part 4: Target description
ISO/IEC 24752-3:2008	Information technology -- User interfaces -- Universal remote console -- Part 3: Presentation template
ISO/TS 16951:2004	Road vehicles -- Ergonomic aspects of transport information and control systems (TICS) -- Procedures for determining priority of on-board messages presented to drivers
ISO 15003:2006	Agricultural engineering -- Electrical and electronic equipment -- Testing resistance to environmental conditions
ISO 15005:2002	Road vehicles -- Ergonomic aspects of transport information and control systems -- Dialogue management principles and compliance procedures
ISO 17287:2003	Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving

Economic Committee for Europe (UN/ECE) regulations which are recognised by the Community after its adhesion to the Revised Agreement of 1958 (see Council Decision 97/836/EC of 27.11.97):

- [ISO 11429:1996](#) Ergonomics -- System of auditory and visual danger and information signals
[ISO 17287:2003](#) Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving
- [ISO 9241-171:2008](#) Ergonomics of human-system interaction -- Part 171: Guidance on software accessibility
- [ISO/TR 9241-309:2008](#) Ergonomics of human-system interaction -- Part 309: Organic light-emitting diode (OLED) displays
- [ISO/TR 9241-308:2008](#) Ergonomics of human-system interaction -- Part 308: Surface-conduction electron-emitter displays (SED)
- [ISO 11064-5:2008](#) Ergonomic design of control centres -- Part 5: Displays and controls
- [ISO 14915-1:2002](#) Software ergonomics for multimedia user interfaces -- Part 1: Design principles and framework
[ISO 14915-2:2003](#) Software ergonomics for multimedia user interfaces -- Part 2: Multimedia navigation and control
- [ISO 14915-3:2002](#) Software ergonomics for multimedia user interfaces -- Part 3: Media selection and combination
- [ISO/TR 16982:2002](#) Ergonomics of human-system interaction -- Usability methods supporting human-centred design
- [ISO 9355-1:1999](#) Ergonomic requirements for the design of displays and control actuators -- Part 1: Human interactions with displays and control actuators
[ISO 9355-2:1999](#) Ergonomic requirements for the design of displays and control actuators -- Part 2: Displays
[ISO 9355-3:2006](#) Ergonomic requirements for the design of displays and control actuators -- Part 3: Control actuators
- [ISO/IEC 11581-5:2004](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 5: Tool icons
[ISO/IEC 24738:2006](#) Information technology -- Icon symbols and functions for multimedia link attributes
- [ISO/IEC 24752-5:2008](#) Information technology -- User interfaces -- Universal remote console -- Part 5: Resource description
[ISO/IEC 24752-4:2008](#) Information technology -- User interfaces -- Universal remote console -- Part 4: Target description

All standards_short

[ISO/IEC 24752-3:2008](#) Information technology -- User interfaces -- Universal remote console -- Part 3: Presentation template

[ISO/IEC 11581-6:1999](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 6: Action icons

[ISO/IEC 11581-1:2000](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 1: Icons -- General

[ISO/IEC 11581-2:2000](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 2: Object icons

[ISO/IEC 11581-3:2000](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 3: Pointer icons

[ISO/IEC 11581-5:2004](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 5: Tool icons

TABLE 2:
All standards detailed



Deliverable n.	12M	
Sub Project	SP n.4	Evaluation & assessment
Workpackage	WP n.4.8	Benchmarking from the consumer point of view
Task n.	T n. 4.8.1	Review of earlier consumer tests and European standards
Author(s)	S. Grabmaier	C. Gauss
	File name	TeleFOT_4.8.1_Review of consumer tests and standards_v2.doc
Status	Draft	
Distribution	Public (PU)	
Issue date	09.06.2009	Creation date: 10.07.2009

All standards_detailed

ISO	SC	Content (original language)
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Road Vehicle - Economics applicable to road vehicles - Transport information and control systems, on-board man-machine interface

All questions of standardization concerning compatibility, interchangeability and safety, with particular reference to terminology and test procedures (including the characteristics of instrumentation) for evaluating the performance of the following types of road vehicles and their equipment as defined in the relevant items of Article 1 of the convention on Road Traffic, Vienna in 1968 concluded under the auspices of the United Nations:

- mopeds (item m);
- motor cycles (item n);
- motor vehicles (item p);
- trailers (item q);
- semi-trailers (item r);
- light trailers (item s);
- combination vehicles (item t);
- articulated vehicles (item u).

ISO

[TC 22](#)

[SC 1](#)

[SC 2](#)

[SC 3](#)

[ISO 1185:2003](#)

Ignition equipment

Braking systems and equipment

Electrical and electronic equipment

Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- 7-pole connector type 24 N (normal) for vehicles with 24 V nominal supply voltage

ISO 1185:2003 specifies the dimensions of, and gives particular requirements for, 7-pole connectors of type 24 N and their contact allocation for the electrical connection between towing and towed vehicles with 24 V nominal supply voltage, thus ensuring interchangeability.

[ISO 1724:2003](#)

Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- 7-pole connector type 12 N (normal) for vehicles with 12 V nominal supply voltage

ISO 1724:2003 specifies the dimensions of, and contact allocation tests and requirements for, 7-pole connectors of type 12 N for the electrical connection between towing and towed vehicles with 12 V nominal supply voltage, thus ensuring interchangeability.

All standards_detailed

ISO 3731:2003	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- 7-pole connector type 24 S (supplementary) for vehicles with 24 V nominal supply voltage	ISO 3731:2003 specifies the dimensional characteristics of, and specific requirements for, 7-pole connectors of type 24 S and their contact allocation for the electrical connection of towing and towed vehicles with 24 V nominal supply voltage, thus ensuring interchangeability. A 24 S connector is intended to be used in addition to a 24 N connector according to ISO 1185 where more than 7 poles are required.
ISO 3732:2003	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- 7-pole connector type 12 S (supplementary) for vehicles with 12 V nominal supply voltage	ISO 3732:2003 specifies the dimensions of, and requirements for, 7-pole connectors of type 12 S and their contact allocation for the electrical connection of towing (passenger cars or light commercial vehicles) and towed vehicles with 12 V nominal supply voltage, thus ensuring interchangeability. A 12 S connector is intended to be used in addition to a 12 N connector according to ISO 1724 where more than 7 poles are required.
ISO 4091:2003	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- Definitions, tests and requirements	ISO 4091:2003 gives definitions and specifies tests and requirements for connectors used for the electrical connection of towing and towed road vehicles. It is applicable to connectors of all types used for this purpose, as specified in ISO 1185, ISO 1724, ISO 3731, ISO 3732, ISO 7638-1, ISO 7638-2, ISO 11446 and ISO 12098.
ISO 4141-1:2005	Road vehicles -- Multi-core connecting cables -- Part 1: Test methods and requirements for basic performance sheathed cables	ISO 4141:2005 specifies the test methods and requirements of basic performance multi-core sheathed cables for the connection of towing and towed vehicles, suitable for a temperature range of -40 °C to +85 °C.
ISO 4141-2:2006	Road vehicles -- Multi-core connecting cables -- Part 2: Test methods and requirements for high performance sheathed cables	ISO 4141-2:2006 specifies the test methods and requirements for high performance sheathed multi-core cables for the connection of towing and towed vehicles, suitable for a temperature range of - 40 °C to + 85 °C.
ISO 4141-3:2006	Road vehicles -- Multi-core connecting cables -- Part 3: Construction, dimensions and marking of unscreened sheathed low-voltage cables	This part of ISO 4141 specifies the construction, dimensions and marking of unscreened sheathed low-voltage multi-core cables for the connection of towing and towed vehicles, suitable for the temperature range -40 °C to +85 °C.

All standards_detailed

ISO 4141-4:2001	Road vehicles -- Multi-core connecting cables -- Part 4: Articulation test method and requirements for coiled cable assemblies	
ISO 4165:2001	Road vehicles -- Electrical connections -- Double-pole connection	
ISO 6722:2006	Road vehicles -- 60 V and 600 V single-core cables -- Dimensions, test methods and requirements	ISO 6722:2006 specifies the dimensions, test methods, and requirements for single-core 60 V cables intended for use in road vehicle applications where the nominal system voltage is equal to or less than (60 V d.c. or 25 V a.c.). It also specifies additional test methods and/or requirements for 600 V cables intended for use in road vehicle applications where the nominal system voltage is greater than (60 V d.c. or 25 V a.c.) to equal to or less than (600 V d.c. or 600 V a.c.). It also applies to individual cores in multi-core cables.
ISO 6969:2004	Road vehicles -- Sound signalling devices -- Tests after mounting on vehicle	ISO 6969:2004 specifies the testing of sound signalling devices in accordance with ISO 512, to be carried out after mounting on the
ISO 7588-1:1998	Road vehicles -- Electrical/electronic switching devices -- Part 1: Relays and flashers	
ISO 7588-2:1998	Road vehicles -- Electrical/electronic switching devices -- Part 2: Electronic devices	
ISO 7588-3:1998	Road vehicles -- Electrical/electronic switching devices -- Part 3: Microrelays	
ISO 7637-1:2002	Road vehicles -- Electrical disturbances from conduction and coupling -- Part 1: Definitions and general considerations	This part of ISO 7637 defines the basic terms relating to electrical disturbances from conduction and coupling used in its other parts, and gives general information on the whole of ISO 7637 and common to all parts.
ISO 7637-1:2002/Amd 1:2008		

[ISO 7637-2:2004](#)

Road vehicles -- Electrical disturbances from conduction and coupling -- Part 2: Electrical transient conduction along supply lines only

ISO 7637-2:2004 specifies bench tests for testing the compatibility to conducted electrical transients of equipment installed on passenger cars and light commercial vehicles fitted with a 12 V electrical system or commercial vehicles fitted with a 24 V electrical system -- for both injection and the measurement of transients. Failure mode severity classification for immunity to transients is also given. It is applicable to these types of road vehicle, independent of the propulsion system (e.g. spark ignition or diesel engine, or electric motor).

[ISO 7637-2:2004/Amd 1:2008](#)

[ISO 7637-3:2007](#)

Road vehicles -- Electrical disturbances from conduction and coupling -- Part 3: Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines

ISO 7637-3:2007 establishes a bench top test for the evaluation of the immunity of devices under test (DUTs) to transient transmission by coupling via lines other than supply lines. The test transient pulses simulate both fast and slow transient disturbances, such as those caused by the switching of inductive loads and relay contact bounce.

Three test methods are described in ISO 7637-3:2007:

the capacitive coupling clamp (CCC) method;
the direct capacitive coupling (DCC) method; and
the inductive coupling clamp (ICC) method.

Only one test method need be selected for slow transients and only one method need be selected for fast transients.

ISO 7637-3:2007 applies to road vehicles fitted with nominal 12 V, 24 V or 42 V electrical systems.

For transient immunity, Annex B provides recommended test severity levels in line with the functional performance status classification (FPSC) principle described in ISO 7637-1.

All standards_detailed

[ISO 7638-1:2003](#)

Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- Part 1: Connectors for braking systems and running gear of vehicles with 24 V nominal supply voltage

ISO 7638-1:2003 gives the dimensions of, and specifies the contact allocation and tests and test requirements for, connectors for the electrical connection of the braking systems and running gear of towing and towed vehicles with 24 V nominal supply voltage. In addition, it specifies a park socket used to receive and store the plug when disconnected.

[ISO 7638-2:2003](#)

Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- Part 2: Connectors for braking systems and running gear of vehicles with 12 V nominal supply voltage

ISO 7638-2:2003 gives the dimensions of, and specifies the contact allocation and tests and test requirements for, connectors for the electrical connection of the braking systems and running gear of towing and towed vehicles with 12 V nominal supply voltage. In addition, it specifies a park socket used to receive and store the plug when disconnected.

[ISO 7639:1985](#)

Road vehicles -- Diagnostic systems -- Graphical symbols

[ISO 8092-1:1996](#)

Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 1: Tabs for single-pole connections -- Dimensions and specific requirements

Gives dimensions for the tabs of single-pole connections and specific requirements, for on-board electrical wiring harnesses of road vehicles. Does apply to connections designed to be disconnected after mounting in the vehicle for the purposes of repair and/or maintenance only.

[ISO 8092-2:2005](#)

Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 2: Definitions, test methods and general performance requirements

ISO 8092:2005 defines terms and specifies test methods and general performance requirements for single-pole and multi-pole connections used with on-board electrical wiring harnesses of road vehicles.

It is applicable to connectors designed to be disconnected after mounting in the vehicle for repair and maintenance only. It does not cover one-part connections, i.e. where one part of the connection has direct contact to the pattern of the printed circuit board.

ISO 8092:2005 is not applicable to internal connections of electronic devices.

All standards_detailed

ISO 8092-3:1996	Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 3: Tabs for multi-pole connections -- Dimensions and specific requirements	Gives dimensions for the tabs of multi-pole connections and specific requirements, for on-board electrical wiring harnesses of road vehicles. Does apply to connections designed to be disconnected after mounting in the vehicle for the purposes of repair and/or maintenance only.
ISO 8092-4:1997	Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 4: Pins for single- and multi-pole connections -- Dimensions and specific requirements	Specifies dimensions for the pins of single- and multi-pole connections and specific requirements, for on-board electrical wiring harnesses of road vehicles. Applies to connections designed to be disconnected after mounting in the vehicle in the case of repair and/or maintenance only.
ISO 8093:1985	Road vehicles -- Diagnostic testing of electronic systems	Defines diagnostic provisions applicable to electronic systems in road vehicles. Applies to electronic systems including electronic modules, associated input sensors, output actuators and indicators. The measurement ranges specified exclude certain devices for which specific test equipment is required. Does not apply to those systems which have built-in diagnostic capabilities and do not require compatibility with off-board equipment.
ISO 8820-1:2008	Road vehicles -- Fuse-links -- Part 1: Definitions and general test requirements	<p>ISO 8820-1:2008 defines terms and specifies general test requirements for fuse-links for electrical systems of road vehicles.</p> <p>ISO 8820-1:2008 is intended to be used in conjunction with other parts of ISO 8820, to which its requirements are applicable except where modified by the particular requirements of another part.</p> <p>ISO 8820-1:2008 is not applicable to fuse holders used in the vehicles.</p>

All standards_detailed

[ISO 8820-2:2005](#)

Road vehicles -- Fuse-links -- Part 2: User's guide

8820-2:2005 gives guidance for the choice and application of automotive fuse-links. It describes the various parameters which have to be taken into account when selecting fuse-links.

8820-2:2005 is intended to be used in conjunction with ISO 8820-1 and the other parts of ISO 8820.

[ISO 8820-3:2002](#)

Road vehicles -- Fuse-links -- Part 3: Fuse-links with tabs (blade type)

ISO 8820-3:2002 specifies low-voltage fuse-links with tabs (blade type) for fuses in road vehicles. It establishes, for this fuse-link type, the rated current, test procedures, performance requirements and dimensions. It is applicable to those fuse-links with a rated voltage of 32 V, a current rating of less than or equal to 80 A and a breaking capacity of 1 000 A, intended for use in road vehicles at a nominal voltage of 12 V or 24 V. ISO 8820-3:2002 is to be used in conjunction with ISO 8820-1, and with ISO 8820-2.

[ISO 8820-4:2002](#)

Road vehicles -- Fuse-links -- Part 4: Fuse-links with female contacts (type A) and bolt-in contacts (type B) and their test fixtures

[ISO 8820-5:2007](#)

Road vehicles -- Fuse-links -- Part 5: Fuse-links with axial terminals (Strip fuse-links) Types SF 30 and SF 51 and test fixtures

ISO 8820-5:2007 specifies fuse-links with axial terminals (Strip fuse-links) Type SF30 and SF51 and test fixtures for fuses in road vehicles. It establishes, for these fuse-link types, the rated current, test procedures, performance requirements and dimensions.

ISO 8820-5:2007 is applicable to fuse-links with a rated voltage of 32 V, a current rating of 30 A to 500 A and a breaking capacity of 2000 A intended for use in the electrical system of road vehicles with a nominal voltage of 12 V and/or 24 V.

ISO 8820-5:2007 is intended to be used in conjunction with ISO 8820-1 and with ISO 8820-2. The numbering of its clauses corresponds to that of ISO 8820-1, whose requirements are applicable, except where modified by requirements particular to ISO 8820-5:2007

[ISO 8820-6:2007](#)

Road vehicles -- Fuse-links -- Part 6: Single-bolt fuse-links

ISO 8820-6:2007 specifies single-bolt fuse-links in road vehicles. It establishes, for this fuse-link type, the rated current, test procedures, performance requirements and dimensions.

ISO 8820-6:2007 is applicable to those fuse-links with a rated voltage of 58 V, a current rating of up to 300 A and a breaking capacity of 2 000 A intended for use in road vehicles at a nominal voltage of 12 V, 24 V and/or 42 V.

[ISO 8820-7:2007](#)

Road vehicles -- Fuse-links -- Part 7: Fuse-links with tabs (Type G) with rated voltage of 450 V

ISO 8820-7:2007 specifies fuse-links with tabs (Type G) in road vehicles. This type of fuse-link is basically designed for use in fuel-cell applications. ISO 8820-7:2007 establishes, for this fuse-link type, the rated current, test procedures, performance requirements and dimensions.

ISO 8820-7:2007 is applicable for fuse-links with a rated voltage of 450 V, a current rating of up to 70 A and a breaking capacity of 2 000 A intended for use in road vehicles at a nominal voltage up to 450 V.

All standards_detailed

ISO 8854:1988	Road vehicles -- Alternators with regulators -- Test methods and general requirements	Specifies test methods and general requirements for the determination of the electrical characteristic data of alternators for road vehicles. Applies to alternators, cooled according to the manufacturer's instructions, mounted on internal combustion engines. Figure 1 shows a diagram for alternator testing.
ISO 9141:1989	Road vehicles -- Diagnostic systems -- Requirements for interchange of digital information	Specifies the requirements for setting up the interchange of digital information between on-board Electronic Control Units (ECUs) of road vehicles and suitable diagnostic testers. This communication is established in order to facilitate inspection, test diagnosis and adjustment of vehicles, systems and ECUs. Does not apply when system-specific diagnostic test equipment is used.
ISO 9141-2:1994	Road vehicles -- Diagnostic systems -- Part 2: CARB requirements for interchange of digital information	Is limited to vehicles with nominal 12 V supply voltage. Describes a subset of ISO 9141:1989. Specifies the requirements for setting-up the interchange of digital information between on-board emission-related electronic control units of road vehicles and the SAE OBD II scan tool as specified in SAE J1978. This communication is established to facilitate compliance with California Code of Regulation, Title 13, 1968.1.
ISO 9141-2:1994/Amd 1:1996		Contains minor amendments in three subclauses.
ISO 9141-3:1998	Road vehicles -- Diagnostic systems -- Part 3: Verification of the communication between vehicle and OBD II scan tool	
ISO 9259:1991/Amd 1:2001		
ISO 9458:1988	Passenger cars -- Starter motor electrical connections	Specifies the requirements for electrical connections used on the starter motors of passenger cars. Applies to the positive terminals of the starter motor to the battery and to the solenoid. The dimensions given in figures 1 to 4 are recommended for starter motor power between 0,5 and 4 kW. Details not specified are left to the manufacturer's choice.
ISO 9534:1989	Road vehicles -- Fuel pump electric connections	Specifies the requirements for electric connections for electric fuel pumps. Does not apply to electric fuel pumps with free couplers, i.e. cable to cable terminations. Gives details for the types A, B and C. Some figures illustrate the meaning of the description. Details not specified are left to the manufacturer's discretion.

All standards_detailed

ISO/TR 10305-1:2003	Road vehicles -- Calibration of electromagnetic field strength measuring devices -- Part 1: Devices for measurement of electromagnetic fields at frequencies > 0 Hz	ISO/TR 10305-1:2003 specifies techniques for calibrating field strength measuring devices used in automotive testing for the measurement of magnetic fields at frequencies greater than 0 Hz, for both EMC and human protection applications. It has been prepared by German experts using devices including capacitor or coil arrangements, TEM cells and antenna arrangements in absorber-lined chambers. In the automotive field, these field strength measuring devices are used for measurements specified in the various parts of ISO 11451 and ISO 11452.
ISO/TR 10305-2:2003	Road vehicles -- Calibration of electromagnetic field strength measuring devices -- Part 2: IEEE standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz	ISO/TR 10305-2:2003 specifies techniques for calibrating electromagnetic field sensors and probes, excluding antennas, used in automotive testing for the measurement of magnetic fields at frequencies from 9 kHz to 40 GHz. In the automotive field, these field strength measuring devices are used for measurements specified in the various parts of ISO 11451 and ISO 11452.
ISO 10483-1:2004	Road vehicles -- Intelligent power switches -- Part 1: High-side intelligent power switch	ISO 10483-1:2004 specifies the minimum requirements for high-side intelligent power switches (HSIPS) installed on road vehicles with 12 V or 24 V nominal supply voltage and intended primarily for automotive applications (lamps, motors, relays, etc.).
ISO 10483-2:1996	Road vehicles -- Intelligent power switches -- Part 2: Low-side intelligent power switch	Specifies the minimum requirements for 12 V and 24 V body system low-side intelligent power switches (LSIPS) intended for road vehicles.

[ISO 10605:2008](#)

Road vehicles -- Test methods for electrical disturbances from electrostatic discharge

ISO 10605:2008 specifies the electrostatic discharge (ESD) test methods necessary to evaluate electronic modules intended for vehicle use. It applies to discharges in the following cases:

ESD in assembly;

ESD caused by service staff;

ESD caused by occupants.

ESD applied to the device under test (DUT) can directly influence the DUT. ESD applied to neighbouring parts can couple into supply and signal lines of the DUT in the vehicle and/or directly into the DUT.

ISO 10605:2008 describes test procedures for evaluating both electronic modules on the bench and complete vehicles. It also describes a test procedure that classifies the ESD sensitivity of modules for packaging and handling. ISO 10605:2008 applies to all types of road vehicles regardless of the propulsion system (e.g. spark-ignition engine, diesel engine, electric motor).

ISO 10605:2008 is based in part on IEC 61000-4-2 and describes vehicle-specific requirements.

ISO 10605:2008 does not apply to pyrotechnic modules.

[ISO 11446:2004](#)

Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- 13-pole connectors for vehicles with 12 V nominal supply voltage

ISO 11446:2004 specifies the dimensional characteristics of, and contact allocation and tests and requirements for, 13-pole connectors for the electrical connection of towing and towed vehicles with 12 V nominal supply voltage. It also specifies a park socket for receiving and storing the plug when it is disconnected.

ISO 11451-1:2005	Road vehicles -- Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 1: General principles and terminology	ISO 11451-1:2005 specifies general conditions, defines terms, gives practical guidelines and establishes the basic principles of the vehicle tests used in the other parts of ISO 11451 for determining the immunity of passenger cars and commercial vehicles to electrical disturbances from narrowband radiated electromagnetic energy, regardless of the vehicle propulsion system (e.g. spark-ignition engine, diesel engine, electric motor). The electromagnetic disturbances considered are limited to continuous narrowband electromagnetic fields. A wide frequency range (0,01 MHz to 18 000 MHz) is allowed for the immunity testing in this and the other parts of ISO 11451.
ISO 11451-1:2005/Amd 1:2008		
ISO 11451-2:2005	Road vehicles -- Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 2: Off-vehicle radiation sources	ISO 11451-2:2005 specifies a vehicle test method for determining the immunity of passenger cars and commercial vehicles to electrical disturbances from off-vehicle radiation sources, regardless of the vehicle propulsion system (e.g. spark ignition engine, diesel engine, electric motor). It can also be readily applied to other types of vehicles. The electromagnetic disturbances considered are limited to narrowband electromagnetic fields.
ISO 11451-3:1994	Road vehicles -- Electrical disturbances by narrowband radiated electromagnetic energy -- Vehicle test methods -- Part 3: On-board transmitter simulation	Lays down on-board transmitter simulation test methods and procedures, for testing passenger cars and commercial vehicles regardless of the propulsion system. The electromagnetic disturbances considered in this part are limited to continuous narrowband electromagnetic fields.
ISO 11451-3:2007	Road vehicles -- Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 3: On-board transmitter simulation	ISO 11451-3:2007 specifies methods for testing the immunity of passenger cars and commercial vehicles to electromagnetic disturbances from on-board transmitters connected to an external antenna and portable transmitters with integral antennas, regardless of the vehicle propulsion system (e.g. spark ignition engine, diesel engine, electric motor).

[ISO 11451-4:2006](#)

Road vehicles -- Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 4: Bulk current injection (BCI)

ISO 11451-4:2006 specifies bulk current injection (BCI) test methods and procedures for testing the electromagnetic immunity of electronic components for passenger cars and commercial vehicles regardless of the propulsion system (e.g. spark-ignition engine, diesel engine, electric motor). The electromagnetic disturbance considered in ISO 11451-4:2006 is limited to continuous narrowband electromagnetic fields.

Part 1 of ISO 11451 gives definitions, practical use and basic principles of the test procedure.

[ISO 11452-1:2005](#)

Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 1: General principles and terminology

ISO 11452-1:2005 specifies general conditions, defines terms, gives practical guidelines and establishes the basic principles of the component tests used in the other parts of ISO 11452 for determining the immunity of electronic components of passenger cars and commercial vehicles to electrical disturbances from narrowband radiated electromagnetic energy, regardless of the vehicle propulsion system (e.g. spark-ignition engine, diesel engine, electric motor). The electromagnetic disturbances considered are limited to continuous narrowband electromagnetic fields. A wide frequency range (0,01 MHz to 18 000 MHz) is allowed for the immunity testing of the components in this and the other parts of ISO 11452.

[ISO 11452-1:2005/Amd 1:2008](#)

All standards_detailed

[ISO 11452-2:2004](#)

Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 2: Absorber-lined shielded enclosure

ISO 11452-2:2004 specifies an absorber-lined shielded enclosure method for testing the immunity (off-vehicle radiation source) of electronic components for passenger cars and commercial vehicles regardless of the propulsion system (e.g spark-ignition engine, diesel engine, electric motor). The device under test (DUT), together with the wiring harness (prototype or standard test harness) is subjected to an electromagnetic disturbance generated inside an absorber-lined shielded enclosure, with peripheral devices either inside or outside the enclosure. It is applicable only to disturbances from continuous narrowband electromagnetic fields. See ISO 11452-1 for general test conditions.

[ISO 11452-3:2001](#)

Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 3: Transverse electromagnetic mode (TEM) cell

[ISO 11452-4:2005](#)

Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 4: Bulk current injection (BCI)

ISO 11452-4:2005 specifies bulk current injection (BCI) test methods for determining the immunity of electronic components of passenger cars and commercial vehicles regardless of the propulsion system (e.g. spark-ignition engine, diesel engine, electric motor). The electromagnetic disturbances considered in ISO 11452-4 are limited to continuous narrowband electromagnetic fields. See ISO 11452-1 for general test conditions.

[ISO 11452-5:2002](#)

Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 5: Stripline

This part of ISO 11452 specifies stripline tests for determining the immunity of electronic components for passenger cars and commercial vehicles to electrical disturbances from narrowband electromagnetic energy, regardless of the vehicle propulsion system (e.g. spark-ignition engine, diesel engine, electric motor). As the performance of these tests depends on the exposure of the equipment harness to a disturbance field, the applicability of this part of ISO 11452 is limited to equipment harnesses, which have a maximum diameter of one-third the stripline height or less.

The electromagnetic disturbances considered are limited to continuous narrowband electromagnetic fields.

[ISO 11452-7:2003](#)

Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 7: Direct radio frequency (RF) power injection

ISO 11452-7:2003 specifies a direct RF power injection test for determining the immunity of electronic components of passenger cars and commercial vehicles to electrical disturbances from narrowband electromagnetic energy, regardless of the propulsion system (e.g. spark-ignition engine, diesel engine, electric motor). The test method, which involves providing differential mode excitation to the DUT (device under test), is applicable to all DUT leads except RF Ground. Applicable over the frequency range 0,25 MHz to 500 MHz, the method can be used to predict the compatibility in the vehicle environment with respect to radiated and conducted RF energy, including conducted transient RF energy, and is especially useful as a means of isolating the susceptible circuits within a DUT and evaluating potential solutions.

[ISO 11452-8:2007](#)

Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 8: Immunity to magnetic fields

ISO 11452-8:2007 specifies tests for the electromagnetic immunity of electronic components for passenger cars and commercial vehicles, regardless of the propulsion system (e.g. spark-ignition engine, diesel engine, electric motor), to magnetic fields generated by power transmission lines and generating stations and some powerful electrical equipment, such as motors. To perform this test, the device under test (DUT) is exposed to a magnetic disturbance field.

The radiating loop method can be applied to small DUTs or to larger DUTs by positioning the coil in multiple locations.

The Helmholtz coil is sometimes used as an alternative method. This technique is limited by the relationship between the size of the DUT and the size of the coils.

The electromagnetic disturbances considered in ISO 11452-8:2007 are limited to continuous narrowband electromagnetic fields.

Immunity measurements of complete vehicles can generally only be carried out by the vehicle manufacturer for reasons including the high cost of an absorber-lined shielded enclosure preserving the secrecy of prototypes or the large number of different vehicle models. Specifies general definitions for low-speed serial data communication up to 125 kbit/s for road vehicle applications. The object is to define the general architecture of the communication network and the content of the data link layer and the physical layer for transmission between the different types of electronic modules on board road vehicles. Parts 2, 3 and 4 are entirely independent.

[ISO 11519-1:1994](#)

Road vehicles -- Low-speed serial data communication -- Part 1: General and definitions

All standards_detailed

ISO 11519-3:1994	Road vehicles -- Low-speed serial data communication -- Part 3: Vehicle area network (VAN)	Specifies the data link layer and the physical layer of the VAN, a communications network up to 125 kbit/s, for road vehicle application. The VAN is an access-method oriented multimaster-multislave which allows optimized request/response management by special method of handling a remote transmission request (retaining access to the medium to allow insertion of a response). Defines the general architecture of the network and the content of the data link layer, and the physical layer for transmission between different types of electronic modules on board road vehicles.
ISO 11519-3:1994/Amd 1:1995		Inserts a new page v and a new introduction. Adds, on page 79, a new clause before clause 8.
ISO 11748-1:2001	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 1: Content of exchanged documents	
ISO 11748-2:2001	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 2: Documentation agreement	
ISO 11748-3:2002	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 3: Application example	This part of ISO 11748 provides an application example of the guidelines and specifications for technical documentation given in ISO 11748-1 and ISO 11748-2. The example is based on the standard generalized markup language (SGML), which is specified in ISO 8879.

ISO 11898-1:2003	Road vehicles -- Controller area network (CAN) -- Part 1: Data link layer and physical signalling	ISO 11898-1:2003 specifies the data link layer (DLL) and physical signalling of the controller area network (CAN): a serial communication protocol that supports distributed real-time control and multiplexing for use within road vehicles. While describing the general architecture of CAN in terms of hierarchical layers according to the ISO reference model for open systems interconnection (OSI) established in ISO/IEC 7498-1, it provides the characteristics for setting up an interchange of digital information between modules implementing the CAN DLL -- itself specified according to ISO/IEC 8802-2 and ISO/IEC 8802-3 -- with detailed specification of the logical link control (LLC) sublayer and medium access control (MAC) sublayer.
ISO 11898-1:2003/Cor 1:2006 ISO 11898-2:2003	Road vehicles -- Controller area network (CAN) -- Part 2: High-speed medium access unit	ISO 11898-2:2003 specifies the high-speed (transmission rates of up to 1 Mbit/s) medium access unit (MAU), and some medium dependent interface (MDI) features (according to ISO 8802-3), which comprise the physical layer of the controller area network (CAN): a serial communication protocol that supports distributed real-time control and multiplexing for use within road vehicles.
ISO 11898-3:2006	Road vehicles -- Controller area network (CAN) -- Part 3: Low-speed, fault-tolerant, medium-dependent interface	ISO 11898-3:2006 specifies characteristics of setting up an interchange of digital information between electronic control units of road vehicles equipped with the controller area network (CAN) at transmission rates above 40 kBit/s up to 125 kBit/s. The CAN is a serial communication protocol which supports distributed control and multiplexing.
ISO 11898-3:2006/Cor 1:2006		

[ISO 11898-4:2004](#)

Road vehicles -- Controller area network (CAN) -- Part 4: Time-triggered communication

ISO 11898-4:2004 specifies time-triggered communication in the controller area network (CAN): a serial communication protocol that supports distributed real-time control and multiplexing for use within road vehicles. It is applicable to setting up a time-triggered interchange of digital information between electronic control units (ECU) of road vehicles equipped with CAN, and specifies the frame synchronisation entity that coordinates the operation of both logical link and media access controls in accordance with ISO 11898-1, to provide the time-triggered communication schedule.

[ISO 11898-5:2007](#)

Road vehicles -- Controller area network (CAN) -- Part 5: High-speed medium access unit with low-power mode

ISO 11898-5:2007 specifies the CAN physical layer for transmission rates up to 1 Mbit/s for use within road vehicles. It describes the medium access unit functions as well as some medium dependent interface features according to ISO 8802-2.

ISO 11898-5:2007 represents an extension of ISO 11898-2, dealing with new functionality for systems requiring low-power consumption features while there is no active bus communication.

Physical layer implementations according to ISO 11898-5:2007 are compliant with all parameters of ISO 11898-2, but are defined differently within ISO 11898-5:2007. Implementations according to ISO 11898-5:2007 and ISO 11898-2 are interoperable and can be used at the same time within one network.

[ISO 11992-1:2003](#)

Road vehicles -- Interchange of digital information on electrical connections between towing and towed vehicles -- Part 1: Physical and data-link layers

ISO 11992-1:2003 specifies the interchange of digital information between road vehicles with a maximum authorized total mass greater than 3 500 kg, and towed vehicles, including communication between towed vehicles in terms of parameters and requirements of the physical and data link layer of the electrical connection used to connect the electrical and electronic systems. It also includes conformance tests of the physical layer.

ISO 11992-2:2003	Road vehicles -- Interchange of digital information on electrical connections between towing and towed vehicles -- Part 2: Application layer for brakes and running gear	ISO 11992-2:2003 specifies the parameters and messages for electronically controlled braking systems, including ABS (anti-lock braking systems) and for running gear equipment (i.e. systems for steering, suspension and tyres), to ensure the interchange of digital information between road vehicles with a maximum authorized total mass greater than 3 500 kg, and their towed vehicles, including communication between towed vehicles. The objective of the data structure is to optimize the use of the interface, while preserving a sufficient reserve capacity for future expansion.
ISO 11992-2:2003/Amd 1:2007 ISO 11992-3:2003	Road vehicles -- Interchange of digital information on electrical connections between towing and towed vehicles -- Part 3: Application layer for equipment other than brakes and running gear	ISO 11992-3:2002 specifies the parameters and messages for electronically controlled braking systems other than systems for braking and running gear (i.e. steering, suspension and tyres), to ensure the interchange of digital information between road vehicles with a maximum authorized total mass greater than 3 500 kg and their towed vehicles, including communication between towed vehicles.
ISO 11992-3:2003/Amd 1:2008 ISO 11992-4:2005	Road vehicles -- Interchange of digital information on electrical connections between towing and towed vehicles -- Part 4: Diagnostics	ISO 11992-4:2005 specifies the data communication for diagnostic purposes on a serial data link between a road vehicle and its towed vehicle(s). ISO 11992-4:2005 is applicable to road vehicles of a maximum authorized total mass greater than 3 500 kg.
ISO 11992-4:2005/Cor 1:2006 ISO 12098:2004	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- 15-pole connector for vehicles with 24 V nominal supply voltage	ISO 12098:2004 gives the dimensions of, and specifies the contact allocation and tests and test requirements for, connectors for the electrical connection of equipment other than braking systems and running gear of towing and towed vehicles with 24 V nominal supply voltage. In addition, it specifies a park socket used to receive and store the plug when disconnected, and a means of adaptation between 7-pole and 15-pole connectors.

All standards_detailed

ISO/TR 12155:1994	Commercial vehicles -- Obstacle detection device during reversing -- Requirements and tests	Specifies requirements and tests for detection devices which indicate to the driver of a commercial road vehicle, when he is reversing, the presence of objects which are within the monitoring range of the device. Applies to detection devices with non-contact sensors which can be fitted on commercial vehicles to improve safety during manoeuvring at a speed of up to 5 km/h, but they do not relieve the driver of his special responsibility when reversing.
ISO/TR 12343:1997	Road vehicles -- Symbols for electrotechnical diagrams	
ISO 14229-1:2006	Road vehicles -- Unified diagnostic services (UDS) -- Part 1: Specification and requirements	ISO 14229:2006 specifies data link independent requirements of diagnostic services, which allow a diagnostic tester (client) to control diagnostic functions in an on-vehicle Electronic Control Unit (server) such as an electronic fuel injection, automatic gear box, anti-lock braking system, etc. connected on a serial data link embedded in a road vehicle. It specifies generic services, which allow the diagnostic tester (client) to stop or to resume non-diagnostic message transmission on the data link. ISO 14229:2006 does not apply to non-diagnostic message transmission, or to use of the communication data link between two Electronic Control Units. It does not specify any implementation requirements. The vehicle diagnostic architecture of ISO 14229:2006 applies to a single tester (client) that may be temporarily or permanently connected to the on-vehicle diagnostic data link and several on-vehicle Electronic Control Units (servers) connected directly or indirectly.
ISO 14230-1:1999	Road vehicles -- Diagnostic systems -- Keyword Protocol 2000 -- Part 1: Physical layer	
ISO 14230-2:1999	Road vehicles -- Diagnostic systems -- Keyword Protocol 2000 -- Part 2: Data link layer	
ISO 14230-3:1999	Road vehicles -- Diagnostic systems -- Keyword Protocol 2000 -- Part 3: Application layer	

All standards_detailed

ISO 14230-4:2000	Road vehicles -- Diagnostic systems -- Keyword Protocol 2000 -- Part 4: Requirements for emission-related systems	
ISO 14572:2006	Road vehicles -- Round, screened and unscreened 60 V and 600 V multi-core sheathed cables -- Test methods and requirements for basic and high-performance cables	ISO 14572:2006 specifies test methods and requirements for basic and high-performance round, screened and unscreened, multi-core sheathed cables, intended for use in road vehicle applications. The unscreened, single-core cables must be in accordance with ISO 6722. Other cores may be used but, in these cases, the construction and tests required to ensure functionality of these cores must be agreed between the customer and supplier. See ISO 6722 for temperature classes.
ISO 14572:2001	Road vehicles -- Round, unscreened 60 V and 600 V multicore sheathed cables -- Test methods and requirements for basic and high performance cables	
ISO 15031-1:2001	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 1: General information	
ISO/TR 15031-2:2004	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 2: Terms, definitions, abbreviations and acronyms	ISO/TR 15031-2 is a guide to terms, definitions, abbreviations and acronyms used in emissions-related diagnostics, with respect to the communication between road vehicles and external equipment used in that field. It also specifies a procedure for constructing new terms. As it gives recommended usage of diagnostic terms applicable to electrical/electronic systems, it also makes reference to related mechanical terms, definitions, abbreviations, and acronyms.

ISO 15031-3:2004	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 3: Diagnostic connector and related electrical circuits, specification and use	ISO 15031-3:2004 specifies a minimum set of requirements for a diagnostic connector used in communication between vehicle and external test equipment for emissions-related diagnostics. Its aim is to promote the use of a common diagnostic connector throughout the motor vehicle industry. The diagnostic connection consists of two mating connectors, the vehicle connector and the external test equipment connector. Applicable to all types of road vehicles, the connector specified has no positive locking feature and is intended for short-term diagnostic connection only.
ISO 15031-4:2005	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 4: External test equipment	ISO 15031-4:2005 specifies: a means of establishing communications between an OBD-equipped vehicle and external test equipment, a set of diagnostic services to be provided by the external test equipment in order to exercise the services defined in ISO 15031-5, conformance criteria for the external test equipment.
ISO 15031-5:2006	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 5: Emissions-related diagnostic services	ISO 15031-5:2006 specifies diagnostic services and functionally addressed request/response messages required to be supported by motor vehicles and external test equipment for diagnostic purposes which pertain to motor vehicle emission-related data. Any external test equipment meeting the requirements of ISO 15031-4 use these messages to retrieve emissions-related information from the vehicle. Each section of ISO 15031-5:2006, which specifies additional detail to existing sections of ISO 9141-2, ISO 14230-4, SAE J1850, and ISO 15765-4, supersedes those specifications.
ISO 15031-6:2005	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 6: Diagnostic trouble code definitions	ISO 15031-6:2005 provides recommended uniformity for alphanumeric trouble codes. It further provides guidance for uniform messages associated with these codes. ISO 15031-6:2005 specifies several sections addressing format, structure, messages, and a few examples, and is applicable to electrical/electronic systems diagnostics of motor vehicles.

All standards_detailed

[ISO 15031-7:2001](#) Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 7: Data link security

[ISO 15170-1:2001](#) Road vehicles -- Four-pole electrical connectors with pins and twist lock -- Part 1: Dimensions and classes of application

[ISO 15170-2:2001](#) Road vehicles -- Four-pole electrical connectors with pins and twist lock -- Part 2: Tests and requirements

[ISO/TR 15497:2000](#) Road vehicles -- Development guidelines for vehicle based software

[ISO 15764:2004](#) Road vehicles -- Extended data link security

ISO 15764:2004 describes an extension of data link protocols for enhancing the security of data transfers between electronic control units (ECUs) connected by a communication network used in road vehicles. It is based on cryptographic methods that include encryption, digital signatures and message authentication codes (MACs). It provides a description of services to establish ECUs as trusted parties in respect of one another and to protect against specific threats. It is applicable to all data links between pairs of ECUs capable of storing and processing secret data so that unauthorised third parties are denied access to it. Parameters are provided to enable the level of security in the data link to be selected.

[ISO 15765-1:2004](#) Road vehicles -- Diagnostics on Controller Area Networks (CAN) -- Part 1: General information

ISO 15765-1:2004 gives an overview of the structure and the partitioning of ISO 15765, and shows the relation between the different parts. It also defines the diagnostic network architecture. The terminology defined in ISO 15765-1:2004 is common for all diagnostic networks and is used throughout all parts of ISO 15765.

All standards_detailed

ISO 15765-2:2004	Road vehicles -- Diagnostics on Controller Area Networks (CAN) -- Part 2: Network layer services	ISO 15765-2:2004 specifies a network protocol tailored to meet the requirements of CAN-based vehicle network systems on controller area networks as specified in ISO 11898. It has been defined in accordance with the diagnostic services established in ISO 14229-1 and ISO 15031-5, but is not limited to use with them, and is also compatible with most other communication needs for in-vehicle networks. The protocol specifies an unconfirmed communication.
ISO 15765-3:2004	Road vehicles -- Diagnostics on Controller Area Networks (CAN) -- Part 3: Implementation of unified diagnostic services (UDS on CAN)	ISO 15765-3:2004 specifies the implementation of a common set of unified diagnostic services (UDS), in accordance with ISO 14229-1, on controller area networks (CAN) as specified in ISO 11898. It gives the diagnostic services and server memory programming requirements for all in-vehicle servers connected to a CAN network and external test equipment. It does not specify any requirement for the in-vehicle CAN bus architecture.
ISO 15765-4:2005	Road vehicles -- Diagnostics on Controller Area Networks (CAN) -- Part 4: Requirements for emissions-related systems	ISO 15765-4:2005 specifies requirements for the emissions-related systems of legislated OBD-compliant controller area networks (CAN), such communications networks consisting of a road vehicle equipped with a single or multiple emissions-related ECUs and external test equipment. It is based on the specifications of ISO 15765-2, ISO 11898-1 and ISO 11898-2, while placing restrictions on those standards for legislated-OBD purposes. It does not specify in-vehicle CAN bus architecture. Legislated OBD-compliant vehicles are to comply with external test equipment requirements.
ISO/TS 16553:2006	Road vehicles -- Data cables -- Test methods and requirements	ISO TS 16553:2006 specifies test methods, requirements for screened and unscreened, and sheathed and unsheathed twisted pair data cables, and coaxial cables intended for use in road vehicle applications.

All standards_detailed

[ISO 16750-1:2006](#)

Road vehicles -- Environmental conditions and testing for electrical and electronic equipment -- Part 1: General

ISO 16750-1:2006 applies to electric and electronic systems/components for vehicles. It describes the potential environmental stresses and specifies tests and requirements recommended for the specific mounting location on/in the vehicle.

ISO 16750-1:2006 contains definitions and general notes. Electromagnetic compatibility (EMC) is not covered by ISO 16750.

[ISO 16750-2:2006](#)

Road vehicles -- Environmental conditions and testing for electrical and electronic equipment -- Part 2: Electrical loads

[ISO 16750-3:2007](#)

Road vehicles -- Environmental conditions and testing for electrical and electronic equipment -- Part 3: Mechanical loads

ISO 16750-3:2007 applies to electric and electronic systems/components for road vehicles. ISO 16750-3:2007 describes the potential environmental stresses, and specifies tests and requirements recommended for the specific mounting location on/in the vehicle.

ISO 16750-3:2007 describes the mechanical loads.

[ISO 16750-4:2006](#)

Road vehicles -- Environmental conditions and testing for electrical and electronic equipment -- Part 4: Climatic loads

ISO 16750 applies to electric and electronic systems/components for road vehicles. It describes the potential environmental stresses and specifies tests and requirements recommended for the specific mounting location on/in the vehicle.

ISO 16750-4:2006 describes the climatic loads.

[ISO 16750-5:2003](#)

Road vehicles -- Environmental conditions and testing for electrical and electronic equipment -- Part 5: Chemical loads

ISO 16750-5:2003 specifies chemical loads and corresponding tests and requirements for the mounting of electric and electronic systems and components on road vehicles. It is applicable to environmental conditions and tests affecting electrical and electronic equipment mounted directly on or in the vehicle. It does not cover electromagnetic compatibility (EMC).

All standards_detailed

ISO 16844-1:2001	Road vehicles -- Tachograph systems -- Part 1: Electrical connectors	
ISO 16844-1:2001/Cor 1:2005		
ISO 16844-2:2004	Road vehicles -- Tachograph systems -- Part 2: Recording unit, electrical interface	ISO 16844-2:2004 specifies the electrical connection between the recording unit, and the vehicle network and motion sensor, in tachograph systems used in road vehicles.
ISO 16844-3:2004	Road vehicles -- Tachograph systems -- Part 3: Motion sensor interface	ISO 16844-3:2004 specifies the physical and data link layers of the electrical interface connecting a motion sensor to a vehicle unit, used in tachograph systems in road vehicles to perform speed signal transmission and data interchange.
ISO 16844-3:2004/Cor 1:2006		
ISO 16844-4:2004	Road vehicles -- Tachograph systems -- Part 4: CAN interface	ISO 16844-4:2004 specifies the CAN (controller area network) interface for the interchange -- performed in accordance ISO 16844-6 -- of digital information between a road vehicle's tachograph system and vehicle units, and within the tachograph system itself. It specifies parameters of, and requirements for, the physical and data link layers of the electrical connection used in the electronic systems.
ISO 16844-5:2004	Road vehicles -- Tachograph systems -- Part 5: Secured CAN interface	ISO 16844-5:2004 specifies the secured interchange of digital information between a road vehicle's tachograph system and vehicle units, and within the tachograph system itself. This type of interchange will be used for CAN communication or diagnostic services on CAN (controller area network), where there is need to protect interchanged parameters against fraud.
ISO 16844-6:2004	Road vehicles -- Tachograph systems -- Part 6: Diagnostics	ISO 16844-6:2004 specifies diagnostic communication and services in tachograph systems used in road vehicles, for both the CAN and K-line communication modes. It is also applicable for programming purposes.

All standards_detailed

ISO 16844-7:2004	Road vehicles -- Controller area network (CAN) -- Conformance test plan	ISO 16844-7:2004 specifies the parameters used in the interchange of digital information between a road vehicle's tachograph system and vehicle units or a diagnostic tester, or within the tachograph system itself. The parameters are applicable for real time communication and/or diagnostic services.
ISO 16845:2004	Road vehicles -- Controller area network (CAN) -- Conformance test plan	ISO 16845:2004 provides the methodology and abstract test suite necessary for checking the conformance of any CAN implementation of the CAN specified in ISO 11898-1.
ISO 17356-1:2005	Road vehicles -- Open interface for embedded automotive applications -- Part 1: General structure and terms, definitions and abbreviated terms	ISO 17356-1:2005 outlines the general structure of, and defines terms and abbreviations used in relation to, the specification of the software open interface for embedded automotive applications given by the other parts of ISO 17356.
ISO 17356-2:2005	Road vehicles -- Open interface for embedded automotive applications -- Part 2: OSEK/VDX specifications for binding OS, COM and NM	ISO 17356-2:2005 gives the OSEK/VDX specifications for binding the OS (operating system), COM (communications) and NM (network management) of the open interface for embedded automotive applications. It specifies the variables (error codes, status types, etc.) programmable by the user to ensure that implementation of OS, COM and NM are coherent between each other.

[ISO 17356-3:2005](#)

Road vehicles -- Open interface for embedded automotive applications -- Part 3: OSEK/VDX Operating System (OS)

ISO 17356-3:2005 describes the concept of a real-time operating system, capable of multitasking, which can be used for motor vehicles. It is not a product description which relates to a specific implementation. It also specifies the operating system Application Program Interface (API).

General conventions, explanations of terms and abbreviations have been compiled in ISO 17356-1. ISO 17356-6 discusses implementation and system generation aspects.

The specification of the OS represents a uniform environment which supports efficient utilisation of resources for automotive control unit application software. The OS is a single processor operating system meant for distributed embedded control units.

[ISO 17356-4:2005](#)

Road vehicles -- Open interface for embedded automotive applications -- Part 4: OSEK/VDX Communication (COM)

ISO 17356-4:2005 (COM) specifies a uniform communication environment for automotive control unit (ECU) application software.

In ISO 17356-4:2005 , the specification increases the portability of application software modules by defining common software communication interfaces and behaviours for internal communication (communication within an ECU) and external communication (communication between networked vehicle nodes), which is independent of the used communication protocol.

All standards_detailed

[ISO 17356-5:2006](#)

Road vehicles -- Open interface for embedded automotive applications -- Part 5: OSEK/VDX Network Management (NM)

ISO 17356-5:2006 defines a set of services for node monitoring (NM). NM consists of the following:

interface to interact with the Application Programming Interface(API);
algorithm for node monitoring;
internal interfaces (NM <-> COM, etc.);
algorithm for transition into sleep mode; and
NM protocol data unit (NMPDU).

[ISO 17356-6:2006](#)

Road vehicles -- Open interface for embedded automotive applications -- Part 6: OSEK/VDX Implementation Language (OIL)

ISO 17356-6:2006 describes the OSEK Implementation Language (OIL) concept for the description for ISO 17356 real-time systems, capable of multitasking and communications, which can be used for motor vehicles. It is not a product description that relates to a specific implementation.

[ISO 19072-1:2007](#)

Road vehicles -- Connection interface for pyrotechnic devices, two-way and three-way connections -- Part 1: Pocket interface definition

ISO 19072-1:2007 defines a common specification of the pyrotechnic device pocket interface. It also defines a sealed variant of the design.

[ISO 19072-2:2007](#)

Road vehicles -- Connection interface for pyrotechnic devices, two-way and three-way connections -- Part 2: Test methods and general performance requirements

ISO 19072-2:2007 defines the performance criteria and requirements of a three-way connection interface, including ground connection, linking the pyrotechnic device and harness connector built into a road vehicle.

Performance criteria and requirements are also defined for a sealed variant of the pyrotechnic device/initiator harness connector assembly, and for a two-way (without ground) variant of the pyrotechnic device/initiator harness connector assembly.

All standards_detailed

[ISO/TS 19072-3:2008](#) Road vehicles -- Connection interface for pyrotechnic devices, two-way and three-way connections -- Part 3: Pyrotechnic device and harness connector assembly - type 1

ISO/TS 19072-3:2008 defines the general minimum specifications of a type 1 three-way connection interface, including ground connection, linking the pyrotechnic device and harness connector built into a road vehicle.

A two-way without ground variant of the pyrotechnic device/initiator harness connector assembly is also defined. All requirements apply also to the two-way design, excepted all items related to ground connection.

[ISO 20653:2006](#) Road vehicles -- Degrees of protection (IP-Code) -- Protection of electrical equipment against foreign objects, water and access

ISO 20653:2006 applies to degrees of protection (IP-Code) provided by enclosures of the electrical equipment of road vehicles. It specifies the following:

Designations and definitions of types and degrees of protection provided by enclosures of electrical equipment (IP-Codes) for the: protection of electrical equipment within the enclosure against ingress of foreign objects, including dust (protection against foreign objects); protection of electrical equipment inside the enclosure against effects due to ingress of water (protection against water); protection of persons against access to hazardous parts inside the enclosure (protection against access); Requirements for each degree of protection; Tests to be carried out in order to confirm that the enclosure complies with requirements of the relevant degree of protection.

[ISO 20828:2006](#)

Road vehicles -- Security certificate management

ISO 20828:2006 establishes a uniform practice for the issuing and management of security certificates for use in Public Key Infrastructure applications. Assuming that all entities, intending to set up a secure data exchange to other entities based on private and public keys, are able to provide their own certificate, the certificate management scheme guarantees that the entities get all additional information needed to establish trust to other entities, from a single source in a simple and unified format. The certificate management is flexible with respect to the relations between Certification Authorities, not requesting any hierarchical structure. It does not prescribe centralized directories or the like, being accessible by all entities involved. With these properties the management scheme is optimised for applications in the automotive domain.

ISO 20828:2006 details the role and responsibilities of the Certification Authority relating to certificate issuing and distribution. It specifies how to handle certificate validity and certificate policies. This is the prerequisite for each entity to make sure it can actually trust. ISO 21609:2003 gives requirements and recommendations for the installation in road vehicles of radio frequency transmitting and receiving equipment, "in-road-vehicle" mounting kits for transportable and handheld RF equipment, and ancillary equipment associated with these. As well as methods for installation, it establishes methods for minimizing the possibility of electromagnetic interference (EMI) between the installed equipment and the vehicle electrical and electronic systems.

[ISO/TS 21609:2003](#)

Road vehicles -- (EMC) guidelines for installation of aftermarket radio frequency transmitting equipment

All standards_detailed

[ISO 21848:2005](#)

Road vehicles -- Electrical and electronic equipment for a supply voltage of 42 V -- Electrical loads

ISO 21848:2005 describes the electrical loads that can affect electric and electronic systems and components of road vehicles for a supply voltage of 42 V which may be used in a multiple voltage electrical system.

In addition it specifies the tests and resulting requirements, test equipment accuracy being agreed upon between the vehicle manufacturer and the supplier.

This International Standard also provides design guidance for the interaction of 42 V with other system voltages.

[ISO 22896:2006](#)

Road vehicles -- Deployment and sensor bus for occupant safety systems

ISO 22896:2006 is a specification of a serial communications bus protocol for automotive occupant restraint systems. It covers Physical Layer and Data Link Layer and those parts of the Application Layer that are not supplier-specific.

[ISO 22900-1:2008](#)

Road vehicles -- Modular vehicle communication interface (MVCI) -- Part 1: Hardware design requirements

ISO 22900-1:2008 provides the framework to allow diagnostic and reprogramming software applications from all vehicle manufacturers the flexibility to work with multiple vehicle communication interfaces (VCI) from multiple tool suppliers. This system enables each vehicle manufacturer to support all vehicle communication interfaces to perform diagnostics and to control the programming sequence for electronic control units (ECUs) in their vehicles.

ISO 22900-1:2008 describes the applicable use cases to justify the benefits of ISO 22900. It also specifies the design requirements to be followed by diagnostic and programming vehicle communication interface designers. The design requirements are categorized into different levels of conformance classes to provide:

“software compliance”, a set of requirements for existing VCIs, which are software but not hardware compliant;
“electrical compliance”, defining all signals and electrical interfaces that allow a system integrator to connect more than one VCI Protocol Module to the vehicle diagnostic connector and the host system;
“mechanical compliance”, defining standard connectors on the VCI Pr

All standards_detailed

[ISO 22901-1:2008](#)

Road vehicles -- Open diagnostic data exchange (ODX) -- Part 1: Data model specification

ISO 22901-1:2008 specifies the concept of using a new industry standard diagnostic format to make diagnostic data stream information available to diagnostic tool application manufacturers, in order to simplify the support of the aftermarket automotive service industry. The Open Diagnostic Data Exchange (ODX) modelled diagnostic data are compatible with the software requirements of the Modular Vehicle Communication Interface (MVCI), as specified in ISO 22900-2 and ISO 22900-3. The ODX modelled diagnostic data will enable an MVCI device to communicate with the vehicle Electronic Control Unit(s) (ECU) and interpret the diagnostic data contained in the messages exchanged between the external test equipment and the ECU(s). For ODX compliant external test equipment, no software programming is necessary to convert diagnostic data into technician readable information to be displayed by the tester.

[ISO 22902-1:2006](#)

Road vehicles -- Automotive multimedia interface -
- Part 1: General technical overview

The ODX specification contains the data model to describe all diagnostic data of a vehicle and physical ECU, e.g. diagnostic ISO 22902-1:2006 is based on the AMI-C specifications and reference documents for the automotive industry.

It is established to facilitate the development, promotion and standardization of automotive information and entertainment system interfaces to motor vehicle communication networks.

The technical glossary is a compilation of terms and definitions used in AMI-C technical publications.

The user guide describes the organization, classification and scope of the reference information for ISO documents.

The architectural overview describes the structural, functional and applications views of the AMI-C architecture.

All standards_detailed

[ISO 22902-2:2006](#)

Road vehicles -- Automotive multimedia interface -
- Part 2: Use cases

ISO 22902-2 is a representative example of possible customer experiences in terms of in-vehicle multimedia functions and features. These functions and features will be enabled by implementations of foreseeable technologies.

It covers representative use cases in categories of commerce (abbreviated as COMM), customer relationship management (CUST), emergency (EMER), entertainment (ENTE), fleet management (FLEE), guidance (GUID), home automation (HOME), information (INFO), messaging (MESS), mobile devices (MOBI), customer preferences (PREF), productivity (PROD), security (SECU), service and maintenance (SERV), user interface (USER), safety (SAFE), Bluetooth (BLUE), intelligent transportation systems (ITS) and combination use cases (COMB).

[ISO 22902-3:2006](#)

Road vehicles -- Automotive multimedia interface -
- Part 3: System requirements

ISO 22902-3:2006 captures system-level requirements and defines the expected functional and physical capabilities of an AMI-C system.

[ISO 22902-4:2006](#)

Road vehicles -- Automotive multimedia interface -
- Part 4: Network protocol requirements for vehicle
interface access

ISO 22902-4:2006 provides a communication model that contains the requirements for a Vehicle Interface Protocol (VIP) to access a vehicle interface over a network transport protocol for AMI-C networks. It does not apply to networks that have pre-existing protocols and messages for transporting vehicle functions.

A VIP defines how an application communicates over a simple network transport mechanism. These requirements can be applied to network technologies that use UDP/IP as the transport method. However, pre-existing systems may have unique protocols and messages for transporting messages about vehicle functions; therefore, ISO 22902-4:2006 does not cover such pre-existing technology.

Messages transported are network-specific instantiations of the CMS.

ISO 22902-4:2006 addresses the following aspects related to the AMI-C's approach to network communication:

Message frame format,
Application transaction,
System transaction,
Initialization process,
Address resolution, and
Functional module discovery and removal process.

[ISO 22902-5:2006](#)

Road vehicles -- Automotive multimedia interface -
- Part 5: Common message set

ISO 22902-5:2006 covers the following aspects of a Common Message Set:

the Common Message Set definition,
ASN.1 format for the Common Message Set, and
standardized descriptions of the selected functions in a network independent message format.

All standards_detailed

ISO 22902-6:2006	Road vehicles -- Automotive multimedia interface - - Part 6: Vehicle interface requirements	ISO 22902-6:2006 defines the services provided by the vehicle interface. Those services are implemented in an "AMI-C" system in one or both of two ways: 1) as messages on a multimedia network, and 2) as Java Classes in the vehicle interface API (Application Programming Interface). These are described in separate specifications.
ISO 22902-7:2006	Road vehicles -- Automotive multimedia interface - - Part 7: Physical specification	The scope of ISO 22902-7:2006 is limited to conditions and testing at the equipment level; it does not include all conditions and testing necessary for complete verification and validation of the vehicle system. Environmental and reliability testing at lower and higher levels are required to ensure that vehicle quality and reliability objectives are met.
ISO 25981:2008	Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- Connectors for electronically monitored charging systems with 12 V or 24 V nominal supply voltage	ISO 25981:2008 specifies dimensional characteristics, contact allocation, tests and requirements of 7-pole connectors for electrical connections of electronically monitored charging systems of towing and towed vehicles. The electronic monitoring system is designed to detect 12 V and 24 V nominal supply voltage and to limit the current to 50 A. This is a connector without breaking capacity. This electrical connection is intended for use with separable truck-trailer combinations in order to connect an additional battery pack of the trailer with the generator of the truck using an electronically monitored charging system. Additional battery packs in trailers are basically used with tailgate lifts, electrical forklifts or other technical equipment with high current consumption. ISO 25981:2008 further specifies a park socket used to receive and store the plug when it is disconnected.
ISO 25981:2008/Cor 1:2008		

All standards_detailed

[ISO 26021-1:2008](#)

Road vehicles -- End-of-life activation of on-board pyrotechnic devices -- Part 1: General information and use case definitions

ISO 26021-1:2008 gives an overview of the structure of ISO 26021 and the way it has been divided into parts, as well as showing the relationship between the parts. In addition, it outlines the use case scenarios in which the ISO 26021 document set will be used. It also defines terminology that is used throughout the ISO 26021 document set.

[ISO 26021-2:2008](#)

Road vehicles -- End-of-life activation of on-board pyrotechnic devices -- Part 2: Communication requirements

ISO 26021-2:2008 defines the deployment process, the system architecture, CAN-based communication methods and system preconditions which have to be implemented to fulfil the use cases defined in ISO 26021•1. Additionally, the relationship to and use with other existing standards are defined.

It also describes the technical details of the on-board deployment method. The way in which the pyrotechnic devices contained in the vehicle function in conjunction with the PDT is the primary focus of the document. Under the provisions of the document, the design of the PDT or PCU can be implemented in accordance with specific functionality and hardware requirements.

This part of ISO 26021 specifies the access to the PCU. This includes communication as well as the logic sequences which are involved during the activation process.

[ISO 26021-2:2008/Cor 1:2009](#)

[ISO/PAS 27145-1:2006](#) Road vehicles -- Implementation of WWH-OBD communication requirements -- Part 1: General information and use case definition

ISO/PAS 27145 is intended to become the single communication standard for access to OBD-related information. To allow for a smooth migration from the existing communication standards to this future world-wide standardized communication standard, the initial communication concept will be based on CAN. In a second step, ISO/PAS 27145 will be extended to define the world-wide harmonized OBD communication standard based on existing industry communications standards (e.g. Internet Protocol) over Ethernet. Due to the usage of standard network layer protocols, future extensions to optional physical layers (e.g. wireless) are possible.

ISO/PAS 27145:2006 gives an overview of the structure and the partitioning of the different parts of ISO/PAS 27145, and shows the relation between the parts. In addition, it outlines the use case scenarios where the ISO/PAS 27145 document set will be used. All terminology that is common throughout the ISO/PAS 27145 document set is also outlined here.

[ISO/PAS 27145-2:2006](#) Road vehicles -- Implementation of WWH-OBD communication requirements -- Part 2: Common emissions-related data dictionary

ISO/PAS 27145-2:2006 defines all regulatory emissions-related data elements of ISO/PAS 27145. The data elements are used to provide the external test equipment with the diagnostic status of the emissions-related system in the vehicle. All data elements are communicated with the unified diagnostic services as defined in ISO/PAS 27145-3. Data elements are Diagnostic Trouble Codes (DTCs), Parameter Identifiers (PIDs), Monitor Identifiers (MIDs), Test Identifiers (TIDs)/Routine Identifiers (RIDs) and InfoType Identifiers (ITIDs).

[ISO/PAS 27145-3:2006](#) Road vehicles -- Implementation of WWH-OBD communication requirements -- Part 3: Common message dictionary

ISO/PAS 27145-3:2006 specifies the implementation of a subset of unified diagnostic services (UDS) as specified in ISO 14229-1. The diagnostic services are used to communicate all diagnostic data as defined in ISO/PAS 27145-3:2006.

[ISO/PAS 27145-4:2006](#) Road vehicles -- Implementation of WWH-OBD communication requirements -- Part 4: Connection between vehicle and test equipment

ISO/PAS 27145-4:2006 defines the requirements to successfully establish, maintain and terminate communication with a vehicle that implements the requirements of the WWH-OBD global technical regulation. This requires plug and play communication capabilities of the vehicle, as well as any test equipment that intends to establish communication with a vehicle. ISO/PAS 27145-4:2006 details all the OSI layer requirements to achieve this goal.

[SC 4](#)

Caravans and light trailers

[SC 5](#)

Engine tests

[SC 6](#)

Terms and definitions of dimensions and masses

[SC 7](#)

Injection equipment and filters for use on road vehicles

[SC 8](#)

Lighting and signalling

[SC 9](#)

Vehicle dynamics and road-holding ability

[SC 10](#)

Impact test procedures

[SC 11](#)

Safety glazing materials

[SC 12](#)

Passive safety crash protection systems

[SC 13](#)

Ergonomics applicable to road vehicles

[ISO 2575:2004](#)

Road vehicles -- Symbols for controls, indicators and tell-tales

ISO 2575:2004 establishes symbols (i.e. conventional signs) for use on controls, indicators and telltales applying to passenger cars, light and heavy commercial vehicles and buses, to ensure identification and facilitate use. It also indicates the colours of possible optical tell-tales, which inform the driver of either correct operation or malfunctioning of the related devices.

[ISO 2575:2004/Amd 1:2005](#)

[ISO 2575:2004/Amd 2:2006](#)

[ISO 2575:2004/Amd 3:2008](#)

[ISO 3409:1975](#)

Passenger cars -- Lateral spacing of foot controls

Establishes required characteristics concerning the positions and distances necessary to ensure sufficient lateral spacing for the operation of controls. Applies only to the accelerator, service brake, and clutch pedals for passenger cars and their derivatives. Two figures illustrate shapes and reference quantities of concern.

All standards_detailed

ISO 3958:1996	Passenger cars -- Driver hand-control reach	Specifies the boundaries of hand-reach of passenger car hand-control locations that can be reached by different proportions of male and female driver populations. Directs towards the initial design states of a new vehicle programme. Replaces the first edition.
ISO 4040:2001	Road vehicles -- Location of hand controls, indicators and tell-tales in motor vehicles	
ISO 6549:1999	Road vehicles -- Procedure for H- and R-point determination	
ISO/TR 9511:1991	Road vehicles -- Driver hand-control reach -- In-vehicle checking procedure	Defines a method for determination of the position of driver hand-controls in vehicles and for verification that the controls lie within the hand-reach envelopes. Applies for checking purposes in road vehicles using the actual dimensions of the vehicle. It refers directly to left-hand drive motor vehicles. Application to right-hand drive vehicles is assumed to be symmetrically opposite. The hand-reach envelopes are described in ISO 3958.
ISO/TS 12104:2003	Road vehicles -- Gearshift patterns -- Manual transmissions with power-assisted gearchange and automatic transmissions with manual-gearshift mode	ISO/TS 12104:2003 establishes the shift patterns for manual transmissions with power-assisted gear changes and automatic transmissions with manual-gearshift mode on road vehicles. It also specifies the location of the gear-select and manual-gearshift modes in relation to one another. It is applicable to road vehicles as defined in ISO 3833, excepting motorcycles. It is not applicable to manual transmissions having gearshift patterns without a +/- manual-gearshift mode, nor to displays or tell-tales.
ISO 12214:2002	Road vehicles -- Direction-of-motion stereotypes for automotive hand controls	This International Standard gives design recommendations and requirements for the direction-of-motion of hand controls found in passenger, multipurpose and commercial vehicles, and buses.

All standards_detailed

[ISO 15005:2002](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Dialogue management principles and compliance procedures

This International Standard presents ergonomic principles for the design of the dialogues that take place between the driver of a road vehicle and the vehicle's transport information and control systems (TICS) while the vehicle is in motion. It also specifies compliance verification conditions for the requirements related to these principles.

This International Standard is applicable to TICSs consisting of either single or multiple devices, which can be either independent or interconnected. It is not applicable to TICSs without dialogues, TICS failures or malfunctions, or controls or displays used for non-TICS functions.

[ISO 15006:2004](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle auditory presentation

ISO 15006:2004 establishes ergonomic specifications for the presentation of auditory information related to transport information and control systems (TICS) through speech or sounds. It is applicable only to the use of auditory displays when the vehicle is in motion. It presents a set of requirements and recommendations for in-vehicle auditory messages from TICS, and provides message characteristics and functional factors for maximizing message intelligibility and utility while helping prevent auditory or mental overload.

[ISO 15007-1:2002](#)

Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 1: Definitions and parameters

ISO/TS 15007-2:2001	Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 2: Equipment and procedures	This Technical Specification gives guidelines on equipment and procedures for analyzing driver visual behaviour, intended to enable assessors of Transport Information and Control Systems (TICS) to plan evaluation trials, specify (and install) data capture equipment, and analyse, interpret and report visual-behaviour metrics (standards of measurement). It is applicable to both road trials and simulated driving environments. It is not applicable to the assessment of head-up displays.
ISO 15008:2003	Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle visual presentation	ISO 15008:2003 gives minimum specifications for the image quality and legibility of displays containing dynamic (changeable) visual information presented to the driver of a road vehicle by an on-board transport information and control system (TICS) used while the vehicle is in motion. These specifications are intended to be independent of display technologies, while test methods and measurements for assessing compliance with them have been included where necessary. ISO 15008:2003 is applicable to mainly perceptual, and some basic cognitive, components of the visual information: these include character legibility and colour recognition. It is not applicable to other factors affecting performance and comfort such as coding, format and dialogue characteristics, nor to displays using the following: superimposed information on the external field (e.g. head-up displays), pictorial images (e.g. closed-circuit TV for reversing), maps and topographic representations (e.g. those for setting navigation systems), static information (e.g. control labels, telltales).

[ISO 16121-1:2005](#)

Road vehicles -- Ergonomic requirements for the driver's workplace in line-service buses -- Part 2: Visibility

ISO 16121-1:2005 applies to the driver's workplace in low-floor line-service buses designed for the carriage of passengers, comprising more than eight seats in addition to the driver's seat, and having a maximum weight exceeding five metric tonnes and an overall width exceeding 2,30 m.

It contains basic requirements for an ergonomic and comfortable seating position, which is essential to keep drivers in a good state of health. The dimensions and mounting positions of driver's seat, pedals and steering have to be carefully chosen, to enable drivers to sit in an ergonomic seating position, i.e. sitting at angles which comply with the given ranges of comfort and to allow some variation when seated.

[ISO 16121-2:2005](#)

Road vehicles -- Ergonomic requirements for the driver's workplace in line-service buses -- Part 3: Information devices and controls

ISO 16121-2:2005 applies to the driver's workplace in low-floor line-service buses designed for the carriage of passengers, comprising more than eight seats in addition to the driver's seat, and having a maximum weight exceeding five metric tonnes and an overall width exceeding 2,30 m.

ISO 16121-2:2005 gives the requirements for the driver's field of view to the area in front of the vehicle, to the entrance opposite the driver's seat and the interior compartment.

[ISO 16121-3:2005](#)

Road vehicles -- Ergonomic requirements for the driver's workplace in line-service buses -- Part 3: Information devices and controls

ISO 16121-3:2005 applies to the driver's workplace in low-floor buses designed for the carriage of passengers, comprising more than eight seats in addition to the driver's seat, and having a maximum weight exceeding five metric tons and a maximum width exceeding 2,30 m.

It gives the requirements for the location of information devices and controls.

All standards_detailed

ISO 16121-4:2005	Road vehicles -- Ergonomic requirements for the driver's workplace in line-service buses -- Part 4: Cabin environment	ISO 16121-4:2005 applies to the driver's workplace in low-floor line-service buses designed for the carriage of passengers, comprising more than eight seats in addition to the driver's seat, and having a maximum weight exceeding five metric tonnes and an overall width exceeding 2,30 m. It gives the minimum requirements for the cabin environment.
ISO/TR 16352:2005	Road vehicles -- Ergonomic aspects of in-vehicle presentation for transport information and control systems -- Warning systems	ISO/TR 16352:2005 provides a literature survey about the human-machine interface of warning systems in vehicles. It covers the experimental experiences about the efficiency and acceptance of different modalities and combinations of warnings, and the design of the sensorial, code and organizational parameters of visual, auditory and tactile warnings.
ISO 16673:2007	Road vehicles -- Ergonomic aspects of transport information and control systems -- Occlusion method to assess visual demand due to the use of in-vehicle systems	ISO 16673:2007 provides a procedure for measuring visual demand due to the use of visual or visual-manual interfaces accessible to the driver while the vehicle is in motion. It applies to both Original Equipment Manufacturer (OEM) and After-Market in-vehicle systems. It applies to both permanently installed and portable systems. It applies to any means of visual occlusion and is not dependent on one specific physical implementation.
ISO/TS 16951:2004	Road vehicles -- Ergonomic aspects of transport information and control systems (TICS) -- Procedures for determining priority of on-board messages presented to drivers	ISO/TS 16951:2004 provides formal procedures and two alternative methods for determining the priority of on-board messages presented to drivers of road vehicles by transport information and control systems (TICS), and other systems. It is applicable to the whole range of TICS in-vehicle messages, including traveller information, navigation, travel and traffic advisories, "yellow pages" information, warnings, systems status, emergency calling system information, and electronic toll/fee collection, as well as to messages from non-TICS sources such as telephone, warnings and telltales.

[ISO 17287:2003](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving

ISO 17287:2002 specifies a procedure for assessing whether specific TICS, or a combination of TICS with other in-vehicle systems, are suitable for use by drivers while driving. It addresses user-oriented TICS description and context of use, TICS task description and analysis, assessment process, and documentation.

The TICS description and context of use includes consideration of improper use, reasonably foreseeable misuse and TICS failure. The TICS description, analysis and assessment include a process for identifying and addressing suitability issues.

ISO 17287:2002 does not recommend specific variables for assessing suitability nor does it define criteria for establishing the suitability of use of a TICS Table while driving.

[ISO 20176:2006](#)

Road vehicles -- H-point machine (HPM II) -- Specifications and procedure for H-point determination

ISO 20176:2006 provides the specifications and procedures for using the H-point machine (HPM) to audit vehicle seating positions. The HPM is a physical tool used to establish key reference points and measurements in a vehicle. The H-point design tool (HPD) is a simplified CAD version of the HPM, which can be used in conjunction with the HPM to take the optional measurements specified in this document, or used independently during product design.

These H-point devices provide a method for reliable layout and measurement of occupant seating compartments and/or seats. ISO 20176:2006 specifies the procedures for using the H-point machine (HPM) to audit (verify) key reference points and measurements in a vehicle.

The devices are intended for application at designated seating positions. They are not to be construed as tools that measure or indicate occupant capabilities or comfort. They are not intended for use in defining or assessing temporary seating, such as folding jump seats.

[SC 14](#)

Exterior fittings

[SC 15](#)

[SC 16](#)

[SC 17](#)

[ISO 4513:2003](#)

Interchangeability of components of commercial vehicles and buses

Reduction of fire risks

Visibility

Road vehicles -- Visibility -- Method for establishment of eyellipses for driver's eye location

ISO 4513:2003 specifies a method for establishing an eyellipse for locating driver's eyes inside a road vehicle for the purpose of measuring the driver's field of view. Elliptical (eyellipse) models in both two and three dimensions are used to represent 95th and 99th percentiles of driver eye locations. Its procedures, which differ depending on the type of vehicle considered, are applicable to passenger cars (and light trucks), and to buses and heavy vehicles, as defined in ISO 3833. The statistical representation of the driver's eye locations it provides can be used as a design tool for passenger cars (V-points can be used in lieu of the complete eyellipse to standardize the driver's field of view for regulation purposes).

[ISO 7397-1:1993](#)

Passenger cars -- Verification of driver's direct field of view -- Part 1: Vehicle positioning for static measurement

Establishes the initial procedure for positioning of a passenger car relative to a three-dimensional reference system, as given in ISO 4130, for the purposes of static measurements on the vehicle. It enables verification of the driver's forward 180° field of view, however, the procedure shown may also be followed for checking other aspects of vehicle design.

[ISO 7397-2:1993](#)

Passenger cars -- Verification of driver's direct field of view -- Part 2: Test method

Specifies a test method for verifying the compliance of a passenger car (as defined in ISO 3833) with the requirements of EEC Directives 77/649 and 88/366 for the driver's 180° forward field of view.

[SC 19](#)

[SC 21](#)

[ISO 6469-1:2001](#)

[ISO 6469-2:2001](#)

Wheels

Electrically propelled road vehicles

Electric road vehicles -- Safety specifications -- Part 1: On-board electrical energy storage

Electric road vehicles -- Safety specifications -- Part 2: Functional safety means and protection against failures

All standards_detailed

[ISO 6469-3:2001](#)

Electric road vehicles -- Safety specifications --
Part 3: Protection of persons against electric
hazards

[ISO 8713:2005](#)

Electric road vehicles -- Vocabulary

ISO 8713:2005 establishes a vocabulary of terms used in International Standards generally in relation to electric road vehicles. It is not intended to give definitions of all parts within a vehicle, but focuses on terms specific to electric road vehicles. This International Standard specifies test procedures for measuring the reference energy consumption and reference range of purely electrically propelled passenger cars and commercial vehicles of a maximum authorized total mass of 3 500 kg and maximum speed greater than or equal to 70 km/h.

[ISO 8714:2002](#)

Electric road vehicles -- Reference energy
consumption and range -- Test procedures for
passenger cars and light commercial vehicles

[SC 22](#)

Motorcycles

[SC 23](#)

Mopeds

[SC 25](#)

Vehicles using gaseous fuels

[SC 26](#)

Accessibility of vehicles to the physically
handicapped

[TC 204](#)

Intelligent transport systems

[ISO 14813-1:2007](#) Intelligent transport systems -- Reference model architecture(s) for the ITS sector -- Part 1: ITS service domains, service groups and services

ISO 14813-1:2007 provides a definition of the primary services and application areas that can be provided to Intelligent Transport System (ITS) Users. Those with a common purpose can be collected together in ITS service domains, and within these there can be a number of ITS service groups for particular parts of the domain. ISO 14813-1:2007 identifies 11 service domains, within which numerous groups are then defined. Within this framework, there are varying levels of detail related to definition of different services. These details differ from nation to nation, depending on whether the specific national architecture building blocks are based directly upon services or on groups of functions. Thus, the intent is to address groups of services and the respective domains within which they fit. As these domains and service groups evolve over time, it is intended that this International Standard be revised to include them.

ISO 14813-1:2007 is applicable to the working groups of ISO TC 204 and other TCs which are developing International Standards for

[ISO/TR 14813-2:2000](#) Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 2: Core TICS reference architecture

[ISO/TR 14813-3:2000](#) Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 3: Example elaboration

[ISO/TR 14813-4:2000](#) Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 4: Reference model tutorial

[ISO/TR 14813-5:1999](#) Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 5: Requirements for architecture description in TICS standards

[ISO/TR 14813-6:2000](#) Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 6: Data presentation in ASN.1

[ISO 14814:2006](#)

Road transport and traffic telematics -- Automatic vehicle and equipment identification -- Reference architecture and terminology

ISO 14814:2006 establishes a common framework to achieve unambiguous identification in ITS/RTTT (Intelligent Transport Systems/Road Transport and Traffic Telematics) AVI/AEI (Automatic Vehicle Identification/Automatic Equipment Identification) applications.

This scheme and Reference Architecture Model is designed to be an "enabling" structure to allow interoperability between different commercial systems, and not prescriptive in determining any one system. It is not frequency- nor air interface protocol-specific, provides maximum interoperability, has a high population capability, and provides the possibility of upwards migration to more capable systems.

ISO 14814:2006 provides a reference structure which enables an unambiguous identification and also identifies the data construct as an ITS/RTTT message. The construct also identifies which ITS/RTTT data structure is contained in the message.

[ISO 14815:2005](#)

Road transport and traffic telematics -- Automatic vehicle and equipment identification -- System specifications

ISO 14815:2005 defines a generic Automatic Vehicle Identification/Automatic Equipment Identification (AVI/AEI) System specification for nominal AVI/AEI to provide an enabling International Standard, which, whilst allowing the system specifier to determine the performance levels and operating conditions, provides a framework for nominal interoperability.

[ISO 14816:2005](#)

Road transport and traffic telematics -- Automatic vehicle and equipment identification -- Numbering and data structure

ISO 14816:2005 establishes a common framework data structure for unambiguous identification in RTTT/ITS systems. It excludes any physical aspects such as interfaces. It is neither frequency- nor air interface protocol-specific.

Data elements that form part of transmission or storage protocols such as headers, frame markers and checksums are thus excluded.

The specifications for protecting against changes, classifying and qualifying security aspects of the data structure elements are not included within ISO 14816:2005.

The principles of data element structure and description determined in ISO/IEC 8824, ISO/IEC 8825-1 and ISO/IEC 8825-2 have been adopted to provide an interoperable architecture within a standard framework according to guidelines from ISO/TC 204 and CEN/TC 278.

ISO 14816:2005 defines data structures based on the ISO/IEC 8824-1 ASN.1 UNIVERSAL CLASS types that may be directly IMPORTED to other application standards that would need only subsets of the full APPLICATION CLASS types. These UNIVERSAL CLASS and APPLICATION CLASS types are uniquely defined as an

[ISO 14817:2002](#)

Transport information and control systems -- Requirements for an ITS/TICS central Data Registry and ITS/TICS Data Dictionaries

ISO 14817:2002 specifies the framework, formats, and procedures used to define information exchanges within the Intelligent Transport System/Transport Information and Control Systems (ITS/TICS) sector. It defines the content of the ITS/TICS central Data Registry and Data Dictionaries, the registration process to enter data concepts into the Data Registry. Throughout the text, the Data Registry should be taken to mean the ITS/TICS central Data Registry.

Specifically, ISO 14817:2002 specifies:

framework used to identify and define all information exchanges;
framework used to extend standardized information exchanges to support local customizations and combinations;
information modelling method for defining ITS/TICS data concepts, when used;
meta attributes used to describe, standardize and manage each of the data concepts defined within this framework;
requirements used to record these definitions; and
formal procedures used to register these definitions within the Data Registry.

The Data Registry described herein supports, and is designed to ISO 14819-1:2003 specifies the coding protocol for Radio Data System - Traffic Message Channel (RDS-TMC) - RDS-TMC using the ALERT-C protocol that is designed to provide mostly event-orientated road driver information messages.

Many "hooks" have been left for future development and indeed a few status-orientated road driver information messages were included. This protocol is designed to be closely linked to the ALERT-Plus protocol, which is specifically designed for status-orientated road driver information; both protocols may be available in the same RDS transmission.

The ALERT-Plus protocol is specified in ENV 12313-4.

[ISO 14819-1:2003](#)

Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 1: Coding protocol for Radio Data System -- Traffic Message Channel (RDS-TMC) using ALERT-C

All standards_detailed

[ISO 14819-2:2003](#)

Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 2: Event and information codes for Radio Data System -- Traffic Message Channel (RDS-TMC)

ISO 14819-2:2003 describes the ALERT-C protocol concept and message structure used to achieve densely coded messages to be carried in the RDS-TMC feature. This part (2) of the ENV 12313/EN ISO 14819 series of standards defines the "Events List" to be used in coding those messages.

[ISO 14819-3:2004](#)

Traffic and Travel Information (TTI) -- TTI messages via traffic message coding -- Part 3: Location referencing for ALERT-C

ISO 14819-3:2004 primarily addresses the needs of RDS-TMC ALERT-C messages, which are already being implemented. However, the modular approach used here is intended to facilitate future extension of the location referencing rules to other traffic and travel messaging systems.

The location referencing rules defined in ISO 14819-3:2004 address the specific requirements of Traffic Message Channel (TMC) systems, which use abbreviated coding formats to provide TTI messages over mobile bearers (e.g. GSM, DAB) or via exchange protocols like DATEX. In particular, the rules address the Radio Data System-Traffic Message Channel (RDS-TMC), a means of providing digitally-coded traffic and travel information to travellers using a silent data channel (RDS) on FM radio stations, based on the ALERT-C protocol.

[ISO 14819-6:2006](#)

Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 6: Encryption and conditional access for the Radio Data System -- Traffic Message Channel ALERT C coding

ISO 14819-6:2006 establishes a method of encrypting certain elements of the ALERT-C coded data carried in the RDS-TMC type 8A data group, such that without application by a terminal or receiver of an appropriate keys, the information conveyed is virtually worthless.

Before a terminal is able to decrypt the data, the terminal requires two "keys". The first is given in confidence by the service provider to terminal manufacturers with whom they have a commercial relationship; the second is broadcast in the "Encryption Administration Group," which is also a type 8A group. This specification explains the purpose of the two keys and how often and when the transmitted key may be changed.

Before an individual terminal may present decrypted messages to the end-user, it must have been activated to do so. Activation requires that a PIN code be entered. The PIN code controls access rights to each service and subscription period, allowing both lifetime and term business models to co-exist.

[ISO/TS 14822-1:2006](#)

Traffic and Travel Information -- General specifications for medium-range pre-information via dedicated short-range communication -- Part 1: Downlink

The specification also describes the considerations for service ISO 14822-1:2005 addresses the passive DSRC issues associated with Medium Range Pre-Information (MRPI) as applied to Traffic and Travel Information (TTI) issued from an information service provider to a suitably equipped moving vehicle.

The AID (Application Identification) number for all MRPI Application entities is defined as No. 8 in accordance with ISO 15628.

[ISO/TS 14823:2008](#)

Traffic and travel information -- Messages via media independent stationary dissemination systems -- Graphic data dictionary for pre-trip and in-trip information dissemination systems

ISO/TS 14823:2008 presents a system of standardized codes for existing signs and pictograms used to deliver traffic and traveller information (TTI). The coding system can be used to form messages to be handled by respective media systems, graphic messages on on-board units, and media system information on TTI dissemination systems [variable message signs (VMS), personal computers (PC), public access terminals (PAT), etc.] (including graphic data).

[ISO 14825:2004](#)

Intelligent transport systems -- Geographic Data Files (GDF) -- Overall data specification

ISO 14825:2004 specifies the conceptual and logical data model and the exchange format for geographic data bases for Intelligent Transportation System (ITS) applications. It includes a specification of potential contents of such data bases (features, attributes and relationships), a specification of how these contents shall be represented, and of how relevant information about the database itself can be specified (metadata).

The focus of this International Standard is on ITS applications and it emphasizes road and road-related information. ITS applications, however, also require information in addition to road and road-related information.

EXAMPLE 1 ITS applications need information about addressing systems in order to specify locations and/or destinations. Consequently, information about the administrative and postal subdivisions of an area is essential.

EXAMPLE 2 Map display is an important component of ITS applications. For proper map display, the inclusion of contextual information such as land and water cover is essential.

[ISO 14827-1:2005](#)

Transport information and control systems -- Data interfaces between centres for transport information and control systems -- Part 1: Message definition requirements

ISO 14827-1:2005 defines the format that should be used to document those end-application messages that are to be exchanged between/among central systems. The format is protocol-independent to the extent practical. For example, this one format can be used to define data exchanges that may apply to DATEX-ASN, CORBA, or other Application Protocols.

In general, each system can be viewed as consisting of the following interfaces:

- Application Interface
- Operator Interface
- Communication Interface
- Database Interface

[ISO 14827-2:2005](#)

Transport information and control systems -- Data interfaces between centres for transport information and control systems -- Part 2: DATEX-ASN

ISO 14827-1:2005 allows different systems to exchange relevant data. The relevant data will be contained in end-application messages. Each end-application message will be formally defined as either a "subscription" or a "publication", according to the format as specified in ISO 14827-1:2005. DATEX-ASN defines how these end-application messages are packaged to form a complete data packet and also defines the rules and procedures for exchanging these data packets. Systems using DATEX-ASN are free to implement additional end-application functionalities according to the user requirements.

[ISO/TS 14904:2002](#)

Road transport and traffic telematics -- Electronic fee collection (EFC) -- Interface specification for clearing between operators

ISO/TS 14904:2002 specifies the interfaces for clearing between operators and gives a framework of the common message structure and data elements to be used on the interfaces. Its objective is to make the transfer of payment and Electronic Fee Collection (EFC) related data possible both between different payment systems and between different operators such as collection agents, clearing operators, or providers of public and private transport services.

ISO/TS 14904:2002 supports:

different payment modes (e.g. pre-payment, post-payment);
a wide variety of transport and transport related services (tolling, parking, ferry/bridge/tunnel, public transport, payment for route guidance etc.);
operator services (co-ordination between collectors of money and charge points etc.);
security and privacy.

It is not within the scope of ISO/TS 14904:2002 to define administrative procedures and organisational structures. The specification of a higher (e.g. pan-European) level inter-operable payment system is outside the scope of ISO/TS 14904:2002.

[ISO 14906:2004](#)

Road transport and traffic telematics -- Electronic fee collection -- Application interface definition for dedicated short-range communication

ISO 14906:2004 specifies the application interface in the context of Electronic Fee Collection (EFC) systems using the Dedicated Short-Range communication (DSRC). The EFC application interface is the EFC application process interface to the DSRC Application Layer.

ISO 14906:2004 is applicable to the EFC attributes (i.e. EFC application information); the addressing procedures of EFC attributes and (hardware) components (e.g. ICC and MMI); EFC application functions, i.e. further qualification of actions by definitions of the concerned services, assignment of associated ActionType values and content and meaning of action parameters; the EFC transaction model, which defines the common elements and steps of any EFC transaction; the behaviour of the interface so as to ensure interoperability on an EFC-DSRC application interface level.

This is an interface standard, adhering to the open systems interconnection (OSI) philosophy (ISO/IEC 7498-1), and it is, as such, not concerned with the implementation choices to be realised at either side of the interface.

ISO/TS 14907-1:2005	Road transport and traffic telematics -- Electronic fee collection -- Test procedures for user and fixed equipment -- Part 1: Description of test procedures	ISO/TS 14907-1:2005 specifies the test procedures of EFC road-side equipment (RSE) and on-board equipment (OBE) with regard to the conformance to standards and requirements for type approval and acceptance testing which is specifically within the realm of EFC application. The scope of ISO/TS 14907-1:2005 is restricted to systems operating within the radio emission, EMC regulations, traffic and other regulations of the countries in which they are operated. ISO/TS 14907-1:2005 identifies a set of suitable parameters and provides test procedures to enable the proof of a complete EFC system as well as components of an EFC system, e.g. OBE related to the defined requirements of an application. The defined parameter and tests are assigned to the following parameter groups: Functionality; Quality; Referenced pre-tests.
ISO/TS 14907-2:2006	Road transport and traffic telematics -- Electronic fee collection -- Test procedures for user and fixed equipment -- Part 2: Conformance test for the onboard unit application interface	ISO TS 14907-2:2006 describes tests that verify OBU conformance of implementations of functions and data structures, as defined in the implementation conformance statement based on ISO 14906, for EFC applications.
ISO 15075:2003	Transport information and control systems -- In-vehicle navigation systems -- Communications message set requirements	ISO 15075:2003 specifies message content and format utilized by in-vehicle navigation systems. Its emphasis is on messages that are required to generate or enhance routing instructions. There is a particular focus on messages that would not necessarily be included in a more general traffic management message list. Although ISO 15075:2003 emphasizes requirements for Locally Determined Route Guidance (LDRG) systems that utilize on-vehicle map databases, it also includes messages that would be utilized primarily by Centrally Determined Route Guidance (CDRG) systems and certain value-added messages.

All standards_detailed

ISO 15622:2002	Transport information and control systems -- Adaptive Cruise Control Systems -- Performance requirements and test procedures	ISO 15622:2002 specifies the basic control strategy, minimum functionality requirements, basic driver interface elements, minimum requirements for diagnostics and reaction to failure, and performance test procedures for Adaptive Cruise Control (ACC) systems. ACC is fundamentally intended to provide longitudinal control of equipped vehicles while travelling on highways under free-flowing traffic conditions. ACC may be augmented with other capabilities, such as forward obstacle warning.
ISO 15623:2002	Transport information and control systems -- Forward vehicle collision warning systems -- Performance requirements and test procedures	ISO 15623:2002 specifies performance requirements and test procedures for systems capable of warning the driver of short inter-vehicle distance and closing speed which may cause a rear-end collision with other vehicles, including motor cycles, ahead of the subject vehicle while it is operating at ordinary speed. ISO 15623:2002 is applicable to operations on roads with curve radii over 125 m as well as higher radius curves.
ISO/TS 15624:2001	Transport information and control systems -- Traffic Impediment Warning Systems (TIWS) -- System requirements	
ISO 15628:2007	Road transport and traffic telematics -- Dedicated short range communication (DSRC) -- DSRC application layer	ISO 15628:2007 specifies the application layer core which provides communication tools for applications based on DSRC. These tools consist of kernels that can be used by application processes via service primitives. The application processes, including application data and application-specific functions, are outside the scope of ISO 15628:2007. ISO 15628:2007 is named "application layer", although it does not cover all functionality of OSI Layer 7 and it includes functionality from lower layers.
ISO 15662:2006	Intelligent transport systems -- Wide area communication -- Protocol management information	ISO 15662:2006 provides information as a checklist to consider handling messages that are defined by the application working groups of ISO/TC204, installing systems and selecting suitable wide area communication systems for providing ITS application services.

[ISO 15784-1:2008](#)

Intelligent transport systems (ITS) -- Data exchange involving roadside modules communication -- Part 1: General principles and documentation framework of application profiles

ISO 15784-1:2008 provides principles and documentation rules of application profiles used to exchange data and messages between a traffic management centre and roadside modules used for traffic management.

The application profiles it specifies are used to exchange data and messages between a traffic management centre and roadside modules for traffic management and between roadside modules used for traffic management.

The scope of ISO 15784-1:2008 does not include the communication between roadside modules and on-board units, in-vehicle communication, in-cabinet communication and motion video transmission from a camera or recorded media.

[ISO 15784-3:2008](#)

Intelligent transport systems (ITS) -- Data exchange involving roadside modules communication -- Part 3: Application profile-data exchange (AP-DATEX)

ISO 15784-3:2008 defines an application profile referring ISO 14827 and other base standards.

The application profile it specifies is used to exchange data and messages

between a traffic management centre and roadside modules for traffic management, and between roadside modules used for traffic management.

The scope of ISO 15784-3:2008 does not include the communication between roadside modules and in-vehicle units, in-vehicle communication, in-cabinet communication or motion video transmission from a camera or recorded media.

All standards_detailed

[ISO/TS 17261:2005](#)

Intelligent transport systems - Automatic vehicle and equipment identification -- Intermodal goods transport architecture and terminology

ISO TS 17261:2005 describes the conceptual and logical architecture for automatic vehicle and Equipment identification (AVI/AEI) and supporting services in an intermodal/multimodal environment. It presents a high level view of AEI intermodal and multimodal system Architecture. ISO TS 17261:2005 describes the key sub systems, their associated interfaces and interactions and how they fit into system-wide functions such as management, security and information flow.

[ISO/TS 17261:2005/Cor 1:2005](#)

[ISO/TS 17262:2003](#)

Automatic vehicle and equipment identification --
Intermodal goods transport -- Numbering and data
structures

ISO/TS 17262:2003 defines generic numbering and data structures for unambiguous identification of equipment used for Intermodal goods transport. These data are known as Intermodal Goods Transport Numbering and Data Structures.

ISO/TS 17262:2003 defines data independently of the data carrier. The modelling of data is based on Abstract Syntax Notation One (ASN.1) as defined in ISO/IEC 8824. ISO/TS 17262:2003 excludes any physical aspects such as interfaces, dimensions etc. Data that form part of transmission or storage protocols (headers, frame markers and checksums) are excluded.

Data defined in ISO/TS 17262:2003 require a system for control and distribution of number series independent of the different AVI/AEI systems. This is required in order to avoid ambiguity and to provide the necessary level of security where appropriate. For this reason the registration authority defined in ENV ISO 14816 applies for ISO/TS 17262:2003.

ISO/TS 17262:2003 enables the use of optimised encoding schemes such as ASN.1 Basic Packed Encoding Rules (PER).

ISO/TS 17262:2003 provides interoperability, not only between simple

ISO/TS 17262:2003 relates to AVI/AEI units, but not to smaller contain

ISO/TS 17262:2003 provides the capability to carry application data, :

All standards_detailed

[ISO/TS 17263:2003](#)

Automatic vehicle and equipment identification --
Intermodal goods transport -- System parameters

ISO/TS 17263:2003 establishes an AEI-System based on radio frequency technologies. This system is intended for general application in RTTT/TICS. It allows for the transfer of the identification codes and further information about equipment and vehicles used in intermodal transport into such RTTT/TICS and information systems related to Intermodal Transport processes. Within the intermodal context of the RTTT/TICS Sector, AEI systems have the specific objective of achieving an unambiguous identification of an ITU or related equipment or vehicle or item used in intermodal transport, and to make that identification automatically. Vehicles will be considered and handled under Intermodal aspects as "Intermodal Equipment". Therefore a differentiation between AEI and AVI systems under the purpose of ISO/TS 17263:2003 is not required.

[ISO 17361:2007](#)

Intelligent transport systems -- Lane departure
warning systems -- Performance requirements and
test procedures

ISO/TS 17263:2003 is specifically aimed at DSRC-type air interfaces. The requirement and test methods may not apply for Intermodal AEI systems using long range communications such as Cellular Networks or Satellite, or vicinity communication such as ISO 17361:2007 specifies the definition of the system, classification, functions, human-machine interface (HMI) and test methods for lane departure warning systems. These are in-vehicle systems that can warn the driver of a lane departure on highways and highway-like roads. The subject system, which may utilize optical, electromagnetic, GPS or other sensor technologies, issues a warning consistent with the visible lane markings. The issuance of warnings at roadway sections having temporary or irregular lane markings (such as roadwork zones) is not within the scope of ISO 17361:2007. ISO 17361:2007 applies to passenger cars, commercial vehicles and buses. The system will not take any automatic action to prevent possible lane departures. Responsibility for the safe operation of the vehicle remains with the driver.

[ISO/TR 17384:2008](#)

Intelligent transport systems -- Interactive centrally determined route guidance (CDRG) -- Air interface message set, contents and format

ISO/TR 17384:2008 describes the message contents and format of the air interface between the infrastructure and the in-vehicle unit in the Interactive CDRG system.

The air interface message set for route guidance information in the interactive CDRG system in this Technical Report is applicable to both vehicles equipped with an onboard map database and those which are not equipped (i.e., those equipped with simplified graphic output and/or text message display functions).

ISO/TR 17384:2008 covers media independent systems. In this Technical Report, messages required for both cellular phone-based CDRG and beacon-based CDRG are taken into account.

[ISO 17386:2004](#)

Transport information and control systems -- Manoeuvring Aids for Low Speed Operation (MALSO) -- Performance requirements and test procedures

ISO 17386:2004 for Manoeuvring Aids for Low Speed Operation addresses light-duty vehicles, e.g. passenger cars, pick-up trucks, light vans and sport utility vehicles (motorcycles excluded) equipped with such MALSO systems. It specifies minimum functionality requirements which the driver can generally expect of the device; i.e., detection of and information on the presence of relevant obstacles within a defined (short) detection range. It defines minimum requirements for failure indication as well as performance test procedures; it includes rules for the general information strategy but does not restrict the kind of information or display system.

MALSO systems use object-detection devices (sensors) for ranging in order to provide the driver with information based on the distance to obstacles. The sensing technology is not addressed. The current test objects are defined based on systems using ultrasonic sensors, which reflect the most commonly used available technology.

Visibility-enhancement systems like video-camera aids without distance ranging and warning and reversing aids and obstacle-detecti

All standards_detailed

[ISO 17387:2008](#)

Intelligent transport systems -- Lane change decision aid systems (LCDAS) -- Performance requirements and test procedures

ISO 17387:2008 specifies system requirements and test methods for Lane Change Decision Aid Systems (LCDAS). LCDAS are fundamentally intended to warn the driver of the subject vehicle against potential collisions with vehicles to the side and/or to the rear of the subject vehicle, and moving in the same direction as the subject vehicle during lane change manoeuvres. This standardization addresses LCDAS for use on forward moving cars, vans and straight trucks in highway situations.

[ISO/TR 17452:2007](#)

Intelligent transport systems -- Using UML for defining and documenting ITS/TICS interfaces

ISO/TR 17452:2007 gives guidelines for using the unified modelling language (UML) for defining and documenting interfaces between intelligent transport systems (ITS) and transport information and control systems (TICS). It presents these guidelines in the context of a case study for the creation of an ITS/TICS data dictionary and submissions to the ITS/TICS data registry.

[ISO 17572-1:2008](#)

Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 1: General requirements and conceptual model

ISO 17572 specifies Location Referencing Methods (LRM) that describe locations in the context of geographic databases and will be used to locate transport-related phenomena in an encoder system as well as in the decoder side. It defines what is meant by such objects, and describes the reference in detail, including whether or not components of the reference are mandatory or optional, and their characteristics.

It specifies two different LRMs:

pre-coded location references (pre-coded profile);
dynamic location references (dynamic profile).

It does not define a physical format for implementing the LRM. However, the requirements for physical formats are defined.

It does not define details of the Location Referencing System (LRS), i.e. how the LRMs are to be implemented in software, hardware, or processes.

ISO 17572-1:2008 specifies the following general LRM related sections:

requirements to a Location Referencing Method;
conceptual Data Model for Location Referencing Methods;
inventory of Location Referencing Methods;

[ISO 17572-2:2008](#)

Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 2: Pre-coded location references (pre-coded profile)

ISO 17572 specifies Location Referencing Methods (LRM) that describe locations in the context of geographic databases and will be used to locate transport-related phenomena in an encoder system as well as in the decoder side. It defines what is meant by such objects, and describes the reference in detail, including whether or not components of the reference are mandatory or optional, and their characteristics.

It specifies two different LRMs:

pre-coded location references (pre-coded profile);
dynamic location references (dynamic profile).

It does not define a physical format for implementing the LRM. However, the requirements for physical formats are defined.

It does not define details of the Location Referencing System (LRS), i.e. how the LRMs are to be implemented in software, hardware, or processes.

ISO 17572-2:2008 specifies the pre-coded location referencing method, comprising:

specification of pre-coded location references (pre-coded profile);
logical format for VICS link location;
TPEG physical format for ALERT-C-location references;

[ISO 17572-3:2008](#)

Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 2: Pre-coded location references (pre-coded profile)

ISO 17572 specifies Location Referencing Methods (LRM) that describe locations in the context of geographic databases and will be used to locate transport-related phenomena in an encoder system as well as in the decoder side. It defines what is meant by such objects, and describes the reference in detail, including whether or not components of the reference are mandatory or optional, and their characteristics.

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dynamic location references (dynamic profile).

It does not define a physical format for implementing the LRM. However, the requirements for physical formats are defined.

It does not define details of the Location Referencing System (LRS), i.e. how the LRMs are to be implemented in software, hardware, or processes.

ISO 17572-3:2008 specifies the dynamic location referencing method, comprising:

attributes and encoding rules;

logical data modelling;

TPEG physical format specification for dynamic location references;

[ISO 17572-3:2008](#)

Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 3: Dynamic location references (dynamic profile)

ISO 17572 specifies Location Referencing Methods (LRM) that describe locations in the context of geographic databases and will be used to locate transport-related phenomena in an encoder system as well as in the decoder side. It defines what is meant by such objects, and describes the reference in detail, including whether or not components of the reference are mandatory or optional, and their characteristics.

It specifies two different LRMs:

pre-coded location references (pre-coded profile);
dynamic location references (dynamic profile).

It does not define a physical format for implementing the LRM. However, the requirements for physical formats are defined.

It does not define details of the Location Referencing System (LRS), i.e. how the LRMs are to be implemented in software, hardware, or processes.

ISO 17572-3:2008 specifies the dynamic location referencing method, comprising:

attributes and encoding rules;
logical data modelling;
TPEG physical format specification for dynamic location references;

[ISO/TS 17573:2003](#) Road Transport and Traffic Telematics --
Electronic Fee Collection (EFC) -- Systems
architecture for vehicle related transport services

ISO/TS 17573:2003 specifies a system architecture for electronic fee collection (EFC) systems concerning vehicle related transport services such as the use of toll roads, zone access, parking and route guidance.

ISO/TS 17573:2003 does not cover person related transport services such as public transport. However, some of the clauses in ISO/TS 17573:2003 may also be applicable for fare collection.

NOTE Fare collection architecture in public transport is covered by other Working Groups in CEN/TC278 and ISO/TC204, e.g. WG3 Public Transport in CEN/TC278.

ISO/TS 17573:2003 provides the overview of, and inter-relationship among, the set of standards for design, development, testing and operation of applications in the field of EFC.

ISO/TS 17573:2003 is also applicable to the ITS Fundamental Service called Electronic Financial Transactions which is the use of electronic, or "cashless" payment systems for transportation. Hence, ISO/TS 17573:2003 covers toll collection systems, parking fee collection systems, systems for road and congestion pricing and ISO/TS 17574:2004 gives guidelines for the preparation and evaluation of security requirements specifications, referred to as Protection Profiles (PP) in ISO/IEC 15408 and ISO/IEC TR 15446, for the production of PPs and security targets. A PP is a set of security requirements which meet specific needs for a category of products or systems. A typical example would be a PP for OBEs to be used in an EFC system. In this case the PP would be an implementation-independent set of security requirements for the OBEs meeting the operators' and users' needs.

[ISO/TS 17574:2004](#) Road transport and traffic telematics -- Electronic
fee collection (EFC) -- Guidelines for EFC security
protection profiles

ISO/PAS 17684:2003	Transport information and control systems -- In-vehicle navigation systems -- ITS message set translator to ASN.1 format definitions	ISO/PAS 17684:2003 specifies a method that can be used to define navigation message sets in tabular form with a subsequent translation into a corresponding ASN.1 description. An intermediate language called Descriptor Normal Form (DNF), which is a subset of ASN.1, is specified and used as an intermediate description between a tabular form and its ASN.1 description. A tabular-form message-set description language called Message Set Tabular Form (MSTF) is included as an example of a tabular form definition.
ISO 17687:2007	Transport Information and Control Systems (TICS) -- General fleet management and commercial freight operations -- Data dictionary and message sets for electronic identification and monitoring of hazardous materials/dangerous goods transportation	<p>ISO 17687:2007 supports the application of automated identification, monitoring and exchange of emergency response information regarding dangerous goods carried on board road transport vehicles. Such information may include the identification, quantity and current condition (such as pressure and temperature) of such goods, as well as any relevant emergency response information. When equipped with appropriate electronics and communications capabilities, vehicles carrying dangerous goods may respond to queries regarding their status or self-initiate a message.</p> <p>The information defined here, electronically carried on-board the road transport vehicle, may be transferred to interested roadside systems by whatever communications means are appropriate to that roadside system.</p> <p>The primary intent of ISO 17687:2007 is not trade, economic, or commercial, but to help save lives by facilitating emergency response. ISO 17687:2007 supports local on-site needs in the same manner as conventional visual placards do but with an optional,</p>

[ISO/TS 18234-1:2006](#) Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 1: Introduction, numbering and versions

ISO TS 18234-1:2006 provides an introduction and index to the initial set of TPEG applications and specifications. It allows the indexing of new applications as they are added to the TPEG applications family, by defining their Application Identification (AID).

As such developments occur, ISO TS 18234-1:2006 will be updated to indicate the latest status and the interworking of the various TPEG specifications. It will be issued as a new editorial version every time a new issue of any other specification is issued.

[ISO/TS 18234-2:2006](#) Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 2: Syntax, Semantics and Framing Structure (SSF)

ISO TS 18234-2:2006 establishes the method of referencing used within a TPEG data stream to allow a service provider to signal availability of the same service on another bearer channel or similar service data from another service.

TPEG is a byte-oriented stream format, which may be carried on almost any digital bearer with an appropriate adaptation layer. TPEG messages are delivered from service providers to end-users, and are used to transfer application data from the database of a service provider to a user's equipment.

The protocol is structured in a layered manner and employs a general purpose framing system which is adaptable and extensible, and which carries frames of variable length. This has been designed with the capability of explicit frame length identification at nearly all levels, giving greater flexibility and integrity, and permitting the modification of the protocol and the addition of new features without disturbing the operation of earlier client decoder models.

ISO/TS 18234-3:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 3: Service and Network Information (SNI) application	ISO TS 18234-3:2006 establishes the method of delivering Service and Network Information (SNI) within a TPEG service. The TPEG-SNI Application is designed to allow the efficient and language independent delivery of information about the availability of the same service on another bearer channel or similar service data from another service provider, directly from service provider to end-users.
ISO/TS 18234-4:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 4: Road Traffic Message (RTM) application	ISO TS 18234-4:2006 establishes the method of delivering Road Traffic Messages within a TPEG service. The TPEG-RTM application is designed to allow the efficient and language independent delivery of road information directly from service provider to end-users. The information provided relates to event and some status information on the road network and on associated infrastructure affecting a road journey. For example, limited information about abnormal operation of links in the network may be included, such as ferries, lifting-bridges, etc.
ISO/TS 18234-5:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 5: Public Transport Information (PTI) application	ISO TS 18234-5:2006 describes the Public Transport Information (PTI) application, which is intended to cover all modes of public (i.e. collective) transport as well as inter-urban and intra-urban travel. The application is designed to allow the efficient and language independent delivery of public transport information directly from service provider to end-users.
ISO/TS 18234-6:2006	Traffic and Travel Information (TTI) - TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 6: Location referencing applications	ISO TS 18234-6:2006 establishes the method of location referencing used by TPEG applications such as TPEG-RTM or TPEG-PTI. TPEG applications are specified to contain all the information required by a client TPEG-decoder (i.e. both location referencing and event information), to present all the information intended for the end-user when it was originated by the service provider.

All standards_detailed

[ISO/TS 20452:2007](#)

Requirements and Logical Data Model for a Physical Storage Format (PSF) and an Application Program Interface (API) and Logical Data Organization for PSF used in Intelligent Transport Systems (ITS) Database Technology

ISO/TS 20452:2007 describes the functional requirements and Logical Data Model for PSF and API and the Logical Data Organization for PSF that were completed under ISO/NP 14826. It does not specify a Physical Data Organization.

[ISO 21212:2008](#)

Intelligent transport systems -- Communications access for land mobiles (CALM) -- 2G Cellular systems

ISO 21212:2008 determines the air interface for second generation (2G) cellular networks and 2G systems (e.g. using WAP and I-Mode type protocols) to be compliant to CALM, i.e., requirements that must be met before a 2G system can be incorporated into a CALM system. In particular, it specifies protocols and parameters that 2G systems shall include to support prolonged, long-range, high data rate wireless communication links in ITS environments where heterogeneous handovers or media independent handovers (MIH) are either necessary to maintain the link, or desirable as determined by media selection policies.

ISO 21212:2008 provides protocols and parameters for long range, medium speed wireless communications in the ITS sector using second generation cellular communications.

Wherever practicable, ISO 21212:2008 has been developed by reference to suitable extant standards, adopted by selection. Required regional variations are provided.

Specifically, for ISO 21212:2008, extant 2G systems, as defined by various international and national standards, are adopted by reference.

[ISO 21213:2008](#)

Intelligent transport systems -- Communications access for land mobiles (CALM) -- 3G Cellular systems

ISO 21213:2008 determines the air interface options applicable to CALM using third generation (3G) cellular networks. In particular, it specifies protocols and parameters that 3G systems shall include to support prolonged, long-range, high data rate wireless communication links in ITS environments where heterogeneous handovers or media independent handovers (MIH) are either necessary to maintain the link, or desirable, as determined by media selection policies.

ISO 21213:2008 provides protocols and parameters for long range, medium speed wireless communications in the ITS sector using third generation cellular communications.

Wherever practicable, ISO 21213:2008 has been developed by reference to suitable extant Standards, adopted by selection. Required regional variations are provided.

Specifically, for ISO 21213:2008, extant 3G systems, as defined by various international and national standards, are adopted by reference.

Application specific upper layers are not included in ISO 21213:2008, but will be driven by application standards (which may

[ISO 21214:2006](#)

Intelligent transport systems -- Communications access for land mobiles (CALM) -- Infra-red systems

ISO 21214:2006 determines the air interface using infra-red systems at 820 nm to 1 010 nm.

It provides protocols and parameters for medium-range, medium- to high-speed wireless communications in the ITS sector using infra-red systems.

Such links are required for quasi-continuous, prolonged or short communications

between vehicles and the roadside,
between vehicles, and
between mobile equipment and fixed infrastructure points,
over medium and long ranges.

Vehicles may be moving or stationary.

Wherever practicable, ISO 21214:2006 has been developed by reference to suitable extant International Standards, adopted by selection. Required regional variations are provided.

Due account is given to, and use made of, any relevant parts of appropriate communications systems, such as global positioning systems (GPS), digital audio broadcasting (DAB), digital video broadcasting (DVB), radio local area networks (RLANs), digital data broadcasting (DDB), TETRA, FM subcarrier, mobile broadband systems (MBS, W-ATM), internet protocols, and dedicated short
ISO 21218:2008 determines the service access points of a communication interface (CI) as provided by the communication adaptation layer (CAL) for communication, and as provided by the CI management adaptation entity (CIMAЕ) for management of the CI.

[ISO 21218:2008](#)

Intelligent transport systems -- Communications access for land mobiles (CALM)-- Medium service access points

[ISO/TR 21707:2008](#)

Intelligent transport systems -- Integrated transport information, management and control -- Data quality in ITS systems

ISO/TR 21707:2008 specifies a set of standard terminology for defining the quality of data being exchanged between data suppliers and data consumers in the ITS domain. This applies to Traffic and Travel Information Services and Traffic Management and Control Systems, specifically where open interfaces exist between systems. It may of course be applicable for other types of interfaces, including internal interfaces, but this Technical Report is aimed solely at open interfaces between systems.

ISO/TR 21707:2008 identifies a set of parameters or meta-data such as accuracy, precision and timeliness etc. which can give a measure of the quality of the data exchanged and the overall service on an interface. Data quality is applicable to interfaces between any data supplier and data consumer, but is vitally important on open interfaces. It includes the quality of the service as a whole or any component part of the service that a supplying or publishing system can provide. For instance this may give a measure of the availability and reliability of the data service in terms of uptime against downtime

[ISO 22837:2009](#)

Vehicle probe data for wide area communications

ISO 22837:2009 relates to vehicle probe data for wide area communications. It specifies the following.

Reference architecture for probe vehicle systems and probe data, which provides a general structure for probe vehicle systems within which a wide range of actual probe vehicle systems can be built whose physical characteristics may differ (e.g., in their choice of communications medium). The reference architecture is used to: clarify the major building blocks and logical interconnections of probe vehicle systems for which this standard will be used; categorize probe data in accordance with the information model described below.

Basic data framework for probe data elements and probe data, which defines probe data elements and probe messages, and specifically provides:

rules for mapping information models (as defined in ISO 14817) of probe data to probe data elements/messages. The information models show the logical structure of entities and concepts involved in probe data;
the required characteristics of probe data elements and probe data messages;

[ISO 22951:2009](#)

Data dictionary and message sets for preemption and prioritization signal systems for emergency and public transport vehicles (PRESTO)

ISO 22951:2009 relates to systems that use priority signal control functions to help emergency vehicles operate. This type of system is composed of a traffic management centre, in-vehicle units, roadside communication units, and roadside units. Public transport vehicles such as buses are also targeted to receive priority signal control service.

The scope of standardization includes message sets and data dictionary related to the communications as follows:

between a roadside communication unit and each in-vehicle unit,
between a roadside communication unit and other roadside units,
between in-vehicle units and roadside units.

ISO 22951:2009 concerns only information related to priority signal control and does not deal with information provision such as that of the situations at scenes. Since it is necessary to handle public transport vehicles in accordance with the conditions of individual cities and regions, the section in the messages and the data dictionary that are concerned with priority signal control for the vehicles are treated as an option. Furthermore, the standardization dc

[ISO 24014-1:2007](#)

Public transport -- Interoperable fare management system -- Part 1: Architecture

ISO 24014-1:2007 provides the basis for the development of multi-operator/multi-service Interoperable public surface (including subways) transport Fare Management Systems (IFMSs) on a national and international level.

ISO 24014-1:2007 is applicable to bodies in public transport and related services which agree that their systems need to interoperate.

While ISO 24014-1:2007 does not imply that existing interoperable fare management systems need to be changed, it applies, so far as it is practically possible, to extensions of these.

ISO 24014-1:2007 covers the definition of a conceptual framework, which is independent of organisational and physical implementation. Any reference within ISO 24014-1:2007 to organisational or physical implementation is purely informative.

The objective of ISO 24014-1:2007 is to define a reference functional architecture for IFMSs and to identify the requirements that are relevant to ensure interoperability between several actors in the context of the use of electronic tickets.

[ISO/TR 24098:2007](#)

Intelligent transport systems -- System architecture, taxonomy and terminology -- Procedures for developing ITS deployment plans utilizing ITS system architecture

ISO/TR 24098:2007 describes the procedure for developing Intelligent Transport System (ITS) deployment plans utilizing ITS system architectures. The document consists of the basic policy of ITS deployment and the procedure for developing ITS deployment plans. Framework, procedures and requirements for developing regional ITS deployment plans utilizing regional ITS architecture are reported.

[ISO 24101-1:2008](#)

Intelligent transport systems -- Communications access for land mobiles (CALM) -- Application management -- Part 1: General requirements

ISO 24101-1:2008 specifies structures and methods for application management, including means for installing, uninstalling and updating applications on on-board equipment (OBE) and wireless access equipment (WAE) deployed in a communications access for land mobiles (CALM) network in a reliable and secure manner.

ISO/TR 24529:2008	Intelligent transport systems -- Systems architecture -- Use of unified modelling language (UML) in ITS International Standards and deliverables	ISO/TR 24529:2008 deals with the use of UML within International Standards, Technical Specifications and Technical Reports and related documents. It discusses the application of the Unified Modelling Language (UML) to the development of standards within the context of Intelligent Transport Systems (ITS).
ISO/TS 24530-1:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 1: Introduction, common data types and tpegML	ISO/TS 24530-1:2006 establishes the top-level "containers" for TPEG messages in XML and the common data types that are used by tpegML applications (e.g. tpeg-ptiML). Inherently, tpegML is designed to "map" the TPEG binary (ISO/TS 18234 series), however, additional tags are provided to create a message and message set structure to facilitate internet file delivery.
ISO/TS 24530-2:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 2: tpeg-locML	ISO/TS 24530-2:2006 establishes the XML encoding of the method of Location Referencing used by TPEG applications. TPEG applications contain the information required by a client TPEG decoder (i.e. both Location Referencing and event information), to present all the information intended for the end-user when it was originated by the service provider. Location Referencing requires a service provider to give an impression or image, to the human end-user, of where an event has taken place. This cannot be done easily because the human end-user may or may not be familiar with the location. tpeg-loc has the added challenge of attempting to be as language independent as possible. This is achieved by the use of tpeg-loc tables (essentially word-oriented data object dictionaries).
ISO/TS 24530-3:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 3: tpeg-rtmML	ISO/TS 24530-3:2006 establishes the XML encoding of the method of the Road Traffic Message application.

[ISO/TS 24530-4:2006](#) Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 4: tpeg-ptiML

ISO/TS 24530-4:2006 establishes the XML encoding of the method of the Public Transport Information application.

The Public Transport Information application is intended to cover all modes of public (i.e. collective) transport as well as inter-urban and intra-urban travel. The application itself is designed to allow the efficient and language-independent transmission of public transport information either directly to an end-user, be it the public or another service provider, such as broadcasters, service operators or other information disseminating points, or to centres for onward transmission.

[ISO 24531:2007](#) Intelligent transport systems -- System architecture, taxonomy and terminology -- Using XML in ITS standards, data registries and data dictionaries

ISO 24531:2007 has been developed to assist developers and users of intelligent transport systems (ITS) standards who wish to use extensible markup language (XML), by providing a consistent definition of the rules and rule references for the use of XML within intelligent transport systems. The scope of ISO 24531:2007 is to define consistent rules and rule references to provide a framework to be used when implementing XML-based applications in ITS, and particularly, in specifying XML in ITS standards, ITS data registries and ITS data dictionaries. ISO 24531:2007 also provides guidance and examples in respect of the use of XML in ITS, and the elaboration of XML within the abstract syntax notation one (ASN.1) data definitions required by ISO 14813-6 and ISO 14817.

[ISO/TR 24532:2006](#) Intelligent transport systems -- Systems architecture, taxonomy and terminology -- Using CORBA (Common Object Request Broker Architecture) in ITS standards, data registries and data dictionaries

ISO TR 24532:2006 clarifies the purpose of CORBA and its role in ITS. It provides some broad guidance on usage, and prepares the way for further ISO deliverables on the use of CORBA in ITS.

<p>ISO/TS 24534-1:2007 Automatic vehicle and equipment identification -- Electronic Registration Identification (ERI) for vehicles -- Part 1: Architecture</p>	<p>ISO TS 24534-1:2007 provides the requirements for electronic registration that is based on an identifier assigned to a vehicle (e.g. for recognition by national authorities), suitable to be used for :</p> <p>electronic identification of local and foreign vehicles by national authorities, vehicle manufacturing, in-life maintenance and end-of-life identification (vehicle life cycle management), adaptation of vehicle data (e.g. for international resales), safety-related purposes, crime reduction, and commercial services. It adheres to privacy and data protection regulations</p> <p>ISO TS 24534-1:2007 provides an overview of the ERI system concept, in terms of the onboard vehicle components and the external off-vehicle components required for an operational system.</p>
<p>ISO/TS 24534-2:2007 Automatic vehicle and equipment identification -- Electronic Registration Identification (ERI) for vehicles -- Part 2: Operational requirements</p>	<p>ISO TS 24534-2:2007 provides the requirements for Electronic registration that are based on an identifier assigned to a vehicle (e.g. for recognition by national authorities), suitable to be used for :</p> <p>electronic identification of local and foreign vehicles by national authorities, vehicle manufacturing, in-life-maintenance and end-of-life identification (vehicle life cycle management), adaptation of vehicle data (e.g. for international resales), safety-related purposes, crime reduction, and commercial services. It adheres to privacy and data protection regulations.</p> <p>ISO TS 24534-2:2007 defines the operational requirements for the remaining parts of TS 24534 and the more limited, but relevant provisions of ISO TS 24535.</p>

[ISO/TS 24534-3:2008](#) Automatic vehicle and equipment identification -- Electronic Registration Identification (ERI) for vehicles -- Part 3: Vehicle data

ISO TS 24534-3:2008 provides the requirements for an Electronic Registration Identification (ERI) that is based on an identifier assigned to a vehicle (e.g. for recognition by national authorities) suitable to be used for :

electronic identification of local and foreign vehicles by national authorities,
vehicle manufacturing, in-life-maintenance and end-of-life identification (vehicle life cycle management),
adaptation of vehicle data, e.g. in case of international re-sales, safety-related purposes,
crime reduction, and
commercial services.

It adheres to privacy and data protection regulations.

ISO TS 24534-3:2008 defines the vehicle identification data. This data is called the ERI data and includes the vehicle identifier and possible additional vehicle related information (as typically included in a vehicle registration certificate).

[ISO/TS 24534-4:2008](#) Automatic vehicle and equipment identification -- Electronic Registration Identification (ERI) for vehicles -- Part 4: Secure communications using asymmetrical techniques

ISO TS 24534-4:2008 provides the requirements for an Electronic Registration Identification (ERI) that is based on an identifier assigned to a vehicle (e.g. for recognition by national authorities) and suitable to be used for :

electronic identification of local and foreign vehicles by national authorities,
vehicle manufacturing, in-life-maintenance and end-of-life identification (vehicle life cycle management),
adaptation of vehicle data, e.g. in case of international re-sales, safety related purposes,
crime reduction, and
commercial services.
It adheres to privacy and data protection regulations.

ISO TS 24534-4:2008 specifies the interfaces for a secure exchange of data between an ERT and an ERI reader or ERI writer in or outside the vehicle using asymmetric encryption techniques. It includes:

the application layer interface between an ERT and a onboard ERI reader or writer,
the application layer interface between the onboard ERI equipment and external ERI readers and writers, and
security issues related to the communication with the ERT.

[ISO/TS 24534-5:2008](#) Automatic vehicle and equipment identification -- Electronic Registration Identification (ERI) for vehicles -- Part 5: Secure communications using symmetrical techniques

ISO/TS 24534-5:2008 provides the requirements for an Electronic Registration Identification (ERI) using symmetric encryption techniques that are

based on an identifier assigned to a vehicle (e.g. for recognition by national authorities),
suitable to be used for:
electronic identification of local and foreign vehicles by national authorities;
vehicle manufacturing, in-life maintenance and end-of-life identification (vehicle life-cycle management);
adaptation of vehicle data, e.g. in case of international re-sales;
safety related purposes;
crime reduction;
commercial services, and
adhering to privacy and data protection regulations.

It specifies the interfaces for a secure exchange of data between an electronic registration tag (ERT) and an ERI reader or ERI writer in or outside the vehicle using symmetric encryption techniques.

Symmetric encryption techniques are based on secret keys shared by a particular community of users, i.e. in closed user groups in which it is trusted that keys are not revealed to outsiders.

[ISO 24535:2007](#)

Intelligent transport systems -- Automatic vehicle identification -- Basic electronic registration identification (Basic ERI)

ISO 24535:2007 supports simple systems for "basic electronic registration identification" ("basic ERI") for use in intelligent road transport applications.

ISO 24535:2007 "basic ERI" defines the: specification of a unique vehicle identifier (using an International Standard, or non-standard, data concept); "basic ERI" functional capabilities, selectable for different "basic ERI" applications; and minimum data interoperability requirements between basic electronic registration tags (ERTs) and electronic registration readers (ERRs).

ISO 24535:2007 allows, but does not require, vehicle-related data storage in addition to the unique vehicle identifier.

ISO 24535:2007 is consistent with the ERI architecture defined in ISO/TS 24534-1 and data concepts defined in ISO/TS 24534-3, but is not necessarily interoperable with, the more capable and "fully featured" ERI communication systems to be defined in ISO/TS 24534-4 or ISO/TS 24534-5.

ISO 24535:2007 defines a "basic ERI" system with security adequate for information that is currently available manually (such as license plate and/or VIN data), but it does not purport to provide the The scope of ISO/TR 25100:2008 is harmonization of data concepts that are being managed by data registry and data dictionaries such as those described in ISO 14817:2002.

[ISO/TR 25100:2008](#)

Intelligent transport systems -- Systems architecture -- Harmonization of ITS data concepts

[ISO/TR 25102:2008](#)

Intelligent transport systems -- System architecture -- 'Use Case' pro-forma template

ISO/TR 25102:2008 discusses the application of use cases for requirements and related aspects of a software-intensive system such as an intelligent transport system (ITS).

The scope of this ISO/TR 25102:2008 is to provide a pro-forma template for the consistent consideration and development of use cases within ITS International Standards and associated deliverables.

All standards_detailed

[ISO/TR 25104:2008](#)

Intelligent transport systems -- System architecture, taxonomy, terminology and data modelling -- Training requirements for ITS architecture

ISO/TR 25104:2008 discusses the development for generic education and training requirements for the teaching of ITS architecture, and the acquisition of skills to interpret and develop ITS architectures.

ISO/TR 25104:2008 provides suggestions to those planning education and/or training courses associated with ITS system architecture as to the subjects that should be studied.

[ISO/TS 25110:2008](#)

Electronic fee collection -- Interface definition for on-board account using integrated circuit card (ICC)

ISO/TS 25110:2008 defines the data transfer models between roadside equipment (RSE) and ICC, and the interface descriptions between RSE and OBE for on-board account using ICC. It also provides examples of interface definitions and transactions deployed in several countries.

ISO/TS 25110:2008 covers:

data transfer models between RSE and ICC which correspond to the categorized operational requirements, and the data transfer mechanism for each model;
interface definition between RSE and OBE based on each data transfer model;
interface definition for each model comprises functional configuration,
RSE command definitions for ICC access, and data format and data element definitions of RSE commands;
transaction examples for each model in Annex B.

ISO/TR 28682:2008 provides a survey of the current status and plan of ITS standards and their deployment, identifies common problems related to international standardization activities, and provides collective opinions to improve ITS standardization activities and their implementations.

[ISO/TR 28682:2008](#)

Intelligent transport systems -- Joint APEC-ISO study of progress to develop and deploy ITS standards

Subcommittees/Working Groups

WG 1
WG 3

Architecture
TICS database technology

All standards_detailed

WG 4	Automatic vehicle and equipment identification
WG 5	Fee and toll collection
WG 7	General fleet management and commercial/freight
WG 8	Public transport/emergency
WG 9	Integrated transport information, management and control
WG 10	Traveller information systems
WG 11	Route guidance and navigation systems
WG 14	Vehicle/roadway warning and control systems
WG 15	Dedicated short range communications for TICS applications
WG 16	Wide area communications/protocols and interfaces
WG 17	Nomadic Devices in ITS Systems

drafts and new work items of TC 204

ISO/AWI 10711	Intelligent Transport Systems -- Interface Protocol and Message Set Definition between Traffic Signal Controllers and Detectors(IPMSTSCD)
ISO/AWI TR 10992	Nomadic Devices to support ITS Service and Multimedia Provision in Vehicles
ISO/CD TR 11766	Lawful Interception in ITS and CALM
ISO/CD TR 11769	Data retention for law enforcement in ITS and CALM
ISO/WD 11915	Communications Access for Land Mobiles: high speed, air interface parameters and protocols for broadcast, point-point, vehicle-vehicle, and vehicle-point communications in the ITS Sector using IEEE802.11 Wireless LAN standard in normal operational modes
ISO/NP TS 12813	Electronic fee collection -- Compliance checking of GNSS/CN systems over DSRC
ISO/CD TR 12859	Intelligent Transport Systems -System Architecture - Data Privacy Aspects of ITS

All standards_detailed

ISO/NP 13181-1	Intelligent Transport Systems - Communications Access for Land Mobiles (CALM) - Security -- Part 1: Framework
ISO/NP 13181-2	Communications access for land mobiles (CALM) - CALM receiving public broadcast communications - Part 2: Threat Vulnerability and Risk Analysis
ISO/NP 13181-3	Intelligent Transport Systems - Communications Access for Land Mobiles (CALM) - Security -- Part 3: Objectives and Requirements
ISO/NP 13181-4	Intelligent Transport Systems - Communications Access for Land Mobiles (CALM) - Security -- Part 4: Countermeasures
ISO/NP 13183	Communications access for land mobiles (CALM) - CALM receiving public broadcast communications
ISO/NP TS 13184	Real-time decision support system at all-way stop control intersections via nomadic and mobile devices
ISO/NP TS 13185	Vehicle Interface for Provisioning and Support of ITS Services
ISO/NP 13189	Business Case Template for ITS Projects
ISO/DIS 14813-5	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 5: Requirements for architecture description in TICS standards
ISO/DIS 14813-6	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 6: Data presentation in ASN.1
ISO/DIS 14906	Road transport and traffic telematics -- Electronic fee collection -- Application interface definition for dedicated short-range communication
ISO/CD TS 14907-1	Road transport and traffic telematics -- Electronic fee collection -- Test procedures for user and fixed equipment -- Part 1: Description of test procedures

All standards_detailed

ISO/DIS 15622	Transport information and control systems -- Adaptive Cruise Control Systems -- Performance requirements and test procedures
ISO/DIS 17264	Road transport and traffic telematics -- Automatic vehicle and equipment identification -- Interfaces
ISO/DIS 17267	Navigation System Application Program Interface (API)
ISO/DIS 17386	Transport information and control systems -- Manoeuvring Aids for Low Speed Operation (MALSO) -- Performance requirements and test procedures
ISO/DIS 17573	Electronic fee collection -- Systems architecture for vehicle related tolling
ISO/NP TS 17574	Road transport and traffic telematics -- Electronic fee collection (EFC) -- Guidelines for EFC security protection profiles
ISO/CD TS 17575-1	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 1: Charging
ISO/CD TS 17575-2	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 2: Communication and connections to the lower layers
ISO/NP TS 17575-3	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 3: Provisions for updating on-board equipment (OBE)

All standards_detailed

- [ISO/NP TS 17575-4](#) Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 4: Roaming
- [ISO/NP TS 18234-7](#) Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 7: Packing information (PKI) application (TPEG-PKI_1.0/001)
- [ISO/NP TS 18234-8](#) Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 8: Congestion and Travel-Time Information (CTT) application (TPEC-CTT_1.0/001)
- [ISO/NP TS 18234-9](#) Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 9: Traffic Event Compact (TEC) application (TPEG-TEC_1.0/001)
- [ISO/NP TS 18234-10](#) Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 10: Weather information (WEA) application (TPEC-WEA_1.0/001)
- [ISO/DIS 21210](#) Intelligent transport systems -- Communications access for land mobiles (CALM) -- Networking Protocols
- [ISO/CD 21215](#) CALM-M5: Medium and long range, high speed, air interface parameters and protocols for broadcast, point-point, vehicle-vehicle, and vehicle-point communications in the ITS Sector using MICROWAVE COMMUNICATIONS at 5.8 GHz-5.9 GHz, including specifications for Master/Slave and Peer to Peer Communications

All standards_detailed

ISO/CD 21216-1	CALM-MM: Medium and long range, high speed, air interface parameters and protocols for broadcast, point-point, vehicle-vehicle, and vehicle-point communications in the ITS Sector using MILLIMETRE WAVE MOCROWAVE COMMUNICATIONS, including specifications for Master/Slave and Peer to Peer Communications -- Part 1: CALM Millimetre, Physical Layer CALM Millimetre, Physical Layer
ISO/DIS 21217	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Architecture
ISO/PRF 22178	Intelligent transport systems -- Low speed following (LSF) systems -- Performance requirements and test procedures
ISO/PRF 22179	Intelligent transport systems -- Full speed range adaptive cruise control (FSRA) systems -- Performance requirements and test procedures
ISO/DIS 22840	Intelligent transport systems -- Devices to aid reverse manoeuvres -- Extended range backing aid systems (ERBA)
ISO/DIS 24097-1	Using Web Services (machine-machine delivery) for ITS service delivery -- Part 1: Realization of interoperable web services
ISO/CD 24099	Navigation data delivery structure and protocol
ISO/DIS 24100	Privacy - the basic principles for probe personal data protection
ISO/CD 24101-2	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Application management -- Part 2: Conformance test
ISO/CD 24102	CALM Management
ISO/DIS 24103	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Media adapted interface layer (MAIL)
ISO/NP TS 24530-5	Traffic and Traveller Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 5: tpeg-pkiML

All standards_detailed

ISO/NP TS 24530-6	Traffic and Traveller Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 6: tpeg-pkiML
ISO/NP TS 24530-7	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 7: tpeg-weaML application
ISO/DIS 24534-1	Automatic vehicle and equipment identification -- Electronic Registration Identification (ERI) for vehicles -- Part 1: Architecture
ISO/DIS 24534-2	Automatic vehicle and equipment identification -- Electronic Registration Identification (ERI) for vehicles -- Part 2: Operational requirements
ISO/DIS 24534-3	Automatic vehicle and equipment identification -- Electronic Registration Identification (ERI) for vehicles -- Part 3: Vehicle data
ISO/DIS 24534-4	Automatic vehicle and equipment identification -- Electronic Registration Identification (ERI) for vehicles -- Part 4: Secure communications using asymmetrical techniques
ISO/DIS 24978	Intelligent transport systems -- ITS Safety and emergency messages using any available wireless media -- Data Registry procedures
ISO/WD TR 25103	Business justification for ITS Architecture
ISO/CD TR 25109	Example high level architecture elaboration : Emergency Call
ISO/DIS 25111	CALM using Public Networks -- General requirements
ISO/DIS 25112	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Mobile wireless broadband using IEEE 802.16e/IEEE 802.16g
ISO/DIS 25113	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Mobile wireless broadband using high capacity spatial division multiple access (HC-SDMA)
ISO/CD TS 25114	Probe Data Reporting Management

All standards_detailed

ISO/NP TR 26682	Crash and Emergency Notification Reference Architecture
ISO/NP 26999	Rules and Guidance for the use of Process (Functional) Oriented Methodology in ITS Standards, Data Registries and Data Dictionaries
ISO/NP TS 28701	Public Transport -- Identifications of Fixed Objects in Public Transport (IFOPT)
ISO/CD 29281	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Non-IP communication mechanisms
ISO/CD 29282	CALM Applications using Satellite
ISO/CD 29283	CALM - Mobile wireless broadband using HC-SDMA
ISO/NP 29284	Event based Probe Vehicle Data

Based on ESoP (European Statement of Principles)

ISO 4040:2001	Road vehicles - Location of hand controls,
ISO 16673:2007	Road vehicles -- Ergonomic aspects of transport information and control systems -- Occlusion method to assess visual demand due to the use of in-vehicle systems

ISO 16673:2007 provides a procedure for measuring visual demand due to the use of visual or visual-manual interfaces accessible to the driver while the vehicle is in motion. It applies to both Original Equipment Manufacturer (OEM) and After-Market in-vehicle systems. It applies to both permanently installed and portable systems. It applies to any means of visual occlusion and is not dependent on one specific physical implementation.

[ISO 20176:2006](#)

Road vehicles -- H-point machine (HPM II) -- Specifications and procedure for H-point determination

ISO 20176:2006 provides the specifications and procedures for using the H-point machine (HPM) to audit vehicle seating positions. The HPM is a physical tool used to establish key reference points and measurements in a vehicle. The H-point design tool (HPD) is a simplified CAD version of the HPM, which can be used in conjunction with the HPM to take the optional measurements specified in this document, or used independently during product design.

These H-point devices provide a method for reliable layout and measurement of occupant seating compartments and/or seats. ISO 20176:2006 specifies the procedures for using the H-point machine (HPM) to audit (verify) key reference points and measurements in a vehicle.

The devices are intended for application at designated seating positions. They are not to be construed as tools that measure or indicate occupant capabilities or comfort. They are not intended for use in defining or assessing temporary seating, such as folding jump seats.

[ISO 16121-4:2005](#)

Road vehicles -- Ergonomic requirements for the driver's workplace in line-service buses -- Part 4: Cabin environment

ISO 16121-4:2005 applies to the driver's workplace in low-floor line-service buses designed for the carriage of passengers, comprising more than eight seats in addition to the driver's seat, and having a maximum weight exceeding five metric tonnes and an overall width exceeding 2,30 m.

It gives the minimum requirements for the cabin environment.

[ISO 4513:2003](#)

Road vehicles -- Visibility -- Method for establishment of eyellipses for driver's eye location

ISO 4513:2003 specifies a method for establishing an eyellipse for locating driver's eyes inside a road vehicle for the purpose of measuring the driver's field of view. Elliptical (eyellipse) models in both two and three dimensions are used to represent 95th and 99th percentiles of driver eye locations. Its procedures, which differ depending on the type of vehicle considered, are applicable to passenger cars (and light trucks), and to buses and heavy vehicles, as defined in ISO 3833. The statistical representation of the driver's eye locations it provides can be used as a design tool for passenger cars (V-points can be used in lieu of the complete eyellipse to standardize the driver's field of view for regulation purposes).

[ISO 15008:2003](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle visual presentation

ISO 15008:2003 gives minimum specifications for the image quality and legibility of displays containing dynamic (changeable) visual information presented to the driver of a road vehicle by an on-board transport information and control system (TICS) used while the vehicle is in motion. These specifications are intended to be independent of display technologies, while test methods and measurements for assessing compliance with them have been included where necessary.

ISO 15008:2003 is applicable to mainly perceptual, and some basic cognitive, components of the visual information: these include character legibility and colour recognition. It is not applicable to other factors affecting performance and comfort such as coding, format and dialogue characteristics, nor to displays using the following: superimposed information on the external field (e.g. head-up displays), pictorial images (e.g. closed-circuit TV for reversing), maps and topographic representations (e.g. those for setting navigation systems), static information (e.g. control labels, telltales).

[ISO 15007-1:2002](#)

Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 1: Definitions and parameters

All standards_detailed

ISO/TS 15007-2:2001	Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 2: Equipment and procedures	This Technical Specification gives guidelines on equipment and procedures for analyzing driver visual behaviour, intended to enable assessors of Transport Information and Control Systems (TICS) to plan evaluation trials, specify (and install) data capture equipment, and analyse, interpret and report visual-behaviour metrics (standards of measurement). It is applicable to both road trials and simulated driving environments. It is not applicable to the assessment of head-up displays.
ISO 16673:2007	Road vehicles -- Ergonomic aspects of transport information and control systems -- Occlusion method to assess visual demand due to the use of in-vehicle systems	ISO 16673:2007 provides a procedure for measuring visual demand due to the use of visual or visual-manual interfaces accessible to the driver while the vehicle is in motion. It applies to both Original Equipment Manufacturer (OEM) and After-Market in-vehicle systems. It applies to both permanently installed and portable systems. It applies to any means of visual occlusion and is not dependent on one specific physical implementation.
ISO 16121-3:2005	Road vehicles -- Ergonomic requirements for the driver's workplace in line-service buses -- Part 3: Information devices and controls	ISO 16121-3:2005 applies to the driver's workplace in low-floor buses designed for the carriage of passengers, comprising more than eight seats in addition to the driver's seat, and having a maximum weight exceeding five metric tons and a maximum width exceeding 2,30 m. It gives the requirements for the location of information devices and controls.

All standards_detailed

[ISO 15006:2004](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle auditory presentation

ISO 15006:2004 establishes ergonomic specifications for the presentation of auditory information related to transport information and control systems (TICS) through speech or sounds. It is applicable only to the use of auditory displays when the vehicle is in motion. It presents a set of requirements and recommendations for in-vehicle auditory messages from TICS, and provides message characteristics and functional factors for maximizing message intelligibility and utility while helping prevent auditory or mental overload.

[ISO 2575:2004](#)

Road vehicles -- Symbols for controls, indicators and tell-tales

ISO 2575:2004 establishes symbols (i.e. conventional signs) for use on controls, indicators and telltales applying to passenger cars, light and heavy commercial vehicles and buses, to ensure identification and facilitate use. It also indicates the colours of possible optical tell-tales, which inform the driver of either correct operation or malfunctioning of the related devices.

[ISO 2575:2004/Amd 3:2008](#)

[ISO 2575:2004/Amd 1:2005](#)

[ISO 2575:2004/Amd 2:2006](#)

[ISO 7000:2004](#)

Graphical symbols for use on equipment -- Index and synopsis

ISO 7000:2004 provides a synopsis of those graphical symbols which are placed on equipment or parts of equipment of any kind in order to instruct the person(s) using the equipment as to its operation.

[IEC 80416-1:2008](#)

Basic principles for graphical symbols for use on equipment -- Part 1: Creation of graphical symbols for registration

IEC 80416-1:2008 provides basic principles and guidelines for the creation of graphical symbols for registration, and provides the key principles and rules for the preparation of title, description and note(s). This second edition cancels and replaces the first edition published in 2001. This edition constitutes a technical revision. This edition includes the following significant technical changes with respect to the previous edition:

- a) Clause 8 in the previous edition is moved to Clause 4;
- b) Mandatory requirement for the line width in symbol originals is changed to 2 mm or 4 mm (see 6th paragraph of 7.3);
- c) For negation of a graphical symbol, a single diagonal bar is allowed in addition to two diagonal bars at right angles;
- d) A new meaning of negation 'do not' is allowed;
- e) Some freedom is given for use of the basic pattern such as for symbol originals to be within the 75 mm square instead of the octagon;
- f) Annex A (normative) is newly introduced for provisions on title, description and notes;

[ISO 80416-4:2005](#)

Basic principles for graphical symbols for use on equipment -- Part 4: Guidelines for the adaptation of graphical symbols for use on screens and displays (icons)

ISO 80416-4:2005 provides guidelines for the adaptation of graphical symbols for use on screens and displays (icons) on a wide range of equipment, such as photocopiers, vehicle dashboards and home appliances. It also provides principles for maintaining the fidelity of icons to the original graphical symbols.

[IEC 80416-3:2002](#)

Basic principles for graphical symbols for use on equipment -- Part 3: Guidelines for the application of graphical symbols

IEC 80416-3:2002 provides guidelines for the application of graphical symbols for use on equipment in order to maintain visual clarity and overall consistency when such graphical symbols are applied. It stipulates the permissible extent by which a symbol original may be modified in reproduction for actual use on equipment.

[ISO/IEC 13251:2004](#) Collection of graphical symbols for office equipment

ISO/IEC 13251:2004 is a bilingual standard (English/French). It provides a certain number of graphical symbols that are typically used on office equipment such as computers, printers, telephones and copying machines.

It comprises four sections:

Section 1 giving general information, provisions and requirements about the use and application of graphical symbols;
Section 2 providing an alphabetical index, a numerical index and a graphical overview of all the graphical symbols described in Section 4 of the Standard;
Section 3 presenting the graphical symbols selected with the corresponding application, in numerical order;
Section 4 containing the symbol originals for reproduction purposes, in numerical order, with the position and size of each graphical symbol described.

Each graphical symbol in Section 3 of the Standard is specified with:

the symbol itself;
a number that is the application symbol number from the International Standard (ISO 7000 or IEC 60417) from which it is derived;
its definition;
a note for technical clarification when necessary.

[ISO/IEC 24752-5:2008](#) Information technology -- User interfaces -- Universal remote console -- Part 5: Resource description

ISO/IEC 24752 facilitates operation of information and electronic products through remote and alternative interfaces and intelligent agents.

ISO/IEC 24752-5:2008 defines a syntax for describing atomic resources, resource sheets, user interface implementation descriptions, resource services, and resource directories relevant to the user interface of a device or service ("target").

Annexes propose an example of atomic resource description, resource description framework (RDF) schema, and a sample resource sheet.

[ISO/IEC 24752-4:2008](#) Information technology -- User interfaces -- Universal remote console -- Part 4: Target description

ISO/IEC 24752 facilitates operation of information and electronic products through remote and alternative interfaces and intelligent agents.

ISO/IEC 24752-4:2008 defines an eXtensible Markup Language (XML) based language for the description of targets and their sockets, as used within the universal remote console framework for discovery purposes. A document conforming to this language is a target description.

Annexes propose an XML schema and an example of target descriptions.

[ISO/IEC 24752-3:2008](#) Information technology -- User interfaces -- Universal remote console -- Part 3: Presentation template

ISO/IEC 24752 facilitates operation of information and electronic products through remote and alternative interfaces and intelligent agents.

ISO/IEC 24752-3:2008 defines a language (presentation template markup language) for describing modality-independent user interface specifications, or presentation templates, associated with a user interface socket description as defined by ISO/IEC 24752-2.

The purpose of a presentation template is to provide the universal remote console (URC) defined in ISO/IEC 24752-1 with hints as to how to build a usable and consistent user interface for a target device or service that is described in a user interface socket description as referenced above. The hints are of an abstract nature, and are intended to apply to any delivery context. These hints primarily provide information on structuring, grouping and linearization of the socket elements.

[ISO/TS 16951:2004](#) Road vehicles -- Ergonomic aspects of transport information and control systems (TICS) -- Procedures for determining priority of on-board messages presented to drivers

Elements within a presentation template can be referenced by atomic resources whose format is given by ISO/IEC 24752-5. Taken together, a presentation template, socket description, and appropriate atomic resources can be used to construct a user interface. ISO/TS 16951:2004 provides formal procedures and two alternative methods for determining the priority of on-board messages presented to drivers of road vehicles by transport information and control systems (TICS), and other systems. It is applicable to the whole range of TICS in-vehicle messages, including traveller information, navigation, travel and traffic advisories, "yellow pages" information, warnings, systems status, emergency calling system information, and electronic toll/fee collection, as well as to messages from non-TICS sources such as telephone, warnings and telltales.

[ISO 15003:2006](#)

Agricultural engineering -- Electrical and electronic equipment -- Testing resistance to environmental conditions

ISO 15003:2006 provides design requirements and guidance for the manufacturers of electrical and electronic equipment for use in all kinds of mobile (including hand-held) agricultural machinery, forestry machinery, landscaping and gardening machinery. It gives tests for specific environmental conditions and defines severity levels for tests which relate to the environmental extremes that can be experienced in practical operation of the equipment.

[ISO 15005:2002](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Dialogue management principles and compliance procedures

This International Standard presents ergonomic principles for the design of the dialogues that take place between the driver of a road vehicle and the vehicle's transport information and control systems (TICS) while the vehicle is in motion. It also specifies compliance verification conditions for the requirements related to these principles.

This International Standard is applicable to TICSs consisting of either single or multiple devices, which can be either independent or interconnected. It is not applicable to TICSs without dialogues, TICS failures or malfunctions, or controls or displays used for non-TICS functions.

[ISO 17287:2003](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving

ISO 17287:2002 specifies a procedure for assessing whether specific TICS, or a combination of TICS with other in-vehicle systems, are suitable for use by drivers while driving. It addresses user-oriented TICS description and context of use, TICS task description and analysis, assessment process, and documentation.

The TICS description and context of use includes consideration of improper use, reasonably foreseeable misuse and TICS failure. The TICS description, analysis and assessment include a process for identifying and addressing suitability issues.

ISO 17287:2002 does not recommend specific variables for assessing suitability nor does it define criteria for establishing the suitability of use of a TICS Table while driving.

Economic Committee for Europe (UN/ECE) regulations which are recognised by the Community after its adhesion to the Revised Agreement of 1958 (see Council Decision 97/836/EC of 27.11.97):

[ISO 11429:1996](#)

Ergonomics -- System of auditory and visual danger and information signals

Specifies a system of danger and information signals taking into account the different degrees of urgency. Applicable to all danger and information signals which have to be clearly perceived and differentiated as specified in ISO/TR 12100-2. Does not apply to certain fields covered by specific standards.

[ISO 17287:2003](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving

ISO 17287:2002 specifies a procedure for assessing whether specific TICS, or a combination of TICS with other in-vehicle systems, are suitable for use by drivers while driving. It addresses user-oriented TICS description and context of use, TICS task description and analysis, assessment process, and documentation.

The TICS description and context of use includes consideration of improper use, reasonably foreseeable misuse and TICS failure. The TICS description, analysis and assessment include a process for identifying and addressing suitability issues.

ISO 17287:2002 does not recommend specific variables for assessing suitability nor does it define criteria for establishing the suitability of use of a TICS Table while driving.

ISO 9241-171:2008	Ergonomics of human-system interaction -- Part 171: Guidance on software accessibility	ISO 9241-171:2008 provides ergonomics guidance and specifications for the design of accessible software for use at work, in the home, in education and in public places. It covers issues associated with designing accessible software for people with the widest range of physical, sensory and cognitive abilities, including those who are temporarily disabled, and the elderly. It addresses software considerations for accessibility that complement general design for usability as addressed by ISO 9241-110, ISO 9241-11 to ISO 9241-17, ISO 14915 and ISO 13407. ISO 9241-171:2008 is applicable to the accessibility of interactive systems. It addresses a wide range of software (e.g. office, Web, learning support and library systems). It promotes the increased usability of systems for a wider range of users. While it does not cover the behaviour of, or requirements for, assistive technologies (including assistive software), it does address the use of assistive technologies as an integrated component of interactive systems.
ISO/TR 9241-309:2008	Ergonomics of human-system interaction -- Part 309: Organic light-emitting diode (OLED) displays	ISO/TR 9241-309:2008 gives guidelines for organic light-emitting diode (OLED) displays.
ISO/TR 9241-308:2008	Ergonomics of human-system interaction -- Part 308: Surface-conduction electron-emitter displays (SED)	ISO/TR 9241-308:2007 gives guidelines for surface-conduction electron-emitter displays (SED).
ISO 11064-5:2008	Ergonomic design of control centres -- Part 5: Displays and controls	ISO 11064-5:2008 presents principles and gives requirements and recommendations for displays, controls, and their interaction, in the design of control-centre hardware and software.

[ISO 14915-1:2002](#)

Software ergonomics for multimedia user interfaces -- Part 1: Design principles and framework

ISO 14915-1:2002 establishes design principles for multimedia user interfaces and provides a framework for handling the different considerations involved in their design. It addresses user interfaces for applications that incorporate, integrate and synchronize different media. This includes static media such as text, graphics or images, and dynamic media such as audio, animation, video or media related to other sensory modalities. Detailed design issues within a single medium (e.g. the graphical design of an animation sequence) are only addressed as far as they imply ergonomic consequences for the user.

ISO 14915-1:2002 gives requirements and recommendations for the ergonomic design of multimedia applications mainly intended for professional and vocational activities such as work or learning. It does not specifically address applications outside this area, such as entertainment, although some recommendations can also be applicable in such domains.

[ISO 14915-2:2003](#)

Software ergonomics for multimedia user interfaces -- Part 2: Multimedia navigation and control

ISO 14915-1:2002 is applicable to software aspects related to ISO 14915-2:2003 provides recommendations and requirements for the design of multimedia user interfaces with respect to the following aspects: design of the organization of the content, navigation and media-control issues. ISO 14915-2:2003 is limited to the design of the organization of the content and does not deal with the design of the content in general. Design issues within a single medium (e.g. the lighting of a film sequence) are only addressed with respect to the ergonomic issues related to user controls.

All standards_detailed

[ISO 14915-3:2002](#)

Software ergonomics for multimedia user interfaces -- Part 3: Media selection and combination

ISO 14915-3:2002 gives recommendations for, and guidance on, the design, selection and combination of interactive user interfaces that integrate and synchronize different media. It addresses user interfaces for applications that incorporate, integrate and synchronize different media. This includes static media such as text, graphics, images; and dynamic media such as audio, animation, video or media related to other sensory modalities. Detailed design issues within a single medium (e.g. the graphical design of an animation sequence) are only addressed as far as they imply ergonomic consequences for the user.

[ISO/TR 16982:2002](#)

Ergonomics of human-system interaction -- Usability methods supporting human-centred design

ISO/TR 16982:2002 provides information on human-centred usability methods which can be used for design and evaluation. It details the advantages, disadvantages and other factors relevant to using each usability method.

It explains the implications of the stage of the life cycle and the individual project characteristics for the selection of usability methods and provides examples of usability methods in context.

The main users of ISO/TR 16982:2002 will be project managers. It therefore addresses technical human factors and ergonomics issues only to the extent necessary to allow managers to understand their relevance and importance in the design process as a whole.

Such issues are dealt with more fully in ISO 9241 which is complementary to ISO/TR 16982:2002 and is aimed at system developers, specifiers and purchasers of systems. Nonetheless, all parties involved in human-centred system development, including the end users of systems, should find the guidance in ISO/TR 16982:2002 relevant.

The guidance in ISO/TR 16982:2002 can be tailored for specific design situations by using the lists of issues characterizing the context

All standards_detailed

[ISO 9355-1:1999](#)

Ergonomic requirements for the design of displays and control actuators -- Part 1: Human interactions with displays and control actuators

[ISO 9355-2:1999](#)

Ergonomic requirements for the design of displays and control actuators -- Part 2: Displays

[ISO 9355-3:2006](#)

Ergonomic requirements for the design of displays and control actuators -- Part 3: Control actuators

ISO 9355-3:2006 gives ergonomic requirements for, and guidance on, the selection, design and location of control actuators adapted to the needs of the operator, suitable for the control task in question and taking account of the circumstances of their use. It is applicable to manual control actuators used in equipment for both occupational and private use.

[ISO/IEC 11581-5:2004](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 5: Tool icons

ISO/IEC 11581 defines graphical symbols for use on a screen, which users can manipulate and interact with. They are part of a graphical interface that can facilitate the user's ability to learn, understand and remember functional elements of the system, and aid in the manipulation of these elements. Their purpose is to facilitate interaction between computer-based applications (software products) and users.

ISO/IEC 11581-5:2004 describes user interaction with and appearance of tool icons on the screen. These tool icons are a subset of the interactive icons that modify graphical or text elements of an application by association with real-life tool objects. These icons represent tool functions such as drawing, painting or modifying graphical elements. ISO/IEC 11581-5:2004 contains requirements and recommendations for 21 commonly used tool icons. It also specifies the relationship between tool and pointer icons.

[ISO/IEC 24738:2006](#) Information technology -- Icon symbols and functions for multimedia link attributes

ISO/IEC 24738:2006 defines a consistent set of icon symbols and related attributes that are presented on a computer screen and with which users interact to decide whether or not to take the associated link. These symbols represent attributes of the link and/or the destination of the link.

Link attribute icon symbols enable users to decide on the suitability of following associated hyperlinks. Information provided by these icon symbols may also be made available via text.

ISO/IEC 24738:2006 provides guidance on the graphics to be used by implementers of ISO 14915-2, Software ergonomics for multimedia user interfaces -- Multimedia navigation and control.

The icon symbol graphics included in ISO/IEC 24738:2006 have been selected on the basis of their ability to convey the desired information to a wide audience of users.

ISO/IEC 24738:2006 applies to icons that are shown on a computer screen in conjunction with a link also shown on that screen. It describes user interaction with and the appearance of link attribute icons on the screen. Other forms of icons are covered in ISO/IEC 115

[ISO/IEC 24752-5:2008](#) Information technology -- User interfaces -- Universal remote console -- Part 5: Resource description

ISO/IEC 24752 facilitates operation of information and electronic products through remote and alternative interfaces and intelligent agents.

ISO/IEC 24752-5:2008 defines a syntax for describing atomic resources, resource sheets, user interface implementation descriptions, resource services, and resource directories relevant to the user interface of a device or service ("target").

Annexes propose an example of atomic resource description, resource description framework (RDF) schema, and a sample resource sheet.

[ISO/IEC 24752-4:2008](#) Information technology -- User interfaces -- Universal remote console -- Part 4: Target description

ISO/IEC 24752 facilitates operation of information and electronic products through remote and alternative interfaces and intelligent agents.

ISO/IEC 24752-4:2008 defines an eXtensible Markup Language (XML) based language for the description of targets and their sockets, as used within the universal remote console framework for discovery purposes. A document conforming to this language is a target description.

Annexes propose an XML schema and an example of target descriptions.

[ISO/IEC 24752-3:2008](#) Information technology -- User interfaces -- Universal remote console -- Part 3: Presentation template

ISO/IEC 24752 facilitates operation of information and electronic products through remote and alternative interfaces and intelligent agents.

ISO/IEC 24752-3:2008 defines a language (presentation template markup language) for describing modality-independent user interface specifications, or presentation templates, associated with a user interface socket description as defined by ISO/IEC 24752-2.

The purpose of a presentation template is to provide the universal remote console (URC) defined in ISO/IEC 24752-1 with hints as to how to build a usable and consistent user interface for a target device or service that is described in a user interface socket description as referenced above. The hints are of an abstract nature, and are intended to apply to any delivery context. These hints primarily provide information on structuring, grouping and linearization of the socket elements.

Elements within a presentation template can be referenced by atomic resources whose format is given by ISO/IEC 24752-5. Taken together, a presentation template, socket description, and appropriate atomic resources can be used to construct a user interface.

All standards_detailed

- [ISO/IEC 11581-6:1999](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 6: Action icons
- [ISO/IEC 11581-1:2000](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 1: Icons -- General
- [ISO/IEC 11581-2:2000](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 2: Object icons
- [ISO/IEC 11581-3:2000](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 3: Pointer icons
- [ISO/IEC 11581-5:2004](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 5: Tool icons

ISO/IEC 11581 defines graphical symbols for use on a screen, which users can manipulate and interact with. They are part of a graphical interface that can facilitate the user's ability to learn, understand and remember functional elements of the system, and aid in the manipulation of these elements. Their purpose is to facilitate interaction between computer-based applications (software products) and users.

ISO/IEC 11581-5:2004 describes user interaction with and appearance of tool icons on the screen. These tool icons are a subset of the interactive icons that modify graphical or text elements of an application by association with real-life tool objects. These icons represent tool functions such as drawing, painting or modifying graphical elements. ISO/IEC 11581-5:2004 contains requirements and recommendations for 21 commonly used tool icons. It also specifies the relationship between tool and pointer icons.

TABLE 3:
Relevant standards for nomadic devices
short



Deliverable n.	12M	
Sub Project	SP n.4	Evaluation & assessment
Workpackag	WP n.4.8	Benchmarking from the consumer point of view
Task n.	T n. 4.8.1	Review of earlier consumer tests and European standards
Author(s)	S. Grabmaier	C. Gauss
	File name	TeleFOT_4.8.1_Review of consumer tests and standards_v2.doc
Status	Draft	
Distribution	Public (PU)	
Issue date	09.06.2009	Creation date: 10.07.2009

Relevant standards for nomadic devices_short

ISO	SC	Content (original language)
		Road Vehicle - Economics applicable to road vehicles - Transport information and control systems, on-board man-machine interface
	TC 22	
	SC 3	Electrical and electronic equipment
	ISO 7637-1:2002	Road vehicles -- Electrical disturbances from conduction and coupling -- Part 1: Definitions and general considerations
	ISO 7637-2:2004	Road vehicles -- Electrical disturbances from conduction and coupling -- Part 2: Electrical transient conduction along supply lines only
	ISO 7637-3:2007	Road vehicles -- Electrical disturbances from conduction and coupling -- Part 3: Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines
	ISO 8092-1:1996	Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 1: Tabs for single-pole connections -- Dimensions and specific requirements
	ISO 8092-2:2005	Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 2: Definitions, test methods and general performance requirements
	ISO 8092-3:1996	Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 3: Tabs for multi-pole connections -- Dimensions and specific requirements
	ISO 8092-4:1997	Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 4: Pins for single- and multi-pole connections -- Dimensions and specific requirements
	ISO 8093:1985	Road vehicles -- Diagnostic testing of electronic systems
	ISO 11519-1:1994	Road vehicles -- Low-speed serial data communication -- Part 1: General and definitions
	ISO 11519-3:1994	Road vehicles -- Low-speed serial data communication -- Part 3: Vehicle area network (VAN)
	ISO 11519-3:1994/Amd 1:1995	
	ISO 11748-1:2001	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 1: Content of exchanged documents
	ISO 11748-2:2001	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 2: Documentation agreement
	ISO 11748-3:2002	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 3: Application example
	ISO 15031-1:2001	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 1: General information
	ISO/TR 15031-2:2004	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 2: Terms, definitions, abbreviations and acronyms
	ISO 15031-3:2004	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 3: Diagnostic connector and related electrical circuits, specification and use
	ISO 15170-1:2001	Road vehicles -- Four-pole electrical connectors with pins and twist lock -- Part 1: Dimensions and classes of application

	ISO 15170-2:2001	Road vehicles -- Four-pole electrical connectors with pins and twist lock -- Part 2: Tests and requirements
	ISO 17356-1:2005	Road vehicles -- Open interface for embedded automotive applications -- Part 1: General structure and terms, definitions and abbreviated terms
	ISO 17356-2:2005	Road vehicles -- Open interface for embedded automotive applications -- Part 2: OSEK/VDX specifications for binding OS, COM and NM
	ISO 17356-4:2005	Road vehicles -- Open interface for embedded automotive applications -- Part 4: OSEK/VDX Communication (COM)
	ISO/TS 21609:2003	Road vehicles -- (EMC) guidelines for installation of aftermarket radio frequency transmitting equipment
SC 13	ISO 3958:1996	Ergonomics applicable to road vehicles Passenger cars -- Driver hand-control reach
	ISO 4040:2001	Road vehicles -- Location of hand controls, indicators and tell-tales in motor vehicles
	ISO/TR 9511:1991	Road vehicles -- Driver hand-control reach -- In-vehicle checking procedure
	ISO 15005:2002	Road vehicles -- Ergonomic aspects of transport information and control systems -- Dialogue management principles and compliance procedures
	ISO 15006:2004	Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle auditory presentation
	ISO 15007-1:2002	Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 1: Definitions and parameters
	ISO/TS 15007-2:2001	Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 2: Equipment and procedures
	ISO 15008:2003	Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle visual presentation
	ISO/TR 16352:2005	Road vehicles -- Ergonomic aspects of in-vehicle presentation for transport information and control systems -- Warning systems
	ISO 16673:2007	Road vehicles -- Ergonomic aspects of transport information and control systems -- Occlusion method to assess visual demand due to the use of in-vehicle systems
	ISO/TS 16951:2004	Road vehicles -- Ergonomic aspects of transport information and control systems (TICS) -- Procedures for determining priority of on-board messages presented to drivers
SC 17	ISO 17287:2003	Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving
	ISO 4513:2003	Visibility Road vehicles -- Visibility -- Method for establishment of eyellipses for driver's eye location
	ISO 7397-1:1993	Passenger cars -- Verification of driver's direct field of view -- Part 1: Vehicle positioning for static measurement
	ISO 7397-2:1993	Passenger cars -- Verification of driver's direct field of view -- Part 2: Test method
SC 21	ISO 6469-1:2001	Electrically propelled road vehicles Electric road vehicles -- Safety specifications -- Part 1: On-board electrical energy storage
	ISO 6469-2:2001	Electric road vehicles -- Safety specifications -- Part 2: Functional safety means and protection against failures
	ISO 6469-3:2001	Electric road vehicles -- Safety specifications -- Part 3: Protection of persons against electric hazards
	ISO 8713:2005	Electric road vehicles -- Vocabulary
	ISO 8714:2002	Electric road vehicles -- Reference energy consumption and range -- Test procedures for passenger cars and light commercial vehicles
TC 204		Intelligent transport systems
	ISO 14813-1:2007	Intelligent transport systems -- Reference model architecture(s) for the ITS sector -- Part 1: ITS service domains, service groups and services
	ISO/TR 14813-4:2000	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 4: Reference model tutorial
	ISO/TR 14813-5:1999	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 5: Requirements for architecture description in TICS standards
	ISO/TR 14813-6:2000	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 6: Data presentation in ASN.1

ISO 14819-1:2003	Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 1: Coding protocol for Radio Data System -- Traffic Message Channel (RDS-TMC) using ALERT-C
ISO 14819-2:2003	Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 2: Event and information codes for Radio Data System -- Traffic Message Channel (RDS-TMC)
ISO 14819-3:2004	Traffic and Travel Information (TTI) -- TTI messages via traffic message coding - Part 3: Location referencing for ALERT-C
ISO 14819-6:2006	Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 6: Encryption and conditional access for the Radio Data System -- Traffic Message Channel ALERT C coding
ISO 14825:2004	Intelligent transport systems -- Geographic Data Files (GDF) -- Overall data specification
ISO 15075:2003	Transport information and control systems -- In-vehicle navigation systems -- Communications message set requirements
ISO/TS 17261:2005	Intelligent transport systems - Automatic vehicle and equipment identification -- Intermodal goods transport architecture and terminology
ISO/TR 17384:2008	Intelligent transport systems -- Interactive centrally determined route guidance (CDRG) -- Air interface message set, contents and format
ISO 17387:2008	Intelligent transport systems -- Lane change decision aid systems (LCDAS) -- Performance requirements and test procedures
ISO 17572-1:2008	Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 1: General requirements and conceptual model
ISO 17572-2:2008	Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 2: Pre-coded location references (pre-coded profile)
ISO 17572-3:2008	Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 2: Pre-coded location references (pre-coded profile)
ISO 17572-3:2008	Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 3: Dynamic location references (dynamic profile)
ISO/PAS 17684:2003	Transport information and control systems -- In-vehicle navigation systems -- ITS message set translator to ASN.1 format definitions
ISO 17687:2007	Transport Information and Control Systems (TICS) -- General fleet management and commercial freight operations -- Data dictionary and message sets for electronic identification and monitoring of hazardous materials/dangerous goods transportation
ISO/TS 18234-4:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 4: Road Traffic Message (RTM) application
ISO 21212:2008	Intelligent transport systems -- Communications access for land mobiles (CALM) -- 2G Cellular systems
ISO 21213:2008	Intelligent transport systems -- Communications access for land mobiles (CALM) -- 3G Cellular systems
ISO/TR 24529:2008	Intelligent transport systems -- Systems architecture -- Use of unified modelling language (UML) in ITS International Standards and deliverables
ISO/TS 24530-1:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 1: Introduction, common data types and tpegML
ISO/TS 24530-2:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 2: tpeg-locML
ISO/TS 24530-3:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 3: tpeg-rtmML
ISO/TS 24530-4:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 4: tpeg-ptiML

Subcommittees/Working Groups

WG 10	Traveller information systems
WG 11	Route guidance and navigation systems
WG 14	Vehicle/roadway warning and control systems
WG 16	Wide area communications/protocols and interfaces
WG 17	Nomadic Devices in ITS Systems

drafts and new work items of TC 204

ISO/AWI TR 10992	Nomadic Devices to support ITS Service and Multimedia Provision in Vehicles Communications Access for Land Mobiles: high speed, air interface parameters and protocols for broadcast, point-point, vehicle-vehicle, and vehicle-point communications in the ITS Sector using IEEE802.11 Wireless LAN standard in normal operational modes
ISO/WD 11915	

ISO/CD TR 12859	Intelligent Transport Systems -System Architecture - Data Privacy Aspects of ITS
ISO/NP 13181-1	Intelligent Transport Systems - Communications Access for Land Mobiles (CALM) - Security -- Part 1: Framework
ISO/NP 13181-3	Intelligent Transport Systems - Communications Access for Land Mobiles (CALM) - Security -- Part 3: Objectives and Requirements
ISO/NP 13183	Communications access for land mobiles (CALM) - CALM receiving public broadcast communications
ISO/NP TS 13184	Real-time decision support system at all-way stop control intersections via nomadic and mobile devices
ISO/NP TS 13185	Vehicle Interface for Provisioning and Support of ITS Services
	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 5: Requirements for architecture description in TICS standards
ISO/DIS 14813-5	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 6: Data presentation in ASN.1
ISO/DIS 14813-6	Road transport and traffic telematics -- Electronic fee collection -- Application interface definition for dedicated short-range communication
ISO/DIS 14906	
ISO/CD TS 14907-1	Road transport and traffic telematics -- Electronic fee collection -- Test procedures for user and fixed equipment -- Part 1: Description of test procedures
ISO/DIS 17267	Navigation System Application Program Interface (API)
	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 1: Charging
ISO/CD TS 17575-1	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 2: Communication and connections to the lower layers
ISO/CD TS 17575-2	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 3: Provisions for updating on-board equipment (OBE)
ISO/NP TS 17575-3	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 4: Roaming
ISO/NP TS 17575-4	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 8: Congestion and Travel-Time Information (CTT) application (TPEC-CTT_1.0/001)
ISO/NP TS 18234-8	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 9: Traffic Event Compact (TEC) application (TPEG-TEC_1.0/001)
ISO/NP TS 18234-9	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 10: Weather information (WEA) application (TPEG-WEA_1.0/001)
ISO/NP TS 18234-10	
ISO/CD 24099	Navigation data delivery structure and protocol
ISO/DIS 24978	Intelligent transport systems -- ITS Safety and emergency messages using any available wireless media -- Data Registry procedures
ISO/CD TR 25109	Example high level architecture elaboration : Emergency Call
ISO/DIS 25112	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Mobile wireless broadband using IEEE 802.16e/IEEE 802.16g
	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Mobile wireless broadband using high capacity spatial division multiple access (HC-SDMA)
ISO/DIS 25113	Crash and Emergency Notification Reference Architecture
ISO/NP TR 26682	Rules and Guidance for the use of Process (Functional) Oriented Methodology in ITS Standards, Data Registries and Data Dictionaries
ISO/NP 26999	CALM Applications using Satellite
ISO/CD 29282	CALM - Mobile wireless broadband using HC-SDMA
ISO/CD 29283	

Based on ESOP

ISO 4040:2001	Road vehicles - Location of hand controls, indicators and tell-tales in motor vehicles
	Road vehicles -- Ergonomic aspects of transport information and control systems -- Occlusion method to assess visual demand due to the use of in-vehicle systems
ISO 16673:2007	Road vehicles -- H-point machine (HPM II) -- Specifications and procedure for H-point determination
ISO 20176:2006	Road vehicles -- Visibility -- Method for establishment of eyellipses for driver's eye location
ISO 4513:2003	

ISO 15008:2003	Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle visual presentation
ISO/TS 15007-2:2001	Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 2: Equipment and procedures
ISO 16673:2007	Road vehicles -- Ergonomic aspects of transport information and control systems -- Occlusion method to assess visual demand due to the use of in-vehicle systems
ISO 15006:2004	Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle auditory presentation
ISO 2575:2004	Road vehicles -- Symbols for controls, indicators and tell-tales
ISO 2575:2004/Amd 3:2008	
ISO 2575:2004/Amd 1:2005	
ISO 2575:2004/Amd 2:2006	
ISO 7000:2004	Graphical symbols for use on equipment -- Index and synopsis
IEC 80416-1:2008	Basic principles for graphical symbols for use on equipment -- Part 1: Creation of graphical symbols for registration
ISO 80416-4:2005	Basic principles for graphical symbols for use on equipment -- Part 4: Guidelines for the adaptation of graphical symbols for use on screens and displays (icons)
IEC 80416-3:2002	Basic principles for graphical symbols for use on equipment -- Part 3: Guidelines for the application of graphical symbols
ISO/IEC 13251:2004	Collection of graphical symbols for office equipment
ISO/TS 16951:2004	Road vehicles -- Ergonomic aspects of transport information and control systems (TICS) -- Procedures for determining priority of on-board messages presented to drivers
ISO 15005:2002	Road vehicles -- Ergonomic aspects of transport information and control systems -- Dialogue management principles and compliance procedures
ISO 17287:2003	Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving

Economic Committee for Europe (UN/ECE) regulations which are recognised by the Community after its adhesion to the Revised Agreement of 1958 (see Council Decision 97/836/EC of 27.11.97):

ISO 11429:1996	Ergonomics -- System of auditory and visual danger and information signals
ISO 17287:2003	Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving
ISO/TR 9241-308:2008	Ergonomics of human-system interaction -- Part 308: Surface-conduction electron-emitter displays (SED)
ISO 11064-5:2008	Ergonomic design of control centres -- Part 5: Displays and controls
ISO 14915-1:2002	Software ergonomics for multimedia user interfaces -- Part 1: Design principles and framework
ISO 14915-2:2003	Software ergonomics for multimedia user interfaces -- Part 2: Multimedia navigation and control
ISO 14915-3:2002	Software ergonomics for multimedia user interfaces -- Part 3: Media selection and combination
ISO/TR 16982:2002	Ergonomics of human-system interaction -- Usability methods supporting human-centred design
ISO 9355-1:1999	Ergonomic requirements for the design of displays and control actuators -- Part 1: Human interactions with displays and control actuators
ISO 9355-2:1999	Ergonomic requirements for the design of displays and control actuators -- Part 2: Displays
ISO 9355-3:2006	Ergonomic requirements for the design of displays and control actuators -- Part 3: Control actuators
ISO/IEC 11581-5:2004	Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 5: Tool icons
ISO/IEC 24738:2006	Information technology -- Icon symbols and functions for multimedia link attributes
ISO/IEC 11581-6:1999	Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 6: Action icons
ISO/IEC 11581-1:2000	Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 1: Icons -- General
ISO/IEC 11581-2:2000	Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 2: Object icons
ISO/IEC 11581-3:2000	Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 3: Pointer icons
ISO/IEC 11581-5:2004	Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 5: Tool icons

TABLE 4:
Relevant standards for nomadic devices
detailed



Deliverable n.	12M	
Sub Project	SP n.4	Evaluation & assessment
Workpackage	WP n.4.8	Benchmarking from the consumer point of view
Task n.	T n. 4.8.1	Review of earlier consumer tests and European standards
Author(s)	S. Grabmaier	C. Gauss
	File name	TeleFOT_4.8.1_Review of consumer tests and standards_v2.doc
Status	Draft	
Distribution	Public (PU)	
Issue date	09.06.2009	Creation date: 10.07.2009

Relevant standards for nomadic devices_detailed

ISO	SC	Content (original language)
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Relevant standards for nomadic devices_detailed

ISO	Road Vehicle - Economics applicable to road vehicles - Transport information and control systems, on-board man-machine interface	All questions of standardization concerning compatibility, interchangeability and safety, with particular reference to terminology and test procedures (including the characteristics of instrumentation) for evaluating the performance of the following types of road vehicles and their equipment as defined in the relevant items of Article 1 of the convention on Road Traffic, Vienna in 1968 concluded under the auspices of the United Nations: mopeds (item m); motor cycles (item n); motor vehicles (item p); trailers (item q); semi-trailers (item r); light trailers (item s); combination vehicles (item t); articulated vehicles (item u).
<u>TC 22</u>	Electrical and electronic equipment Road vehicles -- Electrical disturbances from conduction and coupling -- Part 1: Definitions and general considerations	This part of ISO 7637 defines the basic terms relating to electrical disturbances from conduction and coupling used in its other parts, and gives general information on the whole of ISO 7637 and common to all parts.
<u>SC 3</u>	<u>ISO 7637-1:2002</u>	ISO 7637-2:2004 specifies bench tests for testing the compatibility to conducted electrical transients of equipment installed on passenger cars and light commercial vehicles fitted with a 12 V electrical system or commercial vehicles fitted with a 24 V electrical system -- for both injection and the measurement of transients. Failure mode severity classification for immunity to transients is also given. It is applicable to these types of road vehicle, independent of the propulsion system (e.g. spark ignition or diesel engine, or electric motor).
	<u>ISO 7637-1:2002/Amd 1:2008</u>	
	<u>ISO 7637-2:2004</u>	
	<u>ISO 7637-2:2004/Amd 1:2008</u>	

Relevant standards for nomadic devices_detailed

[ISO 7637-3:2007](#)

Road vehicles -- Electrical disturbances from conduction and coupling -- Part 3: Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines

ISO 7637-3:2007 establishes a bench top test for the evaluation of the immunity of devices under test (DUTs) to transient transmission by coupling via lines other than supply lines. The test transient pulses simulate both fast and slow transient disturbances, such as those caused by the switching of inductive loads and relay contact bounce.

Three test methods are described in ISO 7637-3:2007:

the capacitive coupling clamp (CCC) method;
the direct capacitive coupling (DCC) method; and
the inductive coupling clamp (ICC) method.

Only one test method need be selected for slow transients and only one method need be selected for fast transients.

ISO 7637-3:2007 applies to road vehicles fitted with nominal 12 V, 24 V or 42 V electrical systems.

For transient immunity, Annex B provides recommended test severity levels in line with the functional performance status classification (FPSC) principle described in ISO 7637-1.

[ISO 8092-1:1996](#)

Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 1: Tabs for single-pole connections -- Dimensions and specific requirements

Gives dimensions for the tabs of single-pole connections and specific requirements, for on-board electrical wiring harnesses of road vehicles. Does apply to connections designed to be disconnected after mounting in the vehicle for the purposes of repair and/or maintenance only.

Relevant standards for nomadic devices_detailed

[ISO 8092-2:2005](#)

Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 2: Definitions, test methods and general performance requirements

ISO 8092:2005 defines terms and specifies test methods and general performance requirements for single-pole and multi-pole connections used with on-board electrical wiring harnesses of road vehicles.

It is applicable to connectors designed to be disconnected after mounting in the vehicle for repair and maintenance only. It does not cover one-part connections, i.e. where one part of the connection has direct contact to the pattern of the printed circuit board.

ISO 8092:2005 is not applicable to internal connections of electronic devices.

[ISO 8092-3:1996](#)

Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 3: Tabs for multi-pole connections -- Dimensions and specific requirements

Gives dimensions for the tabs of multi-pole connections and specific requirements, for on-board electrical wiring harnesses of road vehicles. Does apply to connections designed to be disconnected after mounting in the vehicle for the purposes of repair and/or maintenance only.

[ISO 8092-4:1997](#)

Road vehicles -- Connections for on-board electrical wiring harnesses -- Part 4: Pins for single- and multi-pole connections -- Dimensions and specific requirements

Specifies dimensions for the pins of single- and multi-pole connections and specific requirements, for on-board electrical wiring harnesses of road vehicles. Applies to connections designed to be disconnected after mounting in the vehicle in the case of repair and/or maintenance only.

[ISO 8093:1985](#)

Road vehicles -- Diagnostic testing of electronic systems

Defines diagnostic provisions applicable to electronic systems in road vehicles. Applies to electronic systems including electronic modules, associated input sensors, output actuators and indicators. The measurement ranges specified exclude certain devices for which specific test equipment is required. Does not apply to those systems which have built-in diagnostic capabilities and do not require compatibility with off-board equipment.

Relevant standards for nomadic devices_detailed

ISO 11519-1:1994	Road vehicles -- Low-speed serial data communication -- Part 1: General and definitions	Specifies general definitions for low-speed serial data communication up to 125 kbit/s for road vehicle applications. The object is to define the general architecture of the communication network and the content of the data link layer and the physical layer for transmission between the different types of electronic modules on board road vehicles. Parts 2, 3 and 4 are entirely independent.
ISO 11519-3:1994	Road vehicles -- Low-speed serial data communication -- Part 3: Vehicle area network (VAN)	Specifies the data link layer and the physical layer of the VAN, a communications network up to 125 kbit/s, for road vehicle application. The VAN is an access-method oriented multimaster-multislave which allows optimized request/response management by special method of handling a remote transmission request (retaining access to the medium to allow insertion of a response). Defines the general architecture of the network and the content of the data link layer, and the physical layer for transmission between different types of electronic modules on board road vehicles.
ISO 11519-3:1994/Amd 1:1995		Inserts a new page v and a new introduction. Adds, on page 79, a new clause before clause 8.
ISO 11748-1:2001	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 1: Content of exchanged documents	
ISO 11748-2:2001	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 2: Documentation agreement	
ISO 11748-3:2002	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 3: Application example	This part of ISO 11748 provides an application example of the guidelines and specifications for technical documentation given in ISO 11748-1 and ISO 11748-2. The example is based on the standard generalized markup language (SGML), which is specified in ISO 8879.
ISO 15031-1:2001	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 1: General information	

Relevant standards for nomadic devices_detailed

ISO/TR 15031-2:2004	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 2: Terms, definitions, abbreviations and acronyms	ISO/TR 15031-2 is a guide to terms, definitions, abbreviations and acronyms used in emissions-related diagnostics, with respect to the communication between road vehicles and external equipment used in that field. It also specifies a procedure for constructing new terms. As it gives recommended usage of diagnostic terms applicable to electrical/electronic systems, it also makes reference to related mechanical terms, definitions, abbreviations, and acronyms.
ISO 15031-3:2004	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 3: Diagnostic connector and related electrical circuits, specification and use	ISO 15031-3:2004 specifies a minimum set of requirements for a diagnostic connector used in communication between vehicle and external test equipment for emissions-related diagnostics. Its aim is to promote the use of a common diagnostic connector throughout the motor vehicle industry. The diagnostic connection consists of two mating connectors, the vehicle connector and the external test equipment connector. Applicable to all types of road vehicles, the connector specified has no positive locking feature and is intended for short-term diagnostic connection only.
ISO 15170-1:2001	Road vehicles -- Four-pole electrical connectors with pins and twist lock -- Part 1: Dimensions and classes of application	
ISO 15170-2:2001	Road vehicles -- Four-pole electrical connectors with pins and twist lock -- Part 2: Tests and requirements	
ISO 17356-1:2005	Road vehicles -- Open interface for embedded automotive applications -- Part 1: General structure and terms, definitions and abbreviated terms	ISO 17356-1:2005 outlines the general structure of, and defines terms and abbreviations used in relation to, the specification of the software open interface for embedded automotive applications given by the other parts of ISO 17356.
ISO 17356-2:2005	Road vehicles -- Open interface for embedded automotive applications -- Part 2: OSEK/VDX specifications for binding OS, COM and NM	ISO 17356-2:2005 gives the OSEK/VDX specifications for binding the OS (operating system), COM (communications) and NM (network management) of the open interface for embedded automotive applications. It specifies the variables (error codes, status types, etc.) programmable by the user to ensure that implementation of OS, COM and NM are coherent between each other.

Relevant standards for nomadic devices_detailed

[ISO 17356-4:2005](#)

Road vehicles -- Open interface for embedded automotive applications -- Part 4: OSEK/VDX Communication (COM)

ISO 17356-4:2005 (COM) specifies a uniform communication environment for automotive control unit (ECU) application software.

In ISO 17356-4:2005 , the specification increases the portability of application software modules by defining common software communication interfaces and behaviours for internal communication (communication within an ECU) and external communication (communication between networked vehicle nodes), which is independent of the used communication protocol.

[ISO/TS 21609:2003](#)

Road vehicles -- (EMC) guidelines for installation of aftermarket radio frequency transmitting equipment

ISO 21609:2003 gives requirements and recommendations for the installation in road vehicles of radio frequency transmitting and receiving equipment, "in-road-vehicle" mounting kits for transportable and handheld RF equipment, and ancillary equipment associated with these. As well as methods for installation, it establishes methods for minimizing the possibility of electromagnetic interference (EMI) between the installed equipment and the vehicle electrical and electronic systems.

[SC 13](#)

[ISO 3958:1996](#)

Ergonomics applicable to road vehicles
Passenger cars -- Driver hand-control reach

Specifies the boundaries of hand-reach of passenger car hand-control locations that can be reached by different proportions of male and female driver populations. Directs towards the initial design states of a new vehicle programme. Replaces the first edition.

[ISO 4040:2001](#)

Road vehicles -- Location of hand controls, indicators and tell-tales in motor vehicles

Relevant standards for nomadic devices_detailed

ISO/TR 9511:1991	Road vehicles -- Driver hand-control reach -- In-vehicle checking procedure	Defines a method for determination of the position of driver hand-controls in vehicles and for verification that the controls lie within the hand-reach envelopes. Applies for checking purposes in road vehicles using the actual dimensions of the vehicle. It refers directly to left-hand drive motor vehicles. Application to right-hand drive vehicles is assumed to be symmetrically opposite. The hand-reach envelopes are described in ISO 3958.
ISO 15005:2002	Road vehicles -- Ergonomic aspects of transport information and control systems -- Dialogue management principles and compliance procedures	<p>This International Standard presents ergonomic principles for the design of the dialogues that take place between the driver of a road vehicle and the vehicle's transport information and control systems (TICS) while the vehicle is in motion. It also specifies compliance verification conditions for the requirements related to these principles.</p> <p>This International Standard is applicable to TICSs consisting of either single or multiple devices, which can be either independent or interconnected. It is not applicable to TICSs without dialogues, TICS failures or malfunctions, or controls or displays used for non-TICS functions.</p>
ISO 15006:2004	Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle auditory presentation	ISO 15006:2004 establishes ergonomic specifications for the presentation of auditory information related to transport information and control systems (TICS) through speech or sounds. It is applicable only to the use of auditory displays when the vehicle is in motion. It presents a set of requirements and recommendations for in-vehicle auditory messages from TICS, and provides message characteristics and functional factors for maximizing message intelligibility and utility while helping prevent auditory or mental overload.
ISO 15007-1:2002	Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 1: Definitions and parameters	

Relevant standards for nomadic devices_detailed

ISO/TS 15007-2:2001	Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 2: Equipment and procedures	This Technical Specification gives guidelines on equipment and procedures for analyzing driver visual behaviour, intended to enable assessors of Transport Information and Control Systems (TICS) to plan evaluation trials, specify (and install) data capture equipment, and analyse, interpret and report visual-behaviour metrics (standards of measurement). It is applicable to both road trials and simulated driving environments. It is not applicable to the assessment of head-up displays.
ISO 15008:2003	Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle visual presentation	ISO 15008:2003 gives minimum specifications for the image quality and legibility of displays containing dynamic (changeable) visual information presented to the driver of a road vehicle by an on-board transport information and control system (TICS) used while the vehicle is in motion. These specifications are intended to be independent of display technologies, while test methods and measurements for assessing compliance with them have been included where necessary. ISO 15008:2003 is applicable to mainly perceptual, and some basic cognitive, components of the visual information: these include character legibility and colour recognition. It is not applicable to other factors affecting performance and comfort such as coding, format and dialogue characteristics, nor to displays using the following: superimposed information on the external field (e.g. head-up displays), pictorial images (e.g. closed-circuit TV for reversing), maps and topographic representations (e.g. those for setting navigation systems), static information (e.g. control labels, telltales). ISO/TR 16352:2005 provides a literature survey about the human-machine interface of warning systems in vehicles. It covers the experimental experiences about the efficiency and acceptance of different modalities and combinations of warnings, and the design of the sensorial, code and organizational parameters of visual, auditory and tactile warnings.
ISO/TR 16352:2005	Road vehicles -- Ergonomic aspects of in-vehicle presentation for transport information and control systems -- Warning systems	

Relevant standards for nomadic devices_detailed

[ISO 16673:2007](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Occlusion method to assess visual demand due to the use of in-vehicle systems

ISO 16673:2007 provides a procedure for measuring visual demand due to the use of visual or visual-manual interfaces accessible to the driver while the vehicle is in motion. It applies to both Original Equipment Manufacturer (OEM) and After-Market in-vehicle systems. It applies to both permanently installed and portable systems. It applies to any means of visual occlusion and is not dependent on one specific physical implementation.

[ISO/TS 16951:2004](#)

Road vehicles -- Ergonomic aspects of transport information and control systems (TICS) -- Procedures for determining priority of on-board messages presented to drivers

ISO/TS 16951:2004 provides formal procedures and two alternative methods for determining the priority of on-board messages presented to drivers of road vehicles by transport information and control systems (TICS), and other systems. It is applicable to the whole range of TICS in-vehicle messages, including traveller information, navigation, travel and traffic advisories, "yellow pages" information, warnings, systems status, emergency calling system information, and electronic toll/fee collection, as well as to messages from non-TICS sources such as telephone, warnings and telltales.

[ISO 17287:2003](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving

ISO 17287:2002 specifies a procedure for assessing whether specific TICS, or a combination of TICS with other in-vehicle systems, are suitable for use by drivers while driving. It addresses user-oriented TICS description and context of use, TICS task description and analysis, assessment process, and documentation.

The TICS description and context of use includes consideration of improper use, reasonably foreseeable misuse and TICS failure. The TICS description, analysis and assessment include a process for identifying and addressing suitability issues.

ISO 17287:2002 does not recommend specific variables for assessing suitability nor does it define criteria for establishing the suitability of use of a TICS Table while driving.

[SC 17](#)

Visibility

Relevant standards for nomadic devices_detailed

ISO 4513:2003	Road vehicles -- Visibility -- Method for establishment of eyellipses for driver's eye location	ISO 4513:2003 specifies a method for establishing an eyellipse for locating driver's eyes inside a road vehicle for the purpose of measuring the driver's field of view. Elliptical (eyellipse) models in both two and three dimensions are used to represent 95th and 99th percentiles of driver eye locations. Its procedures, which differ depending on the type of vehicle considered, are applicable to passenger cars (and light trucks), and to buses and heavy vehicles, as defined in ISO 3833. The statistical representation of the driver's eye locations it provides can be used as a design tool for passenger cars (V-points can be used in lieu of the complete eyellipse to standardize the driver's field of view for regulation purposes).
ISO 7397-1:1993	Passenger cars -- Verification of driver's direct field of view -- Part 1: Vehicle positioning for static measurement	Establishes the initial procedure for positioning of a passenger car relative to a three-dimensional reference system, as given in ISO 4130, for the purposes of static measurements on the vehicle. It enables verification of the driver's forward 180° field of view, however, the procedure shown may also be followed for checking other aspects of vehicle design.
ISO 7397-2:1993	Passenger cars -- Verification of driver's direct field of view -- Part 2: Test method	Specifies a test method for verifying the compliance of a passenger car (as defined in ISO 3833) with the requirements of EEC Directives 77/649 and 88/366 for the driver's 180° forward field of view.
SC 21	Electrically propelled road vehicles	
ISO 6469-1:2001	Electric road vehicles -- Safety specifications -- Part 1: On-board electrical energy storage	
ISO 6469-2:2001	Electric road vehicles -- Safety specifications -- Part 2: Functional safety means and protection against failures	
ISO 6469-3:2001	Electric road vehicles -- Safety specifications -- Part 3: Protection of persons against electric hazards	

Relevant standards for nomadic devices_detailed

[ISO 8713:2005](#) Electric road vehicles -- Vocabulary

ISO 8713:2005 establishes a vocabulary of terms used in International Standards generally in relation to electric road vehicles. It is not intended to give definitions of all parts within a vehicle, but focuses on terms specific to electric road vehicles. This International Standard specifies test procedures for measuring the reference energy consumption and reference range of purely electrically propelled passenger cars and commercial vehicles of a maximum authorized total mass of 3 500 kg and maximum speed greater than or equal to 70 km/h.

[ISO 8714:2002](#) Electric road vehicles -- Reference energy consumption and range -- Test procedures for passenger cars and light commercial vehicles

[TC 204](#)

[ISO 14813-1:2007](#) **Intelligent transport systems**
Intelligent transport systems -- Reference model architecture(s) for the ITS sector -- Part 1: ITS service domains, service groups and services

ISO 14813-1:2007 provides a definition of the primary services and application areas that can be provided to Intelligent Transport System (ITS) Users. Those with a common purpose can be collected together in ITS service domains, and within these there can be a number of ITS service groups for particular parts of the domain. ISO 14813-1:2007 identifies 11 service domains, within which numerous groups are then defined. Within this framework, there are varying levels of detail related to definition of different services. These details differ from nation to nation, depending on whether the specific national architecture building blocks are based directly upon services or on groups of functions. Thus, the intent is to address groups of services and the respective domains within which they fit. As these domains and service groups evolve over time, it is intended that this International Standard be revised to include them.

ISO 14813-1:2007 is applicable to the working groups of ISO TC 204 and other TCs which are developing International Standards for

[ISO/TR 14813-4:2000](#) Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 4: Reference model tutorial

[ISO/TR 14813-5:1999](#) Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 5: Requirements for architecture description in TICS standards

Relevant standards for nomadic devices_detailed

- [ISO/TR 14813-6:2000](#) Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 6: Data presentation in ASN.1
- [ISO 14819-1:2003](#) Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 1: Coding protocol for Radio Data System -- Traffic Message Channel (RDS-TMC) using ALERT-C
- [ISO 14819-2:2003](#) Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 2: Event and information codes for Radio Data System -- Traffic Message Channel (RDS-TMC)

ISO 14819-1:2003 specifies the coding protocol for Radio Data System - Traffic Message Channel (RDS-TMC) - RDS-TMC using the ALERT-C protocol that is designed to provide mostly event-orientated road driver information messages.

Many "hooks" have been left for future development and indeed a few status-orientated road driver information messages were included. This protocol is designed to be closely linked to the ALERT-Plus protocol, which is specifically designed for status-orientated road driver information; both protocols may be available in the same RDS transmission.

The ALERT-Plus protocol is specified in ENV 12313-4.

ISO 14819-2:2003 describes the ALERT-C protocol concept and message structure used to achieve densely coded messages to be carried in the RDS-TMC feature. This part (2) of the ENV 12313/EN ISO 14819 series of standards defines the "Events List" to be used in coding those messages.

Relevant standards for nomadic devices_detailed

[ISO 14819-3:2004](#)

Traffic and Travel Information (TTI) -- TTI messages via traffic message coding -- Part 3: Location referencing for ALERT-C

ISO 14819-3:2004 primarily addresses the needs of RDS-TMC ALERT-C messages, which are already being implemented. However, the modular approach used here is intended to facilitate future extension of the location referencing rules to other traffic and travel messaging systems.

The location referencing rules defined in ISO 14819-3:2004 address the specific requirements of Traffic Message Channel (TMC) systems, which use abbreviated coding formats to provide TTI messages over mobile bearers (e.g. GSM, DAB) or via exchange protocols like DATEX. In particular, the rules address the Radio Data System-Traffic Message Channel (RDS-TMC), a means of providing digitally-coded traffic and travel information to travellers using a silent data channel (RDS) on FM radio stations, based on the ALERT-C protocol.

[ISO 14819-6:2006](#)

Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 6: Encryption and conditional access for the Radio Data System -- Traffic Message Channel ALERT C coding

ISO 14819-6:2006 establishes a method of encrypting certain elements of the ALERT-C coded data carried in the RDS-TMC type 8A data group, such that without application by a terminal or receiver of an appropriate keys, the information conveyed is virtually worthless.

Before a terminal is able to decrypt the data, the terminal requires two "keys". The first is given in confidence by the service provider to terminal manufacturers with whom they have a commercial relationship; the second is broadcast in the "Encryption Administration Group," which is also a type 8A group. This specification explains the purpose of the two keys and how often and when the transmitted key may be changed.

Before an individual terminal may present decrypted messages to the end-user, it must have been activated to do so. Activation requires that a PIN code be entered. The PIN code controls access rights to each service and subscription period, allowing both lifetime and term business models to co-exist.

The specification also describes the considerations for service

Relevant standards for nomadic devices_detailed

[ISO 14825:2004](#)

Intelligent transport systems -- Geographic Data Files (GDF) -- Overall data specification

ISO 14825:2004 specifies the conceptual and logical data model and the exchange format for geographic data bases for Intelligent Transportation System (ITS) applications. It includes a specification of potential contents of such data bases (features, attributes and relationships), a specification of how these contents shall be represented, and of how relevant information about the database itself can be specified (metadata).

The focus of this International Standard is on ITS applications and it emphasizes road and road-related information. ITS applications, however, also require information in addition to road and road-related information.

EXAMPLE 1 ITS applications need information about addressing systems in order to specify locations and/or destinations. Consequently, information about the administrative and postal subdivisions of an area is essential.

EXAMPLE 2 Map display is an important component of ITS applications. For proper map display, the inclusion of contextual information such as land and water cover is essential.

[ISO 15075:2003](#)

Transport information and control systems -- In-vehicle navigation systems -- Communications message set requirements

ISO 15075:2003 specifies message content and format utilized by in-vehicle navigation systems. Its emphasis is on messages that are required to generate or enhance routing instructions. There is a particular focus on messages that would not necessarily be included in a more general traffic management message list.

Although ISO 15075:2003 emphasizes requirements for Locally Determined Route Guidance (LDRG) systems that utilize on-vehicle map databases, it also includes messages that would be utilized primarily by Centrally Determined Route Guidance (CDRG) systems and certain value-added messages.

Relevant standards for nomadic devices_detailed

ISO/TS 17261:2005	Intelligent transport systems - Automatic vehicle and equipment identification -- Intermodal goods transport architecture and terminology	ISO TS 17261:2005 describes the conceptual and logical architecture for automatic vehicle and Equipment identification (AVI/AEI) and supporting services in an intermodal/multimodal environment. It presents a high level view of AEI intermodal and multimodal system Architecture. ISO TS 17261:2005 describes the key sub systems, their associated interfaces and interactions and how they fit into system-wide functions such as management, security and information flow.
ISO/TR 17384:2008	Intelligent transport systems -- Interactive centrally determined route guidance (CDRG) -- Air interface message set, contents and format	<p>ISO/TR 17384:2008 describes the message contents and format of the air interface between the infrastructure and the in-vehicle unit in the Interactive CDRG system.</p> <p>The air interface message set for route guidance information in the interactive CDRG system in this Technical Report is applicable to both vehicles equipped with an onboard map database and those which are not equipped (i.e., those equipped with simplified graphic output and/or text message display functions).</p> <p>ISO/TR 17384:2008 covers media independent systems. In this Technical Report, messages required for both cellular phone-based CDRG and beacon-based CDRG are taken into account.</p>
ISO 17387:2008	Intelligent transport systems -- Lane change decision aid systems (LCDAS) -- Performance requirements and test procedures	ISO 17387:2008 specifies system requirements and test methods for Lane Change Decision Aid Systems (LCDAS). LCDAS are fundamentally intended to warn the driver of the subject vehicle against potential collisions with vehicles to the side and/or to the rear of the subject vehicle, and moving in the same direction as the subject vehicle during lane change manoeuvres. This standardization addresses LCDAS for use on forward moving cars, vans and straight trucks in highway situations.

Relevant standards for nomadic devices_detailed

[ISO 17572-1:2008](#)

Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 1: General requirements and conceptual model

ISO 17572 specifies Location Referencing Methods (LRM) that describe locations in the context of geographic databases and will be used to locate transport-related phenomena in an encoder system as well as in the decoder side. It defines what is meant by such objects, and describes the reference in detail, including whether or not components of the reference are mandatory or optional, and their characteristics.

It specifies two different LRMs:

pre-coded location references (pre-coded profile);

dynamic location references (dynamic profile).

It does not define a physical format for implementing the LRM.

However, the requirements for physical formats are defined.

It does not define details of the Location Referencing System (LRS), i.e. how the LRMs are to be implemented in software, hardware, or processes.

ISO 17572-1:2008 specifies the following general LRM related sections:

requirements to a Location Referencing Method;

conceptual Data Model for Location Referencing Methods;

inventory of Location Referencing Methods;

Relevant standards for nomadic devices_detailed

[ISO 17572-2:2008](#)

Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 2: Pre-coded location references (pre-coded profile)

ISO 17572 specifies Location Referencing Methods (LRM) that describe locations in the context of geographic databases and will be used to locate transport-related phenomena in an encoder system as well as in the decoder side. It defines what is meant by such objects, and describes the reference in detail, including whether or not components of the reference are mandatory or optional, and their characteristics.

It specifies two different LRMs:

pre-coded location references (pre-coded profile);
dynamic location references (dynamic profile).

It does not define a physical format for implementing the LRM. However, the requirements for physical formats are defined.

It does not define details of the Location Referencing System (LRS), i.e. how the LRMs are to be implemented in software, hardware, or processes.

ISO 17572-2:2008 specifies the pre-coded location referencing method, comprising:

specification of pre-coded location references (pre-coded profile);
logical format for VICS link location;
TPEG physical format for ALERT-C-location references;

Relevant standards for nomadic devices_detailed

[ISO 17572-3:2008](#)

Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 2: Pre-coded location references (pre-coded profile)

ISO 17572 specifies Location Referencing Methods (LRM) that describe locations in the context of geographic databases and will be used to locate transport-related phenomena in an encoder system as well as in the decoder side. It defines what is meant by such objects, and describes the reference in detail, including whether or not components of the reference are mandatory or optional, and their characteristics.

It specifies two different LRMs:

pre-coded location references (pre-coded profile);
dynamic location references (dynamic profile).

It does not define a physical format for implementing the LRM. However, the requirements for physical formats are defined.

It does not define details of the Location Referencing System (LRS), i.e. how the LRMs are to be implemented in software, hardware, or processes.

ISO 17572-3:2008 specifies the dynamic location referencing method, comprising:

attributes and encoding rules;

logical data modelling;

TPEG physical format specification for dynamic location references;

Relevant standards for nomadic devices_detailed

[ISO 17572-3:2008](#)

Intelligent transport systems (ITS) -- Location referencing for geographic databases -- Part 3: Dynamic location references (dynamic profile)

ISO 17572 specifies Location Referencing Methods (LRM) that describe locations in the context of geographic databases and will be used to locate transport-related phenomena in an encoder system as well as in the decoder side. It defines what is meant by such objects, and describes the reference in detail, including whether or not components of the reference are mandatory or optional, and their characteristics.

It specifies two different LRMs:

pre-coded location references (pre-coded profile);
dynamic location references (dynamic profile).

It does not define a physical format for implementing the LRM. However, the requirements for physical formats are defined.

It does not define details of the Location Referencing System (LRS), i.e. how the LRMs are to be implemented in software, hardware, or processes.

ISO 17572-3:2008 specifies the dynamic location referencing method, comprising:

attributes and encoding rules;
logical data modelling;

TPEG physical format specification for dynamic location references; ISO/PAS 17684:2003 specifies a method that can be used to define navigation message sets in tabular form with a subsequent translation into a corresponding ASN.1 description. An intermediate language called Descriptor Normal Form (DNF), which is a subset of ASN.1, is specified and used as an intermediate description between a tabular form and its ASN.1 description. A tabular-form message-set description language called Message Set Tabular Form (MSTF) is included as an example of a tabular form definition.

[ISO/PAS 17684:2003](#)

Transport information and control systems -- In-vehicle navigation systems -- ITS message set translator to ASN.1 format definitions

Relevant standards for nomadic devices_detailed

[ISO 17687:2007](#)

Transport Information and Control Systems (TICS)
-- General fleet management and commercial freight operations -- Data dictionary and message sets for electronic identification and monitoring of hazardous materials/dangerous goods transportation

ISO 17687:2007 supports the application of automated identification, monitoring and exchange of emergency response information regarding dangerous goods carried on board road transport vehicles. Such information may include the identification, quantity and current condition (such as pressure and temperature) of such goods, as well as any relevant emergency response information. When equipped with appropriate electronics and communications capabilities, vehicles carrying dangerous goods may respond to queries regarding their status or self-initiate a message.

The information defined here, electronically carried on-board the road transport vehicle, may be transferred to interested roadside systems by whatever communications means are appropriate to that roadside system.

The primary intent of ISO 17687:2007 is not trade, economic, or commercial, but to help save lives by facilitating emergency response. ISO 17687:2007 supports local on-site needs in the same manner as conventional visual placards do but with an optional, ISO TS 18234-4:2006 establishes the method of delivering Road Traffic Messages within a TPEG service. The TPEG-RTM application is designed to allow the efficient and language independent delivery of road information directly from service provider to end-users. The information provided relates to event and some status information on the road network and on associated infrastructure affecting a road journey. For example, limited information about abnormal operation of links in the network may be included, such as ferries, lifting-bridges, etc.

[ISO/TS 18234-4:2006](#)

Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 4: Road Traffic Message (RTM) application

Relevant standards for nomadic devices_detailed

[ISO 21212:2008](#)

Intelligent transport systems -- Communications access for land mobiles (CALM) -- 2G Cellular systems

ISO 21212:2008 determines the air interface for second generation (2G) cellular networks and 2G systems (e.g. using WAP and I-Mode type protocols) to be compliant to CALM, i.e., requirements that must be met before a 2G system can be incorporated into a CALM system. In particular, it specifies protocols and parameters that 2G systems shall include to support prolonged, long-range, high data rate wireless communication links in ITS environments where heterogeneous handovers or media independent handovers (MIH) are either necessary to maintain the link, or desirable as determined by media selection policies.

ISO 21212:2008 provides protocols and parameters for long range, medium speed wireless communications in the ITS sector using second generation cellular communications.

Wherever practicable, ISO 21212:2008 has been developed by reference to suitable extant standards, adopted by selection. Required regional variations are provided.

Specifically, for ISO 21212:2008, extant 2G systems, as defined by various international and national standards, are adopted by reference.

Relevant standards for nomadic devices_detailed

[ISO 21213:2008](#)

Intelligent transport systems -- Communications access for land mobiles (CALM) -- 3G Cellular systems

ISO 21213:2008 determines the air interface options applicable to CALM using third generation (3G) cellular networks. In particular, it specifies protocols and parameters that 3G systems shall include to support prolonged, long-range, high data rate wireless communication links in ITS environments where heterogeneous handovers or media independent handovers (MIH) are either necessary to maintain the link, or desirable, as determined by media selection policies.

ISO 21213:2008 provides protocols and parameters for long range, medium speed wireless communications in the ITS sector using third generation cellular communications.

Wherever practicable, ISO 21213:2008 has been developed by reference to suitable extant Standards, adopted by selection. Required regional variations are provided.

Specifically, for ISO 21213:2008, extant 3G systems, as defined by various international and national standards, are adopted by reference.

Application specific upper layers are not included in ISO 21213:2008, but will be driven by application standards (which may ISO/TR 24529:2008 deals with the use of UML within International Standards, Technical Specifications and Technical Reports and related documents.

It discusses the application of the Unified Modelling Language (UML) to the development of standards within the context of Intelligent Transport Systems (ITS).

ISO/TS 24530-1:2006 establishes the top-level "containers" for TPEG messages in XML and the common data types that are used by tpegML applications (e.g. tpeg-ptiML). Inherently, tpegML is designed to "map" the TPEG binary (ISO/TS 18234 series), however, additional tags are provided to create a message and message set structure to facilitate internet file delivery.

[ISO/TR 24529:2008](#)

Intelligent transport systems -- Systems architecture -- Use of unified modelling language (UML) in ITS International Standards and deliverables

[ISO/TS 24530-1:2006](#)

Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 1: Introduction, common data types and tpegML

Relevant standards for nomadic devices_detailed

ISO/TS 24530-2:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 2: tpeg-locML	ISO/TS 24530-2:2006 establishes the XML encoding of the method of Location Referencing used by TPEG applications. TPEG applications contain the information required by a client TPEG decoder (i.e. both Location Referencing and event information), to present all the information intended for the end-user when it was originated by the service provider. Location Referencing requires a service provider to give an impression or image, to the human end-user, of where an event has taken place. This cannot be done easily because the human end-user may or may not be familiar with the location. tpeg-loc has the added challenge of attempting to be as language independent as possible. This is achieved by the use of tpeg-loc tables (essentially word-oriented data object dictionaries).
ISO/TS 24530-3:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 3: tpeg-rtmML	ISO/TS 24530-3:2006 establishes the XML encoding of the method of the Road Traffic Message application.
ISO/TS 24530-4:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 4: tpeg-ptiML	ISO/TS 24530-4:2006 establishes the XML encoding of the method of the Public Transport Information application. The Public Transport Information application is intended to cover all modes of public (i.e. collective) transport as well as inter-urban and intra-urban travel. The application itself is designed to allow the efficient and language-independent transmission of public transport information either directly to an end-user, be it the public or another service provider, such as broadcasters, service operators or other information disseminating points, or to centres for onward transmission.

Subcommittees/Working Groups

WG 10	Traveller information systems
WG 11	Route guidance and navigation systems

Relevant standards for nomadic devices_detailed

WG 14	Vehicle/roadway warning and control systems
WG 16	Wide area communications/protocols and interfaces
WG 17	Nomadic Devices in ITS Systems

drafts and new work items of TC 204

ISO/AWI TR 10992	Nomadic Devices to support ITS Service and Multimedia Provision in Vehicles
ISO/WD 11915	Communications Access for Land Mobiles: high speed, air interface parameters and protocols for broadcast, point-point, vehicle-vehicle, and vehicle-point communications in the ITS Sector using IEEE802.11 Wireless LAN standard in normal operational modes
ISO/CD TR 12859	Intelligent Transport Systems -System Architecture - Data Privacy Aspects of ITS
ISO/NP 13181-1	Intelligent Transport Systems - Communications Access for Land Mobiles (CALM) - Security -- Part 1: Framework
ISO/NP 13181-3	Intelligent Transport Systems - Communications Access for Land Mobiles (CALM) - Security -- Part 3: Objectives and Requirements
ISO/NP 13183	Communications access for land mobiles (CALM) - CALM receiving public broadcast communications
ISO/NP TS 13184	Real-time decision support system at all-way stop control intersections via nomadic and mobile devices
ISO/NP TS 13185	Vehicle Interface for Provisioning and Support of ITS Services
ISO/DIS 14813-5	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 5: Requirements for architecture description in TICS standards
ISO/DIS 14813-6	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 6: Data presentation in ASN.1

Relevant standards for nomadic devices_detailed

ISO/DIS 14906	Road transport and traffic telematics -- Electronic fee collection -- Application interface definition for dedicated short-range communication
ISO/CD TS 14907-1	Road transport and traffic telematics -- Electronic fee collection -- Test procedures for user and fixed equipment -- Part 1: Description of test procedures
ISO/DIS 17267	Navigation System Application Program Interface (API)
ISO/CD TS 17575-1	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 1: Charging
ISO/CD TS 17575-2	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 2: Communication and connections to the lower layers
ISO/NP TS 17575-3	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 3: Provisions for updating on-board equipment (OBE)
ISO/NP TS 17575-4	Road Transport and Traffic Telematics (RTTT) -- Electronic Fee Collection (EFC) -- Application Interface Definition for Global Navigation Satellite Systems and Cellular Networks (GNSS/CN) -- Part 4: Roaming
ISO/NP TS 18234-8	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 8: Congestion and Travel-Time Information (CTT) application (TPEC-CTT_1.0/001)

Relevant standards for nomadic devices_detailed

ISO/NP TS 18234-9	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 9: Traffic Event Compact (TEC) application (TPEG-TEC_1.0/001)
ISO/NP TS 18234-10	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 10: Weather information (WEA) application (TPEG-WEA_1.0/001)
ISO/CD 24099 ISO/DIS 24978	Navigation data delivery structure and protocol Intelligent transport systems -- ITS Safety and emergency messages using any available wireless media -- Data Registry procedures
ISO/CD TR 25109	Example high level architecture elaboration : Emergency Call
ISO/DIS 25112	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Mobile wireless broadband using IEEE 802.16e/IEEE 802.16g
ISO/DIS 25113	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Mobile wireless broadband using high capacity spatial division multiple access (HC-SDMA)
ISO/NP TR 26682	Crash and Emergency Notification Reference Architecture
ISO/NP 26999	Rules and Guidance for the use of Process (Functional) Oriented Methodology in ITS Standards, Data Registries and Data Dictionaries
ISO/CD 29282 ISO/CD 29283	CALM Applications using Satellite CALM - Mobile wireless broadband using HC-SDMA

Based on ESoP (European Statement of Principles)

ISO 4040:2001	Road vehicles - Location of hand controls,
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Relevant standards for nomadic devices_detailed

[ISO 16673:2007](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Occlusion method to assess visual demand due to the use of in-vehicle systems

ISO 16673:2007 provides a procedure for measuring visual demand due to the use of visual or visual-manual interfaces accessible to the driver while the vehicle is in motion. It applies to both Original Equipment Manufacturer (OEM) and After-Market in-vehicle systems. It applies to both permanently installed and portable systems. It applies to any means of visual occlusion and is not dependent on one specific physical implementation.

[ISO 20176:2006](#)

Road vehicles -- H-point machine (HPM II) -- Specifications and procedure for H-point determination

ISO 20176:2006 provides the specifications and procedures for using the H-point machine (HPM) to audit vehicle seating positions. The HPM is a physical tool used to establish key reference points and measurements in a vehicle. The H-point design tool (HPD) is a simplified CAD version of the HPM, which can be used in conjunction with the HPM to take the optional measurements specified in this document, or used independently during product design.

These H-point devices provide a method for reliable layout and measurement of occupant seating compartments and/or seats. ISO 20176:2006 specifies the procedures for using the H-point machine (HPM) to audit (verify) key reference points and measurements in a vehicle.

The devices are intended for application at designated seating positions. They are not to be construed as tools that measure or indicate occupant capabilities or comfort. They are not intended for use in defining or assessing temporary seating, such as folding jump seats.

Relevant standards for nomadic devices_detailed

[ISO 4513:2003](#)

Road vehicles -- Visibility -- Method for establishment of eyellipses for driver's eye location

ISO 4513:2003 specifies a method for establishing an eyellipse for locating driver's eyes inside a road vehicle for the purpose of measuring the driver's field of view. Elliptical (eyellipse) models in both two and three dimensions are used to represent 95th and 99th percentiles of driver eye locations. Its procedures, which differ depending on the type of vehicle considered, are applicable to passenger cars (and light trucks), and to buses and heavy vehicles, as defined in ISO 3833. The statistical representation of the driver's eye locations it provides can be used as a design tool for passenger cars (V-points can be used in lieu of the complete eyellipse to standardize the driver's field of view for regulation purposes).

[ISO 15008:2003](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle visual presentation

ISO 15008:2003 gives minimum specifications for the image quality and legibility of displays containing dynamic (changeable) visual information presented to the driver of a road vehicle by an on-board transport information and control system (TICS) used while the vehicle is in motion. These specifications are intended to be independent of display technologies, while test methods and measurements for assessing compliance with them have been included where necessary.

ISO 15008:2003 is applicable to mainly perceptual, and some basic cognitive, components of the visual information: these include character legibility and colour recognition. It is not applicable to other factors affecting performance and comfort such as coding, format and dialogue characteristics, nor to displays using the following: superimposed information on the external field (e.g. head-up displays), pictorial images (e.g. closed-circuit TV for reversing), maps and topographic representations (e.g. those for setting navigation systems), static information (e.g. control labels, telltales).

[ISO 15007-1:2002](#)

Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 1: Definitions and parameters

Relevant standards for nomadic devices_detailed

ISO 16673:2007	Road vehicles -- Ergonomic aspects of transport information and control systems -- Occlusion method to assess visual demand due to the use of in-vehicle systems	ISO 16673:2007 provides a procedure for measuring visual demand due to the use of visual or visual-manual interfaces accessible to the driver while the vehicle is in motion. It applies to both Original Equipment Manufacturer (OEM) and After-Market in-vehicle systems. It applies to both permanently installed and portable systems. It applies to any means of visual occlusion and is not dependent on one specific physical implementation.
ISO 15006:2004	Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle auditory presentation	ISO 15006:2004 establishes ergonomic specifications for the presentation of auditory information related to transport information and control systems (TICS) through speech or sounds. It is applicable only to the use of auditory displays when the vehicle is in motion. It presents a set of requirements and recommendations for in-vehicle auditory messages from TICS, and provides message characteristics and functional factors for maximizing message intelligibility and utility while helping prevent auditory or mental overload.
ISO 2575:2004	Road vehicles -- Symbols for controls, indicators and tell-tales	ISO 2575:2004 establishes symbols (i.e. conventional signs) for use on controls, indicators and telltales applying to passenger cars, light and heavy commercial vehicles and buses, to ensure identification and facilitate use. It also indicates the colours of possible optical tell-tales, which inform the driver of either correct operation or malfunctioning of the related devices.
ISO 2575:2004/Amd 3:2008 ISO 2575:2004/Amd 1:2005 ISO 2575:2004/Amd 2:2006 ISO 7000:2004	Graphical symbols for use on equipment -- Index and synopsis	ISO 7000:2004 provides a synopsis of those graphical symbols which are placed on equipment or parts of equipment of any kind in order to instruct the person(s) using the equipment as to its operation.
ISO 80416-4:2005	Basic principles for graphical symbols for use on equipment -- Part 4: Guidelines for the adaptation of graphical symbols for use on screens and displays (icons)	ISO 80416-4:2005 provides guidelines for the adaptation of graphical symbols for use on screens and displays (icons) on a wide range of equipment, such as photocopiers, vehicle dashboards and home appliances. It also provides principles for maintaining the fidelity of icons to the original graphical symbols.

Relevant standards for nomadic devices_detailed

[IEC 80416-3:2002](#)

Basic principles for graphical symbols for use on equipment -- Part 3: Guidelines for the application of graphical symbols

IEC 80416-3:2002 provides guidelines for the application of graphical symbols for use on equipment in order to maintain visual clarity and overall consistency when such graphical symbols are applied. It stipulates the permissible extent by which a symbol original may be modified in reproduction for actual use on equipment.

[ISO/IEC 13251:2004](#)

Collection of graphical symbols for office equipment

ISO/IEC 13251:2004 is a bilingual standard (English/French). It provides a certain number of graphical symbols that are typically used on office equipment such as computers, printers, telephones and copying machines.

It comprises four sections:

Section 1 giving general information, provisions and requirements about the use and application of graphical symbols;
Section 2 providing an alphabetical index, a numerical index and a graphical overview of all the graphical symbols described in Section 4 of the Standard;
Section 3 presenting the graphical symbols selected with the corresponding application, in numerical order;
Section 4 containing the symbol originals for reproduction purposes, in numerical order, with the position and size of each graphical symbol described.

Each graphical symbol in Section 3 of the Standard is specified with:

the symbol itself;
a number that is the application symbol number from the International Standard (ISO 7000 or IEC 60417) from which it is derived;
its definition;
a note for technical clarification when necessary.

Relevant standards for nomadic devices_detailed

ISO/TS 16951:2004	Road vehicles -- Ergonomic aspects of transport information and control systems (TICS) -- Procedures for determining priority of on-board messages presented to drivers	ISO/TS 16951:2004 provides formal procedures and two alternative methods for determining the priority of on-board messages presented to drivers of road vehicles by transport information and control systems (TICS), and other systems. It is applicable to the whole range of TICS in-vehicle messages, including traveller information, navigation, travel and traffic advisories, "yellow pages" information, warnings, systems status, emergency calling system information, and electronic toll/fee collection, as well as to messages from non-TICS sources such as telephone, warnings and telltales.
ISO 15005:2002	Road vehicles -- Ergonomic aspects of transport information and control systems -- Dialogue management principles and compliance procedures	<p>This International Standard presents ergonomic principles for the design of the dialogues that take place between the driver of a road vehicle and the vehicle's transport information and control systems (TICS) while the vehicle is in motion. It also specifies compliance verification conditions for the requirements related to these principles.</p> <p>This International Standard is applicable to TICSs consisting of either single or multiple devices, which can be either independent or interconnected. It is not applicable to TICSs without dialogues, TICS failures or malfunctions, or controls or displays used for non-TICS functions.</p>

Relevant standards for nomadic devices_detailed

[ISO 17287:2003](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving

ISO 17287:2002 specifies a procedure for assessing whether specific TICS, or a combination of TICS with other in-vehicle systems, are suitable for use by drivers while driving. It addresses user-oriented TICS description and context of use, TICS task description and analysis, assessment process, and documentation.

The TICS description and context of use includes consideration of improper use, reasonably foreseeable misuse and TICS failure. The TICS description, analysis and assessment include a process for identifying and addressing suitability issues.

ISO 17287:2002 does not recommend specific variables for assessing suitability nor does it define criteria for establishing the suitability of use of a TICS Table while driving.

Economic Committee for Europe (UN/ECE) regulations which are recognised by the Community after its adhesion to the Revised Agreement of 1958 (see Council Decision 97/836/EC of 27.11.97):

[ISO 11429:1996](#)

Ergonomics -- System of auditory and visual danger and information signals

Specifies a system of danger and information signals taking into account the different degrees of urgency. Applicable to all danger and information signals which have to be clearly perceived and differentiated as specified in ISO/TR 12100-2. Does not apply to certain fields covered by specific standards.

Relevant standards for nomadic devices_detailed

[ISO 17287:2003](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving

ISO 17287:2002 specifies a procedure for assessing whether specific TICS, or a combination of TICS with other in-vehicle systems, are suitable for use by drivers while driving. It addresses user-oriented TICS description and context of use, TICS task description and analysis, assessment process, and documentation.

The TICS description and context of use includes consideration of improper use, reasonably foreseeable misuse and TICS failure. The TICS description, analysis and assessment include a process for identifying and addressing suitability issues.

ISO 17287:2002 does not recommend specific variables for assessing suitability nor does it define criteria for establishing the suitability of use of a TICS Table while driving.

[ISO/TR 9241-308:2008](#)

Ergonomics of human-system interaction -- Part 308: Surface-conduction electron-emitter displays (SED)

ISO/TR 9241-308:2007 gives guidelines for surface-conduction electron-emitter displays (SED).

[ISO 11064-5:2008](#)

Ergonomic design of control centres -- Part 5: Displays and controls

ISO 11064-5:2008 presents principles and gives requirements and recommendations for displays, controls, and their interaction, in the design of control-centre hardware and software.

Relevant standards for nomadic devices_detailed

[ISO 14915-1:2002](#)

Software ergonomics for multimedia user interfaces -- Part 1: Design principles and framework

ISO 14915-1:2002 establishes design principles for multimedia user interfaces and provides a framework for handling the different considerations involved in their design. It addresses user interfaces for applications that incorporate, integrate and synchronize different media. This includes static media such as text, graphics or images, and dynamic media such as audio, animation, video or media related to other sensory modalities. Detailed design issues within a single medium (e.g. the graphical design of an animation sequence) are only addressed as far as they imply ergonomic consequences for the user.

ISO 14915-1:2002 gives requirements and recommendations for the ergonomic design of multimedia applications mainly intended for professional and vocational activities such as work or learning. It does not specifically address applications outside this area, such as entertainment, although some recommendations can also be applicable in such domains.

ISO 14915-1:2002 is applicable to software aspects related to multimedia user interfaces and does not address hardware or implem

The focus of ISO 14915-1:2002 is on multimedia presentation issues.

[ISO 14915-2:2003](#)

Software ergonomics for multimedia user interfaces -- Part 2: Multimedia navigation and control

ISO 14915-2:2003 provides recommendations and requirements for the design of multimedia user interfaces with respect to the following aspects: design of the organization of the content, navigation and media-control issues. ISO 14915-2:2003 is limited to the design of the organization of the content and does not deal with the design of the content in general. Design issues within a single medium (e.g. the lighting of a film sequence) are only addressed with respect to the ergonomic issues related to user controls.

Relevant standards for nomadic devices_detailed

[ISO 14915-3:2002](#) Software ergonomics for multimedia user interfaces -- Part 3: Media selection and combination

ISO 14915-3:2002 gives recommendations for, and guidance on, the design, selection and combination of interactive user interfaces that integrate and synchronize different media. It addresses user interfaces for applications that incorporate, integrate and synchronize different media. This includes static media such as text, graphics, images; and dynamic media such as audio, animation, video or media related to other sensory modalities. Detailed design issues within a single medium (e.g. the graphical design of an animation sequence) are only addressed as far as they imply ergonomic consequences for the user.

[ISO/TR 16982:2002](#) Ergonomics of human-system interaction -- Usability methods supporting human-centred design

ISO/TR 16982:2002 provides information on human-centred usability methods which can be used for design and evaluation. It details the advantages, disadvantages and other factors relevant to using each usability method.

It explains the implications of the stage of the life cycle and the individual project characteristics for the selection of usability methods and provides examples of usability methods in context.

The main users of ISO/TR 16982:2002 will be project managers. It therefore addresses technical human factors and ergonomics issues only to the extent necessary to allow managers to understand their relevance and importance in the design process as a whole.

Such issues are dealt with more fully in ISO 9241 which is complementary to ISO/TR 16982:2002 and is aimed at system developers, specifiers and purchasers of systems. Nonetheless, all parties involved in human-centred system development, including the end users of systems, should find the guidance in ISO/TR 16982:2002 relevant.

The guidance in ISO/TR 16982:2002 can be tailored for specific design situations by using the lists of issues characterizing the context

Relevant standards for nomadic devices_detailed

[ISO 9355-1:1999](#)

Ergonomic requirements for the design of displays and control actuators -- Part 1: Human interactions with displays and control actuators

[ISO 9355-2:1999](#)

Ergonomic requirements for the design of displays and control actuators -- Part 2: Displays

[ISO 9355-3:2006](#)

Ergonomic requirements for the design of displays and control actuators -- Part 3: Control actuators

ISO 9355-3:2006 gives ergonomic requirements for, and guidance on, the selection, design and location of control actuators adapted to the needs of the operator, suitable for the control task in question and taking account of the circumstances of their use. It is applicable to manual control actuators used in equipment for both occupational and private use.

[ISO/IEC 11581-5:2004](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 5: Tool icons

ISO/IEC 11581 defines graphical symbols for use on a screen, which users can manipulate and interact with. They are part of a graphical interface that can facilitate the user's ability to learn, understand and remember functional elements of the system, and aid in the manipulation of these elements. Their purpose is to facilitate interaction between computer-based applications (software products) and users.

ISO/IEC 11581-5:2004 describes user interaction with and appearance of tool icons on the screen. These tool icons are a subset of the interactive icons that modify graphical or text elements of an application by association with real-life tool objects. These icons represent tool functions such as drawing, painting or modifying graphical elements. ISO/IEC 11581-5:2004 contains requirements and recommendations for 21 commonly used tool icons. It also specifies the relationship between tool and pointer icons.

Relevant standards for nomadic devices_detailed

[ISO/IEC 24738:2006](#) Information technology -- Icon symbols and functions for multimedia link attributes

ISO/IEC 24738:2006 defines a consistent set of icon symbols and related attributes that are presented on a computer screen and with which users interact to decide whether or not to take the associated link. These symbols represent attributes of the link and/or the destination of the link.

Link attribute icon symbols enable users to decide on the suitability of following associated hyperlinks. Information provided by these icon symbols may also be made available via text.

ISO/IEC 24738:2006 provides guidance on the graphics to be used by implementers of ISO 14915-2, Software ergonomics for multimedia user interfaces -- Multimedia navigation and control.

The icon symbol graphics included in ISO/IEC 24738:2006 have been selected on the basis of their ability to convey the desired information to a wide audience of users.

ISO/IEC 24738:2006 applies to icons that are shown on a computer screen in conjunction with a link also shown on that screen. It describes user interaction with and the appearance of link attribute icons on the screen. Other forms of icons are covered in ISO/IEC 115

[ISO/IEC 11581-6:1999](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 6: Action icons

[ISO/IEC 11581-1:2000](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 1: Icons -- General

[ISO/IEC 11581-2:2000](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 2: Object icons

[ISO/IEC 11581-3:2000](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 3: Pointer icons

Relevant standards for nomadic devices_detailed

[ISO/IEC 11581-5:2004](#) Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 5: Tool icons

ISO/IEC 11581 defines graphical symbols for use on a screen, which users can manipulate and interact with. They are part of a graphical interface that can facilitate the user's ability to learn, understand and remember functional elements of the system, and aid in the manipulation of these elements. Their purpose is to facilitate interaction between computer-based applications (software products) and users.

ISO/IEC 11581-5:2004 describes user interaction with and appearance of tool icons on the screen. These tool icons are a subset of the interactive icons that modify graphical or text elements of an application by association with real-life tool objects. These icons represent tool functions such as drawing, painting or modifying graphical elements. ISO/IEC 11581-5:2004 contains requirements and recommendations for 21 commonly used tool icons. It also specifies the relationship between tool and pointer icons.

TABLE 5:
Standards 2003 and earlier short



Deliverable n.	12M	
Sub Project	SP n.4	Evaluation & assessment
Workpackag	WP n.4.8	Benchmarking from the consumer point of view
Task n.	T n. 4.8.1	Review of earlier consumer tests and European standards
Author(s)	S. Grabmaier	C. Gauss
	File name	TeleFOT_4.8.1_Review of consumer tests and standards_v2.doc
Status	Draft	
Distribution	Public (PU)	
Issue date	09.06.2009	Creation date: 10.07.2009

Standards_2003 and earlier_short

ISO	SC	Content (original language)
ISO	TC 22	Road Vehicle - Economics applicable to road vehicles - Transport information and control systems, on-board man-machine interface
	SC 3	Electrical and electronic equipment
	ISO 7637-1:2002	Road vehicles -- Electrical disturbances from conduction and coupling -- Part 1: Definitions and general considerations
	ISO 8093:1985	Road vehicles -- Diagnostic testing of electronic systems
	ISO 11519-1:1994	Road vehicles -- Low-speed serial data communication -- Part 1: General and definitions
	ISO 11519-3:1994	Road vehicles -- Low-speed serial data communication -- Part 3: Vehicle area network (VAN)
	ISO 11519-3:1994/Amd 1:1995	
	ISO 11748-1:2001	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 1: Content of exchanged documents
	ISO 11748-2:2001	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 2: Documentation agreement
	ISO 11748-3:2002	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 3: Application example
	ISO 15031-1:2001	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 1: General information
	ISO 15170-1:2001	Road vehicles -- Four-pole electrical connectors with pins and twist lock -- Part 1: Dimensions and classes of application
	ISO 15170-2:2001	Road vehicles -- Four-pole electrical connectors with pins and twist lock -- Part 2: Tests and requirements
	ISO/TS 21609:2003	Road vehicles -- (EMC) guidelines for installation of aftermarket radio frequency transmitting equipment
	SC 13	Ergonomics applicable to road vehicles
	ISO 3958:1996	Passenger cars -- Driver hand-control reach
	ISO 4040:2001	Road vehicles -- Location of hand controls, indicators and tell-tales in motor vehicles
	ISO/TR 9511:1991	Road vehicles -- Driver hand-control reach -- In-vehicle checking procedure
	ISO 15005:2002	Road vehicles -- Ergonomic aspects of transport information and control systems -- Dialogue management principles and compliance procedures
	ISO 15007-1:2002	Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 1: Definitions and parameters
	ISO/TS 15007-2:2001	Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 2: Equipment and procedures
	ISO 15008:2003	Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle visual presentation
	ISO 17287:2003	Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving

SC 17

[ISO 4513:2003](#)

[ISO 7397-1:1993](#)

[ISO 7397-2:1993](#)

SC 21

[ISO 6469-1:2001](#)

[ISO 6469-2:2001](#)

[ISO 6469-3:2001](#)

[ISO 8714:2002](#)

TC 204

[ISO/TR 14813-4:2000](#)

[ISO/TR 14813-5:1999](#)

[ISO/TR 14813-6:2000](#)

[ISO 14819-1:2003](#)

[ISO 14819-2:2003](#)

[ISO 15075:2003](#)

[ISO/PAS 17684:2003](#)

Visibility

Road vehicles -- Visibility -- Method for establishment of eyellipses for driver's eye location

Passenger cars -- Verification of driver's direct field of view -- Part 1: Vehicle positioning for static measurement

Passenger cars -- Verification of driver's direct field of view -- Part 2: Test method

Electrically propelled road vehicles

Electric road vehicles -- Safety specifications -- Part 1: On-board electrical energy storage

Electric road vehicles -- Safety specifications -- Part 2: Functional safety means and protection against failures

Electric road vehicles -- Safety specifications -- Part 3: Protection of persons against electric hazards

Electric road vehicles -- Reference energy consumption and range -- Test procedures for passenger cars and light commercial vehicles

Intelligent transport systems

Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 4: Reference model tutorial

Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 5: Requirements for architecture description in TICS standards

Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 6: Data presentation in ASN.1

Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 1: Coding protocol for Radio Data System -- Traffic Message Channel (RDS-TMC) using ALERT-C

Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 2: Event and information codes for Radio Data System -- Traffic Message Channel (RDS-TMC)

Transport information and control systems -- In-vehicle navigation systems -- Communications message set requirements

Transport information and control systems -- In-vehicle navigation systems -- ITS message set translator to ASN.1 format definitions

Based on ESOP

[ISO 4040:2001](#)

[ISO 4513:2003](#)

[ISO 15008:2003](#)

[ISO/TS 15007-2:2001](#)

[IEC 80416-3:2002](#)

[ISO 15005:2002](#)

[ISO 17287:2003](#)

Road vehicles - Location of hand controls, indicators and tell-tales in motor
Road vehicles -- Visibility -- Method for establishment of eyellipses for driver's eye location

Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle visual presentation

Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 2: Equipment and procedures

Basic principles for graphical symbols for use on equipment -- Part 3: Guidelines for the application of graphical symbols

Road vehicles -- Ergonomic aspects of transport information and control systems -- Dialogue management principles and compliance procedures

Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving

Economic Committee for Europe (UNECE) regulations which are recognised by the Community after its adhesion to the Revised Agreement of 1958 (see Council Decision 97/836/EC of 27.11.97):

[ISO 11429:1996](#)

[ISO 17287:2003](#)

[ISO 14915-1:2002](#)

[ISO 14915-2:2003](#)

[ISO 14915-3:2002](#)

[ISO/TR 16982:2002](#)

[ISO 9355-1:1999](#)

Ergonomics -- System of auditory and visual danger and information signals

Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving

Software ergonomics for multimedia user interfaces -- Part 1: Design principles and framework

Software ergonomics for multimedia user interfaces -- Part 2: Multimedia navigation and control

Software ergonomics for multimedia user interfaces -- Part 3: Media selection and combination

Ergonomics of human-system interaction -- Usability methods supporting human-centred design

Ergonomic requirements for the design of displays and control actuators -- Part 1: Human interactions with displays and control actuators

[ISO 9355-2:1999](#)

Ergonomic requirements for the design of displays and control actuators -- Part 2: Displays

[ISO/IEC 11581-6:1999](#)

Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 6: Action icons

[ISO/IEC 11581-1:2000](#)

Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 1: Icons -- General

[ISO/IEC 11581-2:2000](#)

Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 2: Object icons

[ISO/IEC 11581-3:2000](#)

Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 3: Pointer icons

TABLE 6:
Standards 2003 and earlier detailed



Deliverable n.	12M	
Sub Project	SP n.4	
Workpackage	WP n.4.8	
Task n.	T n. 4.8.1	Evaluation & assessment Benchmarking from the consumer point of view Review of earlier consumer tests and European standards
Author(s)	S. Grabmaier	C. Gauss
	File name	TeleFOT_4.8.1_Review of consumer tests and standards_v2.doc
Status	Draft	
Distribution	Public (PU)	
Issue date	09.06.2009	Creation date: 10.07.2009

Standards_2003 and earlier_detailed

ISO	SC	Content (original language) Road Vehicle - Economics applicable to road vehicles - Transport information and control systems, on-board man-machine interface	All questions of standardization concerning compatibility, interchangeability and safety, with particular reference to terminology and test procedures (including the characteristics of instrumentation) for evaluating the performance of the following types of road vehicles and their equipment as defined in the relevant items of Article 1 of the convention on Road Traffic, Vienna in 1968 concluded under the auspices of the United Nations: mopeds (item m); motor cycles (item n); motor vehicles (item p); trailers (item q); semi-trailers (item r); light trailers (item s); combination vehicles (item t); articulated vehicles (item u).
ISO			
	TC 22 SC 3	Electrical and electronic equipment	

Standards_2003 and earlier _detailed

ISO 7637-1:2002	Road vehicles -- Electrical disturbances from conduction and coupling -- Part 1: Definitions and general considerations	This part of ISO 7637 defines the basic terms relating to electrical disturbances from conduction and coupling used in its other parts, and gives general information on the whole of ISO 7637 and common to all parts.
ISO 8093:1985	Road vehicles -- Diagnostic testing of electronic systems	Defines diagnostic provisions applicable to electronic systems in road vehicles. Applies to electronic systems including electronic modules, associated input sensors, output actuators and indicators. The measurement ranges specified exclude certain devices for which specific test equipment is required. Does not apply to those systems which have built-in diagnostic capabilities and do not require compatibility with off-board equipment.
ISO 11519-1:1994	Road vehicles -- Low-speed serial data communication -- Part 1: General and definitions	Specifies general definitions for low-speed serial data communication up to 125 kbit/s for road vehicle applications. The object is to define the general architecture of the communication network and the content of the data link layer and the physical layer for transmission between the different types of electronic modules on board road vehicles. Parts 2, 3 and 4 are entirely independent.
ISO 11519-3:1994	Road vehicles -- Low-speed serial data communication -- Part 3: Vehicle area network (VAN)	Specifies the data link layer and the physical layer of the VAN, a communications network up to 125 kbit/s, for road vehicle application. The VAN is an access-method oriented multimaster-multislave which allows optimized request/response management by special method of handling a remote transmission request (retaining access to the medium to allow insertion of a response). Defines the general architecture of the network and the content of the data link layer, and the physical layer for transmission between different types of electronic modules on board road vehicles.
ISO 11519-3:1994/Amd 1:1995		Inserts a new page v and a new introduction. Adds, on page 79, a new clause before clause 8.
ISO 11748-1:2001	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 1: Content of exchanged documents	
ISO 11748-2:2001	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 2: Documentation agreement	

ISO 11748-3:2002	Road vehicles -- Technical documentation of electrical and electronic systems -- Part 3: Application example	This part of ISO 11748 provides an application example of the guidelines and specifications for technical documentation given in ISO 11748-1 and ISO 11748-2. The example is based on the standard generalized markup language (SGML), which is specified in ISO 8879.
ISO 15031-1:2001	Road vehicles -- Communication between vehicle and external equipment for emissions-related diagnostics -- Part 1: General information	
ISO 15170-1:2001	Road vehicles -- Four-pole electrical connectors with pins and twist lock -- Part 1: Dimensions and classes of application	
ISO 15170-2:2001	Road vehicles -- Four-pole electrical connectors with pins and twist lock -- Part 2: Tests and requirements	
ISO/TS 21609:2003	Road vehicles -- (EMC) guidelines for installation of aftermarket radio frequency transmitting equipment	ISO 21609:2003 gives requirements and recommendations for the installation in road vehicles of radio frequency transmitting and receiving equipment, "in-road-vehicle" mounting kits for transportable and handheld RF equipment, and ancillary equipment associated with these. As well as methods for installation, it establishes methods for minimizing the possibility of electromagnetic interference (EMI) between the installed equipment and the vehicle electrical and electronic systems.
SC 13	Ergonomics applicable to road vehicles	
ISO 3958:1996	Passenger cars -- Driver hand-control reach	Specifies the boundaries of hand-reach of passenger car hand-control locations that can be reached by different proportions of male and female driver populations. Directs towards the initial design states of a new vehicle programme. Replaces the first edition.
ISO 4040:2001	Road vehicles -- Location of hand controls, indicators and tell-tales in motor vehicles	
ISO/TR 9511:1991	Road vehicles -- Driver hand-control reach -- In-vehicle checking procedure	Defines a method for determination of the position of driver hand-controls in vehicles and for verification that the controls lie within the hand-reach envelopes. Applies for checking purposes in road vehicles using the actual dimensions of the vehicle. It refers directly to left-hand drive motor vehicles. Application to right-hand drive vehicles is assumed to be symmetrically opposite. The hand-reach envelopes are described in ISO 3958.

[ISO 15005:2002](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Dialogue management principles and compliance procedures

This International Standard presents ergonomic principles for the design of the dialogues that take place between the driver of a road vehicle and the vehicle's transport information and control systems (TICS) while the vehicle is in motion. It also specifies compliance verification conditions for the requirements related to these principles.

This International Standard is applicable to TICSSs consisting of either single or multiple devices, which can be either independent or interconnected. It is not applicable to TICSSs without dialogues, TICS failures or malfunctions, or controls or displays used for non-TICS functions.

[ISO 15007-1:2002](#)

Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 1: Definitions and parameters

[ISO/TS 15007-2:2001](#)

Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 2: Equipment and procedures

This Technical Specification gives guidelines on equipment and procedures for analyzing driver visual behaviour, intended to enable assessors of Transport Information and Control Systems (TICS) to

plan evaluation trials, specify (and install) data capture equipment, and analyse, interpret and report visual-behaviour metrics (standards of measurement). It is applicable to both road trials and simulated driving environments. It is not applicable to the assessment of head-up displays.

[ISO 15008:2003](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle visual presentation

ISO 15008:2003 gives minimum specifications for the image quality and legibility of displays containing dynamic (changeable) visual information presented to the driver of a road vehicle by an on-board transport information and control system (TICS) used while the vehicle is in motion. These specifications are intended to be independent of display technologies, while test methods and measurements for assessing compliance with them have been included where necessary.

ISO 15008:2003 is applicable to mainly perceptual, and some basic cognitive, components of the visual information: these include character legibility and colour recognition. It is not applicable to other factors affecting performance and comfort such as coding, format and dialogue characteristics, nor to displays using the following: superimposed information on the external field (e.g. head-up displays), pictorial images (e.g. closed-circuit TV for reversing), maps and topographic representations (e.g. those for setting navigation systems), static information (e.g. control labels, telltales).

[ISO 17287:2003](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving

ISO 17287:2002 specifies a procedure for assessing whether specific TICS, or a combination of TICS with other in-vehicle systems, are suitable for use by drivers while driving. It addresses user-oriented TICS description and context of use, TICS task description and analysis, assessment process, and documentation.

The TICS description and context of use includes consideration of improper use, reasonably foreseeable misuse and TICS failure. The TICS description, analysis and assessment include a process for identifying and addressing suitability issues.

ISO 17287:2002 does not recommend specific variables for assessing suitability nor does it define criteria for establishing the suitability of use of a TICS Table while driving.

[SC 17](#)

Visibility

ISO 4513:2003	Road vehicles -- Visibility -- Method for establishment of eyellipses for driver's eye location	ISO 4513:2003 specifies a method for establishing an eyellipse for locating driver's eyes inside a road vehicle for the purpose of measuring the driver's field of view. Elliptical (eyellipse) models in both two and three dimensions are used to represent 95th and 99th percentiles of driver eye locations. Its procedures, which differ depending on the type of vehicle considered, are applicable to passenger cars (and light trucks), and to buses and heavy vehicles, as defined in ISO 3833. The statistical representation of the driver's eye locations it provides can be used as a design tool for passenger cars (V-points can be used in lieu of the complete eyellipse to standardize the driver's field of view for regulation purposes).
ISO 7397-1:1993	Passenger cars -- Verification of driver's direct field of view -- Part 1: Vehicle positioning for static measurement	Establishes the initial procedure for positioning of a passenger car relative to a three-dimensional reference system, as given in ISO 4130, for the purposes of static measurements on the vehicle. It enables verification of the driver's forward 180° field of view, however, the procedure shown may also be followed for checking other aspects of vehicle design.
ISO 7397-2:1993	Passenger cars -- Verification of driver's direct field of view -- Part 2: Test method	Specifies a test method for verifying the compliance of a passenger car (as defined in ISO 3833) with the requirements of EEC Directives 77/649 and 88/366 for the driver's 180° forward field of view.
SC 21	Electrically propelled road vehicles	
ISO 6469-1:2001	Electric road vehicles -- Safety specifications -- Part 1: On-board electrical energy storage	
ISO 6469-2:2001	Electric road vehicles -- Safety specifications -- Part 2: Functional safety means and protection against failures	
ISO 6469-3:2001	Electric road vehicles -- Safety specifications -- Part 3: Protection of persons against electric hazards	
ISO 8714:2002	Electric road vehicles -- Reference energy consumption and range -- Test procedures for passenger cars and light commercial vehicles	This International Standard specifies test procedures for measuring the reference energy consumption and reference range of purely electrically propelled passenger cars and commercial vehicles of a maximum authorized total mass of 3 500 kg and maximum speed greater than or equal to 70 km/h.
TC 204	Intelligent transport systems	
ISO/TR 14813-4:2000	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 4: Reference model tutorial	

ISO/TR 14813-5:1999	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 5: Requirements for architecture description in TICS standards	
ISO/TR 14813-6:2000	Transport information and control systems -- Reference model architecture(s) for the TICS sector -- Part 6: Data presentation in ASN.1	
ISO 14819-1:2003	Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 1: Coding protocol for Radio Data System -- Traffic Message Channel (RDS-TMC) using ALERT-C	<p>ISO 14819-1:2003 specifies the coding protocol for Radio Data System - Traffic Message Channel (RDS-TMC) - RDS-TMC using the ALERT-C protocol that is designed to provide mostly event-orientated road driver information messages.</p> <p>Many "hooks" have been left for future development and indeed a few status-orientated road driver information messages were included. This protocol is designed to be closely linked to the ALERT-Plus protocol, which is specifically designed for status-orientated road driver information; both protocols may be available in the same RDS transmission.</p> <p>The ALERT-Plus protocol is specified in ENV 12313-4.</p>
ISO 14819-2:2003	Traffic and Traveller Information (TTI) -- TTI messages via traffic message coding -- Part 2: Event and information codes for Radio Data System -- Traffic Message Channel (RDS-TMC)	<p>ISO 14819-2:2003 describes the ALERT-C protocol concept and message structure used to achieve densely coded messages to be carried in the RDS-TMC feature. This part (2) of the ENV 12313/EN ISO 14819 series of standards defines the "Events List" to be used in coding those messages.</p>
ISO 15075:2003	Transport information and control systems -- In-vehicle navigation systems -- Communications message set requirements	<p>ISO 15075:2003 specifies message content and format utilized by in-vehicle navigation systems. Its emphasis is on messages that are required to generate or enhance routing instructions. There is a particular focus on messages that would not necessarily be included in a more general traffic management message list.</p> <p>Although ISO 15075:2003 emphasizes requirements for Locally Determined Route Guidance (LDRG) systems that utilize on-vehicle map databases, it also includes messages that would be utilized primarily by Centrally Determined Route Guidance (CDRG) systems and certain value-added messages.</p>

Standards_2003 and earlier _detailed

[ISO/PAS 17684:2003](#) Transport information and control systems -- In-vehicule navigation systems -- ITS message set translator to ASN.1 format definitions

ISO/PAS 17684:2003 specifies a method that can be used to define navigation message sets in tabular form with a subsequent translation into a corresponding ASN.1 description. An intermediate language called Descriptor Normal Form (DNF), which is a subset of ASN.1, is specified and used as an intermediate description between a tabular form and its ASN.1 description. A tabular-form message-set description language called Message Set Tabular Form (MSTF) is included as an example of a tabular form definition.

Based on ESOP

[ISO 4040:2001](#)
[ISO 4513:2003](#) Road vehicles - Location of hand controls, indicators and tell-tales in
Road vehicles -- Visibility -- Method for establishment of eyellipses for driver's eye location

ISO 4513:2003 specifies a method for establishing an eyellipse for locating driver's eyes inside a road vehicle for the purpose of measuring the driver's field of view. Elliptical (eyellipse) models in both two and three dimensions are used to represent 95th and 99th percentiles of driver eye locations. Its procedures, which differ depending on the type of vehicle considered, are applicable to passenger cars (and light trucks), and to buses and heavy vehicles, as defined in ISO 3833. The statistical representation of the driver's eye locations it provides can be used as a design tool for passenger cars (V-points can be used in lieu of the complete eyellipse to standardize the driver's field of view for regulation purposes).

[ISO 15008:2003](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Specifications and compliance procedures for in-vehicle visual presentation

ISO 15008:2003 gives minimum specifications for the image quality and legibility of displays containing dynamic (changeable) visual information presented to the driver of a road vehicle by an on-board transport information and control system (TICS) used while the vehicle is in motion. These specifications are intended to be independent of display technologies, while test methods and measurements for assessing compliance with them have been included where necessary.

ISO 15008:2003 is applicable to mainly perceptual, and some basic cognitive, components of the visual information: these include character legibility and colour recognition. It is not applicable to other factors affecting performance and comfort such as coding, format and dialogue characteristics, nor to displays using the following: superimposed information on the external field (e.g. head-up displays), pictorial images (e.g. closed-circuit TV for reversing), maps and topographic representations (e.g. those for setting navigation systems), static information (e.g. control labels, telltales).

[ISO/TS 15007-2:2001](#)

Road vehicles -- Measurement of driver visual behaviour with respect to transport information and control systems -- Part 2: Equipment and procedures

This Technical Specification gives guidelines on equipment and procedures for analyzing driver visual behaviour, intended to enable assessors of Transport Information and Control Systems (TICS) to

plan evaluation trials, specify (and install) data capture equipment, and analyse, interpret and report visual-behaviour metrics (standards of measurement). It is applicable to both road trials and simulated driving environments. It is not applicable to the assessment of head-up displays.

[IEC 80416-3:2002](#)

Basic principles for graphical symbols for use on equipment -- Part 3: Guidelines for the application of graphical symbols

IEC 80416-3:2002 provides guidelines for the application of graphical symbols for use on equipment in order to maintain visual clarity and overall consistency when such graphical symbols are applied. It stipulates the permissible extent by which a symbol original may be modified in reproduction for actual use on equipment.

[ISO 15005:2002](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Dialogue management principles and compliance procedures

This International Standard presents ergonomic principles for the design of the dialogues that take place between the driver of a road vehicle and the vehicle's transport information and control systems (TICS) while the vehicle is in motion. It also specifies compliance verification conditions for the requirements related to these principles.

This International Standard is applicable to TICSs consisting of either single or multiple devices, which can be either independent or interconnected. It is not applicable to TICSs without dialogues, TICS failures or malfunctions, or controls or displays used for non-TICS functions.

[ISO 17287:2003](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving

ISO 17287:2002 specifies a procedure for assessing whether specific TICS, or a combination of TICS with other in-vehicle systems, are suitable for use by drivers while driving. It addresses user-oriented TICS description and context of use, TICS task description and analysis, assessment process, and documentation.

The TICS description and context of use includes consideration of improper use, reasonably foreseeable misuse and TICS failure. The TICS description, analysis and assessment include a process for identifying and addressing suitability issues.

ISO 17287:2002 does not recommend specific variables for assessing suitability nor does it define criteria for establishing the suitability of use of a TICS Table while driving.

Economic Committee for Europe (UN/ECE) regulations which are recognised by the Community after its adhesion to the Revised Agreement of 1958 (see Council Decision 97/836/EC of 27.11.97):

[ISO 11429:1996](#)

Ergonomics -- System of auditory and visual danger and information signals

Specifies a system of danger and information signals taking into account the different degrees of urgency. Applicable to all danger and information signals which have to be clearly perceived and differentiated as specified in ISO/TR 12100-2. Does not apply to certain fields covered by specific standards.

[ISO 17287:2003](#)

Road vehicles -- Ergonomic aspects of transport information and control systems -- Procedure for assessing suitability for use while driving

ISO 17287:2002 specifies a procedure for assessing whether specific TICS, or a combination of TICS with other in-vehicle systems, are suitable for use by drivers while driving. It addresses user-oriented TICS description and context of use, TICS task description and analysis, assessment process, and documentation.

The TICS description and context of use includes consideration of improper use, reasonably foreseeable misuse and TICS failure. The TICS description, analysis and assessment include a process for identifying and addressing suitability issues.

ISO 17287:2002 does not recommend specific variables for assessing suitability nor does it define criteria for establishing the suitability of use of a TICS Table while driving.

[ISO 14915-1:2002](#)

Software ergonomics for multimedia user interfaces -- Part 1: Design principles and framework

ISO 14915-1:2002 establishes design principles for multimedia user interfaces and provides a framework for handling the different considerations involved in their design. It addresses user interfaces for applications that incorporate, integrate and synchronize different media. This includes static media such as text, graphics or images, and dynamic media such as audio, animation, video or media related to other sensory modalities. Detailed design issues within a single medium (e.g. the graphical design of an animation sequence) are only addressed as far as they imply ergonomic consequences for the user.

ISO 14915-1:2002 gives requirements and recommendations for the ergonomic design of multimedia applications mainly intended for professional and vocational activities such as work or learning. It does not specifically address applications outside this area, such as entertainment, although some recommendations can also be applicable in such domains.

ISO 14915-1:2002 is applicable to software aspects related to multimedia user interfaces and does not address hardware or implementation issues. The ergonomics

[ISO 14915-2:2003](#)

Software ergonomics for multimedia user interfaces -- Part 2:
Multimedia navigation and control

ISO 14915-2:2003 provides recommendations and requirements for the design of multimedia user interfaces with respect to the following aspects: design of the organization of the content, navigation and media-control issues. ISO 14915-2:2003 is limited to the design of the organization of the content and does not deal with the design of the content in general. Design issues within a single medium (e.g. the lighting of a film sequence) are only addressed with respect to the ergonomic issues related to user controls.

[ISO 14915-3:2002](#)

Software ergonomics for multimedia user interfaces -- Part 3: Media
selection and combination

ISO 14915-3:2002 gives recommendations for, and guidance on, the design, selection and combination of interactive user interfaces that integrate and synchronize different media. It addresses user interfaces for applications that incorporate, integrate and synchronize different media. This includes static media such as text, graphics, images; and dynamic media such as audio, animation, video or media related to other sensory modalities. Detailed design issues within a single medium (e.g. the graphical design of an animation sequence) are only addressed as far as they imply ergonomic consequences for the user.

[ISO/TR 16982:2002](#)

Ergonomics of human-system interaction -- Usability methods supporting human-centred design

ISO/TR 16982:2002 provides information on human-centred usability methods which can be used for design and evaluation. It details the advantages, disadvantages and other factors relevant to using each usability method.

It explains the implications of the stage of the life cycle and the individual project characteristics for the selection of usability methods and provides examples of usability methods in context.

The main users of ISO/TR 16982:2002 will be project managers. It therefore addresses technical human factors and ergonomics issues only to the extent necessary to allow managers to understand their relevance and importance in the design process as a whole.

Such issues are dealt with more fully in ISO 9241 which is complementary to ISO/TR 16982:2002 and is aimed at system developers, specifiers and purchasers of systems. Nonetheless, all parties involved in human-centred system development, including the end users of systems, should find the guidance in ISO/TR 16982:2002 relevant.

The guidance in ISO/TR 16982:2002 can be tailored for specific design situations by using the lists of issues char

ISO/TR 16982:2002 is restricted to methods that are wide

It does not specify the details of how to implement or carr

[ISO 9355-1:1999](#)

Ergonomic requirements for the design of displays and control actuators -- Part 1: Human interactions with displays and control actuators

[ISO 9355-2:1999](#)

Ergonomic requirements for the design of displays and control actuators -- Part 2: Displays

[ISO/IEC 11581-6:1999](#)

Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 6: Action icons

[ISO/IEC 11581-1:2000](#)

Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 1: Icons -- General

[ISO/IEC 11581-2:2000](#)

Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 2: Object icons

[ISO/IEC 11581-3:2000](#)

Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 3: Pointer icons